Lower Valley
WATER DISTRICT

DESIGN STANDARDS FOR

POTABLE WATER

AND

SANITARY SEWER FACILITIES

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DESIGN STANDARDS FOR POTABLE WATER AND SANITARY SEWER FACILITIES

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DESIGN STANDARDS FOR POTABLE WATER AND SANITARY SEWER FACILITIES

1.0 GENERAL

Referenced herein are:

A. Standard Specifications and Testing Procedures for Water and Wastewater Facilities, incorporated into this document as Appendix A.

B. Design Standard Details, incorporated into this document as Appendix B.

C. *Lower Valley Water District – Rules and Regulations,* Chapter VIII, "Extension of Service to New Areas/Subdivisions", incorporated into this document as Appendix C.

D. *Lower Valley Water District - Rules and Regulations*, Chapter VI, "Design and Ownership of Facilities," incorporated into this document as Appendix D.

E. *Lower Valley Water District - Rules and Regulations,* Chapter IX, Sections 9.009 through 9.012, incorporated into this document as Appendix E.

F. Cross-Connection Program Standards and Guidelines, incorporated into this document as Appendix F.

G. Testing Forms - Water and Sewer Facilities, incorporated into this document as Appendix G.

H. Lower Valley Water District Application Form for Water & Sewer Services to New Developments, incorporated into this document as Appendix H.

I. Sample Water and Sewer Service Agreement, incorporated into this document as Appendix I.

J. Samples - Certificates of Dedication of Water and Wastewater Facilities, incorporated into this document as Appendix J.

K. El Paso Water Utilities *Public Service Board Rules and Regulations No. 9*, "Rules and Regulations Governing the Discharge of Wastewater into El Paso's Wastewater System", incorporated into this document as Appendix K.

1.1 STANDARDS

The standard policies and criteria contained in this document are provided by the Lower Valley Water District (LVWD) to establish uniformity and consistency in the design and construction of engineered water and sanitary sewer facilities. This document is specifically intended to assist contractors and developers in the design and construction of water and wastewater facilities in subdivisions and other small areas.

Deviations from these standards will not be allowed except under unusual circumstances. Deviations from these standards require approval from the LVWD.

The term "LVWD", where used in these guidelines, shall denote the General Manager or his or her assignee, i.e. the LVWD Engineering Department. The terms "wastewater," "sanitary sewer" and "sewer" are used interchangeably throughout this document. The term "water" refers specifically to potable water.

This document was produced to give contractors and developers the most current information on the design and construction of domestic water and wastewater facilities. This document is intended for use in conjunction with the most recent issue, addendum or revision of federal and state rules and regulations.

Approval from the LVWD is required for the location, design, materials, and standards of construction for water or sewer main extensions or enlargements.

Criteria considered in designing pipeline extensions are:

A. The capacity of the extension to fulfill present and future demands of the area served.

B. The distribution or collection system operation and its efficiency.

C. The maintenance and life expectancy of such an extension.

Water and sewer systems and related appurtenances shall be designed in compliance with the minimum standards established by the Texas Commission on Environmental Quality (TCEQ).

LVWD hereby disclaims any responsibility for or intent to make this document, and its use, a guarantee of error-free service and deliverables. The guidelines and standards provided herein for the use of LVWD personnel and its consultants shall be adapted to fit the user's own practices. LVWD, its trustees, directors, administrators, or employees shall not be liable for any claims arising with respect to the use of this document.

1.2 *LOWER VALLEY WATER DISTRICT – RULES AND REGULATIONS*, CHAPTER VIII – BRIEF SUMMARY OF METHODS & PROCEDURES

1.2.0 General

Reference is made to Appendix C for additional requirements governing the extension of service to new area/subdivisions. A brief outline of these requirements follows.

1.2.1 Purpose

This procedure applies to applications for the extension of water service and wastewater service to areas not currently served by the District's public water system or wastewater system and where construction of an extension to the District's water distribution facilities or wastewater collection system is required. The purpose is to assure that any extension of service is in accordance with the laws and regulations governing the public water and wastewater systems and serves the public interest.

1.2.2 Ownership of Facilities

In keeping with Chapter VIII of *Lower Valley Water District – Rules and Regulations*, any water or sewer facilities constructed within the District to serve new areas/subdivisions will become the property of the District, whether constructed by the District or by the Applicant/owner's contractor. Dedication or conveyance of such facilities shall be as prescribed in said Chapter VIII.

1.2.3 Water and Wastewater Agreements

Although Water and Wastewater Agreements are required in the areas of El Paso County, Texas, the City of Socorro and Town of Clint make no stated requirements. Water and Wastewater Agreements are for providing water and wastewater services for a period of 30 years to the subdivision. Developers/Owners can apply for Water and/or Wastewater Agreement by providing a PE certified preliminary subdivision design or RPLS certified preliminary subdivision plat and pay all necessary fees.

1.2.4 Development Agreements

This agreement will be made in order to ensure that the Lower Valley Water District Rules and Regulations and Design Standards are being met by both parties. Developer/Owner and Contractor & Engineer must comply with Development Agreement; if non compliance occurs the Lower Valley Water District can reject the project and deny service.

1.2.5 Refunding Agreements

Chapter VIII also provides that a Refunding Agreement may be entered into with the LVWD, whereby the developer may obtain a refund of frontage foot charges collected by the LVWD from other property owners who benefit from the installed facilities. The LVWD shall reserve the right to determine if, and to what extent such an agreement is appropriate.

1.2.6 Applications and Fees

Developers/Owners, or otherwise known as Applicants, shall file a written application with the District for the extension of services to new subdivisions or areas not currently served. The application will be accompanied by the administrative fee of at least $500.00 for water and $500.00 for wastewater to defray the expenses of processing the application.

1.2.7 Right to Connect Fees:

All new development commercial and residential subdivisions will pay Right to Connect Fees. These fees are to be charged in these areas instead of collecting Water Rights. This is to fairly balance areas that do not have Water Rights to the areas that do have Water Rights.

1.2.8 Subdivision/Line Extension Procedures

A. Submit "Application Form for Water & Sewer Services to New Developments" (see Appendix H), preliminary plans and administrative fee to LVWD.

B. Applicants will pay and submit application(s) as well as proposed plans of water and sewer design of needed infrastructure for proposed project. The fee for this application will be three percent of the proposed contractor's cost for water and three percent of the proposed contractor's cost for sewer.

C. If the application is approved, and the proposed development is a subdivision, the plat of which has not yet been approved, the LVWD will certify for the appropriate governing body that water of sufficient quality and quantity is available per Section 16.343, Texas Water Code, Annotated.

D. The LVWD has the right, as the water and wastewater authority, to design the project at the Applicant's cost if the personnel and resources are available. The Applicant may submit a written request for the LVWD to release these services to the Applicant's chosen Engineer, only if this Engineer submits license information valid in the State of Texas.

E. A cost estimate shall be prepared to include any cost sharing by the LVWD for oversized (larger than 12") mains. LVWD cost sharing will be based upon the estimated difference in cost between the oversized mains and those lines necessary to serve only the proposed development.

F. When project is designed by Applicant's Engineer the Applicant's Engineer will submit the proposed change to the District's water system to the Executive Director of the TCEQ. At the time of TCEQ approval the Applicant will enter into a Development Agreement with the LVWD. The development contract shall include provisions for refund of frontage fees and cost-sharing as appropriate. Lines outside the development necessary to connect the development to the existing system will be eligible for refunds not to exceed the actual cost of installation.

G. A Water and Wastewater Agreement shall be filed only if the project is within the El Paso County, otherwise no Water and Wastewater Agreement will be needed. All applicable fees shall be paid at this time through a formal invoice issued by the LVWD in order for the project to be allowed to continue through the process.

H. After signing Water and Wastewater Agreements as well as signing the Developments

Agreement, applicant will submit 3 sets of the final set of water and/or wastewater design plans to the District. Any work performed on Texas State Right of Way or Water Improvement District Right of Way will require a Texas Department of Transportation (TxDOT) Permit or a Water Improvement District Permit (WID) Permit. Applicant will make arrangements for these permits prior to construction.

I. Applicant will organize a preconstruction meeting with all parties, being the LVWD, Applicant, Applicant's Engineer, Applicant's Contractor, and any other entities affected by the project.

J. Construction will occur once all items have been addressed and all paperwork and/or requirements have been submitted. The LVWD will issue a notice to proceed for the project, and it is at that time that the Applicant's Contractor will be responsible for all work and safety on the job site. At no time is the LVWD responsible for damages or injuries out in the field. LVWD Inspector will revise the water and wastewater installation.

K. Substantial Completion Walkthroughs shall be scheduled one week in advance and after all testing and construction has been completed. Walkthroughs will check for overall operation of project such as manhole inverts, water valve operation, fire hydrant operation, water service conditions, etc. After all items are seen and reviewed, the LVWD will make an assessment of what condition the project is in and will make a determination of the project being Substantially Complete. No service will be provided until the project has been dedicated to the LVWD and acceptance has been accomplished by the Board of Directors.

L. Final Completion Walkthroughs will be scheduled once a Substantial Completion Walkthrough is passed and completed. All street must be paved and all water and wastewater infrastructure must be set to final grade. After all items are seen and reviewed LVWD will make an assessment of what condition the project is in and will make a determination of the project being Finally Complete. No service will be proved until the project has been dedicated to the LVWD and acceptance by the Board of Directors has been accomplished.

M. Dedication of project will require that Final Completion be passed and completed. Dedication will require all needed documentation (to be specified at the time of request) turned in to the LVWD Engineering Department. The LVWD Engineering Department will present and propose to the Board of Directors the acceptance of the project.

N. Applicant as stated in the Development Agreement and Certificate of Dedication will have one year warranty as of day of Board approval. Two months from stated termination date of warranty the Applicant will organized a warranty walkthrough. If corrections are needed the Applicant will be responsible for repairs and rehabilitation at his or her cost. If corrections are not made then the LVWD will stop providing individual water, wastewater, and solid waste services to the project area until

improvements are made.

O. The District, through its General Manager and Engineering Department, may make modifications of the procedures, deposits, fees and contractual arrangements provided for in this Section to assure that the District's interests are fully served and as special circumstances may require.

1.2.9 Construction

Chapter VIII requires that a Bid Package shall be prepared and approved by both the applicant and the LVWD. At the option of the LVWD, construction shall be performed by LVWD, a contractor employed by the LVWD, or a contractor hired by the applicant. The LVWD may make modifications to the actions and procedures of this section as necessary to accommodate special circumstances, and to assure that the interests of the LVWD are served.

A. If construction is to be performed by the LVWD, the applicant shall deposit with the LVWD the total amount of the estimated project cost, or some form of payment assurance acceptable to the LVWD, less any previous deposit. A final statement of account will be prepared by the LVWD when the project ins complete, and the applicant will be billed for any remaining balance due, or will be refunded any balance remaining.

B. If construction is to be performed by a contractor employed by the LVWD, the LVWD will advertise for bids as required by law. The lowest responsive, responsible bidder will be determined, and the applicant will be required to deposit with the LVWD the total bid amount, or some form of payment assurance acceptable to the LVWD, less any previous deposit. A final statement of account will be prepared by the LVWD when the project ins complete, and the applicant will be billed for any remaining balance due, or will be refunded any balance remaining.

C. If construction is to be performed by a contractor employed by the applicant, the LVWD will, at the applicant's expense, monitor all phases of construction and testing. The project will not be accepted as part of the LVWD system until the LVWD certifies that the project is complete and meets the required specifications, and the applicant certifies that all bills have been paid and that there are no outstanding liens on the project. Additionally, if the LVWD participates in the construction costs, the applicant shall post an acceptable performance bond with the LVWD in accordance with Chapter 2253, Texas Government Code, Annotated.

1.3 RECORD KEEPING

1.3.1 Record Keeping

External projects such as new development, the Developer/Owner and contractor shall be required to keep proper record keeping of the construction of water and wastewater mains appurtenances. This record information that is collected by the contractor (contractor redlines) will be given to the Developers Engineer to be electronically recorded (Electronic copy). The final copy must have

Engineers Seal approval and labeled Record Drawing. Engineers Seal of Approval must be on original final set (Mylar) due to Engineer being the one solely responsible to verify that the contractors work is as Designed. All Copies must be submitted to the Lower Valley Water District Engineering Department. Criteria for record keeping are set forth in below subsection and details. Information not conforming to these criteria will be rejected and will hinder the Dedication of the project to the District.

Water and wastewater projects constructed internally or through grant funding will be the responsibility of the Lower Valley Water District employees, consultants, and contractors. This record information that is collected by the contractor (contractor redlines) will be given to the Consulting Engineer to be electronically recorded (Electronic copy). The final copy must have Engineers Seal approval and labeled Record Drawing. Engineers Seal of Approval must be on original final set (Mylar) due to Engineer being the one solely responsible to verify that the contractors work is as designed. Contractors Redlines, Electronic Copy, and Final Approved Set must be submitted to the Lower Valley Water District Engineering Department. Criteria for record keeping are set forth in below subsection and details. Information not conforming to these criteria will be rejected and will hinder the Dedication of the project to the District.
Water: Data collected from water projects must conform to the following. All distances must be taken and recorded. Distances such as from valve to tee, valve to valve, valve to fire hydrant, property line to water meter, and main to property line are some of the many examples. All field changes or changes from the design must be documented well. Electronic copy must coincide with these distances and not just dimensioning text changing will be accepted distances must all verify.

Wastewater: Data collected from wastewater projects must conform to the following. All distances must be recorded under the same stationing used for the design or stationing for design sections. Wastewater must be resurveyed by a professional land surveyor after construction, this will be the responsibility of the project/new development Engineer. Survey must use existing datum from Lower Valley Water District records. All rim elevations and invert elevations must be recorded under this survey as well as new slopes must be recalculated to match new elevations. Contractor must record all wastewater service lateral stationing. Televising of wastewater main will be using the stationing for the project and must be digitally recorded on to a DVD. Electronic copy must coincide with these distances and not just dimensioning text changing will be accepted distances must all verify..

1.4 ROAD AND DRAINAGE PROJECTS

1.4.1 Road and Drainage Projects

The Lower Valley Water District fully understands that water and wastewater are within the Right of Ways of both the, TxDOT, City of Socorro, Town of Clint, and the El Paso County, yet due to this the Lower Valley Water District has a responsibility to the public it serves to regulate certain aspects of road and drainage projects in order to maintain this service.

Road and drainage projects that are within the service area of the Lower Valley Water District must submit a written letter informing the Lower Valley Water District of proposed project as well as

submitting preliminary plans and scope of work in order to asses needed modifications and identify any possible conflicts. The Lower Valley Water District will then mail a written confirmation requesting utility coordination. The Lower Valley Water District will then supply the Governing Authority with the water and wastewater record information after Information Request has been signed. Lower Valley Water District will not lower or adjust water or wastewater mains or appurtenances, this will be the responsibility of the project contractor. The contractor must follow all Lower Valley Water District Design Standards and all materials used on water and wastewater main and appurtenances must be reviewed and approved by the Lower Valley Water District Engineering Department. Existing water and wastewater service in the project area must be maintained in order to keep service to already existing customers. Walkthroughs will be scheduled and performed with the Lower Valley Water District representative being present. Lower Valley Water District will then release the project contractor from liability of the project area.

1.5 *LOWER VALLEY WATER DISTRICT-RULES AND REGULATIONS*, CHAPTER VI

1.5.1 General

Reference is made to Appendix D for additional requirements governing the design and ownership of facilities. A brief outline of these requirements follows.

1.5.2 Operations, Maintenance and Ownership

The District or its agents shall design, operate and maintain all of its water and sewer facilities with due regard and concern for present and future requirements of system capacity, operations and efficiency; the anticipated life of the existing system and any improvements made. Any backflow prevention assembly or enclosure provided by the District becomes the Customer's property for purposes of operation and maintenance.

1.5.3 Utility Furnished Material

The District will furnish or provide for the installing and maintenance of all meters, related piping, equipment and materials used for connecting the water meter to the water main as required and defined in the Service Connection Charge; and title to all such installations shall remain in the District.

1.5.3 Line Location

Water main extensions shall be located on the north and east sides and sewer extensions on the south and west sides of dedicated streets or alleys, as has been the designated location since the early installation of the existing system, except that of such location is not practical or available, or if in the interest of the operations, maintenance and efficiency of the system, the District may designate some other location more suitable.

1.5.4 Right-Of-Way

Before water or wastewater line extensions being financed in whole or in part by the District are made in public street and/or public alleys, the public right-of-ways shall be legally dedicated and brought to grade as approved by the District's Engineer. The District will not place meters or services on the outside of the curb line on any existing or newly constructed streets unless the

grading is within four (4) inches of finished grade for a distance of (10) feet from the curb.

1.5.5 Conditional Services

When a service is requested that is not adjacent to a water main from which an adequate service can be provided and, when in the opinion of the District, it is not feasible to construct a new main that would provide an adequate service, the District may grant permission to the Customer to take "conditional" service at the nearest existing adequate main.

1.5.6 House Connections

The line from the meter to a dwelling will be of Type K Copper or PVC schedule 40 pipe and sized by the Applicant or Owner. Also, the customer service line in the property will require a dual backflow preventer device, cut-off valve and a pressure regulator and meter coupling. (See Chapter IV of these Rules and Regulations.)

1.5.7 Easements

No water or wastewater mains will be constructed in easements unless extensions, project areas, properties, and subdivisions are fronting Texas Department of Transportation (TXDOT) or El Paso County Water Improvement District (EPWID) Right of Way. Easements must be in a minimum 15 feet wide per utility (water and wastewater) line. Easements must be recorded at El Paso County Records under the Lower Valley Water District prior to construction.

1.5.8 Premises with Private Wells

A. Customers with premises which have private wells and who wish to connect to the District's water supply shall have the following two options:

(1) Agree to permanently abandon use of the private wells by plugging the well, prior to connect to the public water supply, in accordance with the TCEQ requirements; and

(2) Agree to completely and permanently server the private well from the premises water supply system in accordance with the TCEQ requirements, prior to connecting to the District's water supply and Customer shall install an approved backflow prevention assembly at the water service connection.

1.6 *LOWER VALLEY WATER DISTRICT-RULES AND REGULATIONS*, CHAPTER IX - SECTIONS 9.009 THROUGH 9.012

1.6.0 General

Reference is made to Appendix E for additional requirements governing the Extension Charges. A brief outline of these requirements follows.

1.6.1 Extension Charge

A. An Extension Charge is a non-refundable payment to the District for installing or having previously installed a water main in a dedicated street or alley adjacent to the property to be served. The Extension Charge shall be determined by applying the appropriate sub-subsections (1), (2),(3), (4), or (5) of this section. The District shall determine which of these sub-paragraphs shall be applicable to the property to be served.

(1) Extension Charges to Connect to Existing Lines. The Extension Charge for property obtaining water service from existing mains when the property obtaining such service did not participate in the cost of construction of the lines shall be based on the "Frontage" of the property multiplied by the frontage rater per foot of **$7.00** for water service.

(a) The Frontage Charge for a property obtaining water and sewer service from existing lines contributed by a funding agency shall be based on the "Frontage" of the property multiplied by a ratio calculated based on the percentage of loan portion or cost of the extension, if applicable.

(b) The Frontage Charge as referred to above will be in effect for a period of one year from the date the referenced water and/or sewer system is in operation.

(2) The Frontage to be used in determining the Extension Charge shall be the distance across the property, measured along a line parallel to the center line of the street which abuts the property or is the average length midway between the front and rear property lines.

(a) In no case shall the frontage for each water meter be less than 50 feet.

(b) If the property is occupied or is to be occupied by a single family or duplex residence and abuts on two or more streets, the frontage is to be measured as though the property abutted only on that street which produces the smallest frontage.

(c) If any property other than those provided for in Subsections (b) and (e) of this section abuts on two or more streets and has a depth greater than 150 feet, the frontage to be used shall be equal to the sum of the frontage or each abutting street less a credit of 150 feet for each street intersection adjacent to the frontage, but not twice the aggregate water demand in gallons, whichever is greater.

(d) If the aggregate demand of all water meters, in gallons per minute, on any property exceeds one-half of the frontages in feet, then such excess demand shall be charted as excess frontage at the rate of two feet of frontage for each additional gallon of demand.

(e) The frontage for public schools, parks, churches and United Fund agencies may be the longest dimension of the property which abuts a single dedicated street, or as determined by the aggregate water demand as specified in Subsection (d), whichever is greater.

(f) The frontage to be used for a single family residence situated on a tract of land of two acres or more in area may be reduced to a minimum of 174 feet wide, provided that all of the water supplied by the District shall be used within an area of 175 feet wide fronting on the street from which service is taken and less than 500 feet in depth.

(g) When, in the opinion of the District, none of the above methods yield an equitable and appropriate charge within the intent of this Rule, the frontage may be determined on the basis of the demand for water as provided in Subsection (d) or by other equitable methods to derive a charge that is proportionate to the water demand and/or size of the property in relationship to the charge for another similar property, but will not be less thatn a 50 foot frontage.

(3) Extension Charges for Small Tracts

(a) The water Extension Charge for lots within subdivisions when such lots are individually owned shall be the same as described in (a) provided the extension charge is paid on the property that is adjacent to the required extension or which could conceivably be considered to obtain service from said extension. Payment of the Extension Charge on an individually owned property shall entitle that property to water services if the extension required reaching that property is 150 feet or less and if the property is owned by an individual who has not previously been granted an extension for other property.

(b) When water service is desired to a tract of land of 20 acres or less in size and the owner of said tract does not at the time of application for service own any other land immediately adjacent to the property to be served and when a line 12-inches or larger is required, he may pay the Frontage Charges provided for in (a) on all of the property in lieu of paying the total cost of the extensions required within or adjacent to his subdivision.

(4) Extension Charges for Other Areas

(a) The Extension Charge for water or wastewater service to new subdivisions and all other areas not included in Subsections (1) or (2) of this Section shall be the total cost of all the lines and appurtenances required to serve the property as determined by the District. The Customer or Developer may also be required to pay for the construction of reservoirs, pumping stations, and

other facilities that are needed to adequately serve that area.

(b) In addition to the cost of the lines as required by District's plans and specifications for construction to provide service to the Customer's or Developer's property, the Customer or Developer shall also be obligated to pay his proportionate part of the cost of all lines that were constructed by others which are adjacent to the boundaries of their properties.

(5) Extension Charges for Water Mains Constructed Crossing Drains and Easements of El Paso County Water Improvement District No. 1 (EPWID#1)

(a) Subject to availability of District funds as determined by the General Manager and subject to approval of the Boards, in the exercise of absolute discretion, the District may promote extensions of water mains crossing over drains and easements of EPWID with the District advancing sixty (60%) percent of the cost of such extensions and the initial customers seeking to connect to such extensions advancing forty (40%) percent of the cost prior to commencement of work on the extensions.

(b) The costs advanced by the District and any Third Party Sponsor shall be repaid by equal monthly payments amortized over term not to exceed ten (10) years. Failure of any customer to pay the portion of the cost for which such customer is liable shall entitle the District to exercise all of the remedies set forth in Chapter VII and additionally to foreclose the lien on the customer's real property which is served by the extension.

(c) The Third Party Sponsor may advance all or any portion of the 40% of the costs required to complete the extension and shall be repaid the costs in the same manner as above provided for 60% of the costs advanced by the District. The District shall reserve exclusively unto itself the right to exercise the remedies set forth in Chapter VII and the District shall have no obligation whatsoever to the Third Party Sponsor except to remit 40% of the payments as and when received by the District.

(d) Refer to Chapter IX for an example of reallocation of the costs of subsequent customers which are connected to the extension.

(6) Extension Charges For Water Mains Not Crossing Over Drains and Easements of El Paso County Water Improvement District No. 1 EPCWID#1)

(a) Subject to availability of District funds as determined by the General Manager and subject to approval of the Board, in the exercise of absolute discretion, the District may promote extension of water mains which do not cross over drains and easements of EPWID and which are located in public right of way. The District may advance sixty (60 %) percent of the cost of

such extensions subject to the initial customers seeking to connect to such extensions advancing forty (40%) percent of the cost prior to commencement of work on the extension.

(b) The terms and conditions set forth in Sections 4 (B), (C) and (D) shall apply to the costs advanced under this Section.

1.6.2 Refunds

A. The Customer or Developer shall be entitled to a refund providing that:

(1) The customer is required to construct or pay to construct "boundary" water lines along the perimeter of the area to be served when such lines are adjacent to other property that can be expected to obtain service directly or indirectly from the lines;

(2) The customer is required to construct or pay to construct lines that are outside the area (off-site) from where he desires service when the property on either side of the line is owned by others and when such property may be expected to obtain service directly or indirectly from said line;

(3) The customer is required to construct or pay to construct water lines larger than 12-inches in size;

B. In order to obtain a refund, contracts providing for refunds must be entered into with the District. Monies to make refunds for facilities included in (1) and (2) below shall be obtained from property owners who receive service directly or indirectly from the lines eligible for refunds and the District shall not be obligated to make any refunds until it has received payment from those properties which benefit from the lines.

(1) Refunds for Boundary Lines. The refunds for "boundary" lines shall be limited to one-half of the estimated cost of the line as installed. The estimated cost of the line installed shall be considered to be the price of the pipe as determined by the actual cost of construction.

(2) Refunds for Off-Site Lines. The refunds for "off-site" lines shall be limited to one-half of the estimated cost of the line as installed. That are constructed outside of the limits of the area to be served, but necessary to provide service, shall be eligible for a refund based on the actual cost of facilities. The applicant will provide all needed construction data.

C. Refund contracts will not take effect until the extension/project is dedicated to the Lower Valley Water District. Contracts will be reviewed by Lower Valley Water District. All contracts will comply with Lower Valley Water District Rules and

Regulations.

1.6.2 Special Deposits

A. Special Deposits are for "off-site" facilities such as reservoirs, pump stations, and line outside the boundaries of the property to be served, but will become part of the total water system. The total cost of these facilities shall be paid by the Customer or Developer first requiring the facilities. The District shall determine the size and type of facility required with consideration towards future growth.

B. A special refund contract will be executed with the Customer or Developer which will provide for a portion or all of the cost to be eligible for a refund as development takes place which the facility serves.

1.6.4 Fire Hydrant Installations

A. This District will not participate in the cost to install fire hydrants where deemed to be required. If the Customer or Developer chooses to install any fire hydrants it will also be at their own cost.

1.7 RIGHTS-OF-WAY AND EASEMENTS

A. Water and sewer mains are to be constructed in dedicated public rights-of-way. Prior to the construction of water and sewer extensions in public streets and/or public alleys, such streets and alleys shall be legally dedicated and brought to within six (6) inches of the finished grade as approved by the City of Socorro Street Department and El Paso County.

No water or wastewater mains will be constructed in easements unless extensions, project areas, properties, and subdivisions are fronting Texas Department of Transportation (TXDOT) or El Paso County Water Improvement District (EPWID) Right of Way.

1.8 STANDARD LOCATIONS FOR FACILITIES

Extension or enlargement of water/sewer lines originates at the nearest adequate water/sewer main and extends to and along property to be served. The extension must be consistent with system operation and efficiency, as determined by the LVWD.

The area over and around any water and/or sewer main or extension must remain free of any structure unless prior provisions have been made for ready and easy access to any and all parts of such main or extension.

TABLE 1, below, contains LVWD requirements for locating new pipeline extensions for the various right-of-way widths, as indicated. Water extensions shall be located on the north or east sides of dedicated streets or alleys in accordance with LVWD Standard Details. Sewer extensions shall be located on the south and west sides of dedicated streets or alleys in accordance with LVWD Standard Details.

"Centerline" in TABLE 1 refers to the centerline of right-of-way provided it coincides with the public street centerline. Where these centerlines do not coincide, then refer to the public street centerline. This assures that the water and sewer mains are constructed within the public street.

Water lines may be designed with a minimum horizontal radius of curvature of 250 feet. Sewer lines may be designed with a minimum radius of curvature of 150 feet. Where curved rights-of-way do not allow the minimum radius, appropriate fittings shall be utilized.

Where standard locations are unavailable, or if in the interest of operation, efficiency, or maintenance of the system, the LVWD may designate another location. In existing rights-of-way where pavement replacement must be minimized, or where existing structures and utilities must be avoided, alternate locations may be selected, subject to LVWD approval..

TABLE 1 - PIPELINE LOCATION WITHIN NEW RIGHTS-OF-WAY

Right-of-Way Width	Distance from Centerline		Right-of-Way Width	Distance from Centerline	
	Water	Sewer		Water	Sewer
46 ft	8 ft	5 ft	60 ft	10 ft	5 ft
50 ft	8 ft	5 ft	70 ft	10 ft	5 ft
52 ft	8 ft	5 ft	90 ft	10 ft	5 ft
56 ft	8 ft	5 ft	120 ft	10 ft	5 ft

1.9 WATER AND SEWER SEPARATION

The required minimum separation distance between water and sewer mains is nine feet (9'), in all directions, measured between outside diameters. Where the nine foot separation distance cannot be achieved, the separation distances indicated in the LVWD Standard Details, is used. Parallel water and sewer lines must be installed in separate trenches.

1.10 TRENCH EXCAVATION

Trench width should be held to a minimum for the size of pipe to be laid. Trench safety systems such as shoring, bracing or sheeting must be used in accordance with requirements and guidelines set by the Occupational Safety and Health Administration (OSHA), and/or to meet the minimum trenching requirements of the right-of-way owner. LVWD expects contractors to use safety

precautions and devices to the fullest extent. For a particular project, open trench length should not exceed the following limits:

A. Business District Areas – 300 Linear Feet: Store front area.

B. Commercial Area – 300 Linear Feet: Industrial, shopping centers, churches, schools, hotels, motels, markets, gas stations, governments and private office buildings, hospitals, fire and police stations, and nursing homes.

C. Residential Areas – 1 Block or 300 Linear Feet, whichever is least: Single- and multi-family residences, apartments, and condominiums.

D. Undeveloped Areas – 1,500 Linear Feet: Parks, golf courses, farms, and undeveloped subdivided land.

Trench backfill and embedment must comply with LVWD Standard Details the for particular pipe material utilized.

1.11 CASINGS

1.11.1 General

Pipe encasement is required when water and/or sewer lines cross under highways maintained by the Texas Department of Transportation, railroads, canals, or other structures, as deemed necessary to protect the pipeline and/or as required by the governing agency of these infrastructures. Casings are also indicated when the minimum separation distance of water and sewer lines, as required by the TCEQ, cannot be achieved.

Casing material is either steel pipe or reinforced concrete pipe and is sized and installed in accordance with the LVWD Standard Details. Casings must be designed to withstand the external dead and live loads, and any jacking or other forces to which they will be subjected.

1.11.2 Annular Space

Generally, the LVWD Standard for treating the annular space between the casing and carrier pipe is to fill the space with pneumatically placed sand, for all pipe installations other than groundwater. In groundwater, the annular space is grout filled.

When the casing pipe is cathodically protected insulated spacers must be used (for pipe other than PVC). Under this circumstance, the annular space between casing and carrier pipe remains void.

When the governing agencies of the above mentioned infrastructures are involved, the annular space shall be filled according to any of their applicable regulations.

1.11.3 End Seal

The end of casing and carrier pipe shall be sealed by one of the following methods, as specified and

approved:

A. Synthetic rubber end seal (must be used when the system is cathodically protected).

1.12 COORDINATION WITH OTHER UTILITIES AND AGENCIES

Before the design of any project begins, it is essential that the designer coordinate with existing utility companies and pertinent federal, state and local agencies. Some of these agencies include, but not limited to, Texas Department of Transportation (TxDOT), El Paso County Road and Bridge Department, TCEQ, railroad companies, irrigation districts, U.S. Bureau of Reclamation (USBR), and the International Boundary and Water Commission (IBWC). All installations shall be in accordance with the requirements specified by the respective agency.

Coordination with a representative from the utilities listed herein or others not shown is required to determine the locations of underground lines or other potential conflicts. Engineering plans should show the location of the facilities of any of these companies, or others in the site area: El Paso Electric Company, Texas Gas Co., El Paso Natural Gas, Southwestern Bell Telephone, Paragon Cable, and various other communications and petroleum products companies. Contact should be made with the proper representative of each of these companies to verify the location of respective utilities.

2.0 WATER SYSTEMS

2.1 WATER LINE CLASSIFICATION

2.1.1 General

The term "pipe size" refers to the actual or nominal inside diameter of the pipe. Generally, the basic classifications of water lines by function and approved standard sizes are as follows.

2.1.2 Transmission Lines

Transmission lines are those 20 inches in diameter and larger. Standard pipe sizes are 20", 24", 30", 36", 42", 48", 54", and 60". Standards for transmission lines are beyond the scope of this document since the primary use of this document is for subdivision development which typically will not require the construction of transmission lines.

2.1.3 Distribution Lines

Water lines 6 inches to 16 inches in diameter are classified as distribution lines. Standard pipe sizes for this classification are 6", 8", 12", and 16".

2.1.4 Service Lines

Service lines are ¾, 1, 1½, 2 and 4 inches in diameter. Note that fire line services and specially metered areas may require 6 inch or larger diameter based on required demand of customer facilities.

2.1.5 Other Lines

Under special design circumstances, non-potable waterline facilities such as well flow lines, plant effluent, or reclaimed water mains may be required. Design of non-potable water line facilities shall comply with the applicable standard guidelines established for transmission or distribution lines, described herein with the exception of Standard Locations. Locations for non-potable water line facilities must be given special consideration for separation from both sewer and potable water lines. Locations for non-potable water lines must be approved by the LVWD.

2.2 DETERMINATION OF WATER LINE CLASSIFICATION

2.2.1 General

The design and selection of water lines comprising the Distribution System for the LVWD shall be based on the following seven internal and external parameters:

2.2.2 Design Demands

In designing the flow capacity of a line, the following water demand rates shall be determined by the LVWD Engineering Department either from previous data or based on predicted demands:

A. Average Daily Demand - the average of the total amount of water used per day in a one-year period.

B. Maximum Daily Demand - the maximum total amount of water used during any 24 hour interval in a three year period. This rate shall exclude any unusual and excessive water use, during this time period, that would affect the final value.

C. Maximum Hourly Demand - the maximum amount of water used during any 60 minute period, on any day, in a three year period.

2.2.3 Fire Flows

Water lines shall be sufficient in capacity to supply the larger of either the Maximum Hourly Demand or the Maximum Daily Demand **plus** the required minimum rates of flow for fire protection for the required duration of time. These Fire Flow Rates are based on the minimum rates established by the Texas Commission on Fire Protection and are indicated in TABLE 2.

TABLE 2 REQUIRED FIRE FLOWS		
Area	**Rate**	**Duration**
Heavy Commercial	3000 gpm	3 hrs
Light Commercial	1500 gpm	2 hrs
Dense Residential	750 gpm	2 hrs
Scattered Residential	500 gpm	2 hrs

The distribution system must be capable of maintaining a minimum pressure of 20 psi at all points in the system under combined fire flow and normal consumption conditions.

2.2.4 Texas Commission on Environmental Quality (TCEQ) System Pressure Requirements

The system shall be designed to maintain a minimum pressure of 35 psi at all points within the distribution network at flow rates of at least 1.5 gallons per minute per connection. A connection is defined as a single family residential unit or each commercial or industrial establishment to which potable water is supplied from the system. When sufficient data is unavailable to accurately determine the number of connections being served or to be served, the population served divided by three will be used as the number of connections for calculating system capacity requirements.

2.2.5 Head Losses

The maximum rate of head loss due to friction in a pipeline is 5-7 feet per 1,000 feet of pipe.

2.2.6 Operating Pressures

In providing material suitable for the anticipated pressure conditions, the following distinction is made:

A. Pressure Class (PC) denotes the maximum sustained working pressure and shall provide for a pressure rise above the maximum working pressure caused by surge.

B. Working Pressure denotes the maximum anticipated sustained operating pressure of the water system.

C. Surge Pressure is defined as the maximum pressure increase greater than working pressure that is anticipated in the system as a result of change in the velocity of the

water column when valves are operated or when pumps are started or stopped.

D. Pressure Rating (PR) is the estimated maximum pressure that water in a pipe can exert continuously with a high degree of certainty that failure of the pipe will not occur. There is no allowance for surge pressure in the pressure rating. Selection of the appropriate pressure class or pressure rating is based upon the anticipated total system pressure which is defined as the sum of the working pressure plus surge pressure.

Selection of Pressure Class or Pressure Rating for a pipe to be used in a particular area is based upon the anticipated normal operating pressures as determined by a system analysis or field data. Refer to TABLE 3 for information regarding appropriate Pressure Class, Pressure Rating and Pipe Material Selection.

E. Selection of the appropriate pressure class or pressure rating shall be based on the anticipated total system pressure which shall be defined as the sum of the working pressure plus surge pressure. Selection of Pressure Class or Pressure Rating for a pipe t be used in a particular area shall be based upon the area's anticipated normal operating pressures as determined by system analysis or field data, and shall be in accordance with the following Working Pressure Zones, as defined by the Utility:

ZONE 1 is assigned to an area whose working pressure is equal to or less than 100 psi.

ZONE 2 is assigned to an area whose working pressure is **greater** than 100 psi.

Refer to **TABLE 3** for information regarding appropriate Pressure Class, Pressure Rating and Pipe Material Selection.

2.2.7 External Loadings

Pipe strength must be sufficient to withstand external forces including standard backfill, the weight exerted by traffic and other anticipated external forces. Embedment of a pipe is significant in determining external load-carrying capacity. Pipe embedment must provide uniform longitudinal support under the pipe and prevent deflection and settlement due to external loads beyond allowable limits.

2.2.8 Distribution Network

A. Minimum pipe diameter within the network is 6" at a maximum spacing of 600 feet. 8" pipe shall be used when this distance is exceeded.

B. In right-of-ways 90 feet and larger, the minimum line size shall generally be 12". These shall be arranged into interlocking loops so that the maximum spacing is the shortest of either of the following: 3000 feet or the length that would, by fluid friction, render the line incapable of producing the flows and pressures set out herein for the type of area to be served.

C. In 70-foot right-of-ways, the minimum line size shall be 12". These distributions' mains shall be arranged within the larger loop, no more than a few blocks apart, and shall provide normal supply and fire fighting capabilities.

D. In right-of-ways 60-feet and smaller, the lines' sizes shall generally be 6" and 8". These lines shall form a grid over the area to be served and shall supply water to service lines and fire hydrants.

E. Prior to developing a distribution network, the LVWD should be consulted. The distribution network which is finally developed should include facilities included in any LVWD master plans for the given area to be served. Master plans to be submitted are not submitted for Approval. Master Plans will be held as reference guides to Future Development.

F. The occurrence of dead-ends in a network should be avoided if possible. The length of any dead-end pipe should not exceed 500 feet. Dead ends will be ended with a fire hydrant. Refer to LVWD Standard Details.

2.3 ACCEPTABLE PIPE MATERIALS

2.3.1 General

This section provides general information on the type of Pipe Materials acceptable for use within the LVWD Distribution System.

2.3.2 Poly Vinyl Chloride (PVC) Pressure Pipe

Shall generally be used for Distribution Lines, unless special conditions require another material. All PVC shall conform to AWWA Standards C-900 and C-905. Outer diameters shall be comparable to cast iron pipe or fittings.

Designation of PVC C-900 shall be according to pressure class as defined in Section 2.6.

Designation of PVC C-905 shall be according to pressure ratings as defined in Section 2.6.

2.3.3 Steel Cylinder Concrete Pipe (SCCP)

Shall generally be used for Transmission Lines and shall conform to AWWA Standards C-303 or C-301.

2.3.4 Steel Pipe

Shall generally be used for Transmission Lines and shall conform to AWWA standard C-200 with mortar lining and Tape Coating in accordance with AWWA Standard C-214. At the owner's discretion, selection of Steel Pipe as an alternate material for use in a project shall be based upon a life cycle cost analysis with regards to other pipe materials.

2.3.5 Ductile Iron (DIP)

Shall generally be used for Transmission Lines, unless special conditions require that it be used for Distribution Lines. DIP shall be accordance with AWWA C-151/A21.51.

Designation of DIP shall no longer be according to thickness class, but rather the pressure class of the pipe. Pressure class shall be for the rated working pressure plus a surge allowance of 100 psi in accordance with AWWA C-151/A21.51.

2.3.6 Cast Iron Pipe (CIP)

Is no longer used except in special circumstances, when available, and with approval from the Utility.

Cast iron pipe, when approved, shall be Class 250, cement lined and seal coated with slip-on joint ("Tyton" or equal) and shall meet all applicable Federal and ANSI specifications. Under certain circumstances, mechanical joint pipe may be used.

2.4 PIPE MATERIAL SELECTION

2.4.1 Water lines must be designed and constructed to satisfy the requirements established in TABLE 3 for the diameters, material type and pressure class shown. It is required that selection of pipe material or alternates be approved by the LVWD.

TABLE 3 - WATER SYSTEM ALLOWABLE MATERIALS AND PIPE CLASS

PIPE DIAMETER	MATERIAL	AWWA STANDARD	ZONE *	MIN PC or PR **	DR	STND LENGTH
6", 8",12"	PVC	C-900	1	150 psi	18	20'
			2	200 psi	14	20'
	DIP	C-151/A21.51	1 & 2	150 psi	NA	18'
	CIP	REPLACEMENT REQUIRES APPROVAL BY THE UTILITY				
16"	PVC	C-905	1	165 psi	25	20'
			2	200 psi	21	20'
	DIP	C-151/A21.51	1 & 2	150 psi	NA	18'

20"- 36"	DIP	C-151/A21.51	1 & 2	150 psi	N A	18'
	STEEL	C-200	1 & 2	***	N A	45'
	SCCP	C-303	1 & 2	***	N A	32'
42" 48" 54" 60"	DIP	C-151/A21.51	1 & 2	150 psi	N A	20'
	STEEL	C-200	1 & 2	***	N A	45'
	SCCP	C-301 (C304-92)	1 & 2	***	N A	32'

* ZONES 1 & 2 as defined in Section 2.2.6
** PC (pressure class) & PR (pressure rating) defined in Section 2.2.6
*** Pipe Class shall depend upon specific project requirements and shall be determined by the pipe Manufacturer.

2.4.2 When a new line is added to an existing network that consists of pipes of one material type, generally, the same material will be used for the new line to provide consistency within the network area.

2.43 Line Addition within Existing Network

When a new line is to be installed within an area such that the existing network of this area consists of one material type, this material type shall generally be used for the new line to provide consistency within the network area.

2.44 Replacement/Maintenance of Existing Pipelines

Projects designed to replace existing pipelines with the same pipe material shall be in accordance with the standards and schedule set herein.

2.45 Well Flow Lines

Are generally designed for low pressure applications therefore these types of pipelines do not require the additional design factors of safety, for internal pressures, that are inherent in other pipe materials such as steel or ductile iron. For this reason, SCCP shall be used exclusively for well flow lines 20" and larger, unless other design factors require otherwise.

2.5 STANDARD COVER

Water main size and installation conditions dictate Standard cover. Standard cover will be as indicated in TABLE 4, and in accordance with LVWD Standard Details.

2.6 FITTINGS AND VALVES

2.6.1 General

Fittings are used for any change in line direction or size and branch connections, and must conform to applicable ASTM, ANSI, and AWWA Standards for the type of pipe material utilized. The system must have a sufficient number of valves such that a small area with in the system can be shut off for repairs or replacement without discontinuing service to other areas within the system.

TABLE 4 – STANDARD COVER FOR WATER LINES

CONDITION	COVER
Normal line Installation, Street and Drainage Projects, Water Line Relocation	5 ft. minimum cover from **top** of pipe to finished grade
New Subdivisions, Non-paved areas	5 ft. minimum cover from **top** of pipe to proposed finished grade

2.6.2 Gate Valves

Gate valves must comply with AWWA Standard C-509, Resilient-Seated Gate Valves. Gate valves are used on water mains with diameters of 12" or less. Gate valves are used to isolate pipe sections for pressure testing, emergency cutoffs, and to provide "blow off" at low dips in the line. Generally, the number of valves at an intersection is the same amount as the number streets coming into an intersection. Valves are also required before or after bends and at every thousand feet along a straight-a-way street/easement. Valves should be aligned with the property line of the street. Usually, the number of valves required to isolate an area is three (3) and the maximum number is five (5). One isolation valve must be placed on each side of major canals, railroads, utility corridors, etc. Shutoff valves must be provided on every hydrant lateral. Valve bonnet boxes surround and provide access to each buried valve. Valve Bonnet Boxes must conform to LVWD Standard Details.

2.6.3 Air Relief Valves

Generally, air relief valves are installed at the high points in a line, or where a long line changes slope. These valves can be positive air release or a combination air/vacuum valve, as required. Air relief valve materials and construction are subject to the approval of the LVWD.

2.6.4 Valve Types

A. Butterfly Valves

Shall be in compliance with AWWA Standard C-504. Butterfly valves shall be used on water mains 16" in diameter and larger. They shall be used to isolate pipe sections for pressure testing, emergency cutoffs, and to provide "blow off" at low dips in the line. Butterfly valves shall be positioned for horizontal operation. 16" operator valves shall have a standard valve extension, pipe spool and bonnet box. Valves larger than 16" shall have a typical manhole in accordance with Utility Standard Butterfly Valve Manhole Details, Appendix Section D.

B. Air Relief Valves

Generally, shall be installed at the high points in a line, or where a long line changes slope. These valves can be positive air release or a combination air vacuum valve as required.

C. Check Valves

Shall be used on discharge side of pumps or other locations where the potential for backflow exists and cannot be tolerated for operational purposes.

E. Miscellaneous Control Valves

Surge Valves

Shall be used in locations where engineering analysis indicates a high probability of high pressures generated by water hammer. Typical location in vicinity of a pumped source of supply.

Pressure Reducing Valves

Shall be used between high and low or intermediate pressure zone where a constant downstream pressure must be maintained.

Pressure Relief Valves

Shall be used to relieve high pressures on the low elevation end of a pressure zone that borders a lower or intermediate zone.

2.6.5 Valve Bonnet Box

Shall surround and provide access to each buried valve. Valve Bonnet Box shall conform to Utility Standard Details, Appendix Section D.

2.6.6 Valve Spacing and Location

A. The system shall have valves in enough locations so that relatively small parts of the system can be shut off for repairs or replacement without discontinuing service to large areas.

B. Generally, valves on water mains shall be placed at a maximum distance of 500'.

C. Generally, the number of valves at an intersection is one less than the streets coming into an intersection. Valves shall be aligned with the property line of the street.

D. Generally, the number of valves required to isolate an area shall be three (3) and the maximum number shall be five (5).

E. One isolation valve shall be placed on each side of major canals, railroads, utility corridors, etc.

F. Shut-off valve shall be provided on every hydrant lateral.

2.7 THRUST RESTRAINT

Thrust restraints reduce the movement of pipes or appurtenances in response to thrust. Thrust restraint is required at each hydrant, valve, bend, tee and at reducers or fittings where changes in pipe diameter or direction occur. Restraint may be made with anchor straps or steel rods embedded to concrete thrust blocks, in accordance with LVWD Standard Details, and sized adequately to resist stresses imposed by internal forces. Thrust blocks shall be installed in accordance with LVWD Standard Details. Unusual loading conditions may require special thrust block design. Design of thrust blocks depends upon soil type, maximum system pressure, pipe or appurtenance size and type.

Alternatively, mechanical joint restraints may be utilized in lieu of or in combination with thrust blocks. Restraining devices shall provide 360° contact with the pipe wall, and shall be approved for use by LVWD prior to installation. Restrained length calculations shall be as recommended by manufacturer and shall also be approved by the LVWD prior to restrained joint installation.

2.8 FIRE HYDRANTS

2.8.1 General

All hydrants must conform to AWWA standard C-502. The standard size for a hydrant is 5-1/4". Hydrants are connected to the main by a 6" line with a separate gate valve. Fire hydrants shall be installed in accordance with the LVWD Standard Details.

2.8.2 Fire Hydrant Location

Public Fire hydrants are installed along open dedicated streets, city property or at other approved locations. The following criteria have been established for hydrant location:

A. The maximum distance of a hydrant from the back of the curb is 1.5 feet, in accordance with LVWD Standard Fire Hydrant Location Details. The minimum distance between fire hydrant and Property/R.O.W. line is 3 feet.

B. Fire hydrants must be installed a minimum of nine feet vertically or horizontally from any sanitary sewer line regardless of construction.

C. The preferable location for installation of fire hydrants is at street intersections. However, if spacing requirements dictate, fire hydrants may be placed at the approximate midpoint of two intersections. This location shall coincide with the property line common to adjoining lots.

D. The location of the hydrant shall meet the requirements of the City of Socorro, El Paso County, Town of Clint and TxDOT as to where it falls within the sidewalk to meet all A.D.A. requirements.

E. The standard maximum spacing of fire hydrants is:

(1) 500 feet for single-family residential

(2) 300 feet for multi-family residential

(3) 300 feet for commercial/industrial

(4) Fire Hydrants shall be placed at all dead ends

(5) Other factors, such as type of risk and street layout, should be considered when determining the spacing of hydrants.

2.9 WATER SERVICE CONNECTIONS

2.9.1 General

Typical service line installations are illustrated in the LVWD Standard Details.

2.9.2 Service Taps

Multiple tapping on a common line parallel to the longitudinal axis of the pipe is not allowable. The minimum separation distance for taps is 18 inches on the longitudinal axis of the pipe.

2.9.3 Water Meter Locations

The LVWD will not place meters or services on the outside of the curb line on any existing street or newly constructed streets unless the outside grading (property side of curb) is within four (4) inches of the finished grade for a distance of ten (10) feet from the property side of the curb. If a curb does not exist then the meters shall be placed flush with the existing roadway surface. There shall be one meter per service line. Water meters can not be located in parking lots or driveways and must be accessible at all times. If development includes curb and gutter, meters shall not be installed until such curb and gutter is in place and approved.

New water meters, unless otherwise specified, will be furnished and installed by the LVWD. All other materials including meter boxes shall be furnished and installed by the developer/contractor. Water meter will not be installed until subdivision is dedicated and/or City of Socorro passes inspection. Fire lines 6" and bigger shall also be installed by Developer/Contractor and be inspected by the LVWD.

2.9.4 Water Meter Sizing

Sizing of a meter depends upon the anticipated required flow rates, pressure at the service connection, and friction losses. Selection of meter size requires approval from the LVWD. Typical sizes of water meters, based on flow demands, are the following:

A. Domestic meters = 3/4", 1", and 1½ "

B. Commercial meters, industrial meters, and yard meters (for sprinkler systems, swimming pools, etc.) = 1 ½", 2" and 4"

C. Fire lines = 6" meters

2.10 BACKFLOW PREVENTION PROGRAM

2.10.1 General

Refer to Appendix F-Cross Connection Program Standards and Guidelines for Detailed Information Regarding the Installation of Backflow Prevention Assemblies.

3.0 GRAVITY SANITARY SEWER SYSTEMS

3.1 SEWER LINE CLASSIFICATION

3.1.1 General

The term "pipe size" refers to the actual or the nominal inside diameter of the pipe. The basic classifications of sewer lines by function and approved standard sizes are:

3.1.2 Service Lines

Also referred to as laterals, service lines are typically 4 inches in diameter and are used to convey wastewater from homes or other contributors to collector lines located in public rights-of-way.

3.1.3 Collector Lines

Generally 8 inches and 12 inches in diameter, collector lines collect wastewater from service lines and convey it to Interceptor Lines. For the purposes of subdivision design, refer to Table 5 below for adequate sizing of pipe diameters.

3.1.4 Trunk Lines

Generally 15 inches to 30 inches in diameter, with 3 inch increments, used to convey wastewater

from collector lines to interceptor lines.

3.1.5 Interceptor Lines

Interceptor lines are 36 inches in diameter and larger and are used to intercept a number of collector lines and convey wastewater to treatment or other disposal facilities. Allowable diameters are dependent on the material selected , the manufacturer's sizes and approval by the LVWD.

3.2 GRAVITY SEWER LINE DESIGN CONSIDERATIONS

3.2.1 General

General requirements for the design and selection of wastewater/sewer lines comprising the Collection System for the LVWD are described in this section. Deviations from these standards require approval by the LVWD.

The minimum structural life cycle of a collection system is 50 years. The minimum diameter for all sewer lines, except service laterals and force mains is 8 inches. Wastewater lines are laid in straight alignment with uniform grade between manholes.

3.2.2 Velocity of Flow

All gravity sewer lines shall be designed and constructed with slopes such that a minimum velocity of 2.0 ft/s is maintained when flowing full or half full in order to prevent solids deposition. The maximum velocity, when flowing full, shall be 10 ft/s. When this velocity and acceptable grades (provided below) are exceeded, special provisions shall be made to protect against pipe displacement due to erosion of bedding, and/or shock.

3.2.3 Grades

The grades indicated in TABLE 5 represent acceptable slopes necessary to sustain the required minimum velocity. They were determined using Manning's formula with a minimum "n factor" of 0.013, regardless of the pipe material type.

TABLE 5
ACCEPTABLE GRADES GRAVITY SANITARY SEWER LINES
(n=0.013) Peak Factor of 5

Pipe Size (in)	Minimum Slope (%)	Maximum Slope (%)	*Number of Residential Lots	
			Min	Max
8	0.33	8.40	4	235
12	0.20	4.88	135	545
15	0.15	3.62	415	860
18	0.11	2.83	630	1200

TABLE 5
ACCEPTABLE GRADES GRAVITY SANITARY SEWER LINES
(n=0.013)

Pipe Size (in)	Minimum Slope (%)	Maximum Slope (%)	*Number of Residential Lots	
			Min	Max
21	0.09	2.30	835	1640
24	0.08	1.93	1005	2210
27	0.060	1.65	1520	2620
30	0.055	1.43	1830	3325
33	0.050	1.26	1950	4085
36	0.045	1.12	2330	4890
>36				

*Based on minimum slope requirements, 5 persons/dwelling, 75 gpc/day and a peak factor of 5. Engineer/Developer shall consider area demographics and current census information when determining flow capacities of pipe.

3.2.4 External Loads

Pipe strength must be sufficient to resist external forces due to soil trench backfill, the weight exerted by traffic and other anticipated external forces. Maximum allowable vertical deflection of flexible pipe is 5% of the pipe inside diameter. Embedment of the pipe is significant in determining external load-carrying capacity. Placement of pipe embedment and backfill must be accomplished so as not to disturb alignment of pipe.

3.2.5 Standard Cover

Generally, minimum cover shall be 5 feet measured from top of pipe to finished grade. However, where natural topography or other circumstances warrant a lesser depth, minimum cover shall not be less than 4 feet measured from top of pipe to finished grade. Developer/Contractor shall take into consideration a deeper cover when designing for subdivisions w/ on-site ponding.

3.3 DESIGN CRITERIA

3.3.1 Design Parameters

The design and selection of Sewer Mains comprising the Collection System for the City of El Paso shall be based upon an analysis of the service area with respect to the maximum sewage discharge flows projected for the existing service population or the anticipated growth of the area. Sewer Collection System Design shall be based on the following parameters:

3.3.2 Location of Facilities

Define the extent of the area to be served, its physical nature and identify possible points of contribution to the collection system. Location of the facilities shall consider such factors as natural drainage patterns and existing or proposed right-of-ways within the service area. Establish the most appropriate location for the sewer within the service area being considered. Lift station locations, if any, shall be identified.

3.3.3 Design Period

The time duration, for which the capacity of the sewer facilities will be adequate for the region to be served shall be selected. This design period shall be determined according to the following conditions:

A. Existing Developed Zones

The Design Period shall consider total existing population and expected growth of this populated zone.

B. New Area Developments

The Design Period shall be either of the following:

(1) The total expected growth of the area to be served (Ultimate Design).

(2) Design for growth expected to occur within the next 25-50 year period, as determined by the Utility.

Final selection shall consider past and future population trends, water use, existing wastewater flows, and economic factors.

3.3.4 Character of Wastewater

The character of wastewater to the sewer system is dependent upon the type of contributors located within the tributary study area and shall be determined according to the following guidelines:

A. Land Use

Available zoning and planning data, both current and future, shall be obtained. This data shall be used to determine the type and number of contributors of wastewater flows within the tributary study area.

Contributor types shall be categorized as follows:

Domestic - Areas consisting of residential and/or institutional developments as defined below.

Residential Developments shall consist of single and/or multiple family housing within the study area. The contributor unit of measure shall be "per person" (capita).

Generally, Residential Developments shall be divided into the following five categories according to density:

(1) Rural or Low Density Residential - single family housing on substantial acreage.

(2) Medium Low Density Residential - typical single family urban development on large lots.

(3) Mixed Medium Low/High Residential - typical single family urban development on small and large lots.

(4) Medium High Density Residential - typical single family urban development on small lots.

(5) High Density Residential - Multiple family residential developments, shall generally denote apartment complexes.

Institutional/Recreational Contributors shall include, but is not limited to, the following: Schools, Churches, Hospitals, University/Colleges, Sports Complexes, Prisons.

When applicable, these types of facilities shall be identified by location, type and population size through a City approved Master Development or Subdivision Plan.

The contributor unit of measure shall be either "per person" (capita) or "acre."

Commercial - Areas designated for retail stores, office buildings, minor manufacturing, etc. The contributor unit of measure shall be "acre."

Industrial Developments - Areas where industrial wastes, from factories, refineries, etc., are predominant. Contributor unit of measure shall be "acre."

B. Tributary Area

The tributary area is the existing or proposed populated area for which the sewer is to be designed.

All tributary areas or subareas shall be classified by contributor type. Total acreage allocated for the projected number of domestic, industrial or commercial establishments shall be estimated.

Large Tributary Areas are characterized by several watershed or drainage subareas that

may generate large wastewater flows requiring trunk or interceptor lines. Large tributary areas shall generally consist of several residential subdivisions and/or large commercial and industrial areas.

Layout of the proposed sewer and points of contribution for each subarea shall be defined as a requisite for line size determination.

"Pipeline sections" shall be defined between locations of major junctions or points where the sewer might change slope or size within the proposed layout. Determination of size within a particular pipeline section shall depend upon all drainage subareas contributing within the specified section.

Under special circumstances, the design of the collection facilities may provide adequate capacity for a portion of the large tributary area, with future relief sewers constructed as growth patterns become better established.

Small Tributary Areas are characterized by small service subareas or a single subdivision where anticipated flows would require only collector lines.

In designing for sewer facilities within small tributary areas, "pipeline sections" shall be defined between proposed manhole locations. Determination of the size of the line shall depend upon all contributions occurring upstream and within the specified pipeline section.

3.3.5 Number of Contributors

The number of contributors, according to type, to the sewer system shall be determined according to the following guidelines:

A. Service Population Contributors

Domestic population to be served in either large or small tributary areas must be estimated for both the current conditions and those projected for the life of the facilities.

Determination of the Residential population shall be based on either of the following two methods:

(1) Existing Populated Zones

The following procedure shall be used to estimate the population of an existing zone.

Persons Per Household

The number of persons per household generally depends on location and land use. Department of Planning shall be consulted for demographic and census data.

Generally, this number ranges from three for Medium Low to Medium High Density Residential, typical of a normal subdivision with five to six houses per acre, to four for Rural or Low Density Residential.

Population Density Factor

When the study area is predominantly residential, a Population Density Factor (Df) measured in persons/acre shall be determined from known data or map records and may be applied to other areas of similar land use. This factor shall be estimated by the following relationship:

Df = No. of households x No. persons/household acreage

Generally, the Population Density Factors presented in TABLE 6 are applicable for the conditions indicated. These numbers may be adjusted if localized information is available.

TABLE 6 - RESIDENTIAL POPULATION DENSITY FACTORS

Residential Category	No. Persons per Household	Avg No. Houses per Acre	Avg Pop. Density Factor pers/acre
Low and Rural	4.0-5.0	3.0	12.00-15.00
Medium Low	3.5	4.5	15.75
Mixed Medium	3.2	5.0	16.00
Medium High	3.0	6.0	18.00
High	3.0	30-60 units	90-180

Total Existing Population (Pt) within the given tract shall be estimated according to:

$$Pt = A1D1 + A2D2 + A3D3 + A4D4 + A5D5 + ... + AnDn$$

where

An = Total area within tract conforming to the Residential Categories described above.

Dn = Corresponding Population Density Factor as described above.

Existing Population Estimates, shall be correlated with City Census Data, Land Use Plans, and other demographics to ensure accuracy and reliability of data. Twenty-five year projections shall be made in five year increments for planning purposes and for possible phasing of construction facilities.

(2) New Area Developments

Projected population shall be based on City of El Paso Department of Planning, Research and Development's Land Use or approved Master Plan of the study area. Approved subdivision plats indicate projected land use patterns, the number of lots and permitted zoning, and expected population densities. This information may be used to estimate the total population within a new area development.

When the population size for Institutional/Recreational contributors must be determined, an estimation from similar existing institutions may be used.

B. Commercial Contributors

Location and type of future commercial facilities shall be identified through a City Master Plan that includes the tributary design area. City zoning regulations limit the use of property through varying degrees of commercial use. For existing developments, the ratio of commercial acreage to residential acreage may be used to project future commercial developments.

C. Industrial Contributors

Location and type of future industrial facilities shall be identified through a City Master Plan that includes the tributary design area. City zoning regulations limit the use of property through varying degrees of industrial use.

3.3.6 Design Flow Determination

Unless otherwise specified, the terms "flow" and "flow rate" shall be used interchangeably to denote the volume of wastewater (water) per unit of time anticipated to flow through a pipe system. The units of measure are gallons per minute (gpm) or million gallons per day (mgd).

Design flows necessary to properly and adequately size each pipeline section shall be determined based on the following criteria:

A. Flow Definitions

The following flows shall be determined either from previous operating data or computed flows:

Daily Minimum Flow - The minimum flow within a 24-hour time period. The design of a sewer collection system shall be such that it functions at or above this minimum

flow throughout the design period to ensure that the deposition of solid materials is prevented.

Daily Maximum Flow - The maximum flow within a 24-hour time period.

Daily Average Flow - The average obtained by analyzing daily operating data over a 12 month period. When this data is not available, daily average flow shall be estimated as described below.

Peak Flow - The average rate during the maximum 15 minutes for any 12-month period. When applied to the design period, this flow determines the size and hydraulic capacity of gravity sanitary sewer lines.

B. Average Unit Flows and Other Factors

(1) Average Unit Flow shall be determined, for each contributor type, by using existing water use data, if available, or estimated by the figures provided in TABLE 7. The figures in TABLE 7 have been determined for the County of El Paso as the average discharge based on total population.

Domestic Unit Flow (gpd/cap)

In determining unit flow for Domestic Contributors, measured in gallons per day per capita, the following distinction shall be made:

Small Residential District Flows may generally consist of the smaller subareas within the large tributary area. Small residential district flows are generally based on population density and the average per capita contribution.

Large Residential District Flows may include many small residential districts and be associated with the larger tributary area. Generally, these flows shall consider the land-use areas and anticipated population density factors.

These domestic unit flows shall be determined using actual flow data from selected typical residential areas located near the proposed service area.

Unit Flows from Institutional/Recreational Contributors, defined in Section 3.33 A., shall be estimated and included when their contribution is significant for the service area. These unit flows may be estimated from existing similar facilities or from other references, with approval from the Utility.

Commercial Unit Flows (gpd/ac) are measured in gallons per day per acre and are

based on similar existing developments. When the commercial development is insignificant, allowance for commercial sewage may be incorporated within the per capita domestic sewage. Determine the degree of anticipated wastewater flows based upon light, medium and heavy water use.

Industrial Unit Flows (gpd/ac) are measured in gallons per day per acre and vary with type and size of industry, and the extent of water reuse programs.

In the absence of actual data, the unit flows in TABLE 7, listed according to type of Contributor shall be used:

TABLE 7 - AVERAGE UNIT FLOWS

CONTRIBUTOR	UNIT	UNIT FLOW
Population	Person	~~75.00 gpd/cap~~ 100.00 gpd/cap
Commercial	Acre	2,155 gpd/ac
Industrial	Acre	840 gpd/ac

(2) Reduction Factors may be applied to account for water conservation programs, water rate increases, increased public awareness, industrial water reuse and wastewater treatment programs.

(3) Extraneous Contributors shall be considered in the design of the sewer system. Extraneous contributors shall include the following:

Infiltration shall mean underground water entering the sewer system through such means as defective pipes, pipe joints, service connections or manhole walls. Infiltration shall be negligible unless the sewer line is installed below the water table. Infiltration rates shall be based on field studies and shall be minimized through proper design and construction of sewage facilities.

Inflow is generally discharged into the sewer system from such sources as roof leaders, foundation drains, area drains, cooling water discharges, storm waters, manhole covers, and unauthorized service connections.

C. Average Design Flow (gpm or mgd)

An estimate of the average design flow shall be obtained to determine the peak flow for designing the sewer facilities. In the absence of actual data, the following relationship may be used to estimate the average design flow for each contributor type, with appropriate reductions taken:

Average Design Flow = Unit Flow x Total Units

Where

Unit Flow = Defined above, as determined through actual measurements or from TABLE 7.
Total Units = Defined in TABLE 7, designates the total units within the service area for the respective contributor.

And

Qavg = (Avg Flow)domestic + (Avg Flow)commercial + (Avg Flow)industrial

Where

Qavg = the Cumulative Average Design Flow (gpm)

The Cumulative Average Design Flow (Q) shall include infiltration contributions when they are determined to be significant.

D. Peak Factor (PF) and Minimum Factor (MF)

Peak Factor is the ratio of Peak flow to Average flow for any one day. Minimum Factor is the ratio of minimum flow to average flow for any one day and shall be used to verify that anticipated minimum daily flows generate the required velocity of 2 ft/s.

Peak Factor or Minimum Factor shall be established based on actual flow-measurement records of similar circumstances. In the absence of such data, the Peaking Factor and Minimum Factor shall be established according to the following conditions:

(1) Domestic Wastewater Flow

When the area to be serviced consists mostly of domestic wastewater flows, it is necessary to differentiate between the following service populations:

Total Residential Population is considered when flow from an entire area, encompassing numerous sections of varying residential densities, as defined in Section 3.33 A., is to be determined.

Individual Area Residential Population is considered when the sewer is designed to serve an area consisting of only one residential density type, as defined in Section 3.33 A.

The Peak Factor and Minimum Factor, for the appropriate service domestic population shall be determined by:

$$PF = \frac{5}{P^{0.2}} \qquad MF = \frac{P^{0.2}}{5}$$

where

P = Population in thousands

The Peak Factor shall be approved by the Utility.

(2) Domestic, Commercial, and Industrial Flows

When the area to be serviced includes domestic flows, and significant commercial and industrial flows, the Peak Factor shall depend on the Cumulative Average Design Flow (Q as defined in part C of this Section). Minimum factor shall not be determined in these circumstances.

In the absence of actual data the following Peak Factors shall be used:

Average Wastewater Flow less than 10,000 gpm:

$$PF = \frac{7.25}{Q^{0.14}} = \frac{7.25}{Q^{0.14}} = 4.0 \text{ peak factor}$$

Q0.14 (Q in gpm)

Average Wastewater Flow greater than or equal to 10,000 gpm:

PF = 2.0

When Commercial and Industrial Flows comprise 25% or more of the average design flows, Peak Factors for the various contributor types of flow shall be estimated separately.

E. Design Flows

Design of the size and hydraulic capacity of the sewer line shall be based on determination of peak flow and cumulative peak design flow. Once the sewer line is sized, the minimum flow shall be used to verify that a minimum velocity of 2.0 ft/s is maintained when the line is flowing at this minimum flow.

Peak Flow (gpm or mgd), as defined in Section 3.35 A., shall be determined from the following relationship:

Peak Flow = PF x Qavg

Where

PF = Peak Factor determined in D of this Section.

Qavg = Cumulative Average Design Flow defined in C of this Section
and

Cumulative Peak Design Flow (gpm or mgd) shall generally denote the additive total of the peak flows in the current pipeline sections and all pipeline sections located upstream. Cumulative Peak Design Flow shall be used for sizing the collection facilities and is determined accordingly as the design of the sewer line progresses through each "pipeline section."

Minimum Flow (gpm or mgd), as defined in Section 3.35 A., shall be determined to ensure that a minimum velocity of 2.0 ft/s is maintained. Minimum flow shall be determined according to:

Minimum Flow = MF x Qavg

where:

MF = Minimum factor determined in D. of this Section

Qavg = Cumulative Average Design Flow defined in C of this Section.

3.3.7 Pipe Sizing

The following Manning Hydraulic Equation, for closed conduit gravity flow, shall be used to determine the pipe diameter:

$$d = \frac{(2.16 \times n \times Q)^{3/8}}{S^{3/16}} \times 12 \text{ (in/ft)}$$

where:

d = Diameter in inches

n = Coefficient of roughness, n=0.013, regardless of the pipe material
s = Slope as determined
Q = Cumulative Peak Design Flow converted to ft^3/s (1 ft^3/s = 448.8 gpm)

For the determined pipe diameter, the minimum flow (determined in Section 3.35) is used to calculate the corresponding velocity to verify it is 2.0 ft/s. The Manning Equation shall be used with the slope and n factor above, and the appropriate wetted perimeter.

3.4 PIPE MATERIAL TYPE

The following section provides general information on the types of Pipe Materials acceptable within the El Paso Collection System. Additional information regarding these material types is included in Section 3.5, PIPE MATERIAL SELECTION.

3.4.1 Polyvinyl Chloride Pipe (PVC)

Flexible pipe that shall be manufactured in the United States and shall conform to applicable ASTM Standards listed in Section 3.5 PIPE MATERIAL SELECTION. 8", 12" and 15" diameter pipe shall have a Solid wall type. Larger sizes of PVC may be either Solid or Profile wall type.

Open Profile shall denote, according to ASTM F-794, a pipe product consisting of an essentially smooth waterway braced circumferentially or spirally with outside projections or ribs.

Closed Profile shall denote, according to ASTM F-794, a pipe product consisting of an essentially smooth waterway braced circumferentially or spirally with outside projections or ribs which are joined by an essentially smooth outer wall.

3.4.2 High Density Polyethylene (HDPE)

Flexible pipe manufactured in the United States and shall conform to ASTM Standard F-894. HDPE shall have an Open Profile Wall Type and shall be used in diameters 18" and larger.

3.4.3 Vitrified Clay Pipe

Shall conform to ASTM Standard C-700 and shall be used for 18", 21" and 24" diameters.

3.4.4 Lined Reinforced Concrete Pipe (RCP)

RCP shall conform to the requirements of ASTM C-76, Class IV Wall B, with approved PVC sheet liner. Acceptable pipe diameter sizes shall be 33" and larger.

3.4.5 Fiberglass

Shall be in accordance with ASTM D-3262 and shall be acceptable in sizes 33" and larger.

3.5 PIPE MATERIAL SELECTION

3.5.1 Gravity sewer mains shall be designed and constructed to satisfy requirements established in TABLE 8 for various diameters, material type and stiffness shown. Selection of pipe material shall be approved by the Utility.

3.5.2 In special cases, such as highway or railroad crossings, siphons, or open spans, another type of pipe may be recommended or casing may be required.

3.5.3 Replacement/Maintenance of Existing Pipelines

Projects designed to replace existing pipelines with the same pipe material shall be in accordance with the standards and schedule set herein.

TABLE 8 - GRAVITY SEWER SYSTEM - ALLOWABLE MATERIALS

PIPE SIZE	ASTM STANDARD	MATERIAL	WALL TYPE	MIN STIFFNESS	STND LENGTH
8" 12" 15"	D-3034	PVC	SOLID (SDR-35)	46 psi	20'
	F-789	PVC	SOLID T1-WALL	46 psi	20'
18"	F-679	PVC	SOLID T1-WALL	46 psi	20'
	F-789	PVC	SOLID T1-WALL	46 psi	20'
	F-794	LARGE DIA PVC	PROFILE OPEN	46 psi	13'
	F-894	HDPE	PROFILE OPEN	RSC 100	20'
	C-700	VCP	SOLID	NA	8'
21" 24"	F-679	PVC	SOLID T1-WALL	46 psi	20'
	F-794	LARGE DIA PVC	PROFILE OPEN OR CLOSED	46 psi	13'
	F-894	HDPE	PROFILE OPEN	RSC 100	20'
	C-700	VCP	SOLID	NA	8'
27"	F-679	PVC	SOLID T1-WALL	46 psi	20'
	F-794	LARGE DIA PVC	PROFILE OPEN OR CLOSED	46 psi	20'

TABLE 8 - GRAVITY SEWER SYSTEM - ALLOWABLE MATERIALS					
PIPE SIZE	**ASTM STANDARD**	**MATERIAL**	**WALL TYPE**	**MIN STIFFNESS**	**STND LENGTH**
	F-894	HDPE	PROFILE OPEN	RSC 100	20'
30"	F-794	LARGE DIA PVC	PROFILE OPEN OR CLOSED	46 psi	13'
	F-894	HDPE	PROFILE OPEN	RSC 100	20'
33" 36"	C-76	RCP w/ PVC SHEET LINER	SOLID	NA	7.5'
	D-3262	FIBERGLASS	SOLID	72 psi	20'
	F-794	LARGE DIA PVC	PROFILE OPEN OR CLOSED	46 psi	13'
	F-894	HDPE	PROFILE OPEN	RSC 100	20'
42" 48"	C-76	RCP w/ PVC SHEET LINER	SOLID	NA	7.5'
	D-3262	FIBERGLASS	SOLID	72 psi	20'
	F-794	LARGE DIA PVC	PROFILE CLOSED	46 psi	13'
	F-894	HDPE	PROFILE OPEN	RSC 100	20'
54" 60"	C-76	RCP w/ PVC SHEET LINER	SOLID	NA	7.5'
	D-3262	FIBERGLASS	SOLID	72 psi	20'
	F-894	HDPE	PROFILE OPEN	RSC 100	20'

3.6 MANHOLES

3.6.1 Manhole Location

Manholes shall be located at the following locations: changes in alignment, grade or size of sewer lines, the intersection of sewer lines, points of transition between dissimilar sewer line material types, and at the end of all sewers that will extend at some future date. Other locations may be required and shall be approved by the LVWD.

A. Changes in Alignment. Generally, manholes shall be placed at changes in sewer alignment defined by horizontal and vertical points of intersection. When manholes are placed at bends, the minimum radius of curvature of the centerline of the pipe or smooth mortar channel, constructed within the manhole, shall not be less than 1.5 times the pipeline diameter.

B. Changes in Grade. Drop Manholes are constructed when the invert grade of an influent pipe is 2.5 feet or more above the manhole invert. Construction of drop manholes should be avoided and is generally used only when it is not feasible to steepen the incoming sewer. Drop Manholes shall be in accordance with LVWD Standard Details.

C. Changes in Size. In manholes with different size pipes, the tops of the pipes shall be placed at the same elevation and flow channels in the invert shall be evenly sloped from pipe to pipe.

D. Intersection of Sewer Lines. Manholes are required at a junction where two or more sewer lines intersect. On smaller lines this junction is made within the standard manholes. For sewer lines 48" and larger, a cast-in-place concrete junction box shall be constructed.

E. Future Extensions. Manholes are required at the end of all sewers that will extend at some future date. A stub-out may be required at these manholes.

3.6.2 Manhole Size

The inside diameter of a manhole shall not be less than 48". It shall be sufficient enough so that personnel may work within it and allow proper joining of the sewer pipes inside the manhole wall. Typically, pipes up to and including 18" diameter will be installed in a 48" diameter manhole; pipes up to and including 36" diameter will be installed in 72" diameter manholes; and pipes up to and including 60" diameter will be installed in 96" diameter manholes. Larger pipes required special design considerations, and specific approval by LVWD.

3.6.3 Acceptable Manhole Material Types

A. Pre-cast concrete manholes may be in accordance with the LVWD Standard Details.

B. Cast-in-place concrete manholes may only be used when specific conditions require it.

C. Brick manholes are not allowed by the LVWD, nor may brick be used to adjust manhole covers to grade.

D. Fiberglass manholes and HDPE manholes are not allowed by the LVWD.

3.6.4 Manhole Types and Applications

Manhole type, in accordance with LVWD Standard Details, shall be used according to the applications provided in TABLE 8, unless otherwise specified.

3.6.5 Manhole Frames and Covers

Manhole frames and covers are designed in accordance with the LVWD Standard Details and must allow sufficient access to the sewer. Frame and cover shall fit well thereby prohibiting surface water drainage. Manhole covers within a 100 year flood plain shall have gaskets and be bolted.

Manhole frames and covers must provide adequate strength to support external loads. Manhole covers are required to provide provisions for opening while deterring unauthorized entry.

TABLE 9 - MANHOLE TYPE AND APPLICATIONS	
Manhole Type	**Application**
STANDARD Manhole Type "A"	For line sizes 18" and smaller
STANDARD Manhole Type "A1"	For line sizes 18" and smaller installed in groundwater
SPECIAL Manhole Type "A2"	For line sizes 18" and smaller when special soil conditions require foundation be stabilized
STANDARD Manhole Type "B1"	To be used under special loading conditions generally greater than H-20, or when required by other governing agencies

3.6.6 Manhole Spacing

The maximum recommended manhole spacing along sewer pipelines with straight alignment, uniform grade, and for diameters of 6 to 15 inches is 500 feet; for diameters of 18 to 30 inches is 800 feet; for diameters of 36 to 48 inches is 1,000 feet; and for diameters of 54 inches and larger is 2,000 feet. Reduced spacing may be necessary for sewer inspection and maintenance. Areas subject to flooding require special consideration to minimize inflow.

A manhole shall be provided at the end of a line, greater than 200 feet in length, which will not be extended in the future. Such lines less than 200 feet in length shall be terminated with clean-outs.

3.6.7 Manhole Connection to Sewer Main

Connection will generally utilize a resilient connector, conforming to ASTM C-923, and shall be in accordance with the LVWD Standard Details. The connection shall form a watertight seal between sewer and manhole.

3.6.8 Manhole Access

For depths greater than 4 feet a portable ladder is recommended for access. Generally, ladder rungs shall not be designed for manholes. However, if ladder rungs are required they shall be made of a non-corrosive material and be in accordance with applicable OSHA specifications.

3.7 SEWER SERVICE CONNECTIONS

3.7.1 General

When required, a service lateral, with a minimum diameter of 4-inches, shall be provided for future customer service connections. Service connections are generally not allowed within manholes except for services located within cul-de-sacs. The maximum number of taps into a cul-de-sac manhole shall be three.

3.7.2 Service Connection Locations

A minimum 3-foot separation distance between service taps along the length of a collector is required. Service lines shall extend 6 inches beyond existing or proposed improvements, such as pavement, curb and gutter, sidewalk, etc., in accordance LVWD Standard Details.

3.8 NON-DOMESTIC WASTEWATER DISCHARGES

3.8.1 Prohibited Discharges

No user shall discharge or cause to be discharged into the LVWD wastewater system any pollutant or wastewater except in conformity with the El Paso Water Utilities *Public Service Board Rules and Regulations No. 9* Rules and Regulations Governing the Discharge of Wastewater into El Paso's Wastewater System (Appendix K). In addition, the requirements of the Clean Water Act, the General Pretreatment Regulations in 40 CFR Part 403, and applicable state laws shall also apply to such wastewater discharges.

3.8.2 Industrial Pretreatment

As outlined in the EPWU *Rules and Regulations No. 9*, pretreatment shall be employed as necessary to comply with these rules, and dilution of waste streams in an effort to reduce concentrations of contaminants shall be prohibited. The issuance of industrial wastewater discharge permits shall be through the EPWU Public Service Board, as explained in *Lower Valley Water District - Rules and Regulations*, and in the EPWU *Rules and Regulations No. 9*.

3.8.3 Discharges Requiring Traps, Interceptors or Separators

In accordance with *Lower Valley Water District – Rules and Regulations*, commercial or industrial developments/establishments which may introduce grease, oil, sand or any flammable materials into a wastewater stream shall have in service a well-maintained trap, interceptor or separator to remove such materials from the wastewater prior to discharge into the LVWD system. Such commercial or industrial activities include, but are not limited to, restaurants, food processing plants, garages, service stations, machine shops and factories.

3.8.4 Commercial Connection

To help monitor the effluent into the public sewer system, the LVWD will dictate when the use of a manhole is needed in the case of a commercial service connection is requested. The LVWD will determine the size of Lateral needed and the need for alternative manhole connection at the time commercial plans are reviewed or at construction.

4.0 DESIGN STANDARDS FOR LIFT STATIONS

4.1 GENERAL

Lift stations shall be designed to receive wastewater discharged into the station wet wells from pipelines and to pump that wastewater to selected points of discharge through other pipelines.

The lift stations shall be designed in accordance with the standards set forth in this section and in consideration of the specific conditions, which affect each individual lift station.

The standards included herein establish criteria for determining the size, nature and configuration of the facilities required at each lift station. They shall not be considered as a substitute for the actual design of the stations. The specific conditions, which affect individual lift stations must be determined separately and used in conjunction with these standards to develop the actual designs.

The lift station designs shall include all structural features and all required influent and effluent piping, fittings and valves; wet wells and their accessories; sewage pumps, motors and starters; sensors to monitor liquid levels in the wet wells; controls to start, stop and sequence pump operations; status and alarm systems; electrical systems for power, lighting and communications; ventilation and odor control systems; pump hoisting equipment; and site features.

Lift Stations shall be designed and equipped for regional capability. Lift Stations shall not be accepted when designed for several subdivisions. Lift Stations will also not be allowed when elevation problems that can be solved by filling in the land to be served.

4.2 STANDARD LIFT STATION INSTALLATION

4.2.1 General

The lift stations shall be of the "Duplex" type. The duplex lift stations shall be constructed of precast, reinforced concrete pipe sections. Each duplex lift station shall be equipped with two pumping units.

Duplex type lift stations shall be considered suitable to accommodate wastewater flows in the range up to 1 mgd. If anticipated wastewater flows are greater than 1 mgd, then an alternative design is required. In this event the LVWD shall determine the acceptability of said design on an individual basis.

4.2.2 Basis for Design Standards

The design standards set forth in this section are based upon the use of totally submersible electrically operated sewage pumps; upon the recommendations of pump manufacturers and the Hydraulic Institute as to wet well designs which provide optimum pumping conditions; upon the recommendations of the Environmental Protection Agency and the Texas Commission of Environmental Quality (TCEQ) as to ventilation and odor control requirements; and upon established designs and procedures for influent and effluent piping, liquid level monitoring, status and alarm systems, electrical power and lighting, communication systems, hoisting equipment and site development.

4.2.3 Wet Well Volume Determination

The volume of the lift station wet well shall be such that the maximum number of pump starts does not exceed 10 per hour. This minimum volume shall be determined by the following formula:

$$V = \frac{60}{NS}\left[\frac{Q_1}{Q_2}\left(Q_2 - Q_1\right)\right]$$

where

V = minimum pumping volume per pumping cycle in gallons
60 = minutes per hour
N = number of duty pumps in pumping cycle = 1
S = number of pump starts per hour ≤ 10
Q_1 = expected peak flow, gpm
Q_2 = pumping capacity of station in gallons per minute
(for min. cycle time: $Q_2 = 2\ Q_1$)

The size and depth of the wet well shall assure free flow of wastewater into the wet well with no submergence of the influent pipe. Any limitations, which restrict the depth or area of the wet well shall also be taken into consideration.

If wastewater flow to a lift station is expected to increase in the future, the design must consider increasing the size of the wet well to provide the minimum volume required for the expected future peak flow.

4.3 Selection of Pumping Units

4.3.1 General

Each pumping unit shall consist of a totally submersible electrically operated sewage pump, a mating discharge connection, a motor and an electrical power supply cable.

4.3.2 Basis for Selection

The pumping units shall be selected in consideration of the expected present and future volume of wastewater to be pumped, the head against which that wastewater is to be pumped, the number of pumping units required to meet the pumping conditions, the present cost of the pumping units and the future costs of operation and maintenance.

Each of the pumping units in a duplex lift station must be capable of pumping the expected peak flow to its desired destination with the other unit out of service.

If wastewater flow to a lift station is expected to increase in the future, the design must consider selecting and installing pumping units which are capable of handling present peak flows and then replacing them with units of greater capacity when increased volumes of flow make this necessary. The discharge connections of the pumps selected for the original installation should be compatible with the discharge connections of the pumps which may replace them, and the size of the wet well and the spacing of the pumps must be suitable for both the original and the future pumps.

4.4 Lift Station Design Features

4.4.1 General

All lift stations shall have the following features:

A. Influent and Effluent Piping

B. Wet well and Pipe Vault

C. Pump Redundancy

D. Plug Valves, Check Valves and Sewage Combination Air Valves

E. Reinforced Concrete (Precast or Cast in Place)

F. Accessories, Including Stainless Steel Chains, Guide Bars, Brackets and Supports. These Items Shall be made of Aluminum or Stainless Steel

G. Access Hatches with Safety Features

H. Pump Hoisting Facilities

I. Lockout Switches for Pumps

J. Liquid Level Sensors

K. Provisions for Site Security

L. Sources of Electrical Power

M. Status and Alarm Systems/ Telemetry

N. Non-resettable hour meter to measure motor run times

O. Voltmeter and ampmeter for each pump

In addition to the features described above, the lift stations shall provide facilities for ventilation and odor control as required by the special conditions of individual installations and in accordance with the requirements of the TCEQ.

4.4.2 Specific Lift Station Design Considerations

A. Level Controls: The liquid levels of the wet wells shall be monitored by float type sensors which signal the pump controls to start the duty pump at a predetermined high liquid level and to stop that pump at a predetermined low liquid level.

B. Instrumentation: The functions to be monitored or controlled at the duplex type lift stations shall include the following:

a. High wet well alarm
b. Low wet well alarm
c. Motor on/off status
d. Motor run times
f. Discharge pressure in psi
f. Kilowatt usage
g. Intrusion alarm
h. Gas Monitor
i. Permanent wet well by-pass system

The instruments at the lift stations shall transmit the data described above to a remote terminal unit (RTU) at the site, which in turn will transmit the data by radio to a central station. All remote communications equipment shall be compatible with current LVWD equipment. The control strategy shall be in conformance with the LVWD Standard Details included with this document.

C. Pump Hoisting Equipment: Portable type hoisting equipment installed temporarily in a socket near the wet well hatch may be used to raise or lower the pumps at the duplex lift station, provided that the weight of the pumps does not exceed the capacity of the hoist and its socket. A 2:1 safety factor shall be used in sizing the hoisting equipment.

Portable type hoists shall be as indicated in the LVWD Standard Details included with this document, and shall not weigh more than 150 pounds so that two persons can easily install and remove the hoisting equipment.

D. Access Hatches: Convenient access to the submersible pumps shall be provided by hatches in the top of the wet well. These hatches shall be supplied by the pump supplier, and they shall be sized and located so that the pumps can be raised and lowered through them without hindrance. The hatches shall be as shown in the LVWD Standard Details included with this document, and equipped with the indicated safety features. An allowance for a cable tray through the access hatch frame shall be provide. The tray shall accommodate power and controls cables which shall run in a covered cable trench in the top slab of the lift station from the wet well to the control center.

E. Site Layout: The site for the duplex lift stations must be of sufficient size to permit the stations to be constructed and the attendant facilities installed without encroaching on other adjacent properties. The lift station and its site shall be designed and laid out so as to blend with the adjacent development.

The sites and the lift station facilities must have adequate vehicular access to and from public streets, and they must be enclosed by security fences with locked gates to prevent unauthorized entrance into the sites.

A typical layout for Duplex type stations is shown in the LVWD Design Standards Details included with this document.

F. Typical Layout for Electric Service: Electricity must be supplied to the lift stations for power, lighting and communications. A typical layout for supplying the electrical needs of the Duplex lift stations and a typical electrical diagram for supplying those needs is included in the LVWD Design Standards Details included with this document.

G. Pipe Clearances: The influent and effluent piping, fittings and valves must be installed in accordance with the configurations shown in the Design Standards Details included with this document. The actual sizes, locations, elevations and clearances required for those facilities must be determined by the actual design of each station.

The design of the piping, fittings and valves must consider the sizes of the wet wells and pipe vaults in which they will be installed and the clearances and other dimensions required to install, remove or repair them.

I. By-Pass System: All lift stations shall be designed with a permanent by-pass system that will allow for the maintenance of the wet well for 14 to 31 consecutive calendar days. In general, the by-pass system shall be equipped with a wet well, two pump guide bars, pump supports, piping, coating, access hatch, electrical/controls, and appurtenances for a complete and operational system. The system shall be designed so that the two existing pumps can be employed as the by-pass pumps. The by-pass wet well shall be constructed of similar strength concrete as the wet well and shall be a monolithic poured structure.

Design criteria (flows, time, etc.) used to determine the size of the by-pass wet well and piping shall be presented to the LVWD Engineering Department for review and approval on a case by case basis. A typical plan layout of a by-pass system is included in the LVWD Design Standards Details section of this document.

APPENDIX A

Standard Specifications and Testing Procedures For Water and Wastewater Facilities

STANDARD SPECIFICATIONS AND TESTING PROCEDURES
FOR
Water and Wastewater Facilities

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GENERAL

1. **Contractors' Responsibility for Installation of the Water and Sanitary Sewer System.** It is the intent of these specifications/guidelines that the installation of the water and sewer mains be a complete workable system, functioning in accordance with the specified purpose. Therefore, it is the direct responsibility of the Contractor to furnish, install and construct a complete system required by the plans for the bid unit prices in the Contract, and to take account of all subsidiary requirements for the materials and other items furnished to the end that the water and sewer mains function in accordance with the specified requirements.

2. **Schedule of Work:** Contractor shall fully coordinate his work with that of other Contractors and any operations required from the Lower Valley Water District in advance in order to avoid delays and conflicts. Personnel from the Lower Valley Water District will assist in working out the coordination between the construction operations and the operation of the existing facilities, but it is the Contractor's responsibility to clear all his operations that might interfere with such existing operations with the Project Engineer. Contractor shall fully coordinate in advance any service outage with the property owners, businesses and residents.

3. **Temporary Service.** Contractor shall take into consideration that service outages to businesses and residences are limited to a maximum of four (4) consecutive hours within a 24-hour period. Contractor shall make provisions to immediately provide and maintain temporary service to all customers (businesses, residences, etc.) should the service outage extends beyond the four-hour outage limit. However, temporary service shall be immediately provided to any customer that requests it prior to the four-hour outage limit. Should the Contractor not be able to restore service within the 4-hour maximum service outage limit, the Lower Valley Water District will furnish potable water to the customers, at the Contractor's cost.

4. **Inspection of Materials.** All materials furnished by the Contractor shall be subject to the inspection and approval of the Lower Valley Water District or its representative, at any and all times during the progress of the work and until the final completion of the same. As soon as the materials are tested and inspected, the Contractor shall immediately remove all rejected material from the work, and to a point such distance there from as the Lower Valley Water District may require. No material shall be used before being inspected and approved by the Lower Valley Water District, or its representative, but failure or neglect on the part of the Lower Valley Water District, or its representative, to condemn or reject inferior materials or work shall not be construed to imply any acceptance of the same should its inferiority become evident at any time prior to final acceptance of the work.

5. **Removed Materials.** Equipment, piping, appurtenances and other components scheduled to be salvaged shall be returned and delivered by the Contractor to the Lower Valley Water District. However, if the Contractor removes any section of pipe that is scheduled to be abandoned, then it will become the responsibility of the Contractor to properly dispose of it.

6. **Water for Construction.** Water for all construction purposes will be provided at the Contractor's expense for trenching, water and sanitary sewer installation, filling, testing, disinfecting and flushing existing and proposed installations, and all storm drain, landscape, roadway construction, dust control, compaction and clean-up. At no time will un-metered

water consumption be allowed, nor will the Contractor be allowed to operate a fire hydrant. Construction water can be provided upon approval and meter deposits and fees to the Utility have been paid on an existing fire hydrant. Any fees and/or rates shall be current at time of construction. The fire hydrant meter will not be removed from the assigned fire hydrant by anyone other than Utility Personnel. An outlet valve will be provided with the fire hydrant meter for Contractor use. A water loss fee of $1,000.00 (or at the current rate) will be assessed to the Contractor for each occurrence that violates the above. Charges due will be deducted from the deposited amount. Charges in excess of the deposit amount must be paid before the project will be accepted into the Utility System. Any excess deposit will be refunded promptly.

Construction water drawn through fire hydrant meters will be charged to the Contractor at a usage rate current at time of construction. Fire hydrants meters will be installed and removed by Lower Valley Water District's personnel only. Fire hydrant meters have a locking device and a built-in backflow preventor. The Contractor maybe responsible for providing his own backflow preventor for fire hydrant meters. Water used to fill, pressure test, and disinfect water main lines will be billed at the standard construction water rate current at the time of construction and will be calculated at one and a half times the volume of the installed pipe.

The Contractor may, with the approval of the Engineer, make other arrangements and secure water for construction purposes, with the exception of filling, testing and disinfecting the water lines, from a source of his own choosing, including but not limited to Reclaimed Water from the Wastewater Treatment Plants. The Contractor shall obtain information, terms and conditions of service, application process, and other requirements from the Lower Valley Water District Rules & Regulations. Issuance of a construction meter or standpipe requires a deposit. Standard forms are available at the Lower Valley Water District's Customer Service Department. The Contractor shall provide such facilities as may be required for transporting and utilizing this water, at his own cost.

Upon completion of the project, the Contractor must call the Lower Valley Water District's Customer Service Dept. at 791-4480 to have the meter removed. Upon meter removal, the Contractor will be assessed for the water consumed plus any damages to the fire hydrant and/or fire hydrant meter assembly.

7. **Care of Existing Structures.** Existing buildings, structures, power and telephone lines, trees, fences, water pipes, gas lines, sewer or other conduits, embankments, monuments and sundry structures in the vicinity of the work shall be supported and protected from damage by the Contractor during construction and until completion of the work. The Contractor shall be liable for all damages done to such structures, as herein provided, and shall save and keep the Owner harmless from any liability or expense for injuries, damages, or repairs to it.

I. WATER MAINS

Note: The word "Engineer" used in this section refers to the Lower Valley Water District's Engineering Department personnel or project representative.

1. **Description.** This Item shall govern for all materials and work necessary for the installation of all water mains as shown on the plans.

2. **Materials.**

   (1) Polyvinyl Chloride (PVC) Pressure Pipe.

   (a) Scope. These specifications cover the requirements for polyvinyl chloride (PVC) pressure plastic pipe materials and installation for potable water use. These specifications shall apply to PVC pipe in sizes 4-inch through 16-inch diameters.

   (b) Quality Assurance. All PVC pipe shall be coded to provide positive identification and prevent accidental damage to or interruption of the water facilities. Pipe shall conform to American National Standards Institute/National Sanitation Foundation (ANSI/NSF) Standard 61 "Drinking Water System Components - Health Effects" and be certified by and organization accredited by ANSI. Such compliance shall be evidenced by an affidavit from the manufacturer or vendor. If the pipe does not presently conform to this standard, information from the manufacturer regarding action being taken to comply with this standard must be submitted.

   Only pipe manufactured in the United States of America will be accepted.

   Pipe shall be suitable for use in the conveyance of water for human consumption. Each piece of pipe shall be marked with two seals of the testing agency that certified the pipe material as being suitable for potable water use.

   (c) Submittals. The CONTRACTOR shall be responsible for furnishing all necessary shop drawings, certificates, etc. for review and acceptance to the ENGINEER. A certification from the manufacturer shall be furnished to the ENGINEER attesting compliance with appropriate ASTM Standards and ANSI/NSF Standard 61. Such compliance shall be evidenced by an affidavit from the manufacturer or vendor. If the pipe does not presently conform to this standard, information from the manufacturer regarding action being taken to comply with this standard must be submitted. Failure to provide this information may result in rejection of pipeline material.

   Submit documentation on pipe products, fittings, and related materials as may be required by the Contract Documents or the ENGINEER. Review all submittals prior to submission. Submit it in a timely manner so as not to delay the project. Allow sufficient time for ENGINEER's review and resubmission, if necessary. Include certifications from manufacturer that the product complies with appropriate ASTM standards.

(d) Standards. PVC Pressure Pipe shall comply with the applicable requirements of the following:

ANSI/NSF 61	Drinking Water System Components - Health Effects
ASTM F-477	Specifications for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
ASTM D-1784	Specifications for Rigid Polyvinyl Chloride (PVC) Compounds and Chlorinated Polyvinyl Chloride (CPVC) Compounds
ASTM D-2241	Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR-Series)
ASTM D-2774	Recommended Practice for Underground Installation of Thermoplastic Pressure Piping
AWWA C-651	Standard for Disinfecting Water Mains
AWWA C-900	Standard for Polyvinyl Chloride (PVC) Pressure Pipe 4-Inch through 12-Inch, for Water Distribution
AWWA C-905	Standard for Polyvinyl Chloride (PVC) Water Transmission Pipe, Nominal Diameters 16-Inch through 36-Inch
AWWA M-23	Manual: PVC Pipe - Design and Installation
UNI-BELL-3	Polyvinyl Chloride (PVC) Pressure Pipe (Complying with AWWA Standard C-900)
UNI-BELL-11	Polyvinyl Chloride (PVC) Water Transmission Pipe Nominal Diameters 16-Inch through 36 Inch

(e) Delivery and Storage. Pipe, fittings and accessories shall be inspected upon delivery and during progress of the work. Any material found defective will be rejected by the ENGINEER, and shall be promptly removed from the site.

All pipe, fittings and other accessories shall, unless otherwise directed, be unloaded at point of delivery, hauled to and distributed at the site of the work by the CONTRACTOR. In loading and unloading, materials shall be lifted by hoists or rolled on skidways so as to avoid shock or damage. Under no circumstances shall materials that have been dropped be incorporated in the work. Pipe handled on skidways shall not be skidded or rolled against pipe already on the ground.

PVC pipe shall not be stored outside exposed to prolonged periods of sunlight. Any discoloration of pipe due to such exposure is an indication of reduced pipe impact strength, and will be sufficient cause for rejection of the pipe. Any pipe rejected shall be removed from the job site.

(f) Pipe Materials. Pipe shall meet the requirements of AWWA C-900 for 4-inch through 12-inch sizes, and AWWA C-905 for 14-inch through 36-inch pipe. Pipe shall be Underwriters Laboratories (UL) approved. All PVC pressure pipe shall be

furnished in cast iron pipe equivalent outside diameters and a standard laying length of 20-feet. Minimum pressure class shall be 150 psi (DR 18) for 4-inch through 12-inch diameters, and 200 psi (DR 21) for 14-inch through 16-inch pipe.

(g) Joints. Pipe joints shall be push-on, flexible elastomeric gasket. The pipe length shall contain one bell-end or couple with a synthetic elastomeric gasket. Gaskets shall meet the requirements of ASTM F-477. The bell shall be an integral part of the pipe length and have the same strength and DR as the pipe. The spigot pipe end shall be beveled.

All pipe shall have a home mark on the spigot indicating proper penetration when the joint is assembled. The sockets and/or spigot configurations for the fittings and couplings shall be compatible to the pipe. Socket configuration shall prevent improper installation of gasket and shall ensure that the gasket remains in place during joining operations.

(h) Fittings. Pipe fittings shall be ductile iron, cement lined, in accordance with AWWA C-110 and Section IV - Valves and Fittings of this manual. Pipe fittings shall be mechanical joint (MJ) unless otherwise specified.

(i) Provisions for Thrust. Concrete thrust blocks and support blocks and/or mechanical joint restrainers shall be installed at all fittings and valves in accordance with LVWD Standard Details and these specifications. Mechanical Joint Restrainers shall be as manufactured by EBAA Iron, Uni-Flange or approved equal.

(j) Pipe Trenching, Installation and Backfill. Except as noted, Pipe Trenching, Installation and Backfill for PVC Pressure Pipe shall be in accordance with AWWA M-23, C-900, C-905.

Trench Width. The minimum clear width of the trench should be 1-foot greater than the outside diameter of the pipe. The maximum clear width of the trench at a point 1-foot above the top of the pipe is equal to the pipe outside diameter plus 2-feet. If the maximum recommended trench width is exceeded or if the pipe is installed in a compacted embankment, then pipe embedment shall be compacted to a minimum point of 2-1/2 pipe diameters from the side of the pipe or to the trench walls.

Pipe Zone Embedment. Unless otherwise specified, PVC pressure pipe shall be embedded in Class II material as defined in Section III. Native material or imported material meeting or exceeding Class II requirements may be used. Class I material is acceptable at the discretion of the CONTRACTOR.

Installation. Plastic pressure pipe shall be installed in accordance with AWWA M 23 and C-900 and/or manufacturer's printed recommendations, whichever is applicable. Where a conflict arises with this specification, this specification shall control.

Care shall be taken to insert the pipe spigot to the reference mark to prevent buckling or separation of the pipe joint. The reference mark shall be showing and

not be further than 1/2-inch from the leading edge of the pipe bell. The CONTRACTOR shall verify that the manufacturer's reference mark is correct per manufacturer's literature.

Under no circumstances should the pipe or accessories be dropped into the trench. When pipe laying is not in progress, open ends of installed pipe should be closed to prevent entrance of trench water, dirt and foreign matter into the line.

Marking Tape. PVC pressure water pipe shall be marked by concurrently installing the appropriate marking tape for detection purposes. The detectable tape shall consist of a 5.0 mil inert polyethylene plastic material. It shall be high visibility blue with the standard warning and identification for potable water imprinted on the tape. The minimum width of detectable tape shall be 2-inches for 8-inch lines and smaller and 6-inches for larger potable water lines. The maximum burial depth shall be 18-inches for the 2-inch wide and 36-inches for the 6-inch wide tape, measured from finished grade. Detecting tape shall be manufactured by Thor Enterprises or approved equal.

Deflection. Maximum ring deflection of installed PVC pressure pipe shall be 5 percent. Joint deflection shall not exceed manufacturer's recommendations for the particular size pipe.

Corrosion Protection. As a precaution against corrosion, all flanges, bolts, nuts and other exposed metal surfaces underground shall be coated with Texaco, Koppers, or approved equal rustproof compound.

(k) Testing. Disinfect and test the piping system as detailed in AWWA C-651 and in accordance with Section II of these Specifications.

(2) Ductile Iron (DIP) Pipe.

(a) Scope. Furnish all labor, materials, equipment and incidentals required and install all ductile iron piping, as shown on the drawings and as specified herein.

(b) Quality Assurance. The entire pipeline shall be the product of one manufacturer. The manufacturer shall have a minimum of ten-years successful experience in designing and manufacturing pipe joints of similar design, pipe diameter, and pressure class as those specified. Pipe shall conform to American National Standards Institute/National Sanitation Foundation (ANSI/NSF) Standard 61 "Drinking Water System Components - Health Effects" and be certified by and organization accredited by ANSI. Such compliance shall be evidenced by an affidavit from the manufacturer or vendor. If the pipe does not presently conform to this standard, information from the manufacturer regarding action being taken to comply with this standard must be submitted.

(c) Submittals. Submit documentation on pipe products, fittings, and related materials as may be required by the Contract Documents or the ENGINEER. Review all submittals prior to submission. Submit in a timely manner so as not to delay the project. Allow sufficient time for ENGINEER's review and resubmission, if

necessary. Include certifications from manufacturer that the Ductile Iron Pipe complies with appropriate AWWA Standards and ANSI/NSF Standard 61.

Such compliance shall be evidenced by an affidavit from the manufacturer or vendor. If the pipe does not presently conform to this standard, information from the manufacturer regarding action being taken to comply with this standard must be submitted.

If requested, copies of results of factory hydrostatic tests shall be provided.

(d) Standards. DIP shall comply with applicable requirements of the following:

ANSI/NSF 61	Drinking Water System Components - Health Effects
ASTM A-536	Specification for Ductile Iron Castings
AWWA C-104	Standard for Cement Mortar Lining for Ductile Iron Pipe and Fittings
AWWA C-105	Standard for Polyethylene Encasement for Ductile Iron Piping
AWWA C-110	Standard for Ductile Iron and Gray Iron Fittings
AWWA C-111	Standard for Rubber Gasket Joints for Ductile Iron Pipe and Fittings
AWWA C-150	Standard for Thickness Design of Ductile Iron Pipe
AWWA C-151	Standard for Ductile Iron Pipe
AWWA C-214	Tape Coating Systems for the Exterior of Steel Water Pipelines
AWWA C-600	Standard for Installation of Ductile Iron Water Mains and Appurtenances
AWWA C-651	Disinfecting Water Mains

(e) Pipe Materials. Ductile iron pipe shall be manufactured in accordance with AWWA C-151. The minimum pressure class rating shall be 150 psi, unless otherwise specified. The Ductile Iron shall conform to ASTM Specification A-536 with physical properties of Grade 60-40-18. The pipe shall be designed for 5-feet of cover or for the depths shown on the plans; whichever is greater.

Standard joint length shall be 18-feet or 20-feet and inside diameter shall be industry standard. A maximum of 20% of the total number of pipe joints of each specified size may be furnished in lengths that are as much as 24-inch shorter than the standard laying length and an additional 10% may be furnished in length that are as much as 6-inches shorter than the standard laying length.

CONTRACTOR shall be responsible for all material furnished by him and shall replace, at his own expense, any material found to be defective in manufacture or damaged.

(f) Joints. Shall be in accordance with AWWA C-111, AWWA C-151. Standard joints for ductile iron pipe shall be push-on. Where indicated on the drawings, joints shall be mechanical or flanged. Flanged joints shall have pressure ratings equal to or greater than adjacent pipe. Flange pattern shall match pattern of valve, fitting, or appurtenance to be attached.

(g) Fittings. Shall be ductile iron in accordance with AWWA C-110 and Section IV of these Specifications. Fittings shall be rated for a minimum working pressure of 250 psi, unless otherwise specified.

Factory welded outlets, minimum pressure rating 250 psi, may be used in lieu of tee fittings for 18-inches and larger tee fittings. Factory welded outlets may not be used near sources of vibration, such as pump stations or roads, unless specifically noted on the plans.

All fittings and appurtenances shown on the Contract Drawings shall be considered subsidiary to the water main installation. Mechanical Joint Restrainers shall be considered subsidiary to the installation all fittings, valves and appurtenances.

Any "Additional Fittings" (bends, caps, plugs, tapping sleeves, tees, crosses, etc.), deemed necessary by the Engineer for the adequate system operation and as approved by the Owner, shall be installed complete in place with the required provisions for thrust restraint and corrosion protection. "Additional Fittings" shall be measured and paid for at the unit price bid for "Additional Fittings" by the pound (lbs.).

(h) Exterior Coating. The manufacturer shall provide a standard asphaltic coating in accordance with AWWA C-151, unless otherwise specified. The finished coating shall be continuous, and smooth and strongly adherent to the pipe.

Polyethylene wrap shall be used on ductile iron for sizes 30-inch and smaller. The polyethylene wrap shall be applied in accordance with AWWA C-105/A21.5 except a minimum thickness of 30-mils shall be used.

(i) Interior Lining. Ductile Iron Pipe and fittings shall have a cement mortar lining in accordance with AWWA C-104 and bituminous seal coat. Cement Type for lining shall be appropriate for pipe application. Lining thickness shall be as specified in AWWA C-104.

(j) Provisions for Thrust. Where indicated and where required for thrust restraint, joints shall be restrained. Restrained joints shall be mechanically interlocking joints. Restrained joints shall be U.S. Pipe "TR Flex", American Cast Iron Pipe "Flex Ring", or Clow Corporation "Super-Lock". Restrained joints shall be capable of sustaining the specified design pressure.

Thrust at bends, tees, plugs, or other fittings shall be resisted by restrained joints. If thrust cannot be accommodated using restrained joints, such as bends adjacent to casing pipe, use thrust blocking or concrete anchors to restrain thrust, in accordance with Article II of these Specifications.

Restrained joints shall be used for a sufficient distance from each bend, tee, plug, or other fitting to resist thrust which will be developed at the design pressure of the pipe. For the purposes of thrust restraint, design pressure shall be 1.5 times the design working pressure class indicated. Length of pipe with restrained joints to resist thrust forces shall be determined by pipe manufacturer in accordance with the Handbook of Ductile Iron Pipe. The following parameters shall be used: laying condition equal to AWWA C-600 Type 5 soil, safety factor of 1.8, a unit bearing resistance equal to zero, an a factor for polyethylene encasement as recommended by DIPRA, if required.

(k) **Pipe Trenching, Installation, and Backfill.** Except as noted, Pipe Trenching, Installation and Backfill for DIP shall be in accordance with AWWA C-600 and these Specifications.

General. Any damage to Polyethylene encasement shall be repaired according to AWWA C-105. Pipe shall be kept clean during installation. Exposed ferrous metal which cannot be protected with field-applied tape coating, shall receive two coats of Koppers Bitumastic No. 50, or approved equal.

Pipe and fittings shall be installed to line and grade indicated. In areas where the line and grades indicated cannot be achieved using standard manufactured bends and fittings, make slight adjustments by deflecting joints according to the limitations of AWWA C-600.

Embedment. Unless otherwise specified or shown on the drawings, Ductile Iron Pipe shall be embedded in NATIVE material as defined in Section III. If NATIVE material is not suitable, CLASS II material as defined in Section III shall be used.

Pipe Cutting. When required, the cutting shall be by machine, leaving a smooth cut at right angles to the axis of the pipe. Ends of cut pipe to be used with a push-on joint bell shall be beveled to comply with manufactured spigot end. Cement lining shall be undamaged.

Corrosion Protection. As a precaution against corrosion, all flanges, bolts, nuts and other exposed metal surfaces underground shall be coated with Texaco, Koppers, or equal rustproof compound.

(l) **Testing.** Disinfect and test the piping system in accordance with Section II of these Specifications and as detailed in AWWA C-651.

(3) **Cement Stabilized Backfill.** When indicated on the plans or as required by governmental entities (r.o.w. owners), trenches shall be backfilled to the elevations shown, with stabilized backfill containing aggregate, water and a minimum of two (2) sacks per cubic yard of material as placed. Aggregate, cement and water shall be as noted on the plans and/or as approved by the Engineer.

(4) **Cutting and Restoring Pavement.** Where sewers must be installed in streets or other paved areas, the work shall include saw cutting of the pavement and base to neat lines and prompt replacement of these materials after sewer excavation and backfill are completed. The replacement materials, as to type and thickness, shall be as shown on

the plans. Any work done or damage to base and/or pavement outside the limits shown on the plans will not be measured for payment, but shall be restored at the Contractor's entire expense.

Where excavation is required to be done in streets or highways, maintenance and control of traffic shall be in accordance with the plans.

When allowed by the construction sequence, shown in the plans or when directed by the Engineer, a "Temporary Concrete Cap" of the depth and class of concrete as shown on the plans, or as directed by the Engineer, shall be used in lieu of a permanent repair. Use of cement stabilized materials in lieu of compacted soils will be at the Contractor's expense.

3. Measurement.

(1) Water Main (PVC). This Item will be measured in place by the linear foot of PVC pipe water mains.

(2) Water Main (Ductile Iron Pipe). This Item will be measured in place by the linear foot of ductile iron pipe water mains.

(3) Cement Stabilized Backfill. This Item will be measured by cubic yard.

(4) Pavement Cut and Restore. This will be measured by the square yard.

II. CLEANING, DISINFECTION, AND TESTING OF WATER SYSTEM

Note: The word "Engineer" used in this section refers to the Lower Valley Water District's Engineering Department personnel or project representative.

1. **Description.** This Item shall govern for disinfection and testing of all water mains and related appurtenances.

2. **Materials.**

   (5) **Standards.** Disinfecting and Testing of Water Mains shall comply with applicable requirements of the following:

   AWWA B-300 "Standard for Hypochlorites"

   AWWA B-301 "Standard for Liquid Chlorine"

   AWWA C-651 "Standard for Disinfecting Water Mains"

   (6) **Materials.**

   (a) **Water** required for filling, flushing and testing the line will be provided at the CONTRACTOR's cost, at such points along the pipeline as water is available from the existing distribution or supply systems (See "Water for Construction"). Wasting of water will not be condoned and such actions may require the Owner to make appropriate charges for such water.

   The CONTRACTOR shall make provisions to provide the water, by tank truck or other means, to the points necessary to produce specified test pressure.

   The CONTRACTOR shall coordinate the disposal of water with the Engineer and LVWD's Operations Division. Disposal of water onto the streets will not be allowed and will be considered "wasting of water", unless otherwise approved by the LVWD.

   (b) **Chlorinating Material.** Shall be either liquid chlorine conforming to AWWA B-301 or hypochlorite conforming to AWWA B-300.

4. **Execution.**

   (1) **General.** After completion of all pipe line section, the following procedure will be used to clean, sterilize and pressure test the pipeline. The pipeline shall be filled and flushed until all evidence of dirt or debris has been washed from the pipeline. The line shall then be refilled if necessary, introducing the chlorinating material. Each valved section shall then be brought up to test pressure and the leakage test performed. After all sections have been accepted, all valves shall be cleaned and the line left full of sterilizing water.

Water for disinfection and testing of water mains will be provided at the CONTRACTOR's expense, as described in "Water for Construction".

(2) **Quality Assurance.** The CONTRACTOR shall take special care to keep the interior of the pipe clean during storing, handling, and laying operations in order to reduce the need for flushing to an absolute minimum. In addition, all open ends shall be tightly covered whenever unattended to prevent small animals and dirt from entering the pipeline after it is in place. Testing firm shall be a company specializing in testing and examining potable water systems and be approved by the State of Texas. Submit bacteriologist's signature and authority associated with testing

(3) **Sterilization/Disinfection.** Before acceptance for operation, each unit of completed water system shall be sterilized as specified below or as prescribed by AWWA Standard C-651. The unit to be sterilized shall be thoroughly flushed with water until all entrained dirt and mud have been removed before introducing the chlorinating material. The CONTRACTOR shall provide all chlorination material for sterilization at his cost. The chlorinating material shall provide a dosage of not less than 50 parts per million and shall be introduce into the water line in an approved manner. The treated water shall be retained in the pipe long enough to destroy all nonspore-forming bacteria. Except where a shorter period is approved, the retention time shall be at least 25 hours after which the lines shall be flushed clean until the chlorine concentration in the water leaving the lines is no higher than that generally prevailing in the system, or less than 1 ppm. Chlorine solution with a higher residual may remain in the line, without flushing, if approved by the Engineer.

Procedure. During installation, the interior of all pipe, fittings and other accessories shall be kept as free as possible from dirt and foreign matter at all times. If, in the opinion of the Owner or Engineer, the pipe contains dirt or foreign matter that could not be removed during the flushing operation, the interior of the pipe shall be cleaned and swabbed with a bactericidal solution. When pipe laying is not in progress, the open ends of pipe shall be sealed with watertight plugs. If water has accumulated in the trench, the seal shall remain in place until the trench water has been removed to such an extent that it will not enter the pipe.

After the completion of hydrostatic pressure tests and prior to disinfection, the pipeline shall be flushed, as thoroughly as possible with the water pressure and outlets available. If feasible, flushing rate should develop a velocity in the pipeline of at least 2.5 fps. The minimum quantity of water used for flushing shall be in excess of the storage capacity of the pipeline, to insure that clean water has traversed the entire length of the line.

After flushing has been completed to the point that all apparent dirt and foreign matter have been removed from the pipeline, calcium hypochlorite solution shall be injected into the pipeline as provided in AWWA Standard C-651.

Following chlorination, all treated water shall be flushed from the newly laid pipeline at its extremities until the replacement water throughout its length is proved by test to be: a) comparable in quality to the potable water served from the existing water supply system, or b) as approved by the public health authority

having jurisdiction. Should the initial treatment fail to achieve the satisfactory quality described above, the original chlorination procedure shall be repeated until satisfactory results are obtained.

Contractor shall not discharge water used for disinfection purposes to any waterway or water course known to support fish or wildlife, if the water contains more than 4 ppm of chlorine. Dechlorination by methods acceptable to the Owner and Engineer must be used if Contractor proposes discharge to waterways or water courses known to support fish or wildlife. Discharge to holding ponds so that evaporation or infiltration will occur, or use in obtaining optimum moisture content in trench backfill or embankments, or other approved discharge methods may be used in lieu of dechlorination.

Bacteriological report shall include, at minimum, the following information:

1. Date issued, project name, and testing laboratory name, address, and telephone number.

2. Time and date of water sample collection.

3. Name of person collecting samples.

4. Test locations.

5. Initial and 24 hour disinfectant residuals in ppm for each outlet tested.

6. Coliform bacteria test results for each outlet tested.

(4) Hydrostatic Pressure and Leakage Testing. All valves and hydrants shall be checked for proper operation and pressure the pipe system shall be subjected to a hydrostatic pressure and leakage test. After completion of each valved section and following the filling and disinfection of the section, the system shall be subjected to this test. The meter, pressure gauges, pump, small piping and hose connections, and all labor necessary for conducting the test, shall be furnished by the CONTRACTOR.

After the section of pipeline has been filled, water shall be pumped into the section and the pressure raised to 150 psi. This test pressure shall be maintained for a period of at least two (2) hours. The water required to maintain this pressure shall be delivered into the pipe through the meter. The amount of water through the meter during the two-hour test period will be the total leakage. Should this leakage exceed the allowable amount, as specified herein, the CONTRACTOR shall make such repairs as may be required until the actual leakage, as determined by succeeding tests, is no greater than the allowable as determined by the following formula:

$L = S \times D \times (P^{1/2}) / 133{,}200$

L = 0 in above ground systems and otherwise

L = Allowable Leakage in gallons/hour

S = Length of pipe tested in feet

D = Nominal diameter of pipe in inches.

P = Average test pressure during the test, in pounds per square inch, gage; determined by computing the weighted average of actual pressures on various portions of the section.

After all sections of the pipeline have been tested, as described above, all valves shall be closed and the line left filled with the water to be used for disinfection and testing. Under no circumstances will the Contractor be allowed to open/close existing valves on the existing potable water system.

III. EXCAVATION, INSTALLATION AND BACKFILL OF WATER SYSTEM

Note: The word "Engineer" used in this section refers to the Lower Valley Water District's Engineering Department personnel or project representative

1. Description.

Trench Excavation and Preparation. Classification of excavation shall be "unclassified" and involves removing unnecessary materials and excavating trenches to the alignment, width, and depth as indicated in the plans or as required for the proper installation of the pipe and appurtenances. Adjacent structures shall be protected from damage by construction equipment. All excavated material shall be piled along the trench in a manner which will not endanger the work.

2. Materials.

(1) Pipe Zone and Backfill Materials.

(a) Standards. Embedment materials shall comply with applicable requirements of the following:

ASTM D-75 "Methods for Sampling Aggregates", ASTM D-448 "Specification for Standard Sizes of Coarse Aggregate for Highway Construction", ASTM D-2321 "Recommended Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe", ASTM D-2487 "Classification of Soils for Engineering Purposes".

(b) Definitions. For the purpose of this specification, "pipe zone" shall define the area extending from the bottom of the trench bedding to 12-inches above the top of the pipe and to the undisturbed trench walls on either side of the pipe.

"Embedment" shall be defined as those vertical stratas of backfill material in the pipe zone consisting of bedding, haunching, and initial backfill, as defined in ASTM D-2321, and shown in the Utility's Standard Detail No. 101 or as shown on the Drawings.

(c) Submittals. Submittals shall include certified test reports for embedment material. Certified test reports shall be from an independent laboratory. Test reports shall include sieve analysis and Atterberg's limits.

A gradation of Class I material shall be submitted by the CONTRACTOR to the ENGINEER for approval prior to use.

(2) Pipe Zone Backfill.

Pipe zone embedment material shall be any of the following classes:

Class I material shall be manufactured angular, well-graded, crushed stone per ASTM D-2321 with a maximum particle size of 3/4-inch unless otherwise specified. The following materials shall be acceptable under this class designation: ASTM D-448

- Stone Sizes 4, 67, 5, 56, 57, and 6. Pea Gravel and other uniformly graded material are not acceptable under this class.

Class II material shall be coarse sands and gravels per ASTM D-2487 with maximum particle size of 1-1/2 inch, including variously graded sands and gravels, containing less than 5 percent fines (material passing the #200 sieve) generally granular and non-cohesive, either wet or dry. Soil Types GW, GP, SW and SP are included in this class.

Class III material shall be fine sand and clayey (clay filled) gravels, per ASTM D-2487, including fine sands, sand-clay mixtures, and gravel-clay mixtures, containing more than 12 percent fines (materials passing the #200 sieve). Class III includes soil Types GM, GC, SM and SC.

Under no circumstances shall Class IV or V material, as defined in ASTM D-2487, be used for embedment.

Materials shall be classified according to The Unified Soil Classification System as defined in ASTM D-2487.

(3) **Final Backfill.** Material for backfilling above the pipe zone shall be defined as follows, unless otherwise shown on the contract drawings or directed by the governing agency for the specific right-of-way:

Native. The most granular material excavated from the trench comprising the spoil bank may be used, provided it is devoid of rocks larger than three inches in greatest dimension, organic material, and other unsuitable material. If initially saturated during the excavation, the backfill shall be allowed to dry sufficiently, being manipulated if necessary, prior to placing back into trench, to achieve the specified compaction at plus or minus 2 percent of optimum moisture content.

Select. If material excavated from the trench is unsuitable as backfill material, or the required compaction is unattainable for the particular spoil backfill material, the CONTRACTOR shall, at his expense, import select material to be mixed with or used in place of the spoil material. Select material shall be designated as Class II as described in this Article.

Soil Cement. Where cement stabilized backfill is shown on the Drawings, or required by governing jurisdiction or utility, it shall consist of a mixture of soil or sand and 2 sacks of Portland cement per cubic yard. Soil shall be a sandy material, free from lumps, clods or organic material. If excavated material is not suitable, pit-run sand shall be used. Cement stabilized backfill shall be mixed in a concrete mixer or transit mixer.

3. Execution.

(1) **Sources and Evaluation Testing.** Materials to be used for embedment and for backfill shall be obtained in accordance with a sampling plan and ASTM D-75. Testing of materials to certify conformance with specification requirements shall be performed by an independent testing laboratory approved by the Owner, at the CONTRACTOR's expense. CONTRACTOR's testing agency shall perform tests upon change of source and at sufficient intervals to certify conformance of all material furnished for use on this project.

(2) Trench Excavation and Preparation.

(a) Trench Width. The trench walls in the "pipe zone" shall be vertical.

Trench width at the top of the pipe for **RIGID PIPE** shall not exceed the outside diameter of the pipe barrel, plus the following allowance:

RIGID PIPE - TRENCH WIDTH	
PIPE DIAMETER	TRENCH WIDTH = BARREL OUTER DIAMETER PLUS
Less than 18-in.	16 in.
18 in. - 24 in.	19 in.
27 in. – 39 in.	22 in.
42-in. & Larger	½ Pipe O.D.

If maximum trench width specified above is exceeded at the top of the pipe, the CONTRACTOR shall provide, at his expense, additional load-bearing capacity by means of improved bedding, concrete cradle, cap, or encasement, or other means approved by the ENGINEER.

Trench walls above the pipe zone may be laid back or benched, where space permits, as necessary to satisfy the requirements of Occupational Safety and Health Administration (OSHA). Additional requirements for Trench Support are specified herein.

Wherever the prescribed maximum trench width is exceeded, the CONTRACTOR shall remove all loose and sloughed-in material from the trench and replace with compacted granular material such that haunching and initial backfill is compacted to at least 2.5 pipe diameters from either side of the pipe or to the trench walls at no additional cost to the Owner.

Unless otherwise agreed upon, no additional payment will be made to the CONTRACTOR for extra material and labor required to fill excessive trench widths caused by the CONTRACTOR's equipment or natural collapse of trench walls.

(b) Trench Bottom. Excavate the trench to an even grade so that the full length of the pipe barrel is supported and joints may be properly assembled.

For 30-inch diameter and smaller pipe, the trench shall be "rough cut" a minimum of 4-inches below the bottom of the pipe. For 33-inches and larger pipe, the trench shall be "rough cut" a minimum of 6-inches below the bottom of the pipe. The "rough cut" dimension shall be increased as necessary to provide a minimum clearance of 2-inches from the bottom of the trench to the bottom of the bells, flanges, valves, fittings, etc.

The entire foundation area at the bottom of all excavations shall be firm, stable material. Loose material shall be removed, leaving a clean, flat trench bottom, and material shall not be disturbed below required subgrade except as hereinafter described.

If the subgrade is soft, spongy, disintegrated, or where the character of the foundation materials is such that a proper foundation cannot be achieved at the elevation specified, the CONTRACTOR shall deepen the excavation, not less than 6-inches to a depth where a satisfactory foundation may be obtained. The subgrade shall then be brought back to the required grade with Class I coarse gravel compacted to seventy percent (70%) relative density per ASTM D-4254.

(c) **Over Excavation.** If the trench is excavated to a faulty grade (at a lower elevation than indicated), correct the faulty grade at no additional cost to the Owner, as specified below:

In uniform, stable dry soils; correct the faulty grade with Class II granular embedment material thoroughly compacted to ninety percent (90%) Modified Proctor Density per ASTM D-1557.

In soft spongy disintegrated soils, or where necessary to allow proper drainage, correct the faulty grade with Class I coarse gravel compacted to seventy percent (70%) of relative density.

(d) **Rock Excavation.** When pipe is to be laid in rock cut, provide a clearance of at least 6-inches below parts of the pipe, valves or fittings. Provide adequate clearance at bell holes to permit proper jointing of pipe laid in rock trenches. Refill excavation to pipe grade with Class II granular embedment material compacted to ninety percent (90%) Modified Proctor Density. Unless specifically required and called for in the specifications, and with a permit issued by governing authorities, blasting shall not be permitted.

(e) **Bell Holes.** Bell holes of ample dimension shall be dug in trenches at each joint of pipe to permit the jointing to be made properly, visually inspected, and so that the pipe will rest on the full length of the barrel.

(f) **Dewatering.** (Not covered under this Section). Must follow all Texas Commission on Environmental Quality (TCEQ) and El Paso County Water Improvement District No. 1 (EPCWID#1) requirements.

(g) **Trench Support.** Excavations shall be braced and sheeted to provide complete safety to persons working therein and bracing shall comply with applicable federal (OSHA), state and local laws and ordinances. All trenches exceeding 5-feet in depth, as measured from the ground surface at the highest side of the trench to the trench bottom, shall meet the requirements specified in the current OSHA Standards.

CONTRACTOR shall be fully responsible for providing sufficient and adequate bracing for excavations with respect to work under construction and to adjacent utility lines and private property. Where soil conditions within trench area require support, CONTRACTOR may elect to use tight sheeting, skeleton sheeting, stay bracing, trench jacks, movable trench shield, or other approved methods to support the trench during pipe installation operations such as bedding preparation, pipe laying, and backfilling of haunches and initial zone.

Whenever possible, trench support shall not extend below the pipe crown. Where trench support must extend below the crown, such support should either be left in place or consist of approved steel sheets which can be retracted with minimal disturbance. Remaining voids shall be treated with grout or granular embedment material.

When a movable trench shield is used, the trailing half of the shield should be notched to the height of the top of the pipe. This will allow the haunch area of the pipe to be compacted properly to the wall of the trench. Dragging of a trench shield at pipe grade may be done provided such practice does not disturb the bedding. Voids created by the shield shall be filled and compacted properly.

(h) Trenching in Public Right-of-Way. Except where otherwise specified, indicated on the Plans, or accepted in writing by the ENGINEER, the maximum length of open trench, where the construction is in any stage of completion, shall not exceed the length set forth in the following. The definition of "open trench" for the purposes of this description will include excavation, pipe laying, backfilling, and pavement replacement. The descriptions under the area designations are general in nature and may be amended in writing by the ENGINEER due to particular or peculiar field conditions.

BUSINESS DISTRICT AREAS –300 LINEAR FEET: Store front areas.

COMMERCIAL AREAS –300 LINEAR FEET: Industrial, shopping centers, churches, schools, hotels, motels, markets, gas stations, government and private office buildings, hospitals, fire and police stations, and nursing homes.

RESIDENTIAL AREAS - ONE (1) BLOCK OR 300 LINEAR FEET, WHICHEVER IS THE LEAST: Single and multi-family residences, apartments, and condominiums.

UNDEVELOPED AREAS –1,500 LINEAR FEET: Parks, golf courses, farms, undeveloped subdivided land.

Any excavated areas shall be considered as "open trench" until all pavement replacement has been made, or until all trenches outside of pavement replacement areas have been backfilled and compacted in accordance with these Contract Documents. Trenches across streets shall be completely backfilled with temporary or permanent pavement in place within 72 hours after pipe laying. An open trench shall not be permitted overnight, unless adequately barricaded and approved by the ENGINEER.

CONTRACTOR shall provide steel plates with adequate trench shoring and bracing, designed to support traffic loads where required to bridge across trenches at street and alley crossings, commercial driveways, and residential driveways where trench backfill and temporary patch have not been completed during regular working hours. Safe and convenient passage for pedestrians shall be provided. The ENGINEER may designate a passage to be provided at any point he deems necessary. Access to fire stations, fire hydrants, and hospitals shall be maintained at all times.

(3) Pipe Installation.

(a) General. Pipe shall be laid true to lines and grades as indicated on the drawings. All pipe and fittings shall be inspected before laying in the trench. Clean all joint surfaces and soiled materials prior to connecting one another. As work progresses, maintain interior of pipes clean.

(b) Pipe Zone Embedment. Unless otherwise specified or shown in the drawings, pipelines shall be embedded in either Class I, II, or III material defined in this Article and installed as here forth described. CONTRACTOR may use native or imported material for embedment provided material conforms to these Specifications.

Embedment materials shall be placed in lifts not exceeding 8-inches loose depth. Unless otherwise specified or directed in writing by the ENGINEER, all material in the embedment zone shall be homogeneous.

Bedding shall be placed to provide uniform and adequate longitudinal support under the pipe. Place the first lift of bedding material from the bottom of the trench to slightly above the bottom of the pipe grade. Unless otherwise shown in the drawings, bedding shall be a minimum of 4-inches in depth for pipe sizes 30-inches and smaller, and 6-inches for pipe sizes greater than 30-inches. Material shall be true to line and grade with bell holes of ample dimension to permit pipe to rest on the full length of the barrel and to permit joint make-up and coating application at joints. Consolidate and compact the bedding material as described in ArticleV, and lay pipe to indicated grade.

Place a second lift, and if required, subsequent lifts, of embedment material to the springline of pipe. This process shall be defined as **Haunching**. Material shall be sliced under the haunches of the pipe, carefully filling all voids, and using care to prevent movement of the pipe.

Place **Initial Backfill** using a third lift from the springline of the pipe to the pipe crown, and a fourth lift from the pipe crown to a point 12-inches above the pipe.

(c) Groundwater Installation. In areas where the pipe is installed below existing or future ground water levels, Class I material shall be used throughout the pipe zone and enclosed with a layer of approved geotechnical filter fabric. The fabric shall be placed carefully along the bottom of the trench and up the side of the trench a sufficient distance to lap over the top of the completed pipe installation. Fabric shall lap a minimum of 3-feet in the longitudinal at the end of one roll and beginning of the next, and lap 2-feet in the transverse at the top of pipe, except that for trench widths greater than 3-feet measured at the top of pipe, the top overlap shall be 3-feet. Follow manufacturer's recommendations for installation. Fabric shall be either Mirafi 140N, Dupont Typar 3401, or approved equal.

(d) Embedment Class Schedule. Unless otherwise shown in the project drawings, the Utility Standard Embedment Class designations for the pipe material types listed in this Article shall be used to define each particular pipe's Embedment Condition

allowed under these specifications. The detail drawings shall be examined for additional information or other special bedding requirements.

(e) **Consolidation Methods in Embedment Zone.** Embedment backfill shall be compacted by equipment that is suitable for the type of soil encountered, and is capable of producing the degree of compaction specified. Where applicable, backfill materials shall be moisture conditioned to produce the required degree of compaction.

Hand or mechanical tamping shall be used to compact Class II or III material used in bedding, haunching, and initial backfill, except that the use of mechanical tampers or vibratory compactors directly over the pipe in the embedment area is prohibited. Caution in the use of mechanical compactors in the haunch and initial backfill to 12-inches above the pipe, shall be exercised to avoid damaging or misaligning the pipe.

Flooding or jetting shall not be used for compaction of embedment material.

(f) **Compaction and Testing of Pipe Embedment Zone.** Class I material used in the embedment zone may be placed by loose dumping with a minimum of compactive effort, except that care should be taken to assure proper placement of material under the pipe haunches. Class I material shall not specifically require testing unless directed by the ENGINEER, in which case, such test shall be measured by ASTM D-4254 by percent of relative density.

Class II material used in the embedment zone shall be compacted to a density of not less than 90% of Standard Proctor Density defined by ASTM D-698.

Class III material used in the embedment zone shall be compacted to a density of not less than 90% of Standard Proctor Density defined by ASTM D-698.

Moisture content in Class II or III material shall not exceed 3% over the optimum to assure proper compaction.

Unless otherwise directed by the ENGINEER, one compaction test in the embedment zone for Class II or III material shall be taken at 200-feet intervals along the trench on either side of the pipe, or at any other intervals as may be judged by the ENGINEER to be warranted by questionable installation conditions. For pipe sizes 4-inches to 12-inches diameter, the first test shall be performed on the side level with the top of pipe. For sizes 15-inches and larger, the first test shall be at the springline of the pipe. For all sizes, the second test shall be made at the top of the embedment zone.

(g) **Density Control and Laboratory Testing.** Unless otherwise specified, reference to "maximum dry density" shall mean maximum density defined by ASTM D-1557 or D-698. Determination of density of backfill in-place, shall be in accordance with the requirements of ASTM D-2922.

Unless otherwise specified, the Owner shall select a soils testing laboratory and shall provide for initial density testing of in-place backfill; however, the

CONTRACTOR shall pay for all additional density testing of backfills found not to be within the minimum requirements of the specifications.

Laboratory materials testing, including but not limited to determination of Atterberg Limits, Proctor Curves, Grain Size Analysis, as well as laboratory certification of manufactured materials, shall be at the CONTRACTOR's expense, and as further required by this Article.

In the case of subdivisions or private ventures, where the developer has retained a CONTRACTOR to perform utility installations as allowed by the Utility's Public Service Board's Rules and Regulations, the word "Owner" above shall be deemed to be the developer.

CONTRACTOR shall notify the soils testing laboratory and City Engineering Field Inspection Department 24 hours in advance to obtain soil density tests to fulfill the compaction requirements of the project.

(4) Final Backfill.

(a) General. As soon as practicable after laying and jointing of the pipe, the completion of embedment and the completion of structures, the trench shall be backfilled, in accordance to the governing agency for the area where the pipe was installed, or as shown on the drawings.

Take the necessary precautions to protect the pipe during backfilling operations.

Remove sheeting and shoring as backfilling operations progress. Incorporate methods so that a good bond is achieved between the backfill material and the undisturbed trench walls. Where sheeting or trench protection is intact below the top of pipe and their removal cause obvious damage to the bedding and haunching, it may be necessary to leave portions of sheeting or bracing in place.

Caution, in the use of mechanical compactors in the haunch and initial backfill to 12-inches above the pipe, shall be exercised to avoid damaging or misaligning the pipe. Provide at least 3-feet of compacted cover over the top of the pipe before the trench is wheel-loaded, and 4-feet of cover before using pneumatic hammers during compaction. Contact between the pipe and compaction equipment shall be avoided at all times.

(b) Consolidation Methods. Backfill above the pipe zone to surface subgrade shall be with backfill material as indicated on the drawings and described in this Section III. Backfill above the pipe zone shall be compacted by mechanical means. Water consolidation (flooding) may be used if approved by the City Engineer.

For mechanical compaction, place the backfill material above the pipe zone in lifts not exceeding 8-inches loose depth, moisten or aerate to obtain optimum moisture, and compact to the required density as described in this Section III.

The jetting method of water tamping will not be allowed.

When the ponding method of water tamping is permitted, backfill material above the pipe zone shall be placed in the trench not to exceed 3-feet loose depth, and flooded until free water is evident on the surface for at least two hours. Approximately 1-foot of water shall then be placed in the trench and subsequent lifts shall be started by depositing backfill material in the water until a maximum lift of 3-feet is placed. Additional water shall then be added to the backfill material until free water is again evident as before. This procedure shall be repeated until the entire trench is filled and thoroughly settled.

(c) **Cement Stabilized Backfill.** Where the drawings indicate that backfill for trenches under roads, driveways, concrete slabs, and in the zone of excavation for structures shall be cement stabilized, the backfill material shall be stabilized with a minimum of 2 sacks of Portland cement per cubic yard of material placed. Cement stabilized soil shall be placed around all adjusted manholes and shall be subsidiary to the manhole installation. Use of Soil Cement Backfill at the discretion of the Contractor, without the Owner's prior approval, or for over-excavated portions of the trenches shall be at the Contractor's cost. Cement stabilized soil placed for adjusting manholes shall be subsidiary to the different manhole installation and abandonment items.

(d) **Compaction and Testing Final Backfill.** (This item may be superseded by the requirements of the governing agency where the pipe was installed). Under existing or proposed paved streets, final backfill shall be compacted to the following Modified Proctor Densities per ASTM D-1557 (refer to standard drawing details) "Typical Trench Backfill Detail under Existing or Proposed Paved Streets"):

ZONE	SOIL CONDITION	% OF PROCTOR
Backfill	Suitable Native Material or As Specified	95%
Subgrade	Suitable Native Material or As Specified	95%

For all backfill in the areas not in existing or proposed paved streets, density of not less than 85% ASTM D-1557 shall be obtained from top of pipe bedding to ground surface.

Compaction tests will be required on backfill under proposed or existing streets and easements, and shall generally be as follows, unless otherwise directed by the ENGINEER:

Tests at 8-inches below subgrade at 200-feet intervals and not less than 2 per street at this level.

One test for every 2-feet of vertical trench backfill between top of pipe bedding and 18-inches below subgrade, at 200-feet horizontal intervals and not less than 2 per street at each level.

Additional tests shall be taken by the Owner as deemed necessary.

The provisions for selection of the testing laboratory and Owner/CONTRACTOR responsibilities for density control shall apply to backfilling in this section.

IV. VALVES AND FITTINGS

Note: The word "Engineer" used in this section refers to the Lower Valley Water District's Engineering Department personnel or project representative

1. **Description.** The CONTRACTOR shall furnish all valves and fittings where indicated on the Plans, as called for in these Specifications, or as required for proper operation of the equipment in general. Unless otherwise indicated on the Plans or specified in other sections of these Specifications, valves and fittings shall conform to the requirements as specified herein.

   Where proper operation and utilization of equipment and facilities require installation of valves not indicated or specified, the CONTRACTOR shall provide and install, upon acceptance by the ENGINEER, valves similar and comparable to valves specified for similar and comparable duty in other parts of the project.

   Quality Assurance. Valves shall conform to American National Standards Institute / National Sanitation Foundation (ANSI/NSF) Standard 61 "Drinking Water system Components - Health Effects" and be certified by an organization accredited by ANSI. Such compliance shall be evidenced by an affidavit from the manufacturer or vendor. If the pipe does not presently conform to this standard, information from the manufacturer regarding action being taken to comply with this standard must be submitted. All valves installed in a given line shall be designed to withstand the test pressure for that particular line and shall be fabricated with ends to fit the piping.

2. **Materials.** All materials shall conform to the pertinent material requirements of the following Items. Complete shop drawings and specifications shall be furnished prior to acceptance and approval of the bid proposal. If requested, the valve manufacturer shall also submit a list of similar installations that have been in satisfactory operation for at least three years.

   The manufacturer shall furnish a complete set of installation, operation, and maintenance instructions for each type of valve furnished. Instructions shall be bound in a cover.

   (1) Valves.

   (a) Non-Rising Stem (NRS) Resilient-Seated Gate Valves. Non-Rising Stem Gate Valves are to be resilient seat, non-rising stem and shall be approved for servicve to 250 psi, cold non-shock water works service and 200 psi fire protection service. Shall comply with AWWA C-509 "Resilient-Seated Gate Valves for Water and Sewage Systems" and AWWA C-550 "Standard for Protective Coatings for Valves and Hydrants". The valves design shall not have any recesses, insets in the bottom of the waterway that would promote build-up or collection of residue and debris. Resilient Seated Gate Valves shall be provided for the size specified. Valve shall open when turned to the left.

   With the valve open, the valve shall provide an unobstructed waterway that has a diameter not less than the full nominal diameter of the valve. The minimum number of turns to open the valve shall be three times the valve diameter.

Acceptable manufacturers and models shall be:

American Flow Control	Series 500, Series 2500
Clow	F-6100, F-6102
Kennedy	KEN-SEAL II
Mueller	A-2360-20

Submittals. Submittals shall be provided for approval. Also, the manufacturer shall provide approved certified test data or an affidavit stating that the valve complies with AWWA C-509 Section 6.1 and the following, in accordance with AWWA C-509 Section 6.2:

Hydrostatic Test. The manufacturer shall pressure test one valve of each size and class with 400 psi applied to one side and zero to the other. The test shall be made in each direction across the closed gate.

Torque Test. The manufacturer shall over-torque a valve of each size to demonstrate that no distortion of the valve stem occurs. The applied torque shall be 250 ft-lb for a 4-inch valve and 350 ft-lb for the larger valves in both the open and closed position.

Leakage Test. The manufacturer shall select two valves of each size to be fully opened and closed for 500 complete cycles with a 200 psi differential pressure across the gate. The valve shall be drip tight upon completion of the test.

Pressure Test. One valve of each size shall be tested, with the gate fully open, to a pressure of 500 psi. There shall be no evidence of rupture or cracking of valve body, bonnet or seal plated.

Markings. Shall be cast on the bonnet or body of each valve. Markings shall include the manufacture's name or mark, the year the valve casting was made, the size of the valves, and the designated working pressure.

Valve Ends. Shall be mechanical joint or flanged ends as specified.

Valve Body and Bonnet. Shall be cast iron conforming to ASTM A-126, or ductile iron conforming to ASTM A-536 or A-395.

Bolts. All bonnet and seal plate bolts shall be factory installed and made from stainless steel ASTM A-276 with either regular-square or hexagonal heads with dimensions conforming to ANSI B18.2.1.

Wedge. The wedge shall be cast iron or ductile iron fully encapsulated with resilient rubber material bonded to the disc. The method for bonding the resilient material shall be confirmed by ASTM D-429 as required by AWWA C-509.

Valve Stem. Shall be constructed of low zinc bronze CDA Copper Alloy No. C99500 with a minimum yield strength of 40,000 psi and minimum elongation in 2-inches of 10%.

Stem Seals. Shall consist of two O-rings such that the seal above the stem collar can be replaced with the valve under pressure in the fully open position. O-rings shall meet the requirements of ASTM D-2000 and have physical properties suitable for the application.

Valve Operator. Shall be a cast iron, ASTM A-126 Class B, wrench nut. The nut shall have a 2-inch square base and shall be 1-15/16" square at the top and be 1-3/4 inch high and shall open counterclockwise (left). The wrench nut shall be painted black and an arrow indicating direction of opening shall be cast on the nut, according to AWWA C-509.

Protective Coating. An epoxy coating shall be applied to all exterior and all stationary interior ferrous surfaces including all interior openings in the valves body. The coating shall not be applied to the gasket surfaces of the end flanges.

The coating shall be applied in accordance with AWWA C-550 and the manufacturer's instructions. The epoxy coating shall have a minimum dry film thickness of 8 mils. After the coating is completely cured, the coated surface shall be tested for porosity, holidays, and pinholes using a holiday detector. All holidays or irregularities shall be repaired and the coating again tested.

(b) Tapping Valves. Tapping Valves are to be iron-body, bronze mounted, parallel seat internal wedging type with non-rising stem. Tapping Valves shall conform to AWWA C-500 "Gate Valves for Water and Sewage Systems" except that tapping valves shall have over-sized seat rings to accommodate full size cutters. Tapping Valves shall be provided for the size specified.

Acceptable manufacturers and models shall be:

American Darling	565
Clow	5093
Kennedy	950-X
M&H	STYLE 751
Mueller	H-667

The number of turns to open shall be a minimum of three times the valve diameter.

Submittals. Submittals shall be provided for approval. Also, the manufacturer shall provide an Affidavit of Compliance in accordance with AWWA Standard C-500 Section 1.4. Records of all tests performed in accordance with AWWA Standard C-500 Section 2.2 and Section 5.1 shall be provided. These records will be representative test results for AWWA Standard C-500 Section 2.2 and certificate of testing for Section 5.1. An affidavit of testing for the valve assembly as outlined in Section 3.1 of AWWA Standard C-500 300 ft-lbs., shall also be provided.

(c) **Butterfly Valves.** Shall be of the tight-closing, rubber-seated type for Class 150B service. Butterfly valves shall comply with the requirements of AWWA C-504, "Standard for Rubber-Seated Butterfly Valves". Butterfly valves shall be provided for the size specified.

Acceptable manufacturers and models shall be:

American-Darling	Class 150B Flanged or Mechanical Joint
M&H	450, 4500, 1450
Kennedy	30A, 30C
Mueller	Lineseal III
Pratt	Groundhog Flanged

Submittals. Submittals shall be provided for approval. Also, the Manufacturer shall provide approved certified test data or an affidavit stating that the valve complies with the performance tests, leakage tests, hydrostatic test and proof-of-design tests as described in Section 5.2 of AWWA C-504.

Valve Ends. Shall be short body flanged, mechanical joint or as otherwise specified.

Valve Bodies. Shall be constructed of cast iron ASTM A-126, Class B, or ASTM A-48, Class 40 or Ductile Iron, ASTM A-536, Grade 65/45/12.

Valve Discs. Shall be cast iron conforming to ASTM A-126, Class B or Ductile Iron conforming to ASTM A-536, Grade 65/45/12. Valve disc shall seat in a position of 90 degrees to the pipe axis and shall rotate 90 degrees between full open and tight closed position. Dimensions of clearance for valve discs are required.

Valve Shafts, keys, dowel pins, or taper pins used for attaching valve shaft to the valve disc shall be Type 304 or 316 Stainless Steel, conforming to ASTM A-276, or equivalent corrosion resistant material. All portions of shaft bearings shall be stainless steel or bronze.

Valve shafts may consist of a one-piece unit extending completely through the valve disc, or may be of the "stub shaft" type as defined in AWWA C-504.

Butterfly valves shall be provided with an extended bonnet, unless otherwise specified.

Shaft Seals. Shall be a Split-V or O-ring type. Replacement shall be possible without removing the valve shaft.

Valve Seats. Shall be new natural or synthetic rubber resilient seats to provide tight shut off at the specified pressure. Seats shall be attached to either the disc or the body. Seats shall be clamped, mechanically secured, bonded or vulcanized to either the disc or body. Seat rings shall be stainless steel and fastened by stainless steel cap screws.

Mating Seat Surface. Shall be ASTM A-276, stainless steel 18-8, Type 304, or have a 95% pure nickel overlay.

Valve Bearings. Shall be sleeve type. Bearings shall be manufactured from corrosion resistant, and "self lubricated" materials that will not damage natural or synthetic rubber.

Valve Operators. Shall be manual with a 2-inch square operating-nut and turn left (counterclockwise) to open. Operators shall have all gearing totally enclosed and shall be pre-lubricated or grease packed. Operators shall be of the worm gear or traveling nut and link type with field adjustable stops capable of withstanding 300 ft. lbs. input torque, as required by AWWA C-504.

Protective Coating. Except as otherwise specified, all interior steel or cast iron surfaces shall be shop coated in accordance with the requirements of AWWA Standard C-504. All external surfaces for buried valves shall be shop coated with two coats of asphalt varnish according to AWWA C-504.

When specified, a standard epoxy interior coating shall be applied in accordance with AWWA Standard C-550, "Standard for Protective Interior Coatings for Valves and Hydrants".

(d) **Air Release, Air/Vacuum, and Combination Air Valves.** Air-Release, Air/Vacuum and Combination Air Valves shall comply with AWWA C-512 and the following specifications. These specifications shall apply to valve sizes 6 inch and smaller.

Air Release Valves (AR) shall be designed to automatically release accumulated air pockets within the pipeline while in operation and under pressure. Air release valves shall be APCO Model 200, Val-Matic Model 38, or Crispin Model P.

Air/Vacuum Valves (AV) shall be designed to allow large volumes of air to escape through the valve orifice when filling a pipeline and to close watertight once the air has been expelled. Air and vacuum valves shall also permit large volumes of air to enter through the valve orifice when the pipeline is being drained to break the vacuum. Air and vacuum valves shall be APCO Series 140, Val-Matic Series 100, or Crispin Model AL.

Combination Air Valves (CAV) shall be heavy-duty air and vacuum valves with air release. Combination Air Valves shall be designed to release accumulations of air at high points within a pipeline by exhausting large volumes of air as the pipeline is being filled and by releasing accumulated pockets of air while the pipeline is in operation and under pressure. Combination air valves shall also be designed to permit large volumes of air to enter the pipeline during pipeline drainage. Combination Air Valves shall be APCO, Val-Matic Series 200, or Crispin Model C.

Submittals. The manufacturer shall provide an affidavit stating that the valve and all materials used in its construction conform to the applicable requirements of AWWA C-512 and these specifications. When required, the manufacturer shall

provide and affidavit stating that the valve has been tested and is in compliance with the requirements specified in Section 5.1 of AWWA C-512.

Markings. Manufacturer's name or trademark, size of valve, and the designated maximum working pressure rating shall be cast in the body or marked on a corrosion-resistant name plate.

Body and Cover. Each air valve shall have a cast or ductile iron body and cover. Cast iron shall comply with ASTM A-126 Class B, or ASTM A-48 Class 35. Ductile iron shall comply with the requirements of ASTM A-536, Grade 65-45-12. Bolting material shall meet or exceed the strength requirements of ASTM A-307. All internal trim shall be of stainless steel.

Float. Shall be stainless steel. Float shall be baffled to prevent air from blowing valve closed until air is exhausted. Valve body, float, etc., shall be designed for a working pressure equal to that of the system in which it is installed. Floats for valves with inlet sizes less than 100 mm (4 inch) shall be capable of withstanding a collapse gauge pressure of 1,000 psig. For larger inlet sizes, floats shall be capable of withstanding a collapse gauge pressure of 750 psig.

Valve Outlet. Shall be fitted to attach discharge pipe as indicated. Valve inlet shall be N.P.T. for 2-inch and smaller valves. Valve inlet shall be ANSI flange for 3-inch and larger valves. Flange rating shall equal or exceed the maximum working pressure of the system in which it is installed.

Installation. Air release and air/vacuum valves shall be installed within valve vaults, or manhole, in accordance with Utility Standard Details 263-1, 263-2, 263-3, 263-4 and plans.

Protective Coatings. Interior surface coatings shall not be required unless otherwise specified. External surfaces shall be coated with the manufacturer's standard primer.

(2) **Fittings.** Fittings as specified herein shall be ductile iron (DI) for use with ductile iron and polyvinyl chloride (PVC) water pressure or transmission pipe.

All fittings shall be smooth cement lined in accordance with AWWA C-104 and shall be outside asphaltic coated per AWWA C-110. The size, body type, type of joint ends, and applicable reference standard, shall be as shown on engineering drawings or as specified.

Standards. Fittings shall comply with applicable requirements of the following:

ANSI B16.1 "Cast Iron Pipe Flanges and Fittings", AWWA C-104 "American National Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water", AWWA C-105 "Standard for Polyethylene Encasement for Ductile Iron Pipe and Fittings", AWWA C-110 "American National Standard for Ductile-Iron and Gray-Iron Fittings, 3 In. Through 48 In., for Water and Other Liquids", AWWA C-111 "Rubber-Gasket Joints", AWWA C-153 "American National Standard for Ductile-Iron Compact Fittings, 3 In. Through 16 In., for Water and Other Liquids"

Minimum Requirements. The following minimum requirements of TABLE A and TABLE B shall apply to the specified fittings.

All joint accessories such as gaskets, glands, bolts, and nuts shall be furnished with mechanical joints, and gaskets and lubricant shall be furnished with push-on joints in sufficient quantity for assembly of each joint.

Push-on joint fittings shall be marked with the proprietary name or trademark of the joint.

Fittings shall be marked on the outside with their applicable AWWA Standard and information called for by the Standard.

Fittings shall be polyethylene wrapped in accordance with AWWA C-105.

TABLE A – STANDARD SHORT-BODY FITTINGS PER AWWA C-110

TYPE OF JOINT	DIAMETER	RATED WORKING PRESSURE	MATERIAL
Mechanical (Rubber Gasket/C-111)	4 - 24 inches	350 psi	DI
Flanged	4 - 24 inches	250 psi	DI
All types	30 - 80 inches	250 psi	DI
Push-On (Rubber Gasket/C-111)	4 - 24 inches	250 psi	DI

TABLE B - COMPACT SHORT-BODY FITTINGS PER AWWA C-153

TYPE OF JOINT	DIAMETER	RATED WORKING PRESSURE	MATERIAL
Mechanical or Push-On (Rubber Gasket/C-111)	4 - 24 inches	350 psi	DI

3. Execution.

(1) Valve Installation. Carefully handle and install valves horizontally in such a manner as to prevent damage to any parts of the valves. Installation shall be in accordance with manufacturer's instruction. Valves delivered closed to the site shall be opened by the CONTRACTOR prior to installation. The CONTRACTOR shall record the number of turns required to open the valve. This information shall be submitted to the Utility on the standard valve report.

Valves shall be polyethylene-wrapped in accordance with AWWA C-105, unless otherwise specified. Thrust blocking shall be provided as specified.

(2) **Valve Testing.** Upon completion of installation of the valves, an acceptance test shall be conducted to verify the satisfactory operation of the valves. The unit shall be checked for operation and leakage. The valves must perform in a manner acceptable to the ENGINEER before the Owner makes final acceptance.

4. Measurement.

(1) **Gate Valves.** This Item will be measured in place by each gate valve unit installed.

(2) **Tapping Valves.** This Item will be measured in place by each tapping valve unit installed.

(3) **Butterfly Valves w/Manholes.** This Item will be measured in place by each complete butterfly valve unit installed.

(4) **Fittings.** This Item is subsidiary to the various water mains and related appurtenances Items and will not be measured for individual payment.

(5) **Additional Fittings.** This Item will be measured in place by the pound (lb) of additional fittings installed.

(6) **Adjust Existing Bonnet Box to Grade.** Existing bonnet box remaining in service and required to be adjusted to proposed grade will be measured by each bonnet box adjusted.

V. SANITARY SEWER FACILITIES

Note: The word "Engineer" used in this section refers to the Lower Valley Water District's Engineering Department personnel or project representative

1. **Description.** This Item shall govern for all materials and work necessary for the installation of sanitary sewer construction and adjustments in conformity with the details shown on the plans and as described herein.

   (1) **Plans.** The data furnished in the plans regarding the size and location of utility lines has been obtained from field surveys and the various utility companies. The Contractor is responsible for verifying the location of all utilities prior to commencing sewer construction. All work shall be within public right-of-way and at no time shall extend into or encroach upon private property.

   (2) **Coordination with Lower Valley Water District (LVWD).** Coordination with LVWD is required for sewer line tie-ins and bypassing, where indicated in the specifications and on the plans; and for CCTV video-inspection of new sewer lines. The Contractor shall make arrangements with the LVWD to perform video-inspection of all new sewer lines to determine acceptance by LVWD. Contractor shall notify LVWD a minimum of 48 hours in advance of any scheduled inspection; and Contractor shall provide a staging area free and accessible for TV camera activities.

   (3) **Sequence of Construction.** Twenty-one (21) calendar days prior to commencement of construction activities, the Contractor shall submit to the Engineer for review a detailed sequence of construction for the sewer line installation as well as methods the contractor proposes to use to for the installation of the sewer lines, tie-ins and bypasses, etc..

   (4) **Water Line Relocation/Replacement Required for Sewer Installation.** Any water line relocation/replacement work and materials required for the placement of the sewer lines shall be done in accordance to Section I, Water Mains, of these specifications.

   (5) **Definitions.**

      (a) **Sanitary Sewer Main (Sanitary Sewers).** Is defined as that portion of the sanitary sewer system, which collects the effluent from the service laterals, including stub outs from the nearest manhole, to the point of final destination.

      (b) **Sanitary Sewer Service Connection/Service Lateral.** Is defined as that portion of the sanitary sewer system beginning at a home or other establishment which is the point of origin of the effluent being carried by the system, to the sanitary sewer main, including the connection into the sanitary sewer main system.

2. **Materials.** All materials furnished for this project shall be new. A manufacturer's certificate of compliance will be acceptable for quality control of fittings, manhole rings and covers, and pipe. The pipe, fittings, and accessories shall be inspected upon delivery and during the progress of the work and any material found to be defective will be rejected by the Engineer and the Contractor shall remove such defective material from the site of the work.

The Contractor shall be responsible for all material furnished by him and he shall replace at his own expense all such material found to be defective in manufacture or damaged after delivery.

All pipe, fittings, and other accessories shall, unless otherwise directed, be unloaded at the point of delivery, hauled to and distributed at the site of the work by the Contractor. In loading and unloading, they shall be lifted by hoists, slid, or rolled on skidways, in such manner as to avoid shock or damage to the materials. Under no circumstances shall they be dropped. Pipe handled on skidways must not be skidded or rolled against pipe already on the ground.

(1) Sanitary Sewer Pipe. Materials for sanitary sewer pipe shall made from polyvinyl chloride compounds which comply with the requirements for minimum cell classification defined by ASTM D-1784 and conforming to the following standards unless a specific type pipe is called for on the plans:

ASTM D-1784	Rigid Poly Vinyl Chloride (PVC) Compounds, Class 12454-B
ASTM D-2321	Specification for Underground Installation of Flexible Thermoplastic Sewer Pipe.
ASTM D-3034	Specification for Type PSM Poly (Vinyl Chloride) (PVC) Large Diameter Plastic Gravity Sewer Pipe and Fittings
ASTM D-3212	Joints for Drain and Sewer Pipes Using Flexible Elastometric Seals.
ASTM F-477	Specification for Elastometric Seals (Gaskets) for Joining Plastic Pipe.
ASTM F-679	Specification for Poly (Vinyl Chloride) (PVC) Large Diameter Plastic Gravity Sewer Pipe and Fittings.

Fittings, service risers, and laterals shall be PVC with a SDR rating, except on force mains, which shall be PVC with a DR and pressure class rating indicated on the plans. Pipe shall be furnished in the standard lengths shown below although not more than 15 percent may be in random lengths. Polyvinyl Chloride (PVC) pipe shall be designated as gravity sewer conduit and shall meet the requirements as set forth in the following schedule in the various diameters and types shown:

Table 1
Pipe Specifications

PIPE SIZE	ASTM STANDARD	MATERIAL	WALL TYPE	MINIMUM STIFFNESS	STANDARD LENGTH
4-inch to 15-inch	D-3034	PVC	SOLID SDR-35	46 psi	20-feet
18-inch to 27-inch	F-679	PVC	SOLID T-1 WALL	46 psi	20-feet

(a) Gravity Sewers. All gravity sewers including mains, service laterals and fittings shall conform to the requirements of ASTM D3034 "Poly Vinyl Chloride (PVC) Sewer Pipe and Fittings" with a Standard Dimension Ratio (SDR) of 35. The nominal sizes shall be as shown on the plan. Neoprene gaskets shall conform to ASTM F477 "Elastomeric Seals (Gaskets) for Joining Plastic Pipe". The joints shall meet the requirements of ASTM D3212.

(b) Water Main Crossing. Where gravity or force main sewers are constructed in the vicinity of water mains, the most current requirements of the Texas Commission on Environmental Quality (TCEQ) and LVWD Standards shall be met.

(c) Sewer Service Connections. Fittings, service risers, and laterals shall be as specified for the material type utilized. Where additional service connections are required on an existing main line, an approved service saddle compatible to the size and type of both the collection line and service lateral shall be installed. All sanitary sewer service laterals shall be of materials conforming to the requirements of the Lower Valley Water District and City of Socorro's Plumbing Code and all amendments thereto. Where PVC saddles with rubber seals and stainless steel bands are used, the saddles shall be encased with Class B 2500 psi concrete in accordance with the plan details to protect the steel bands from corrosion and to add stability. Fittings shall be bell-type. Unless otherwise specified, the minimum diameter of the lateral service lines shall be 4-inches.

(2) Ductile Iron (DIP) Pipe.

(a) Scope. Furnish all labor, materials, equipment and incidentals required and install all ductile iron piping, as shown on the drawings and as specified herein.

(b) Quality Assurance. The entire pipeline shall be the product of one manufacturer. The manufacturer shall have a minimum of ten-years successful experience in designing and manufacturing pipe joints of similar design, pipe diameter, and pressure class as those specified. Pipe shall conform to American National Standards Institute/National Sanitation Foundation (ANSI/NSF) Standard 61 "Drinking Water System Components - Health Effects" and be certified by and organization accredited by ANSI. Such compliance shall be evidenced by an affidavit from the manufacturer or vendor. If the pipe does not presently conform to this standard, information from the manufacturer regarding action being taken to comply with this standard must be submitted.

(c) **Submittals.** Submit documentation on pipe products, fittings, and related materials as may be required by the Contract Documents or the ENGINEER. Review all submittals prior to submission. Submit in a timely manner so as not to delay the project. Allow sufficient time for ENGINEER's review and resubmission, if necessary. Include certifications from manufacturer that the Ductile Iron Pipe complies with appropriate AWWA Standards and ANSI/NSF Standard 61.

Such compliance shall be evidenced by an affidavit from the manufacturer or vendor. If the pipe does not presently conform to this standard, information from the manufacturer regarding action being taken to comply with this standard must be submitted.

If requested, copies of results of factory hydrostatic tests shall be provided.

(d) **Standards.** DIP shall comply with applicable requirements of the following:

ANSI/NSF 61	Drinking Water System Components - Health Effects
ASTM A-536	Specification for Ductile Iron Castings
AWWA C-104	Standard for Cement Mortar Lining for Ductile Iron Pipe and Fittings
AWWA C-105	Standard for Polyethylene Encasement for Ductile Iron Piping
AWWA C-110	Standard for Ductile Iron and Gray Iron Fittings
AWWA C-111	Standard for Rubber Gasket Joints for Ductile Iron Pipe and Fittings
AWWA C-150	Standard for Thickness Design of Ductile Iron Pipe
AWWA C-151	Standard for Ductile Iron Pipe
AWWA C-214	Tape Coating Systems for the Exterior of Steel Water Pipelines
AWWA C-600	Standard for Installation of Ductile Iron Water Mains and Appurtenances
AWWA C-651	Disinfecting Water Mains

(e) **Pipe Materials.** Ductile iron pipe shall be manufactured in accordance with AWWA C-151. The minimum pressure class rating shall be 150 psi, unless otherwise specified. The Ductile Iron shall conform to ASTM Specification A-536 with physical properties of Grade 60-40-18. The pipe shall be designed for 5-feet of cover or for the depths shown on the plans; whichever is greater.

(f) **Joints.** Shall be in accordance with AWWA C-111, AWWA C-151. Standard joints for ductile iron pipe shall be push-on. Where indicated on the drawings, joints shall be mechanical or flanged. Flanged joints shall have pressure ratings equal to or greater than adjacent pipe. Flange pattern shall match pattern of valve, fitting, or appurtenance to be attached.

(g) **Fittings.** Shall be ductile iron in accordance with AWWA C-110 and Section IV of these Specifications. Fittings shall be rated for a minimum working pressure of 250 psi, unless otherwise specified.

Factory welded outlets, minimum pressure rating 250 psi, may be used in lieu of tee fittings for 18-inches and larger tee fittings. Factory welded outlets may not be used near sources of vibration, such as pump stations or roads, unless specifically noted on the plans.

All fittings and appurtenances shown on the Contract Drawings shall be considered subsidiary to the sanitary sewer main installation. Mechanical Joint Restrainers shall be considered subsidiary to the installation all fittings, valves and appurtenances.

Any "Additional Fittings" (bends, caps, plugs, tapping sleeves, tees, crosses, etc.), deemed necessary by the Engineer for the adequate system operation and as approved by the Owner, shall be installed complete in place with the required provisions for thrust restraint and corrosion protection. "Additional Fittings" shall be measured and paid for at the unit price bid for "Additional Fittings" by the Pound (Lbs).

(h) **Exterior Coating.** The manufacturer shall provide a standard asphaltic coating in accordance with AWWA C-151, unless otherwise specified. The finished coating shall be continuous, and smooth and strongly adherent to the pipe.

Polyethylene wrap shall be used on ductile iron for sizes 30-inch and smaller. The polyethylene wrap shall be applied in accordance with AWWA C-105/A21.5 except a minimum thickness of 30-mils shall be used.

(i) **Interior Lining.** Ductile Iron Pipe and fittings shall have a cement mortar lining in accordance with AWWA C-104 and bituminous seal coat. Cement Type for lining shall be appropriate for pipe application. Lining thickness shall be as specified in AWWA C-104.

(j) **Pipe Trenching, Installation, and Backfill.** Except as noted, Pipe Trenching, Installation and Backfill for DIP shall be in accordance with AWWA C-600 and these Specifications.

General. Any damage to Polyethylene encasement shall be repaired according to AWWA C-105. Pipe shall be kept clean during installation. Exposed ferrous metal which cannot be protected with field-applied tape coating, shall receive two coats of Koppers Bitumastic No. 50, or approved equal.

Pipe and fittings shall be installed to line and grade indicated. In areas where the line and grades indicated cannot be achieved using standard manufactured bends and fittings, make slight adjustments by deflecting joints according to the limitations of AWWA C-600.

Embedment. Unless otherwise specified or shown on the drawings, Ductile Iron Pipe shall be embedded in NATIVE material as defined in Section III. If NATIVE material is not suitable, CLASS II material as defined in Section III shall be used.

Pipe Cutting. When required, the cutting shall be by machine, leaving a smooth cut at right angles to the axis of the pipe. Ends of cut pipe to be used with a push-on joint bell shall be beveled to comply with manufactured spigot end. Cement lining shall be undamaged.

Corrosion Protection. As a precaution against corrosion, all flanges, bolts, nuts and other exposed metal surfaces underground shall be coated with Texaco, Koppers, or equal rustproof compound.

(k) Testing. Disinfect and test the piping system in accordance with "Sewer Pipe Testing Inspection" on Page 80-85 of these Specifications.

(3) **Pipe Zone Bedding/Backfill.** For the purpose of this specification, "pipe zone" shall define the area extending from the bottom of the trench to 12-inches above the top of the pipe and to the undisturbed trench walls on either side of the pipe. "Embedment" shall be defined as those vertical stratas of backfill material in the pipe zone consisting of bedding, haunching, and initial backfill, as defined in ASTM D-2321, and shown on the Construction Plans. Select bedding material shall be used for bedding and backfilling, within the pipe embedment zone, for all pipes. Pipe zone embedment material shall be as follows:

(a) Pipe Diameter Less than 18-Inches. Select native material with less than 12% passing the No. 200 sieve. No backfill material larger than 3/4-inch shall be allowed from the bottom of the trench to 12-inches above the pipe.

(b) Pipe Diameter 18-inches and Greater. Class I, angular graded crushed stone material per ASTM D-2321 that meets the following gradation:

Percent Passing ½-inch sieve.....95 to 100

Percent Passing 3/8-inch sieve.....70 to 90

Percent Passing #4 sieve.....20 to 40

Percent Passing #8 sieve.....0 to 15

Percent Passing #16 sieve.....0 to 5

No material larger than 1-inch shall be placed from the bottom of the trench to 12-inches above the top of the pipe.

(4) **Manholes.** Materials for manholes shall conform to the requirements of the Item 465, "Manholes and Inlets" except as modified herein and as shown on the plans.

(a) Pre-cast Reinforced Concrete Manhole Sections. All manholes shall conform to the requirements of ASTM Designation C-478. The pre-cast sections shall have rubber gasket compression joints for watertight construction conforming to the material and requirements of ASTM C-443.

(b) Manhole Connectors. All pipe openings in pre-cast manhole base sections and risers shall have a compression type flexible pipe to manhole connector

conforming to the requirements of ASTM C-923, as manufactured by Kor-N-Seal, Link Seal or equal.

(c) **Throat Rings.** In the areas of proposed new streets or existing streets, a minimum of two and a maximum of four throat rings shall be used at each manhole for adjustability. Adjustment throat rings shall be non-reinforced concrete rings having a maximum thickness of 2-inches. The internal diameter shall be not less than 24-inches and the width shall be a minimum of 5-inches.

(d) **Rings and Covers.** Materials for rings and covers shall conform to the requirements of the Item 471, "Frames, Grates, Rings, and Covers". The rings and covers shall be cast iron as manufactured by Trans-Tex Supply Company, No. A-77 400 lbs. or equal. Covers shall contain no holes or openings and shall be impressed with the lettering as shown on the project plans. Lifting bars with slots cast into the covers shall be provided for lifting purposes.

(5) **Concrete.** All concrete shall meet the requirements of Item 421, "Portland Cement Concrete". Unless otherwise shown on the plans or required by the specifications, all concrete shall be Class A concrete.

(6) **Mortar.** Mortar shall be composed of one (1) part Portland Cement, two (2) parts sand and sufficient water to produce a workable mixture. When used to plaster manholes, it may be composed of one (1) part cement to three (3) parts sand. Lime up to ten percent (10%) may be used.

(7) **Reinforcing Steel.** Reinforcing steel and the placing thereof shall conform to the requirements of the Item 440, "Reinforcing Steel", except where welded wire is called for on the plans, the material shall be welded wire flat sheets meeting A.S.T.M. A-185.

(8) **Sand Cement Grout.** Sand cement grout shall be used in manholes to form flow lines and place inverts as indicated on the drawings. The grout shall contain 9.81 sacks of cement per cubic meter of grout (7-1/2 sacks of cement per cubic yard of grout) and shall contain only sufficient water to provide required consistency. Water, cement and sand shall be as specified in Item 421 "Portland Cement Concrete".

(9) **Non-shrink Non Metallic.** Non-shrink non-metallic grout shall be used for voids between pipe and manhole walls. The grout shall be Masterflow 713 grout by Masterbuilder, Five Star, or approved equal.

(10) **Cement Stabilized Backfill.** When indicated on the plans, trenches shall be backfilled to the elevations shown, with stabilized backfill containing aggregate, water and a minimum of 2 sacks of Portland cement per cubic yard of material as placed. Cement and water shall conform to the requirements of Item 421, "Portland Cement Concrete". Aggregate shall be as noted on the plans and/or as approved by the Engineer.

(11) **Potable Water Pipe & Appurtenances.** Materials for potable water line relocation/replacement as required for proposed sewer installation shall be in accordance with Articles I through XI of this Specification Item; and in conformance with the plans for Water System Relocation.

3. **Construction Methods.** Construction practices shall conform to ASTM D2321-89 "Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications", ASTM D2774-72 "Underground Installation of Thermoplastic Pressure Piping" and the following conditions. In case of conflict, the following conditions shall prevail.

(1) **Excavation and Backfill.** Excavation and backfill as required to complete the work shall be performed in accordance with the Item 400, "Excavation and Backfill for Structures" except as modified herein and as indicated on the plans.

When cutting and restoring existing pavement outside the limits of proposed concrete pavement improvements and where indicated on the plans, trenches shall be backfilled to the elevations shown, with stabilized backfill containing aggregate, water and a minimum of 2 sacks of Portland cement per cubic yard of material as placed. Cement and water shall conform to the requirements of Item 421, "Portland Cement Concrete". Aggregate shall be as noted on the plans and/or as approved by the Engineer.

(2) **Bedding.** Prior to laying the pipe, the bedding material shall be shaped to conform to the outside diameter of the pipe as shown in the plans. Bell holes shall be carefully prepared to fit the bell where bell and spigot pipe is used. Bedding material as specified shall be installed as follows:

(a) Select Native Material. Shall be placed in uniform layers not exceeding 8-inches in depth (loose measurement) and thoroughly compacted mechanically to 90% ASTM D-1557. No water flooding will be allowed. Special care shall be taken to secure thorough compaction of the materials placed under the haunches of the pipe and to prevent damage or displacement of the pipe. Filling and/or backfilling shall be continued in this manner to the elevation of 12-inches above the top of the pipe.

(b) Class I, Angular Crushed Stone. Shall be placed in uniform layers not exceeding 8-inches in depth (loose measurement) and thoroughly consolidated mechanically. No water flooding will be allowed. Special care shall be taken to secure thorough compaction of the materials placed under the haunches of the pipe and to prevent damage or displacement of the pipe. Filling and/or backfilling shall be continued in this manner to the elevation of 12-inches above the top of the pipe.

(c) Filter Fabric. For Class I, Angular Crushed Stone Bedding filter fabric shall be used. The filter fabric shall be laid along the bottom of a well-graded trench. Placing of the bedding material and installation of the pipe shall proceed as described above and the filter fabric shall be lapped over the top of the completed pipe installation and lapped over itself a minimum of 3-feet as detailed on the plans. The fabric used shall be either Mirafi Filterweave 700, or an approved equal.

The fabric shall be a woven monifilament material designed to serve as a filter to prevent migration of fines into the bedding material while allowing water to pass and providing a high tensile strength to resist compaction forces. The fabric shall have a minimum tensile strength of 370 x 250 lbs when tested in accordance with ASTM D-4632.

During construction, protection of the pipe shall be in accordance with the pertinent pipe item. Pipe damaged by the Contractor during construction shall be replaced at the Contractor's expense.

(3) Laying Pipe. Pipe shall be installed as specified herein.

(a) General. After the trench has been excavated and the pipe bed properly fine graded, the pipe shall be laid in accordance with manufacturer's recommendations and the following specifications. Each length of pipe shall be inspected for defects immediately before it is laid. Any defective pipe, which has been damaged by mishandling, or any other cause, shall be replaced with satisfactory pipe by the Contractor at his expense.

Pipe laying shall proceed upgrade with spigot ends pointing downgrade. All pipe shall be laid true to the lines and grades as established. Grade may be established by laser beam or batter boards (not exceeding 50-ft intervals) and a string line may be used and each length of pipe set to grade from the string line with a grade rod equipped with a "shoe" designed to set in the flow line of the pipe. All sewers must be laid in straight alignment, so that a light can be seen from one manhole to the other even for the smaller size of sewers. Pipes and fittings shall be fitted together and matched so that they will form a sewer with a smooth and uniform invert. Special care shall be taken to provide uniform bearing for the entire length of pipe.

The work shall be watertight at all joints and any leaks or defects shall be immediately repaired. Any pipe which has been disturbed from any cause after being laid in its final position shall be taken up, the joint cleaned and the pipe properly re-laid.

Excessive ovality (greater than 2.5% out-of-round) in the pipe will be grounds for rejection, however, pipe with acceptable ovality shall be laid with the larger diameter in the vertical direction.

Proper and suitable tools and appliances for the safe and convenient handling of the pipe and fittings shall be provided and used. Care shall be taken to prevent any damage to the pipe coating. All pipe shall be examined for defects and no pipe shall be laid that is known to be defective.

Any defective pipe discovered after being laid, shall be removed and replaced. Wherever the pipe requires cutting, it shall be done with a standard wheel pipe cutter for pipe 12-inches and smaller. Cutting methods for larger pipes shall be as approved by the Engineer. Each cut must be smooth and at right angles to the axis of the pipe.

(b) Service Connections. The Contractor is to provide new sewer service laterals and reconnections of all existing sewer service laterals to new lines installed to replace lines to be abandoned. The Contractor shall be responsible for verifying location of laterals indicated on the drawings and ensuring service is not interrupted to homes or other establishments.

Wyes, bends, tees, stacks, and other hardware where required, shall be installed for service laterals as shown in the plans or as directed by the Engineer.

(c) Marking Tape. Sanitary sewer lines and/or relocated water lines shall be marked by concurrently installing the appropriate marking tape in the trench for detection purposes.

Marking tape shall consist of a minimum of 4.0 mil inert polyethylene plastic with metallic backing/layer for location with magnetic locators. The tape shall be imprinted continuously over its entire length in permanent black ink to identify the type of line.

The tape shall be minimum 4-inches in width and colored High Visibility Safety Green for the sewer line. The marking tape shall be as manufactured by Alarm-Tapes, Inc., or equal. Installation in the trench shall be as recommended by the manufacturer.

(4) Connections to Existing Lines. Connections between new work and existing work, where required, shall be made using proper specials and fittings to suit the actual conditions. When it is necessary to interrupt service to existing facilities in order to make connection to an existing line, the Contractor may be required to make the connections at some time other than during normal working hours at no additional costs to the Owner.

(5) Manhole Construction. Manhole construction shall be in accordance with ASTM C891-90, "Practice for Installation of Underground Pre-cast Concrete Utility Structures", Item 465, "Manholes and Inlets", and as specified herein.

(a) All invert channels of manholes shall be constructed and shaped accurately with sand cement grout so as to be smooth, uniform and cause minimum resistance to flow.

(b) Joints on sewer pipes shall not be cast or constructed within the wall sections of manholes.

(c) On new sewer manhole and pipe systems and new pipe systems connecting to existing manholes, pipes entering a manhole above the lowest sewer shall project 2-inches from the inside wall. Such pipes shall be installed with a joint a minimum of 6-inches and a maximum of 18-inches from the outside manhole wall.

(d) Where connections to existing manholes are required, the adjacent pipe bedding shall be prepared to proper grade, the existing manhole neatly cored and the new pipe inserted so that the end is projecting 2-inches from the inside wall. The invert shall then be reshaped to properly channel new flows. Debris of any kind shall be kept out of new or existing manholes or mains.

(e) Voids between exterior pipe walls and manhole walls at all pipe connections in manholes shall be filled with a non-shrink , non-metallic grout as specified herein.

(f) Construction Joints will be allowed as shown on the plans and when the manhole depth exceeds 12-feet. Additional joints may be allowed when approved by the Engineer.

(g) Throat Rings shall be mortared between all bearing surfaces sufficient to provide a minimum, in place, mortar thickness of 1/4-inch. No more than 4 throat rings may be used on any manhole.

(h) **Manhole Ring Encasement.** All manhole rings shall be encased with non-reinforced concrete as shown on the plan details or as approved by the Engineer.

Manhole rings encasement shall have a minimum depth of 28-inches and a minimum thickness when measured at the manhole ring of 12-inches. The surface of the encasement shall be 4-1/2 inches below the top of the manhole ring.

Where manholes are constructed in existing or proposed streets and where directed by the Engineer or shown on the plans, the exterior exposed surfaces of the ring, mortar, throat rings and manhole surface shall be coated with a 1/8 inch minimum thickness of Trowel Mastic No. 710-23 asbestos fiber as manufactured by Flintkote, or equal prior to placement of concrete.

(i) **External Protective Coating.** Manholes that are in ground water shall be externally coated with a 40 MIL bituminous coating.

(j) **Internal Protective Coating.** Where called out on the plans, concrete manholes shall be coated as follows:

Surface Preparation. Concrete and mortar to be dry and clean free of laitance with all oil, grease, form release agents, curing compounds sealers, hardeners and any other contaminants removed. Concrete surface must have a minimum of 30 days cure.

Whip blast with a fine grade of sand reducing the normal nozzle pressures.

Concrete Filler-Sealer. 2 coats to provide flush uniform surface, Plasite 9028M1.

Finish. 2 coats of Plasite 7122L to a dry mil thickness of 15 mils.

(6) **Adjusting Manholes.** Existing manholes required to remain in place shall be adjusted to match temporary and final established grades as required for construction and shall be done in accordance with Item 479, "Adjusting Manholes and Inlets".

(7) **Abandon (Cap) Manholes.** Abandonment (Capping) of existing manholes shall be completed as shown on the plans and shall be in accordance with Item 479, "Adjusting Manholes and Inlets".

(8) **Remove Manholes.** Removal of existing manholes where required for installation of new sewer lines and where required for installation of new manholes shall be done in accordance with Item 400, "Excavation and Backfill For Structures".

(9) **Potable Water Line Relocation/Replacement Required for Sewer Line.** Installation, Relocation and/or replacement of water lines and associated appurtenances, including

but not limited to pipe, valves, fire hydrants, fittings, etc., as required for installation of new sewer system shall be in conformance with Articles I through XI of this specification, and in conformance with the plans details for Water System Relocation.

4. Sewer Line Bypassing and Dewatering/Draining.

(1) Scope of Work. This item specifies the requirements for temporary bypassing, dewatering/draining, flushing and abandonment of sewer lines. The Contractor shall keep excavations free from water during construction. The static water level shall be drawn down a minimum of 1-foot below the bottom of trench excavation to maintain the undisturbed state of natural soils and allow the placement of any fill to the specified density. Disposal of water shall not damage property or create a public nuisance. The Contractor shall have on hand pumping equipment and machinery in good working condition for emergencies and shall have workmen available for its operation. Dewatering systems shall operate continuously until backfill has been completed to 1 foot above the normal static groundwater level.

Groundwater shall be controlled to prevent softening of the bottom of excavations, or formation of "quick" conditions. Dewatering/draining systems shall not remove natural soils. The Contractor shall control surface runoff to prevent entry or collection of water in excavations.

Release of groundwater to its static level shall be controlled to prevent disturbance of the natural foundation soils or compacted fill and to prevent flotation or movement of structures or pipelines.

(2) Requirements. Contractor shall provide labor, equipment, materials and supervision to temporarily bypass flow around the Contractor's work during sewer construction and/or during work associated with sewer construction when necessary. Contractor shall also provide temporary dewatering/draining of low lying portions of existing sewers as necessary. Contractor shall flush all sewers to be abandoned with a minimum of twice the sewer's volumes of water. Contractor shall dewater/drain all sewers lines to be abandoned. All work shall be closely coordinated with the Engineer.

(3) Submittals. Twenty-one (21) calendar days prior to commencement of construction activities, the Contractor shall submit to the Engineer for review and approval drawings and complete design data showing methods and equipment he proposes to utilize in sewer bypassing and dewatering/draining. The submittal shall include the following information:

(a) Drawings indicating the location of temporary sewer plugs and bypass discharge lines

(b) Schedule times for bypasses

(c) Capacities of pumps, prime movers, and standby equipment

(d) Design calculations proving adequacy of the system and selected equipment

(4) Job Conditions.

(a) **Available Data.** Existing sewer system map of the project area can be reviewed at the officer of the LVWD, at 1557 FM Road 1110, Clint, TX. 79936, during regular business hours.

(b) **Protection.** Where bypassing or dewatering/draining of the contents of a line is required, the Contractor shall ensure that service for connecting sewer laterals are not disrupted. All flow shall be discharged into the nearest downstream manhole and only after consultation with LVWD operations to coordinate the discharge. Bypassing and dewatering/draining of the contents of a line shall not surcharge sewers or interfere with normal operation of related sewer facilities. No discharging to the ground surface, receiving streams, storm drains, or discharging which results in groundwater contamination or potential health hazards shall be permitted. In the event accidental discharging is caused by the Contractor's operations, the LVWD shall immediately be entitled to employ others to stop the discharging without giving written notice to the Contractor.

Penalties imposed on the LVWD as a result of any discharge by the actions of the Contractor, his employees, or subcontractors, shall be borne in full by the Contractor, including legal fees and other expenses to the LVWD resulting directly or indirectly from the discharge.

(c) **Scheduling.** The bypassing and dewatering systems shall not be shut down between shifts, on holidays or weekends, or during work stoppages without written permission from the Engineer. The Contractor shall submit a detailed outage plan and time schedule for his operations when necessary to remove a sewer line or structure from service. The schedule shall be coordinated with the Engineer and shall meet the restrictions and conditions specified in this section. The detailed plan shall describe the Contractor's method for preventing accidental discharges, the length of time required to complete said operation, the necessary plan and equipment which the Contractor shall provide in order to prevent accidental discharges.

The Contractor shall observe the following restrictions: Systems or individual equipment items shall be isolated, dewatered/drained, decommissioned, de-energized, or depressurized in accordance with the detailed outage plan and schedule. The Engineer shall be notified in writing at least one week in advance of the planned operation.

(5) **Sewer Line Dewatering/Draining.** Sewers to be abandoned shall be flushed with two pipeline volumes of water and allowed to drain fully prior to abandoning.

(6) **Sewer Bypassing.** Sewer bypassing shall be accomplished by pumping or diverting the upstream flow around the Contractor's work or as directed by the Engineer. The Contractor shall provide temporary pumps, conduits, and other equipment to bypass the sewer flow. Contractor shall furnish the necessary labor, equipment and material, and supervision to set up and operate the pumping and bypass system. Engines shall be equipped with mufflers and/or enclosed to keep the noise level within local ordinance requirements. Pumps and bypass lines shall be of adequate capacity and size to handle the flows.

Unless otherwise specified, the Contractor shall bypass flow around his work whenever the depth of flow, as measured at the inlet pipe to the upstream manhole adjacent to the Contractor's work, exceeds the crown elevation of the pipe; or whenever the Contractor's equipment operating in the sewer provides an obstruction that restricts flow and causes the depth of flow to exceed the crown elevation.

(7) **Standby Equipment.** The Contractor shall maintain on site sufficient equipment and materials to ensure continuous and successful operation of the bypass and dewatering systems. Standby pumps shall be fueled and operational at all times. The Contractor shall maintain on site a sufficient number of valves, tees, elbows, connections, tools, sewer plugs, piping and other parts or system hardware to ensure immediate repair or modification of any part of the system as necessary.

(8) **Damages.** The Contractor shall repair without cost to the Owner any damage that may result from his negligence, inadequate or improper installation, maintenance and operation of bypassing and a dewatering system including mechanical or electrical failures.

5. Testing Sanitary Sewers for Leakage.

(1) **Manhole Testing.** Successful passage of a hydrostatic or vacuum test shall be required for acceptance of standard sanitary sewer manholes. Test shall be performed when manholes are set to final grade.

(a) **Vacuum Test.** Plug all inlets and outlets and insert rubber ring "donut" type plug in cone opening. Attach vacuum pump to hose connected to plug in cone and apply 4 psi of vacuum (install vacuum regulator on pump such that maximum applied vacuum is 10 psi. After vacuum has stabilized at 3.5 psi for 1 minute, test shall begin. During test period, manhole shall lose no more than 0.5 psi of vacuum. Specified test periods are as follows:

Table 1

Manhole Test Time

Manhole Depth Feet	Test Period (Min.)
0-5	4.5
5-10	5.5
10-15	6.0
>15	6.5

(2) **Sewer Pipe Testing & Inspection.** The Contractor shall conduct low pressure air tests and deflection tests on completed sections of sewer main. The test results will be used to evaluate materials and construction methods on the pipe line sections, and successful tests shall be mandatory for the acceptance of the lines. In addition, visual inspection through television of inside of all new pipelines is required for acceptance.

(a) **Materials for Testing.** The Contractor shall furnish all materials and equipment for testing, including air compressors and pressure pumps. The equipment for testing will also consist of valves, plugs, calibrated measuring equipment and

calibrated pressure gages used to control the rate at which air and water flows to the test section and to monitor the pressure inside the plugs. Test plugs shall be securely braced to prevent movement. Control valves and gages used to conduct the tests shall be located at ground level. Test pressures shall fall within the upper half of the pressure gages range.

(b) Exfiltration Air Test Procedures.

a. A low pressure air test shall be the standard method for testing sewer lines.

b. Determine section of line to be tested.

b. Apply air pressure until the pressure inside the pipe reaches 4 psig.

c. Allow the pressure inside the pipe to stabilize, then bleed back to 3.5 psig.

d. At 3.5 psig, the time, temperature and pressure will be observed and recorded. A minimum of 5 readings will be required for each test.

e. The section shall maintain the test pressure without losing more than 1.0 psi for a length of time as described by the following table. If the section being tested includes more than on size of pipe, the test time for each size shall be calculated and added to determine the total test time for the section. Any section losing more than 1.0 psi shall be considered to have failed the test, any shall be repaired and re-tested prior to acceptance.

Table 2
Allowable Time Table

Pipe	Time (t) / 100 ft. Minutes
4-inches	0.3
6-inches	0.7
8-inches	1.2
10-inches	1.5
12-inches	1.8
15-inches	2.1
18-inches	2.4
21-inches	3.0
24-inches	3.6
30-inches	4.8
36-inches	6.0
42-inches	7.3

(c) Deflection Test.

a. Deflection tests shall be performed on all flexible sewer pipes including cleanouts. A rigid mandrel shall be used to measure deflection for sewer lines. Adjustable or flexible mandrels are prohibited.

b. The test shall be conducted after the final backfill has been in place at least 30 days. No pipe shall exceed a defection of 5 percent of the pipe diameter. If a pipe should fail to pass the deflection test, the problem shall be corrected by the contractor and a second test shall be conducted after the corrected area has been backfilled for at least 30 days. The test shall be conducted without the use of a mechanical pulling device.

c. The mandrel shall be constructed of metal or a rigid plastic that can withstand a 200 psi force without being deformed. The mandrel shall have at least nine runners or more, as long as the number of runners is an odd number. The barrel section of the mandrel shall have a length of at least 75 percent of the inside diameter of the pipe. A proving ring shall be provided and used for each mandrel in use.

d. The rigid mandrel shall have an outside diameter equal to 95 percent of the inside diameter of the pipe. The inside diameter of the pipe shall be the average outside diameter minus two minimum wall thicknesses for OD controlled pipe, and the average inside diameter for ID controlled pipe. All dimensions shall be per appropriate standards. Statistical or tolerance methods shall not be considered in mandrel sizing.

(d) CCTV Video Inspection. LVWD/EPWU will televise all new sewer lines to determine acceptance. Contractor shall coordinate and schedule video-inspection by LVWD/EPWU to occur after deflection test and prior to installation of new concrete pavement. Contractor shall dewater/drain all sagged submerged portions of the sewer during television inspection by the LVWD/EPWU. The Contractor shall inform LVWD/EPWU 48 hours prior to any scheduled inspection. Contractor shall reduce sewer flow so that no portion of the television camera's lens is submerged during inspection. The Contractor may temporarily force flow away from the area under inspection by water jetting or by pumping the flow from within the sewer line. Any defects or damage identified by televising shall be corrected by contractor immediately. Subsequent televising by LVWD/EPWU shall be at contractors expense.

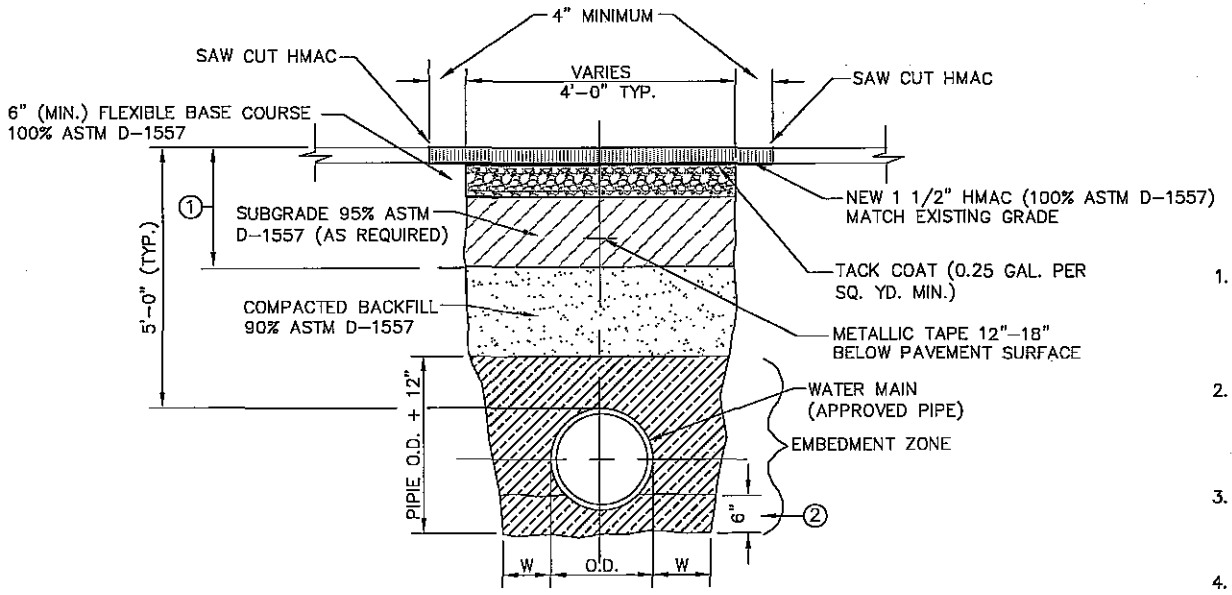
6. **Cement Stabilized Backfill.** When indicated on the plans, trenches shall be backfilled to the elevations shown, with stabilized backfill containing aggregate, water and a minimum of two (2) sacks per cubic yard of material as placed. Aggregate, cement and water shall be as noted on the plans and/or as approved by the Engineer. Testing Sanitary Sewers for Leakage.

7. **Cutting and Restoring Pavement.** Where sewers must be installed in streets or other paved areas, the work shall include saw cutting of the pavement and base to neat lines and prompt replacement of these materials after sewer excavation and backfill are completed. The replacement materials, as to type and thickness, shall be as shown on the plans. Any work done or damage to base and/or pavement outside the limits shown on the plans will not be measured for payment, but shall be restored at the Contractor's entire expense.

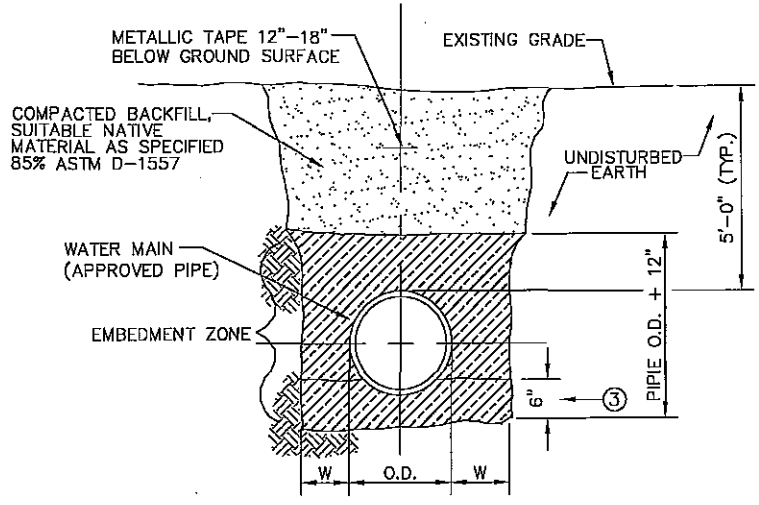
APPENDIX B

Design Standard Details

WATER FACILITIES
SECTION 100



PAVEMENT REPAIR AND BACKFILL DETAIL



PIPE TRENCH AND BACKFILL DETAIL

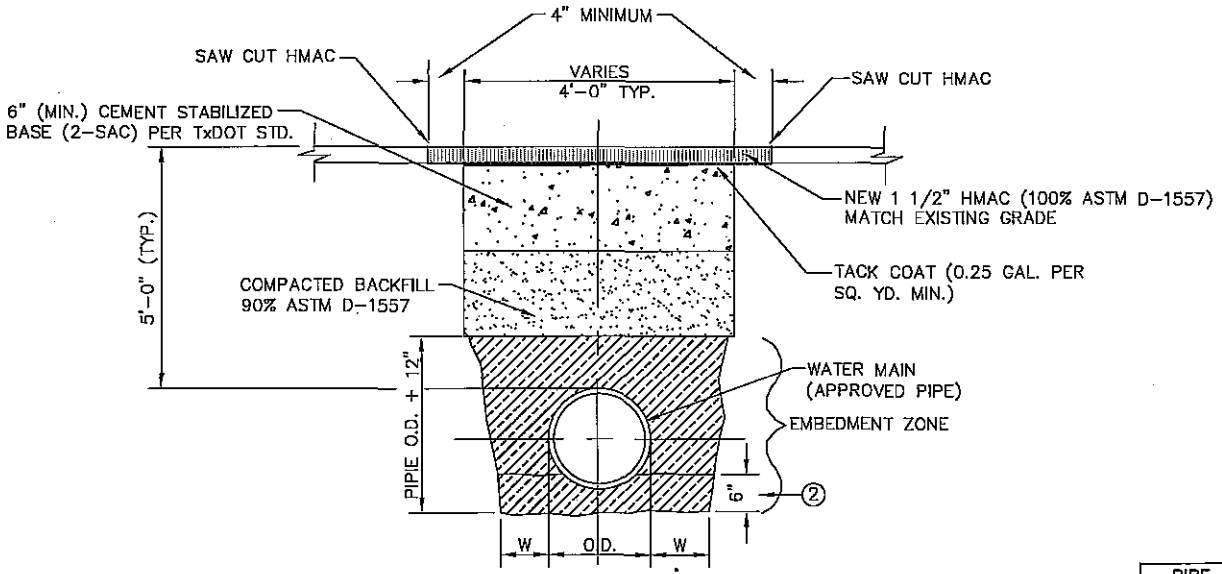
GENERAL NOTES:

1. THE PAVEMENT REPLACEMENT SYSTEM (HMAC, BASE, SUBGRADE) SHOWN ARE GENERAL REQUIREMENTS AND WILL WORK IN GOOD TO MODERATE SOIL CONDITIONS. REFER TO SITE SPECIFIC GEOTECHNICAL STUDY FOR PAVEMENT RECOMMENDATIONS IN AREAS OF BAD SOIL CONDITIONS AND FOR NEW SUBDIVISIONS.
2. UNIFORM TRENCH BOTTOM – PIPE SHALL GENERALLY BE LAID ON UNIFORM, EVENLY GRADED TRENCH BOTTOM. TRENCH BOTTOM SHALL BE SHAPED AT EVERY BELL TO PROVIDE UNIFORM BEARING OF PIPE BARREL.
3. NON-UNIFORM TRENCH BOTTOM – WHEN A UNIFORM TRENCH BOTTOM IS UNATTAINABLE (ie ROCKY OR UNEVENLY GRADED) A 6" SAND BEDDING SHALL BE REQUIRED.
4. EMBEDMENT BACKFILL – USE CLASS II COARSE GRAVELS PER ASTM D-2487 W/<12% FINES & MAX SIZE 1-1/2". NATIVE MATERIAL OR IMPORTED SELECT MATERIAL, MEETING OR EXCEEDING CLASS II REQUIREMENTS, MAY BE USED. CLASS I MATERIAL (MAXIMUM 1-1/2" SIZE) IS ACCEPTABLE AT THE DISCRETION OF THE CONTRACTOR.
5. FINAL BACKFILL – SUITABLE COMPACTED NATIVE MATERIAL, MINIMUM 3" SIZE IS ACCEPTABLE.
6. SHORING (TRENCH SAFETY) SHALL BE AS PER O.S.H.A. REQUIREMENTS. CONTRACTOR SHALL OBTAIN WRITTEN PERMISSION FROM R.O.W. OWNER TO PERFORM "ANGLE OF REPOSE" ON TRENCH WALLS.

NOMINAL PIPE DIAMETER	W	
	MIN.	MAX.
8"-18"	6"	12"
24" OR LARGER	12"	18"

PIPE MATERIAL	NOMINAL PIPE DIAMETER	EMBEDMENT MATERIAL
PVC	8"-18"	NATIVE MATERIAL W/ <12% PASSING NO. 200 @ 85% D-689 OR CRUSHED ROCK AS SPECIFIED
	24" OR LARGER	CRUSHED ROCK (PEA GRAVEL) AS SPECIFIED
D.I.	ALL DIA.	NATIVE MATERIAL W/ <12% PASSING NO. 200 @ 85% D-689 OR CRUSHED ROCK AS SPECIFIED
C-303	ALL DIA.	
STEEL	ALL DIA.	

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES	DATE: APRIL 2005	No: 101
		DETAIL: TYPICAL PIPE TRENCH, EMBEDMENT AND BACKFILL		

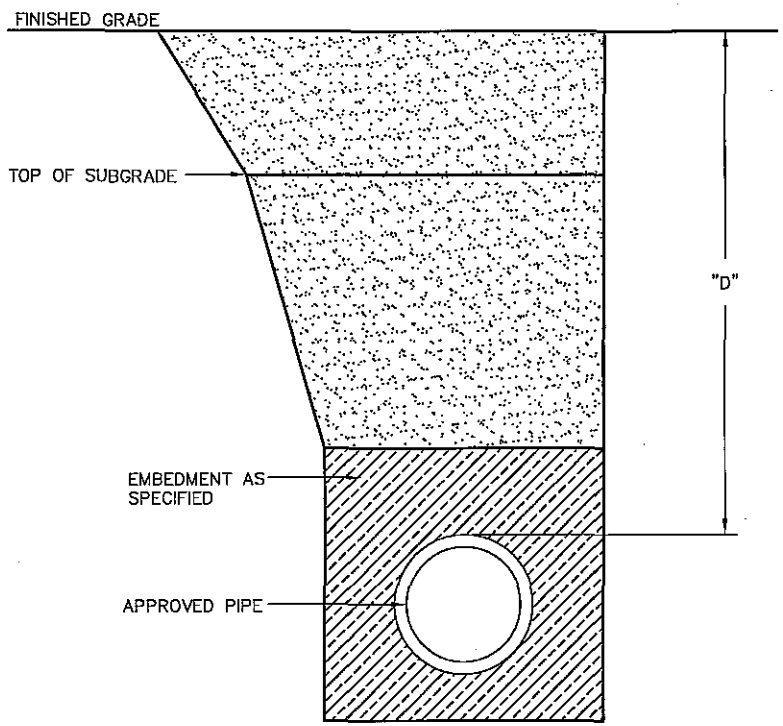


PIPE TRENCH AND BACKFILL DETAIL

NOMINAL PIPE DIAMETER	W	
	MIN.	MAX.
8"-18"	6"	12"
24" OR LARGER	12"	18"

PIPE MATERIAL	NOMINAL PIPE DIAMETER	EMBEDMENT MATERIAL
PVC	8"-18"	NATIVE MATERIAL W/ <12% PASSING NO. 200 @ 85% D-689 OR CRUSHED ROCK AS SPECIFIED
	24" OR LARGER	CRUSHED ROCK (PEA GRAVEL) AS SPECIFIED
D.I.	ALL DIA.	NATIVE MATERIAL W/ <12% PASSING NO. 200 @ 85% D-689 OR CRUSHED ROCK AS SPECIFIED
C-303	ALL DIA.	
STEEL	ALL DIA.	

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES	DATE: APRIL 2005	No: 102
		DETAIL: TYPICAL PIPE TRENCH IN TxDOT R.O.W.		



GENERAL NOTES:

1. REFER TO UTILITY STANDARD DETAIL FOR PAVEMENT REPLACEMENT AND BACKFILL REQUIREMENTS.
2. TRENCH SAFETY SYSTEMS SHALL BE USED WHEN TRENCH DEPTH EXCEEDS 5 FEET OR WHEN EXISTING SOIL CONDITIONS DICTATE.

CONSTRUCTION KEY NOTES:

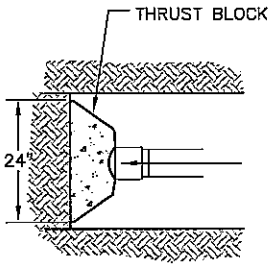
A. STANDARD COVER FOR WATER MAINS SHALL DEPEND ON THE PIPE SIZE AND THE FOLLOWING INSTALLATION CONDITIONS,

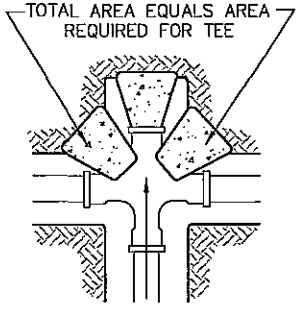
CONDITION A – WATERLINE RELOCATION

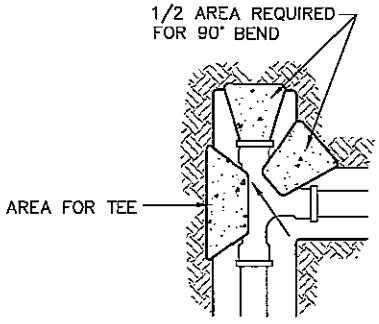
CONDITION B – NORMAL LINE INSTALLATION, STREET AND DRAINAGE PROJECTS, FOR NEW SUBDIVISIONS AND NON–PAVED AREA.

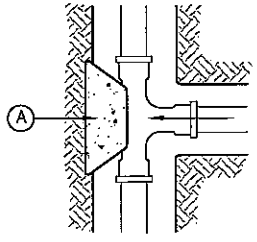
AND SHALL BE AS FOLLOWS.

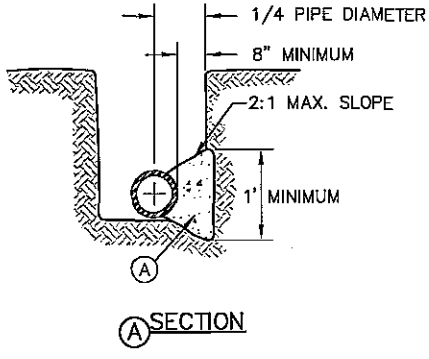
PIPE SIZE	CONDITION	DIMENSION
6", 8"	A	"D" = 4'
6", 8"	B	"D" = 5'
12" & LARGER	A OR B	"D" = 5'



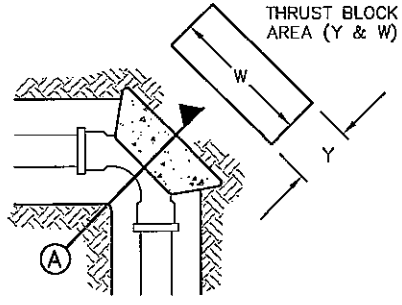








A SECTION



GENERAL NOTES:

1. TABLE IS BASED ON 2000#/SQ. FT. SOIL. IF CONDITIONS ARE FOUND TO INDICATE SOIL BEARING IS LESS, THE AREAS SHALL BE INCREASED ACCORDINGLY.
2. AREAS FOR PIPE LARGER THAN 18" SHALL BE CALCULATED.
3. CONCRETE SHALL HAVE A MINIMUM COMPRESSION STRENGTH OF 2500 PSI.
4. THRUST BLOCK IS TO EXTEND TO UNDISTURBED SOIL.
5. SIZE MAY BE DECREASED FOR LESSER DEGREE BENDS AS DETERMINED BY ENGINEER.
6. KEEP CONCRETE CLEAR OF M.J. OR BELL AND SPIGOT JOINTS.
7. BLOCK IN A SIMILAR MANNER AT TEES, HYDRANTS, PLUG OR OTHER LOCATIONS AS REQUIRED.
8. IF CONCRETE BLOCKS CANNOT BE POURED, THEN USE TIE-RODS OR OTHER APPROVED METHOD TO RESTRAIN THRUST.

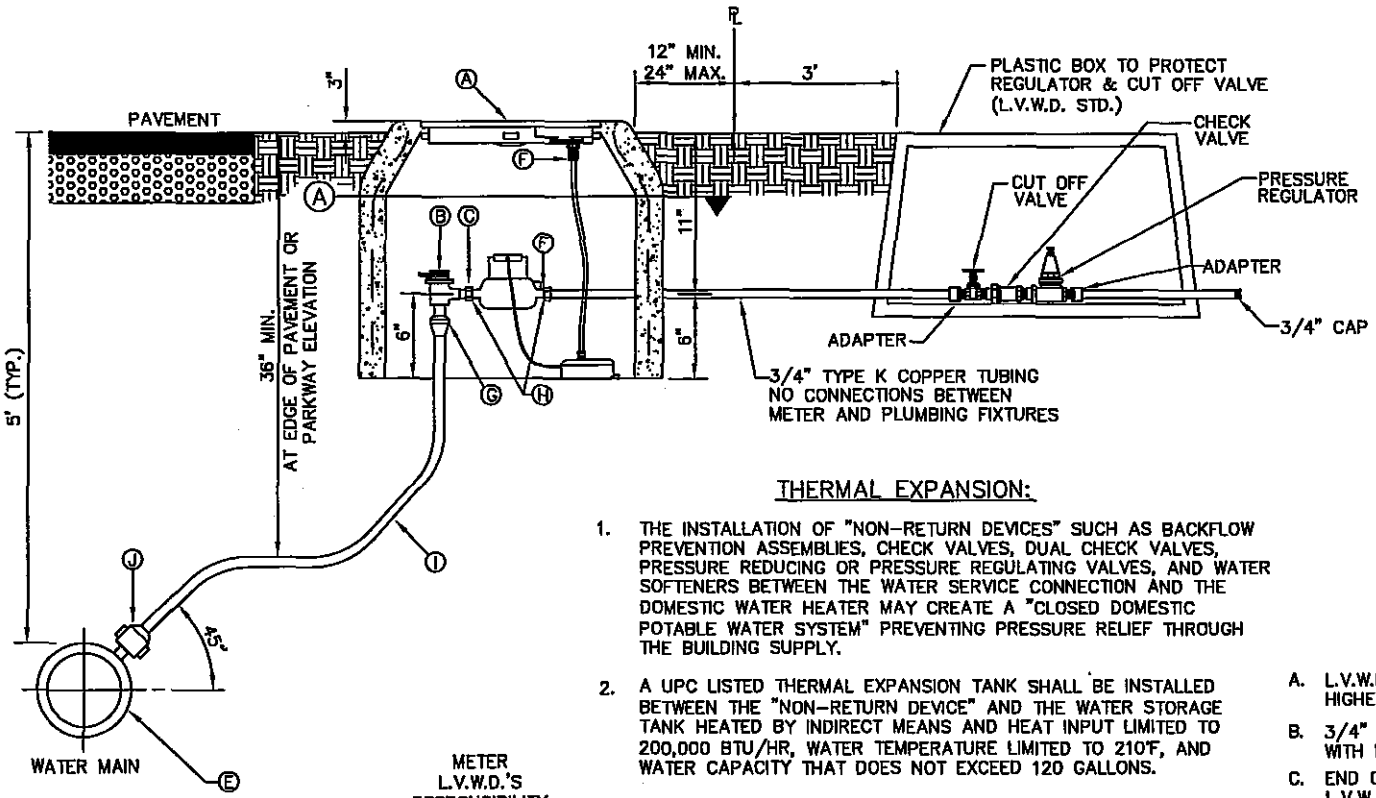
CONSTRUCTION KEY NOTES:

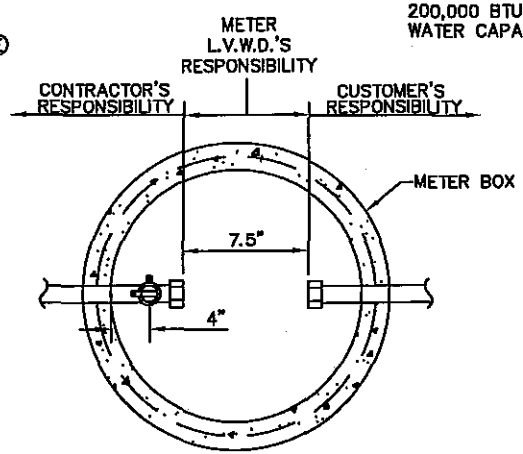
A. LENGTH "Y & W" AS REQUIRED TO OBTAIN BEARING AREA AGAINST UNDISTURBED SOIL.

B. ADDITIONAL EXCAVATION IF NECESSARY TO OBTAIN REQUIRED BEARING AREA.

C. MINIMUM THRUST BLOCK AREA REQUIREMENTS FOR (Y & W) AS FOLLOWS:

PIPE SIZE	WATER PIPE	
	TEE, DEAD END 90° BEND	45° AND 22 1/2° BENDS
4" & LESS	3 SQ. FEET	3 SQ. FEET
6"	4 SQ. FEET	3 SQ. FEET
8"	6 SQ. FEET	3 SQ. FEET
10"	9 SQ. FEET	5 SQ. FEET
12"	13 SQ. FEET	7 SQ. FEET
16"	23 SQ. FEET	12 SQ. FEET
18"	29 SQ. FEET	15 SQ. FEET





Ⓐ SECTION

THERMAL EXPANSION:

1. THE INSTALLATION OF "NON-RETURN DEVICES" SUCH AS BACKFLOW PREVENTION ASSEMBLIES, CHECK VALVES, DUAL CHECK VALVES, PRESSURE REDUCING OR PRESSURE REGULATING VALVES, AND WATER SOFTENERS BETWEEN THE WATER SERVICE CONNECTION AND THE DOMESTIC WATER HEATER MAY CREATE A "CLOSED DOMESTIC POTABLE WATER SYSTEM" PREVENTING PRESSURE RELIEF THROUGH THE BUILDING SUPPLY.
2. A UPC LISTED THERMAL EXPANSION TANK SHALL BE INSTALLED BETWEEN THE "NON-RETURN DEVICE" AND THE WATER STORAGE TANK HEATED BY INDIRECT MEANS AND HEAT INPUT LIMITED TO 200,000 BTU/HR, WATER TEMPERATURE LIMITED TO 210°F, AND WATER CAPACITY THAT DOES NOT EXCEED 120 GALLONS.

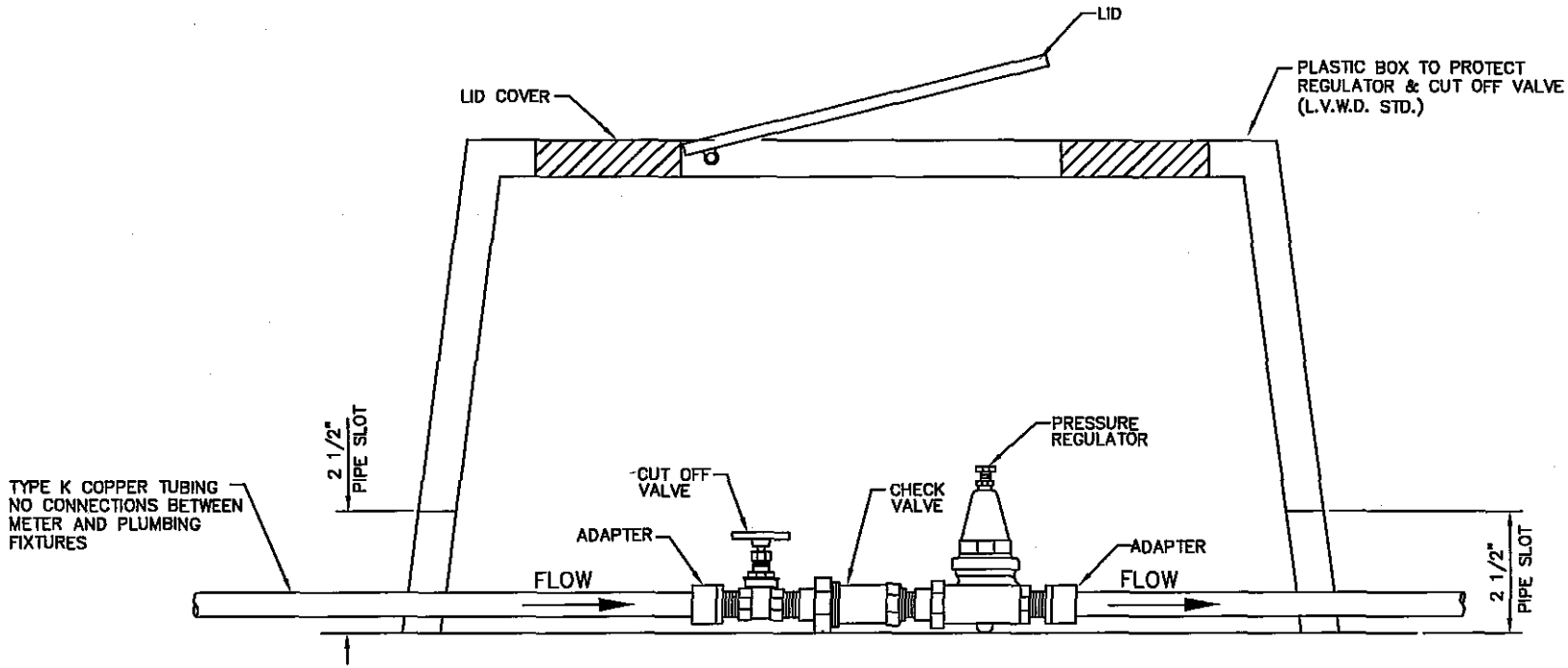
GENERAL NOTES:

1. DETAIL SHOWN FOR A 3/4" SERVICE, 1" SERVICE INSTALLATION IS SIMILAR EXCEPT FOR SIZES OF PIPE, FITTING, METER AND BOX (TYPE "B").
2. WHERE NO CURB EXISTS, METER IS TO BE SET NEAR PROPERTY LINE, AS SHOWN.
3. GENERALLY, IN NEW SUBDIVISIONS FOR 3/4" AND 1" SERVICE LINES CONTRACTOR SHALL FURNISH AND INSTALL ALL FITTINGS, PIPING AND VALVES FROM MAINLINE CONNECTION TO THE INLET SIDE OF THE METER.
4. THE PRIVATE OWNER SHALL BE RESPONSIBLE FOR HAVING A PLUMBER EXTEND THE SERVICE FROM THE DISCHARGE SIDE OF THE METER OR BACKFLOW PREVENTOR, TO THE RESIDENCE.
5. PROPERTIES WITH HIGH CONSUMPTION WILL REQUIRE THE USE OF A WILKINS BACKFLOW PREVENTOR ASSEMBLY.

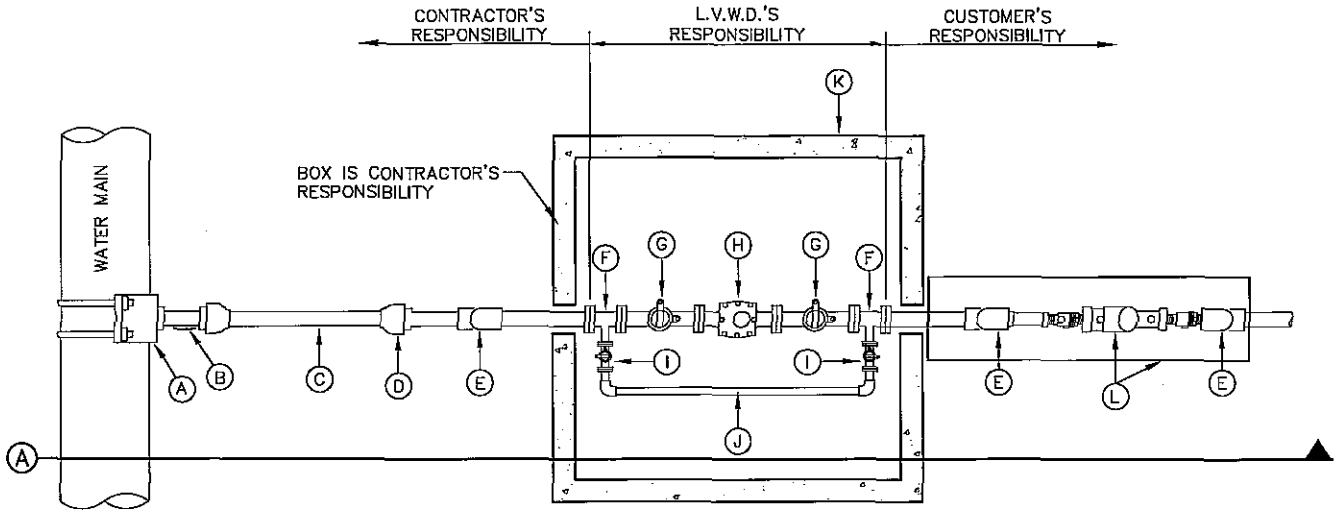
CONSTRUCTION KEY NOTES:

A. L.V.W.D. STD. METER BOX TYPE "A" SHALL BE SET 3" HIGHER THAN SURROUNDING GROUND OR AT CURB LEVEL.
B. 3/4" ANGLE BALL VALVE. COPPER FLARE BY SWIVELNUT WITH LOCK-WING.
C. END OF CONTRACTORS RESPONSIBILITY, BEGINNING OF L.V.W.D.'S.
D. WATER METER TO BE INSTALLED BY LVWD. AN 8" GAP SHALL BE LEFT FOR METER INSTALLATION.
E. DOUBLE STRAP SERVICE SADDLE ON EXISTING PIPE. NEW PIPE TO USE MANUFACTURER SPECIFIED SINGLE HINGED SADDLE.
G. FLARE OF SERVICE LINE.
F. END OF L.V.W.D.'S RESPONSIBILITY AND BEGINNING OF CUSTOMERS.
H. INLET AND OUTLET COUPLING; CONTRACTOR'S AND CUSTOMER'S RESPONSIBILITY.
I. 3/4" (TYPE K) COPPER TUBING.
J. 3/4" CORPORATION STOP, CC THREAD TO FLARE COPPER.
K. PRESSURE REGULATOR ASSEMBLY LOCATED WITHIN PROPERTY (TYP.).
L. NEPTUNE R9000 TRANSPONDER

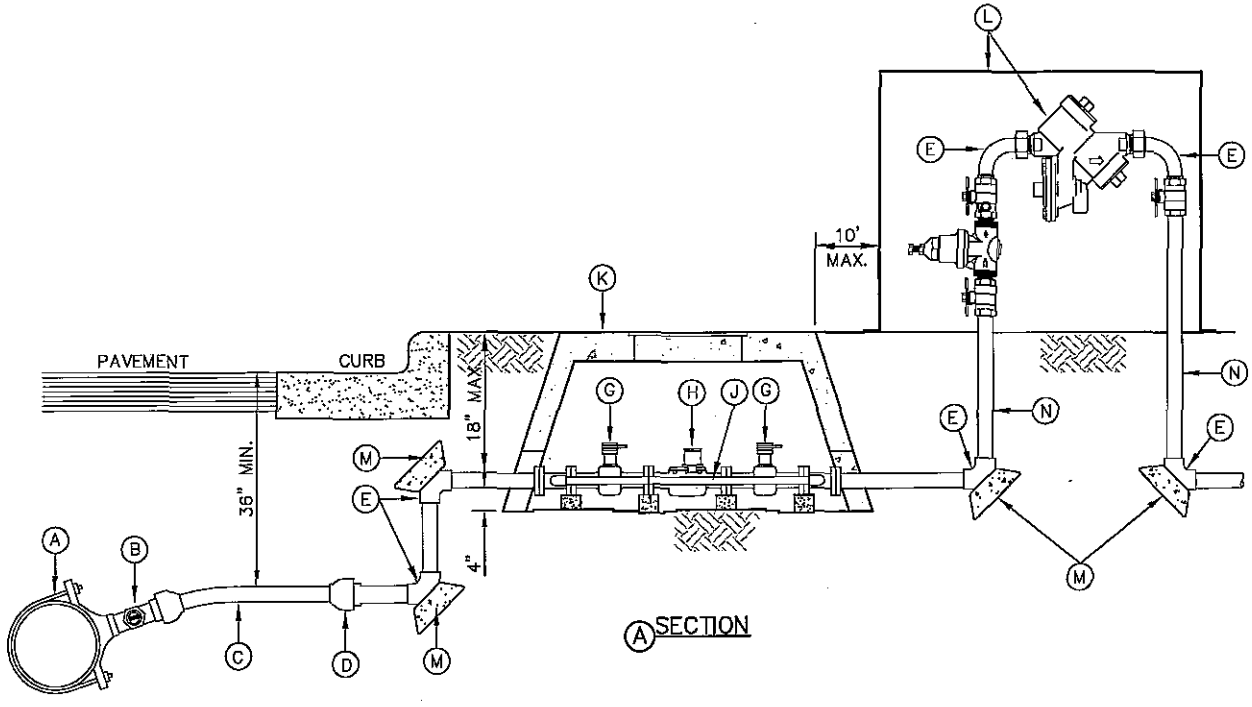
Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES	DATE: APRIL 2005	No: 105
		DETAIL: TYPICAL RESIDENTIAL SERVICE LINE		



Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES DETAIL: PRESURE REGULATOR ASSEMBLY DETAIL	DATE: APRIL 2005	No: 106



PLAN



A SECTION

GENERAL NOTES:

1. DETAIL SHOWN FOR 1½" SERVICE; INSTALLATION SIMILAR FOR 2" SERVICE EXCEPT FOR SIZES OF PIPE, FITTINGS AND METER. 2" SERVICE SHALL ALSO HAVE A 1" BY–PASS METER
2. WHERE NO CURB EXISTS, METER IS TO BE SET NEAR NEAR PROPERTY LINE OR AT DESIGNATED LOCATION. CONTRACTOR/CUSTOMER TO COORDINATE LOCATION WITH L.V.W.D.
3. THE L.V.W.D. WILL FURNISH AND INSTALL THE METER IT SHALL BE THE RESPONSIBILITY OF THE PRIVATE OWNER TO HAVE PLUMBER EXTEND SERVICE LINE ON DISCHARGE SIDE OF METER, AS REQUIRED.
4. CONTRACTOR WILL BE RESPONSIBLE FOR MAINTAINING SYSTEM FOR NO LESS THAN 1–YEAR AFTER DEDICATION/CONSTRUCTION.

CONSTRUCTION KEY NOTES:

A. DOUBLE STRAP SERVICE SADDLE

B. 1½"–2" TAP WITH CORPORATION STOP

C. 1½"COPPER PIPE. FOR 1½" & 2" SERVICE INSTALLATIONS, ALL PIPING SHALL BE COPPER AND ALL FITTINGS SHALL BE BRONZE UNLESS OTHERWISE SPECIFIED.

D. UNION

E. BEND 90°

F. TEE

G. 1½"–2" BALL VALVE

H. 1½"–2" TURBINE METER (L.V.W.D.'S RESPONSIBILITY). (THE NEED OF A COMPOUND METER WILL BE DICTATED AT TIME OF APPLICATION.)

I. CURB VALVE

J. 1" BY–PASS LINE

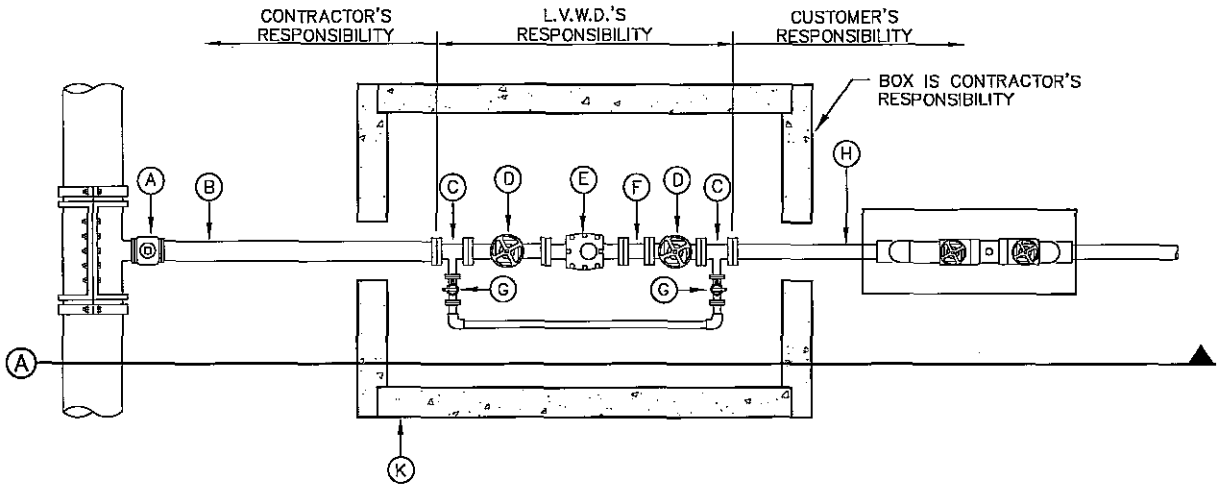
K. STANDARD METER BOX TYPE "C"; 3" ABOVE GRADE OR FLUSH WITH CONCRETE.

L. BACKFLOW PREVENTER AND ENCLOSURE ASSEMBLY AS REQUIRED. BY L.V.W.D. REFER TO L.V.W.D. STANDARD IN THIS MANUAL.

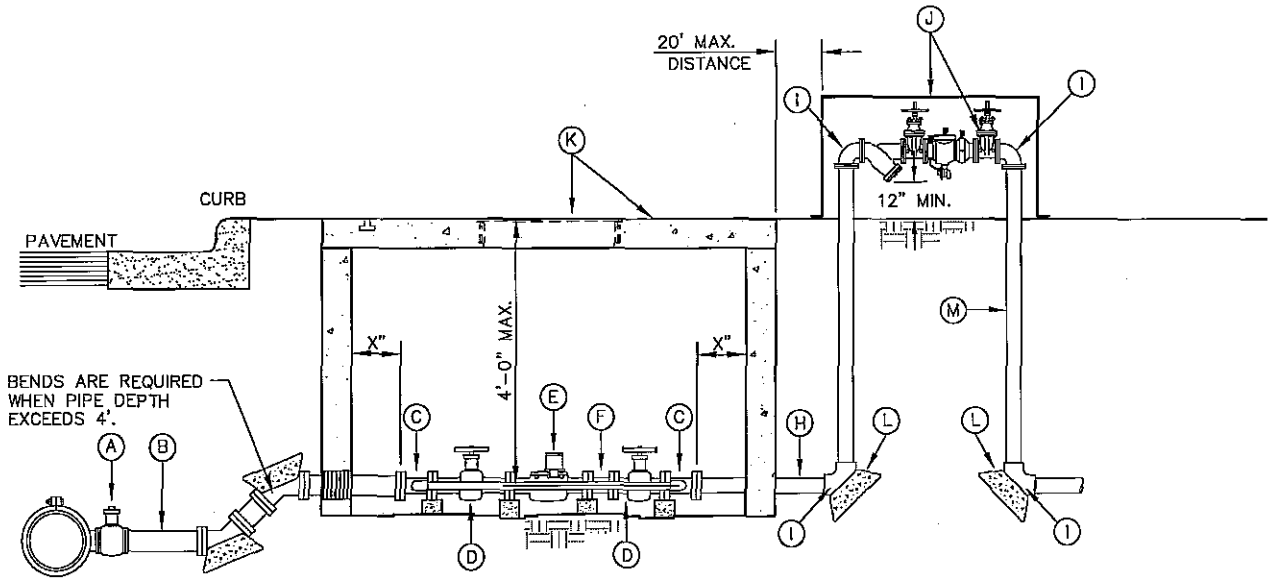
M. THRUST BLOCKING OR RESTRAINED JOINTS AS REQUIRED.

N. 1½"–2" BRASS PIPE–LENGTH AS REQUIRED

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES DETAIL: TYPICAL 1 ½" – 2" SERVICE LINE INSTALLATION	DATE: APRIL 2005	No: 107



PLAN



A SECTION

GENERAL NOTES:

1. DETAIL SHOWN FOR 4" SERVICE: INSTALLATION SIMILAR FOR LARGER SERVICES EXCEPT FOR SIZE OF PIPE, FITTINGS AND METER. NO 3" SERVICES WILL BE ALLOWED.
2. WHERE NO CURB EXISTS, METER IS TO BE SET NEAR PROPERTY LINE OR AT DESIGNATED LOCATION. CONTRACTOR/CUSTOMER TO COORDINATE LOCATION WITH L.V.W.D.
3. THE L.V.W.D. WILL FURNISH AND INSTALL THE METER. IT SHALL BE THE RESPONSIBLITY OF THE PRIVATE OWNER TO HAVE PLUMBER EXTEND SERVICE LINE ON DISCHARGE SIDE OF METER, AS REQUIRED.

CONSTRUCTION KEY NOTES:

A. 4" TAPPING SLEEVE AND RESILIENT WEDGE GATE VALVE. REFER TO OTHER REQUIREMENTS IN THIS MANUAL.

B. 4" P.V.C.

C. 4"x2" TEE

D. 4" RESILIENT WEDGE GATE VALVE

E. 4" METER

F. 4" TEST PLUG D.I.P.

G. 2" BALL VALVE WITH LOCK WING

H. 4" SPOOL D.I.P.

I. 4" BEND 90°

J. 4" BACKFLOW PREVENTER AND ENCLOSURE ASSEMBLY AS REQUIRED BY L.V.W.D. REFER TO DETAIL IN THIS MANUAL.

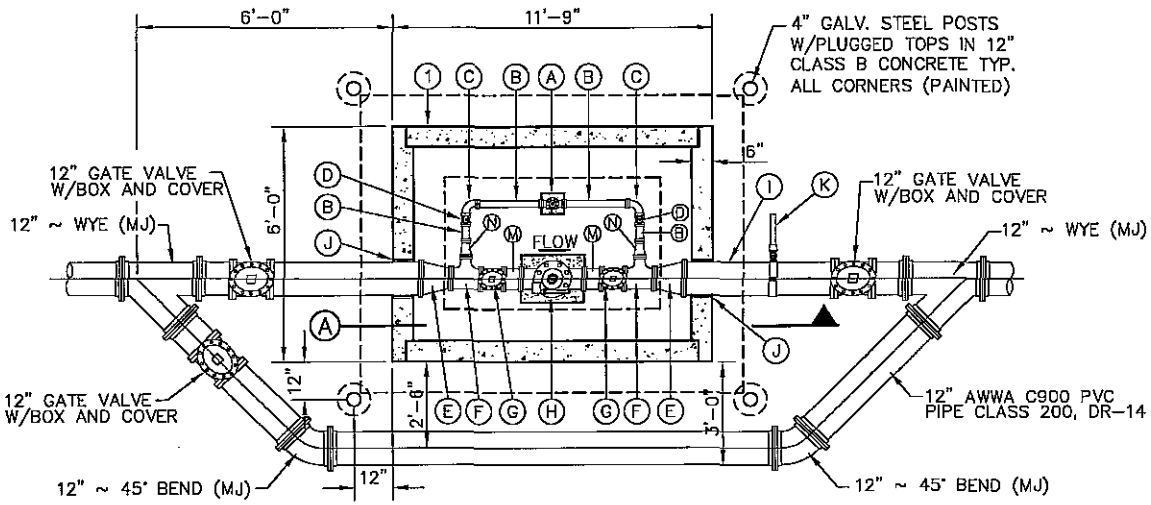
K. STANDARD METER BOX TYPE "D" AND COVER.

L. THRUST BLOCKING AS REQUIRED

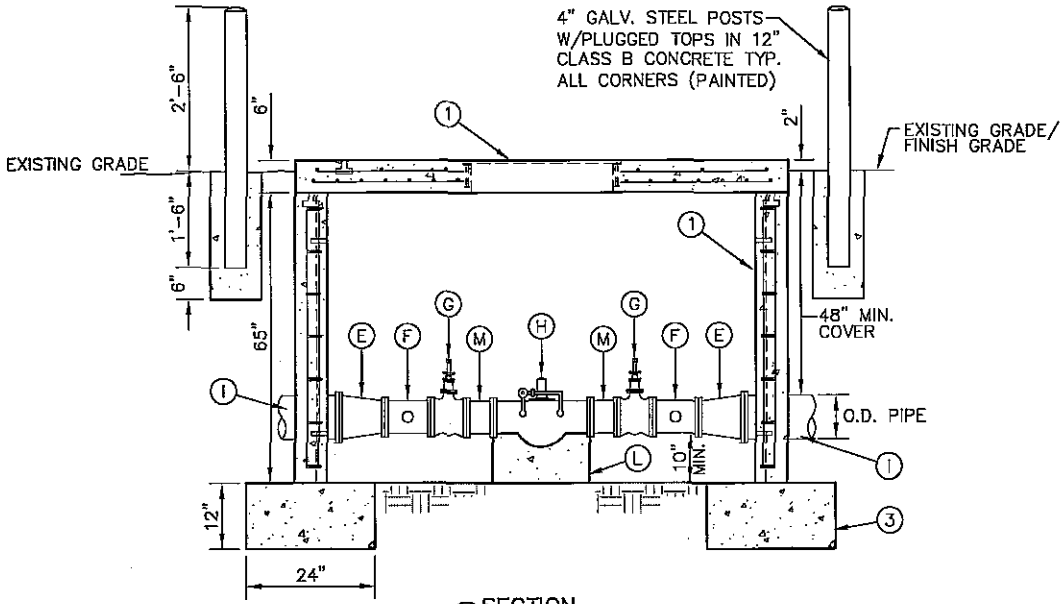
M. 4" FLANGED D.I.P. – LENGTH AS REQUIRED

N. 4" BEND 45°

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES	DATE: APRIL 2005	No: 108
		DETAIL: TYPICAL 4" AND LARGER SERVICE LINE INSTALLATION		



PLAN



A SECTION

GENERAL NOTES:

1. VALVE VAULT AND COVER SHALL BE IN ACCORDANCE WITH L.V.W.D. STANDARDS. SEE DETAILS THIS MANUAL.
2. PRESSURE RELIEF VALVE MAY BE LOCATED EITHER UPSTREAM OR DOWNSTREAM OF PRESSURE REDUCING VALVE DEPENDING ON A SUITABLE DISCHARGE LOCATION. WHEN RELIEF VALVE IS LOCATED DOWNSTREAM REDUCING VALVE SHALL BE EQUIPPED WITH A PRESSURE RELIEF PILOT AS NOTED IN A AND H.
3. FOOTING REQUIRED WHEN PLACED UNDER EXISTING OR PROPOSED STREET PAVING.

CONSTRUCTION KEY NOTES:

A. 2" FLANGED PRESSURE REDUCING VALVE, WITH SURGE RELIEF PILOT, FOR LOW FLOWS.

B. FLANGED SPOOL 2" DIAMETER (BRASS)

C. 2"-90° BEND FLANGED (BRASS)

D. 2" GATE VALVE FLANGED

E. 12"x8" REDUCER FLANGED

F. 8"x4" FLANGED TEE

G. 8" FLANGED GATE VALVE

H. 8" FLANGED PRESSURE REDUCING VALVE, WITH SURGE RELIEF PILOT, FOR HIGH FLOWS. AS MANUFACTURED BY BERMAD INC., PH.(714) 666-1100, FAX (714) 666-2533, OR APPROVED EQUAL

I. MAINLINE, SIZE AS SPECIFIED.

J. WALL SLEEVES, SEAL ALL VOIDS W/CAULKING, (SONNEBORN NP1)

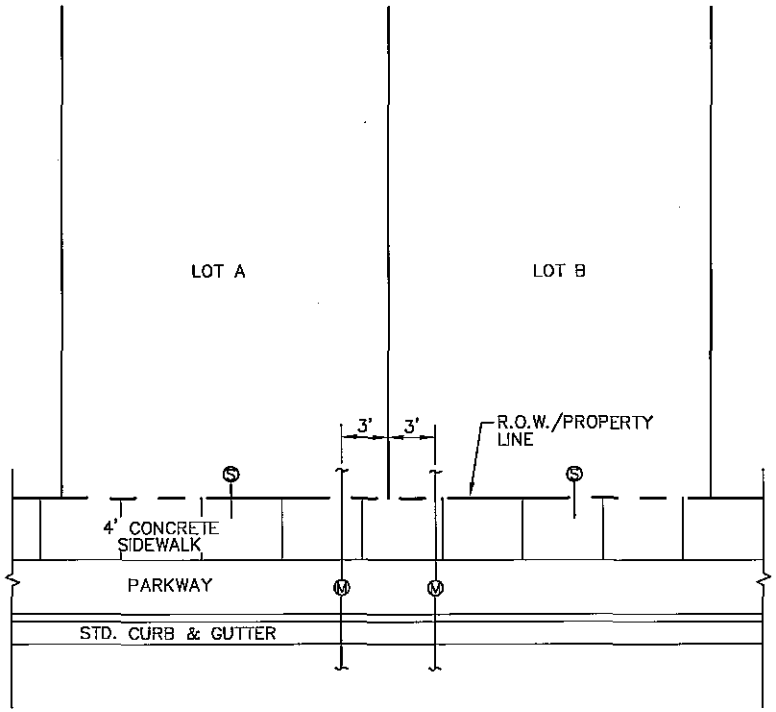
K. TO PRESSURE RELIEF, VALVE SIZE IS GENERALLY ONE OR TWO SIZES SMALLER THAN THE SIZE OF THE MAINLINE.

L. VALVES INSTALLED ON NATURAL GROUND WITH CONCRETE SUPPORTS AS REQUIRED.

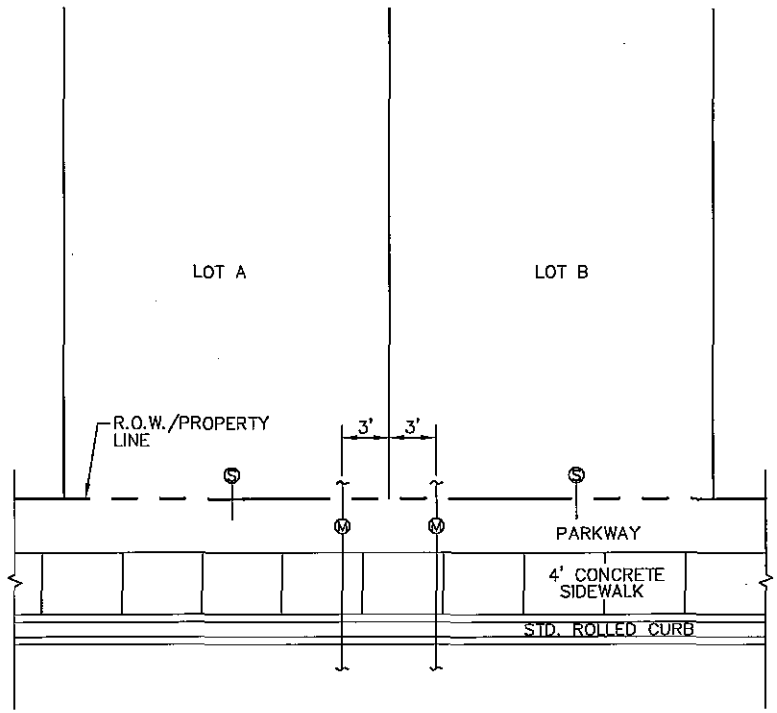
M. FLANGED SPOOL, SIZE AS SPECIFIED

N. 4"x 2" REDUCER FLANGED

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES	DATE: APRIL 2005	No: 109
		DETAIL: PRESSURE REDUCING VALVE ASSEMBLY		



PLAN

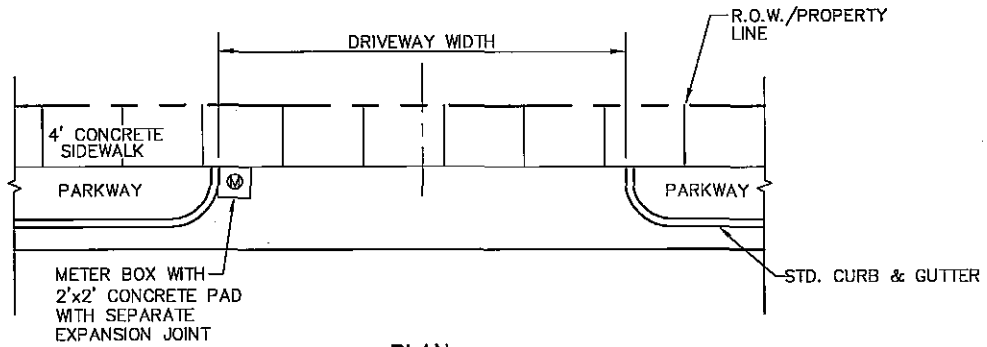


PLAN

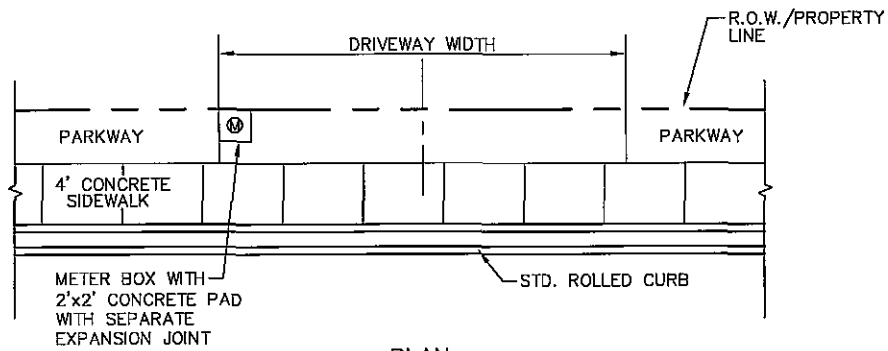
GENERAL NOTES:

1. METER BOXES TO BE PLACED BACK TO BACK AS SHOWN.
2. SEWER SERVICE SHALL BE LOCATED AT CENTER OF LOTS, AS SHOWN.
3. WHEN METER BOX IS WITHIN DRIVEWAY LIMITS, REFER TO DETAIL 111.

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES	DATE: APRIL 2005	No: 110
		DETAIL: SERVICE CONNECTION LOCATION		

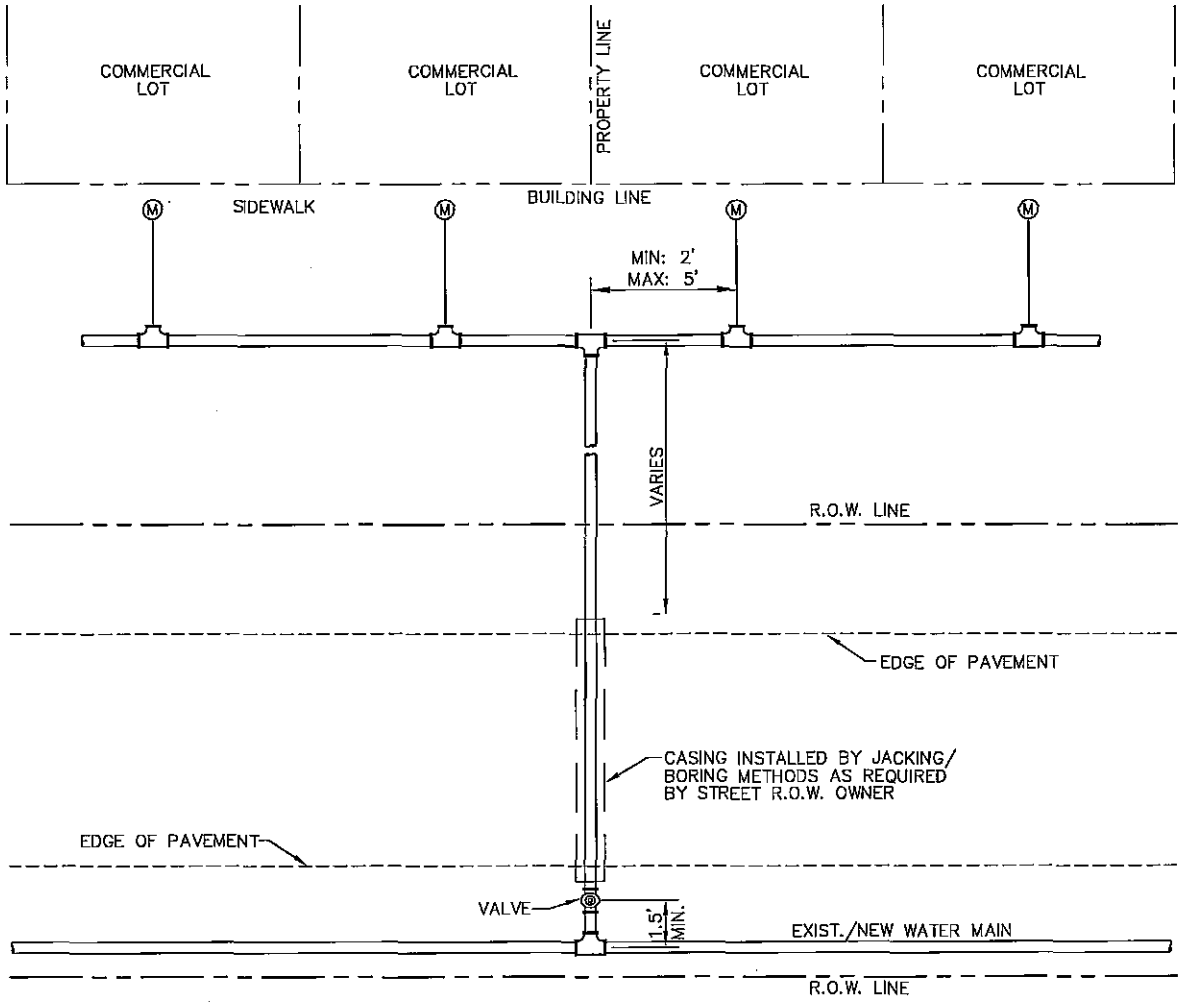


PLAN



PLAN

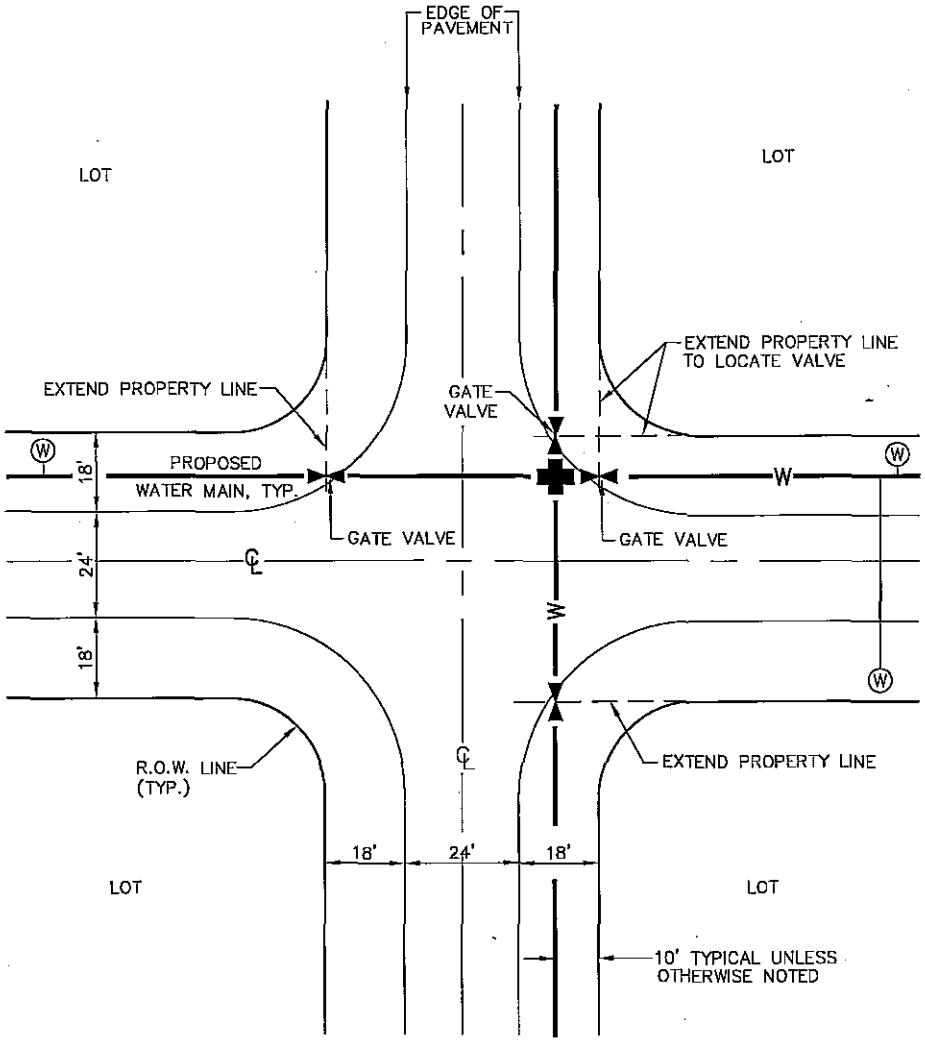
Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES DETAIL: SERVICE CONNECTION WITHIN DRIVEWAY LIMITS	DATE: APRIL 2005	No: 111



GENERAL NOTES:

1. PURPOSE OF THIS DETAIL IS TO SERVE COMMERICAL/ INDUSTRIAL CUSTOMERS BY EXECUTING ONE STREET CROSSING AND SERVING NUMEROUS CUSTOMERS.
2. SIZE OF LINES WILL BE AS DETERMINED BY L.V.W.D. AND TCEQ REQUIREMENTS.
3. REQUIRED PRESSURE AT THE METER (ACCORDING TO TCEQ STANDARDS) SHALL BE AT LEAST 35 P.S.I.
4. A MAXIMUM OF 20 SERVICES SHALL BE CONNECTED IN SERIES. A PRESSURE DROP OF APPROXIMATELY 15–20 P.S.I., AT PEAK USAGE TIME (e.g. NOON), SHALL BE TAKEN INTO ACCOUNT FOR THE MAXIMUM AMOUNT OF SERVICES INSTALLED. PRESSURE DROP COULD VARY DUE TO SPECIFICATIONS ON THE DESIGN.

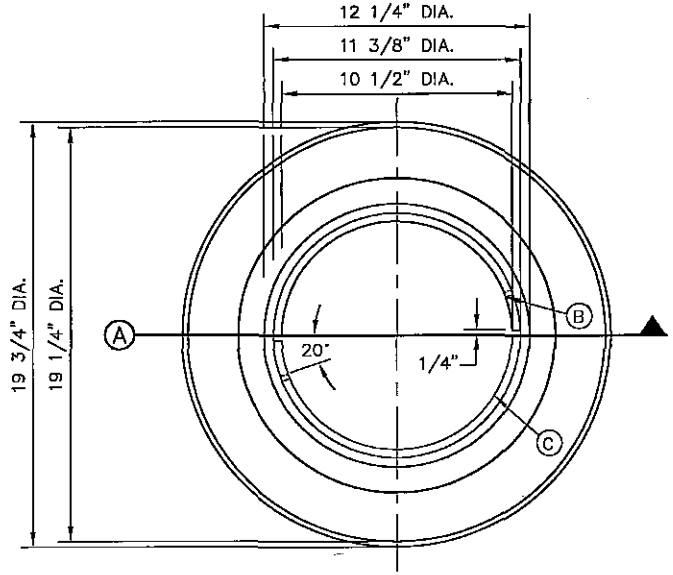
Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES	DATE: APRIL 2005	No: 112
		DETAIL: SERVICE CONNECTION WITHIN COMMERCIAL SITE		



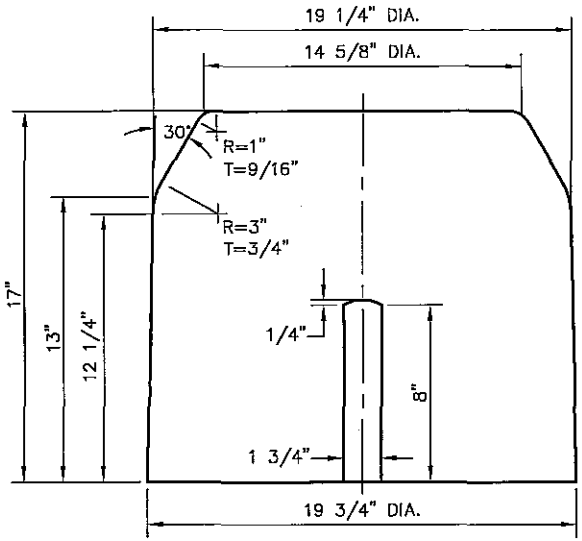
GENERAL NOTES:

1. SEE PLANS FOR SIZE AND LOCATION OF WATER MAIN AND LOTS TO BE SERVICED.
2. LOCATION OF THE 3/4" SERVICE CONNECTION TO BE INSTALLED PER L.V.W.D. STANDARDS.
3. THE NUMBER OF VALVES INSTALLED AT THE INTERSECTION MUST EQUAL THE NUMBER OF INCOMING STREETS.

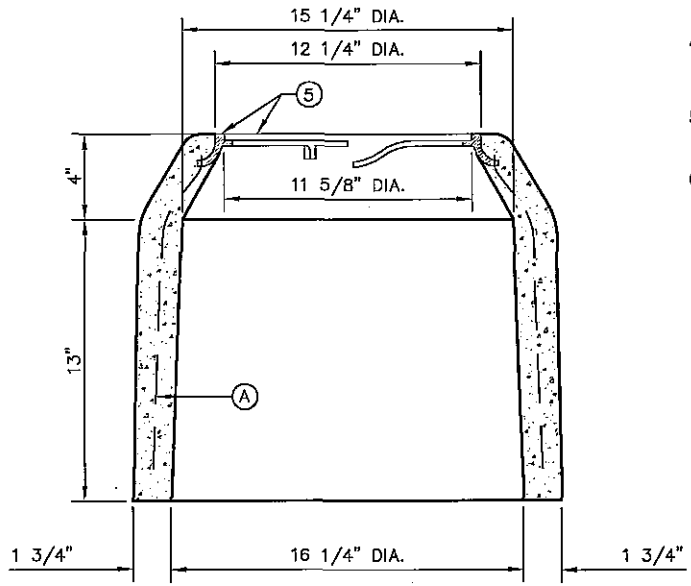
Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES	DATE: APRIL 2005	No: 113
		DETAIL: TYPICAL VALVE LOCATIONS		



TOP VIEW



SIDE VIEW



(A) SECTION

GENERAL NOTES:

1. INSTALL TO GRADE MATCHING TOP OF CURB, OR AS SPECIFIED.
2. ANGLE VALVE SHALL BE IN LINE WITH THE INLET/OUTLET PORTS OF THE METER BOX.
3. METER BOXES SHALL NOT BE INSTALLED UNDER SIDEWALKS, DRIVEWAYS, OR PROPOSED ABOVE GROUND STRUCTURES.
4. WHERE NO CURBING EXIST, INSTALL BOXES IN ACCESSIBLE LOCATIONS BEYOND LIMITS OF STREET SURFACING, WALKS AND DRIVEWAYS.
5. STANDARD METER BOX RING AND COVER PER LVWD STANDARD DETAILS.
6. WHERE IT IS NECESSARY TO INSTALL A TYPE "A" BOX FOR 3/4" METER UNDER ROADWAYS OF TRAFFIC BEARING SURFACES, BOX SHALL BE ENCASED IN 12" CONCRETE, 3000 PSI. MINIMUM.

CONSTRUCTION KEY NOTES:

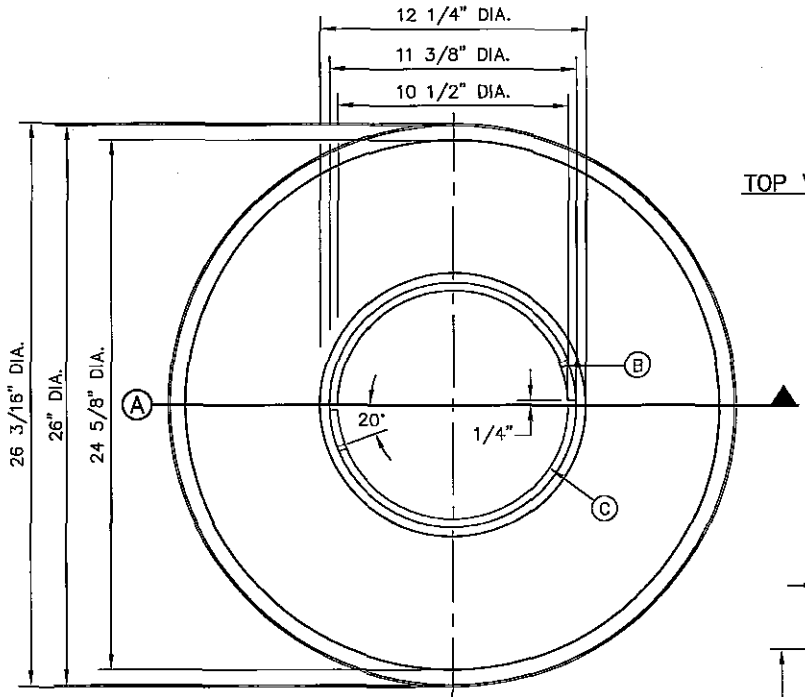
A. 3/16", 9 GAUGE BLACK ANNEALED WIRE

B. LUG–STOP

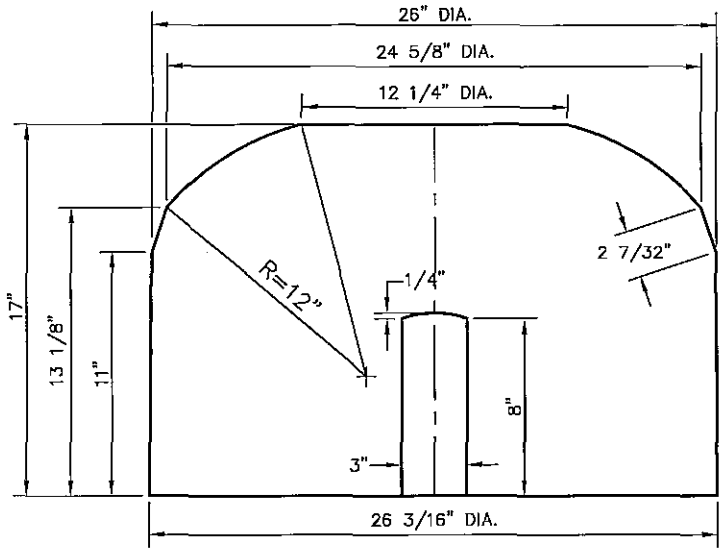
C. STANDARD CAST IRON RING

D. SINGLE UNIT

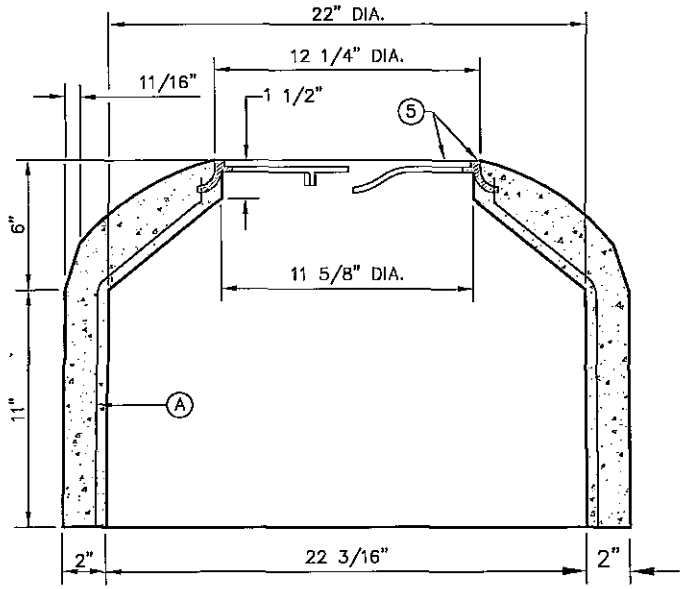
Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES	DATE: APRIL 2005	No: 114
		DETAIL: METER BOX TYPE "A"–3/4" SERVICE INSTALLATION		



TOP VIEW



SIDE VIEW



(A) SECTION

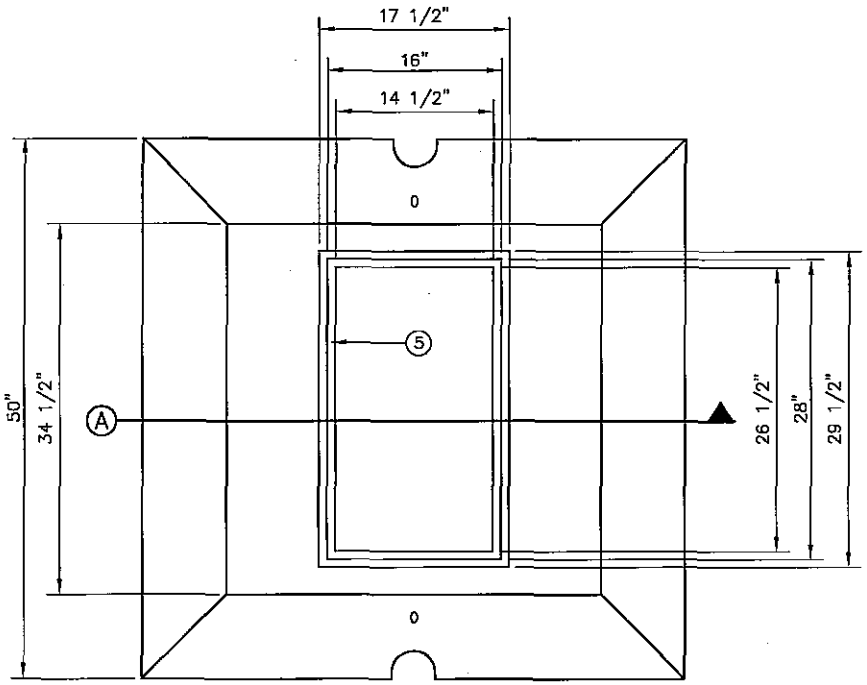
GENERAL NOTES:

1. INSTALL TO GRADE MATCHING TOP OF CURB.
2. ANGLE VALVE SHALL BE IN LINE WITH THE INLET/OUTLET PORTS OF THE METER BOX.
3. METER BOXES SHALL NOT BE INSTALLED UNDER SIDEWALKS, DRIVEWAYS, OR PROPOSED ABOVE GROUND STRUCTURES.
4. WHERE NO CURBING EXIST, INSTALL BOXES IN ACCESSIBLE LOCATIONS BEYOND LIMITS OF STREET SURFACING, WALKS AND DRIVEWAYS.
5. STANDARD METER BOX RING AND COVER PER L.V.W.D. STANDARD DETAILS.
6. WHERE IT IS NECESSARY TO INSTALL A TYPE "B" BOX FOR 1" METER UNDER ROADWAYS OF TRAFFIC BEARING SURFACES, BOX SHALL BE ENCASED IN 12" CONCRETE, 3000 PSI MINIMUM.

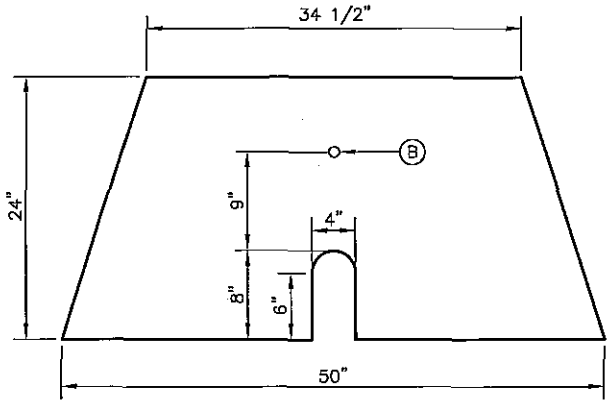
CONSTRUCTION KEY NOTES:

A. 3/16", 9 GAUGE BLACK ANNEALED WIRE
B. LUG–STOP
C. STANDARD CAST IRON RING
D. SINGLE UNIT

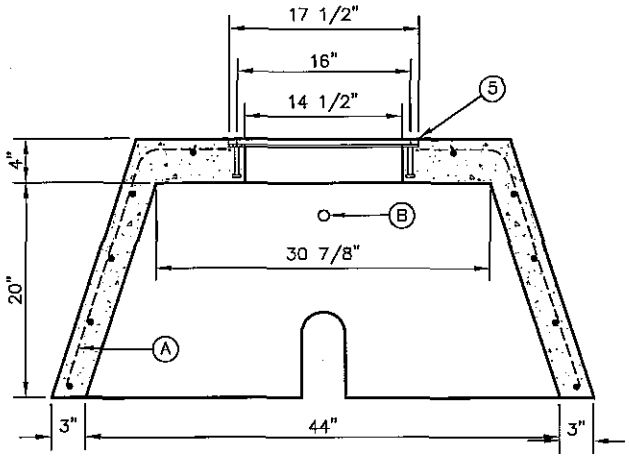
Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES DETAIL: METER BOX TYPE "B"–1" SERVICE INSTALLATION	DATE: APRIL 2005	No: 115



TOP VIEW



FRONT VIEW



(A) SECTION

GENERAL NOTES:

1. INSTALL TO GRADE MATCHING TOP OF CURB.
2. ANGLE VALVE SHALL BE IN LINE WITH THE INLET/OUTLET PORTS OF THE METER BOX.
3. METER BOXES SHALL NOT BE INSTALLED UNDER SIDEWALKS, DRIVEWAYS, OR PROPOSED ABOVE GROUND STRUCTURES.
4. WHERE NO CURBING EXIST, INSTALL BOXES IN ACCESSIBLE LOCATIONS BEYOND LIMITS OF STREET SURFACING, WALKS AND DRIVEWAYS.
5. STANDARD METER BOX FRAME AND COVER PER L.V.W.D. STANDARD DETAILS.

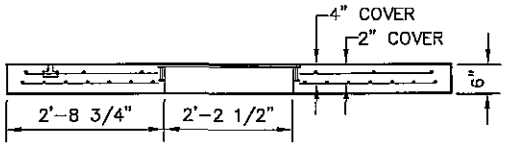
CONSTRUCTION KEY NOTES:

A. No. 4 REBAR AT 6" ON CENTER, EACH WAY

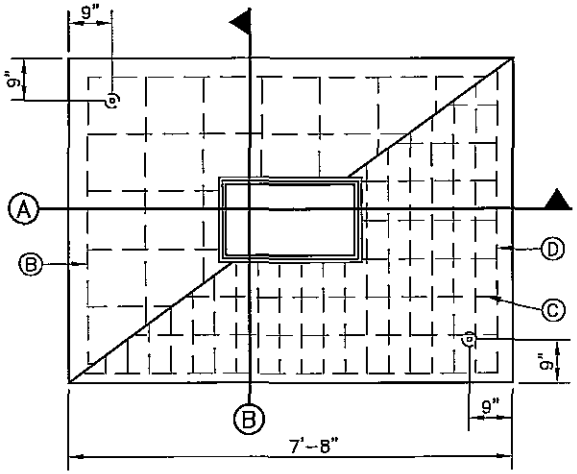
B. 1" DIAMETER HOLE

C. SINGLE UNIT

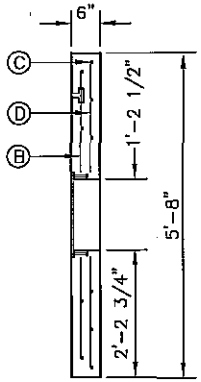
Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES	DATE: APRIL 2005	No: 116
		DETAIL: METER BOX TYPE "C"–1 1/2" TO 2" SERVICE INSTALLATION		



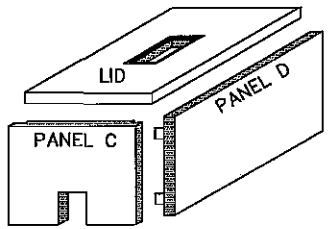
Ⓐ SECTION



LID



Ⓑ SECTION

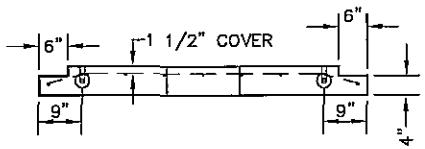


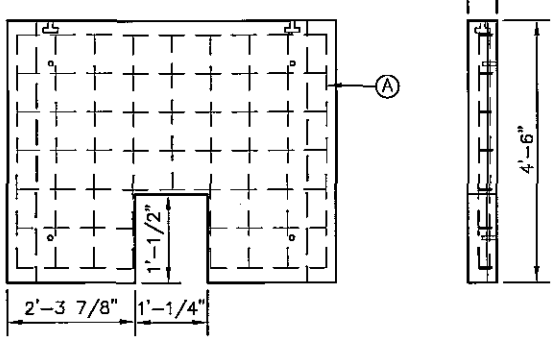
GENERAL NOTES:

1. WATER CEMENT RATIO 0.5 OR LESS BY WEIGHT OR NOT MORE THAN 5.5 GALLONS PER SACK.
2. REINFORCING SHALL COMPLY WITH ASTM A615 GRADE 60 STEEL FY=60000 PSI.
3. BAR BENDING AND PLACEMENT TO COMPLY WITH LATEST ACI STANDARDS.
4. LIFTERS FOR HANDLING SHALL BE INSTALLED PER MANUFACTURER'S REQUIREMENTS AND RATED TO HANDLE THE WEIGHT.
5. CONCRETE TO HAVE A MINIMUM 28 DAYS COMPRESSIVE STRENGTH OF 4000 PSI.
6. STANDARD METER BOX FRAME AND COVER PER L.V.W.D. STANDARD DETAILS.

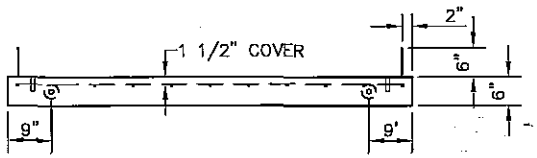
CONSTRUCTION KEY NOTES:

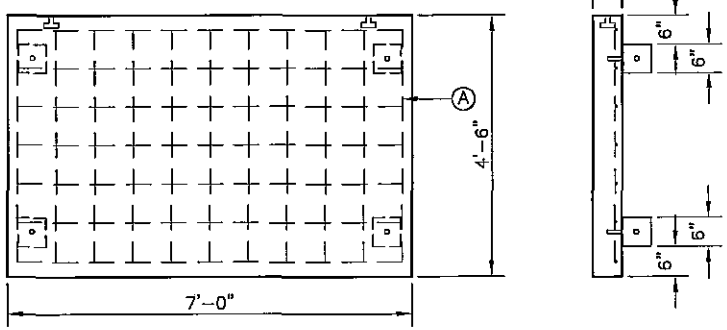
A. No. 4 REBAR AT 8" ON CENTER, BOTH WAYS.
B. No. 4 REBAR AT 12" ON CENTER, BOTH WAYS (TOP LAYER).
C. No. 4 REBAR AT 8" ON CENTER, LONG SPAN (BOTTOM LAYER).
D. No. 5 REBAR AT 4 1/2" ON CENTER, SHORT SPAN (BOTTOM LAYER).
E. MODULAR





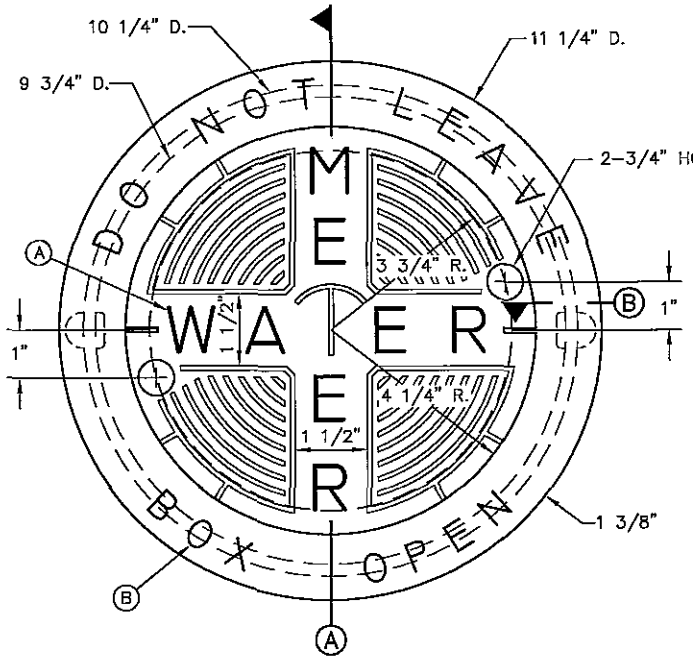
PANEL C



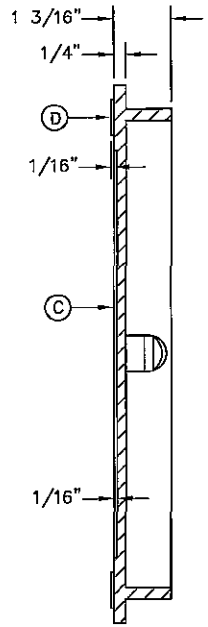


PANEL D

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES	DATE: APRIL 2005	No: 117
		DETAIL: METER BOX TYPE "D"-3" AND LARGER SERVICE INSTALLATION		



TOP VIEW



(A) SECTION

GENERAL NOTES:

1. MATCHING SURFACES TO BE ROUGH GROUND OF ANY IRREGULARITIES THAT WOULD PREVENT A SNUG FIT.
2. CASTING TO BE SMOOTH AND VOID OF AIR
3. METER BOX COVER WEIGHT= 1 1/4 lbs.

CONSTRUCTION KEY NOTES:

A. LETTERS TO BE 1" HIGH, 3/4" WIDE, 1/8' THICK

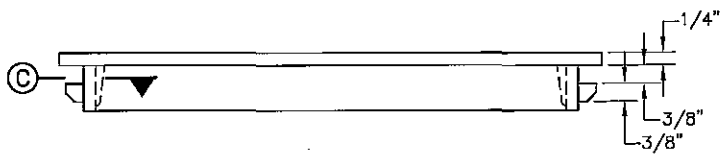
B. LETTERS TO BE 3/4" HIGH, 5/8" WIDE, 1/8" THICK

C. INSIDE LETTERS & RIBS 1/16" TALL

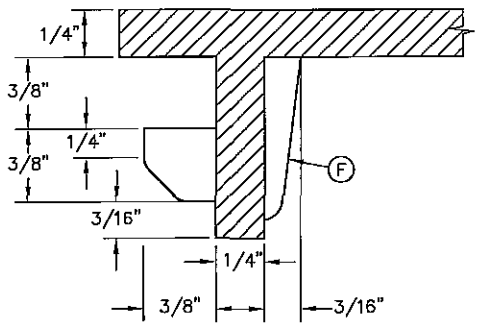
D. OUTSIDE LETTERS 1/16" TALL

E. REINFORCE BACK OF LUG

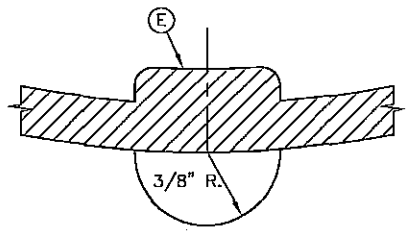
F. REINFORCEMENT



SIDE VIEW

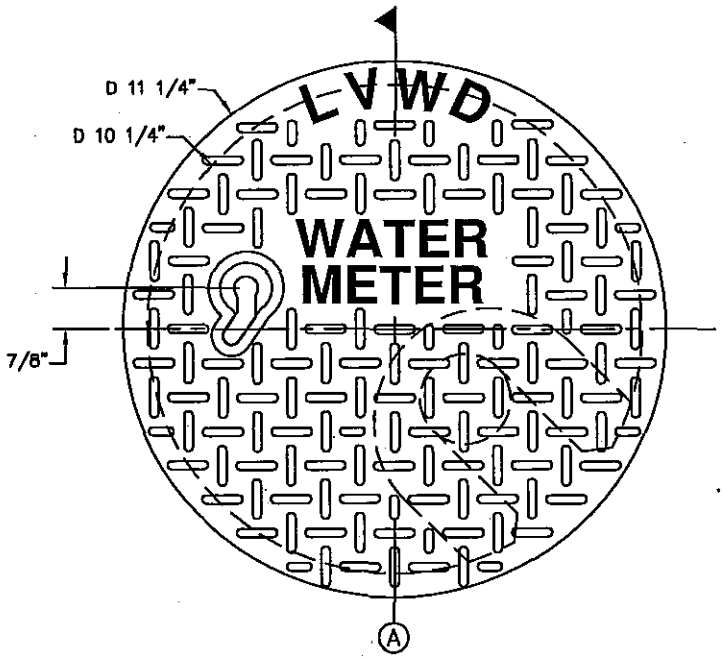


(B) SECTION

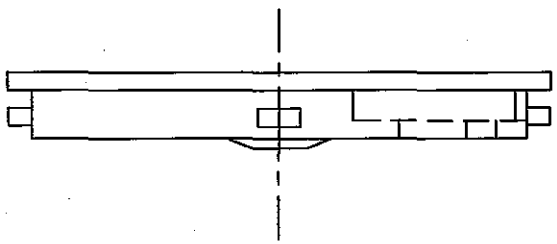


(C) SECTION

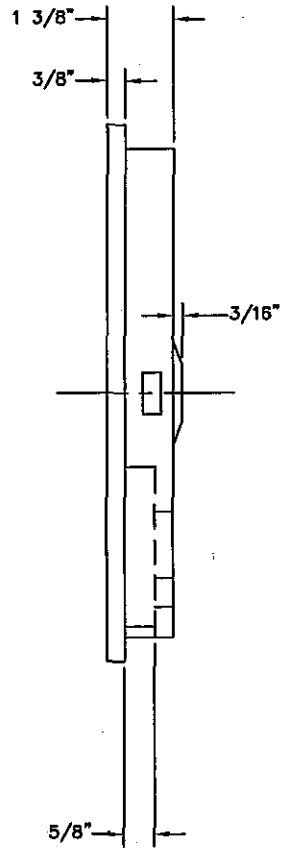
Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES	DATE: APRIL 2005	No: 118
		DETAIL: METER BOX COVER		



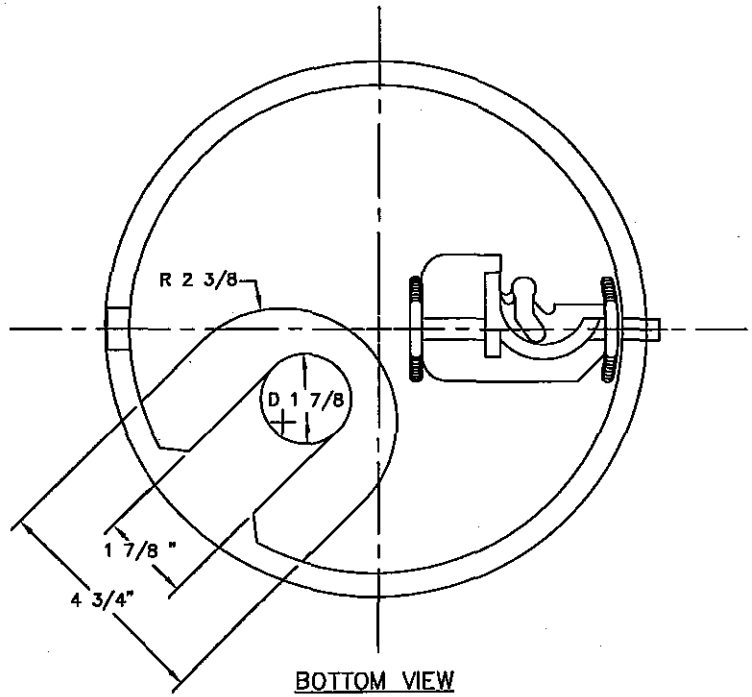
TOP VIEW



SIDE VIEW



A TOP VIEW

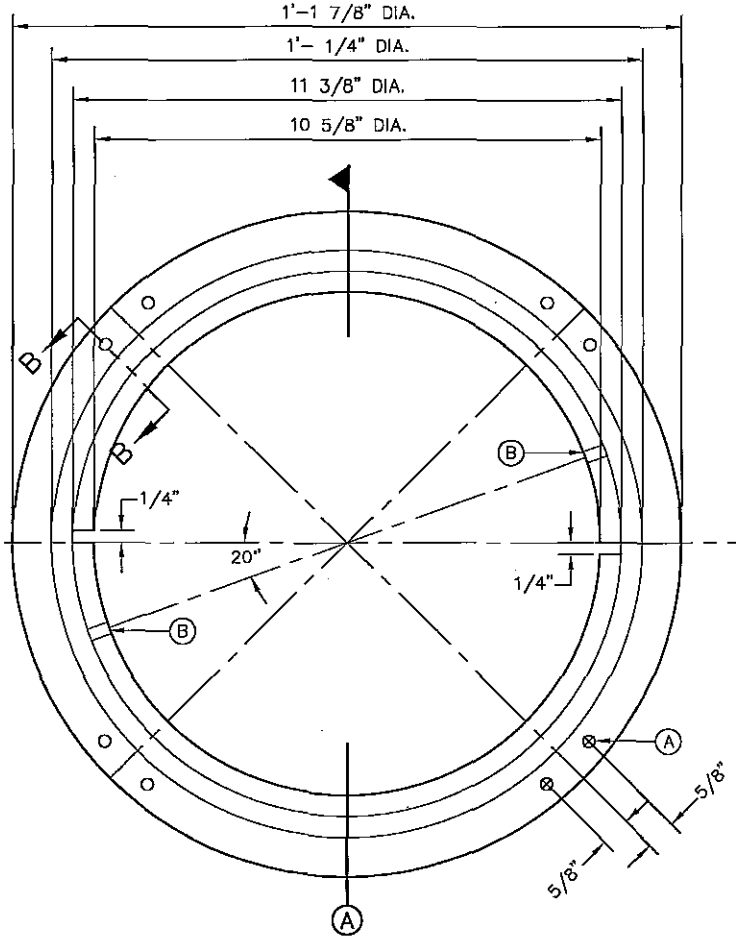


BOTTOM VIEW

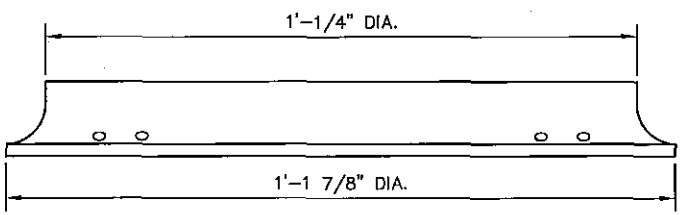
PLASTIC LID

1) THE LID SHALL BE BLACK
2) THE LID CAN HAVE A LOGO MOLDED ON ITS SURFACE
3) THE SHALL HAVE THE WORDING "WATER METER" MOLDED ON ITS SURFACE
4) THE LID SHALL HAVE A DIAMOND PATTERN FOR SKID RESISTANCE
5) THE LID SHALL BE SOLID AND WEIGH A MINIMUM OF 4LBS.
6) THE LID SHALL HAVE A MOLDED ERT POCKET ON ITS BOTTOM SIDE THAT WILL ACCOMIDATE AN "NEPTUNE R9000 TRANSPONDER"
7) THE LID SHALL HAVE A PLASTIC LOOKING MECHANISM STAINLESS STEEL COIL SPRING THAT CAN BE OPENED AND CLOSED USING A STANDARD BRASS KEY
8) THE LID DIMENSIONS SHALL BE APROXIMATELY: 11 1/4 DIA X 1 3/8 INCHES

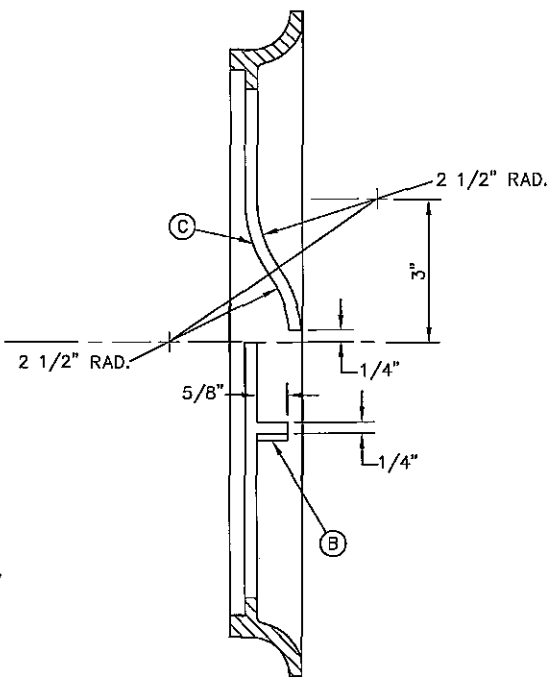
Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES	DATE: APRIL 2005	No: 118A
		DETAIL: METER BOX COVER		



TOP VIEW



SIDE VIEW



(A) SECTION

GENERAL NOTES:

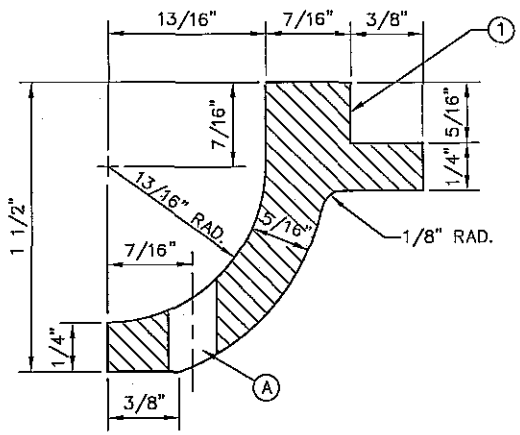
1. MATCHING SURFACES TO BE FINISHED OF ANY IRREGULARITIES THAT WOULD PREVENT A SNUG FIT.
2. CASTING TO BE SMOOTH AND VOID OF AIR HOLES.
3. METER BOX RING WEIGHT = 7 LBS.
4. METER BOX RING MADE OF CAST IRON.

CONSTRUCTION KEY NOTES:

A. 1/4" DIAMETER HOLES FOR ANCHORING RING TO CONCRETE METER BOX.

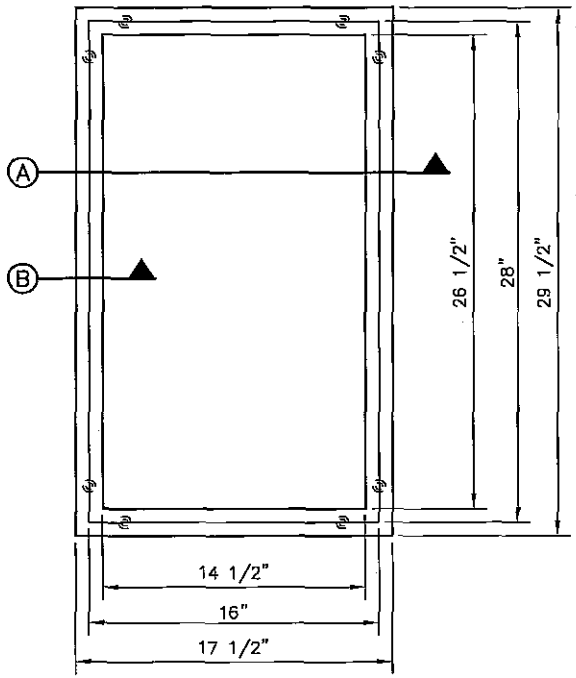
B. LUG STOP

C. LOCKING LUG SLIDE

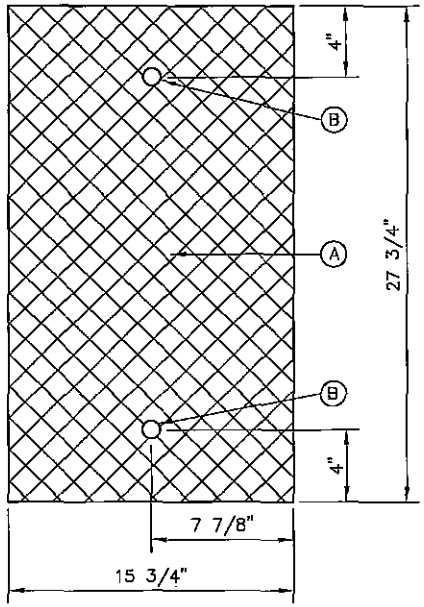


(B) SECTION

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES	DATE: APRIL 2005	No: 119
		DETAIL: METER BOX RING		



TOP VIEW



STEEL COVER

CONSTRUCTION KEY NOTES:

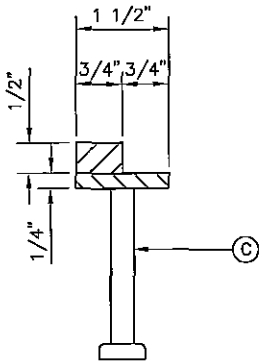
A. MATERIAL 3/8" DIAMOND PLATE

B. 2 – 1" DIAMETER HOLES

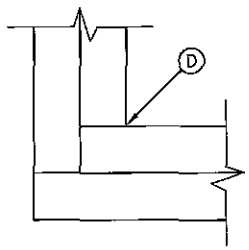
C. 8 – 3/4"x2 1/2" NELSON STUDS

D. BUTT CORNERS AND TACKWELD GRIND SMOOTH

Ⓐ SECTION

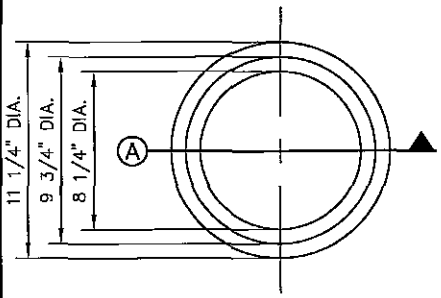


Ⓑ SECTION

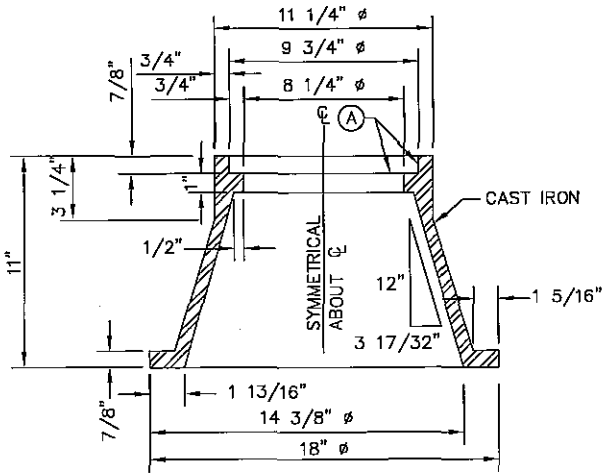


CORNER DETAIL

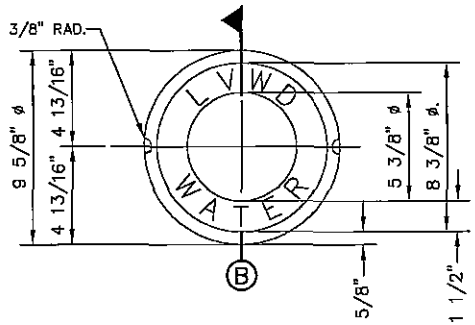
Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES DETAIL: FRAME AND COVER TYPE " C" METER BOX	DATE: APRIL 2005	No: 120



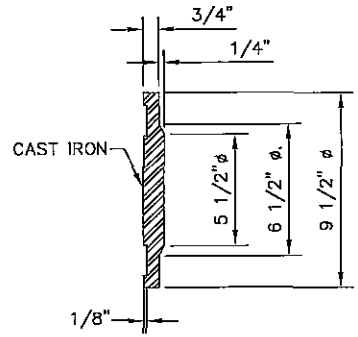
TOP VIEW



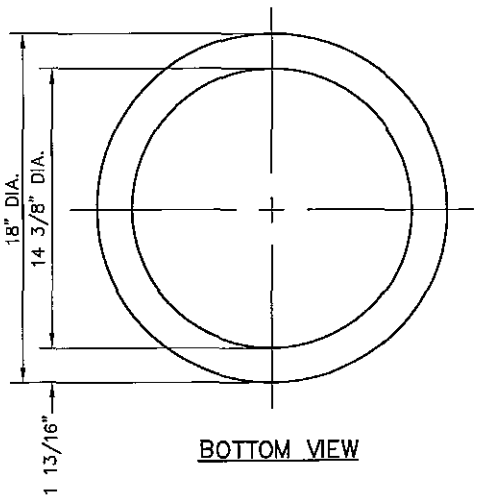
Ⓐ SECTION



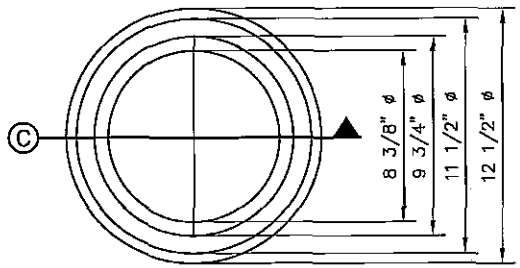
COVER



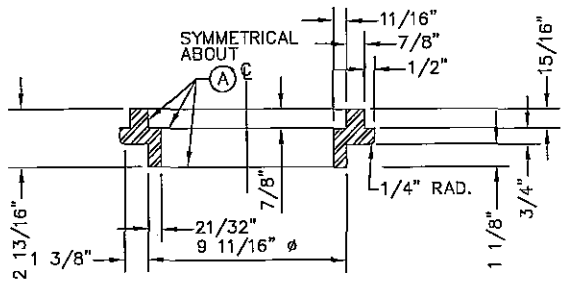
Ⓑ SECTION



BOTTOM VIEW



TOP VIEW



Ⓒ SECTION

GENERAL NOTES:

1. CASTING TO BE SMOOTH AND VOID OF AIR HOLES.
2. WEIGHT OF BONNET BOX IS 95 POUNDS.

CONSTRUCTION KEY NOTES:

A. TO BE ROUGH GROUND OF ANY IRREGULARITIES THAT WOULD PREVENT A SNUG FIT.

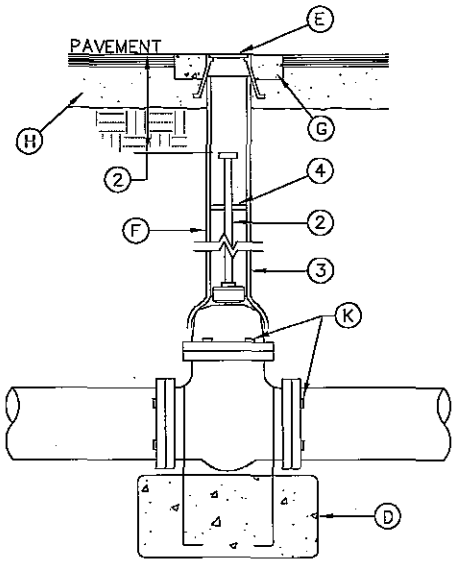
GENERAL NOTES:

1. CASTINGS TO BE SMOOTH AND VOID OF AIR HOLES.
2. WEIGHT OF BONNET BOX EXTENSION IS 25 POUNDS.
3. WEIGHT OF COVER IS 10 POUNDS.

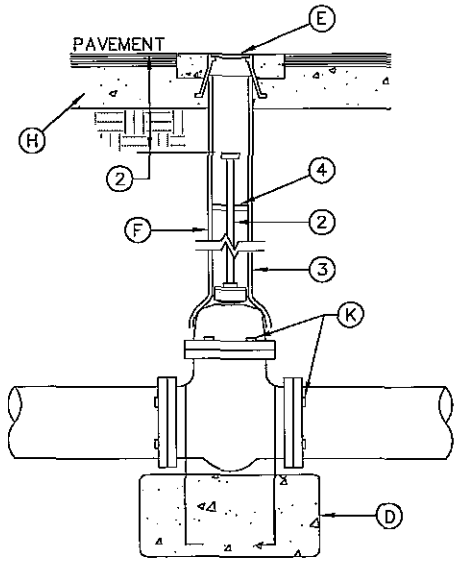
CONSTRUCTION KEY NOTES:

A. TO BE ROUGH GROUND OF ANY IRREGULARITIES THAT WOULD PREVENT A SNUG FIT.

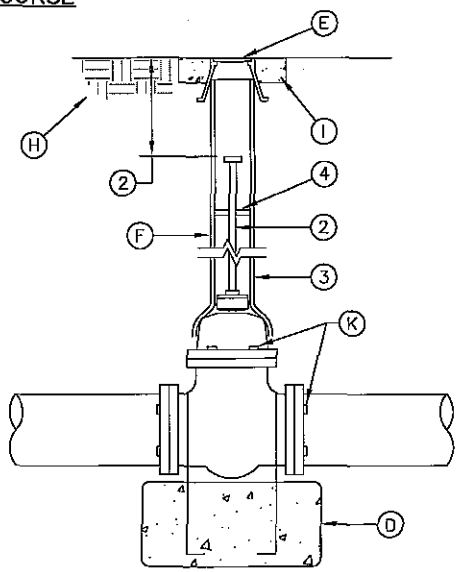
Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES	DATE: APRIL 2005	No: 121
		DETAIL: BONNET BOX WITH COVER AND EXTENSION		



BASE COURSE



CEMENT STABILIZED



UNPAVED AREAS

GENERAL NOTES:

1. RESILIENT WEDGE GATE VALVE AND VALVE ENDS SHALL BE AS SHOWN. VALVE MODEL SHALL BE KENNEDY, MUELLER OR APPROVED EQUAL.
2. ALL BURIED VALVES 5' AND DEEPER SHALL BE PROVIDED WITH SOLID STEEL EXTENSION STEM OPERATOR WITH 2" SQUARE AWWA NUT WITHIN 36" OF VALVE BOX COVER. NUT IS TO INDICATE DIRECTION OF ROTATION TO OPEN VALVE. ALL VALVES SHALL OPEN TO THE LEFT.
3. 8" DIA. MINIMUM P.V.C. PIPE. PIPE SHALL NOT REST ON VALVE BODY.
4. EXTENSION STEM STABILIZER, PER MANUFACTERER'S RECOMMENDATIONS.

CONSTRUCTION KEY NOTES:

A. CLEAN VALVE BOX OF ALL DEBRIS AND SOIL.

B. COAT BURIED PIPE AND VALVE BOX PER SPECIFICATIONS. VALVE SHALL BE WRAPPED IN POLYETHYLENE IN ACCORDANCE WITH SPECIFICATION.

C. ON EXISTING PAVED STREETS WHERE VALVE BOXES ARE ADJUSTED, PROVIDE SOIL CEMENT STABILIZED MATERIAL ON SUBBASE PRIOR TO REPAVING.

D. 2,500 PSI CONCRETE VALVE SUPPORT AND 2 No. 5 REBAR HAIRPINS. PAINT UNEMBEDDED PORTION WITH 2 COATS OF TAR EPOXY.

E. STANDARD BONNET BOX COVER IN ACCORDANCE WITH DETAIL IN THIS MANUAL.

F. FINAL EXTENSION TO SUBGRADE WITH BELL END (P.V.C. SPOOL) TO BOTTOM OF BONNET BOX.

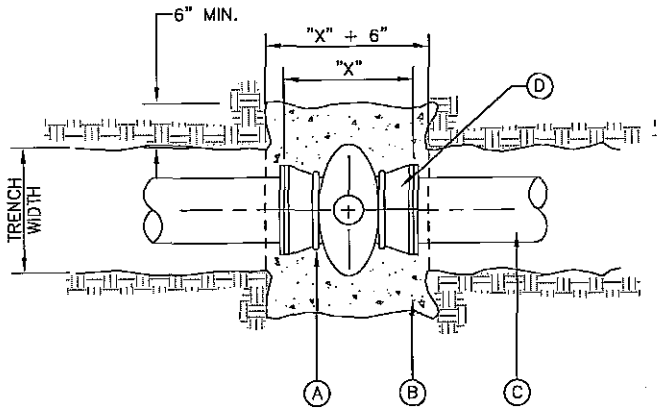
G. CLASS "A" CONCRETE 6" THICK BY 2'X2' SQUARE PAD FOR PAVED AREAS WITH STANDARD BASE COURSE MATERIAL FLUSH WITH H.M.A.C.

H. 6" CEMENT STABILIZED BACKFILL IN PAVED AREAS, WHEN REQUIRED, CONCRETE PAD NOT REQUIRED.

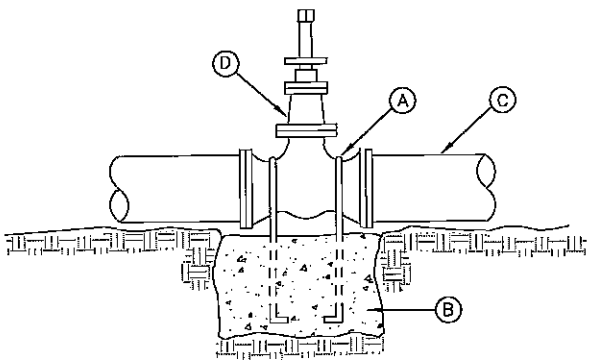
I. CLASS "A" CONCRETE 6" THICK BY 2'X2' SQUARE PAD FLUSH WITH BONNET BOX COVER FOR UNPAVED CONDITIONS.

J. BASE COURSE MATERIAL, AS SPECIFIED.

K. GREASE ALL NUTS AND BOLTS AND WRAP VALVE IN POLYETHYLENE PER SPECIFICATIONS.



PLAN



SECTION

GENERAL NOTES:

1. COMPLY WITH REQUIREMENTS OF AWWA C-550, PROTECTIVE EPOXY INTERIOR COATINGS FOR VALVES.

CONSTRUCTION KEY NOTES:

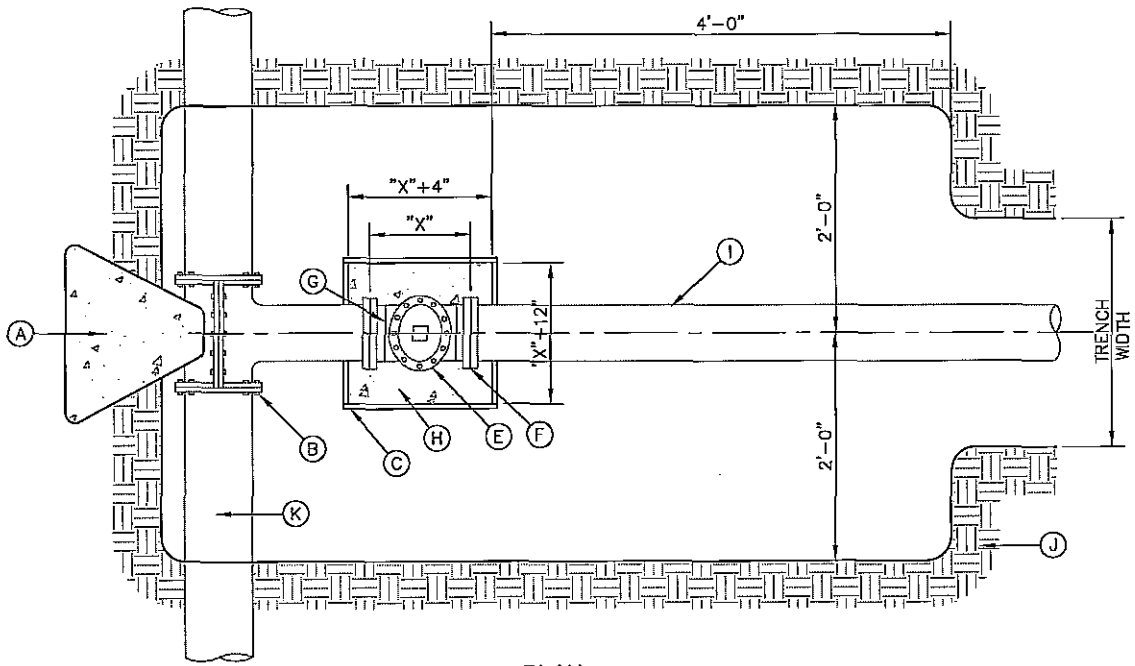
A. TWO No.5 REBAR HAIR PINS. PAINT UNEMBEDDED PORTION OF REBARS WITH TWO COATS OF COAL TAR EPOXY.

B. CONCRETE VALVE SUPPORT, 2500 PSI. CONCRETE.

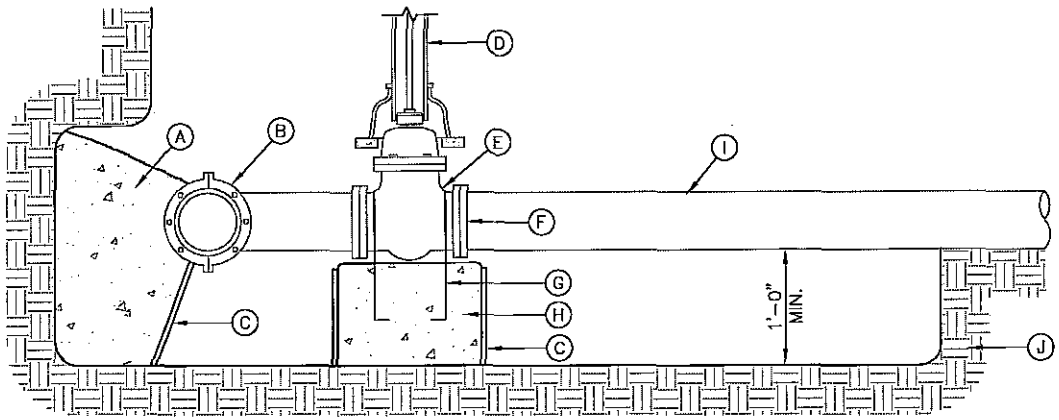
C. APPROVED PIPE.

D. RESILIENT WEDGE GATE VALVE. KENNEDY, MUELLER MODELS OR APPROVED EQUAL.

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES DETAIL: GATE VALVE INSTALLATION – VALVE ANCHOR	DATE: APRIL 2005	No: 123



PLAN



SECTION

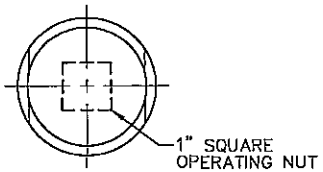
GENERAL NOTES:

1. TRUST BLOCKING SHALL EXTEND TO UNDISTURBED EARTH.
2. TAPPING SLEEVE SHALL BE 18" MINIMUM FROM ANY BELL, COUPLING, VALVE OR FITTING.
3. REPLACE EXCAVATED MATERIAL WITH CEMENT STABILIZED BACKFILL PRIOR TO PAVING.
4. JOINTS AND BOLTS SHALL BE CLEAR OF CONCRETE.
5. INSTALL PERMANENT THRUST BLOCKING UNDER VALVE BEFORE TAP IS MADE. JOINTS AND BOLTS TO BE CLEAR OF CONCRETE.

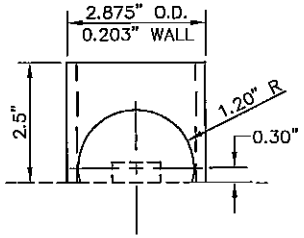
CONSTRUCTION KEY NOTES:

A. CONCRETE THRUST BLOCKING, PER L.V.W.D. STANDARD DETAILS.
B. TAPPING SLEEVE
C. FORMS
D. PVC PIPE, PER LVWD STANDARD DETAIL.
E. TAPPING VALVE
F. VALVE ENDS FOR TYPE OF PIPE INSTALLED
G. 2–#5 REBAR HAIRPINS, PAINT UNEMEDDED PORTION OF BARS WITH 2–COATS OF COAL TAR EPOXY, THEN COVER WITH 2" MINIMUM OF CEMENT MORTAR.
H. CONCRETE VALVE SUPPORT.
I. NEW WATER LINE TO BE CONSTRUCTED.
J. UNDISTURBED EARTH
K. EXISTING WATER MAIN TO BE TAPPED

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES	DATE: APRIL 2005	No: 124
		DETAIL: TAPPING SLEEVE AND VALVE		



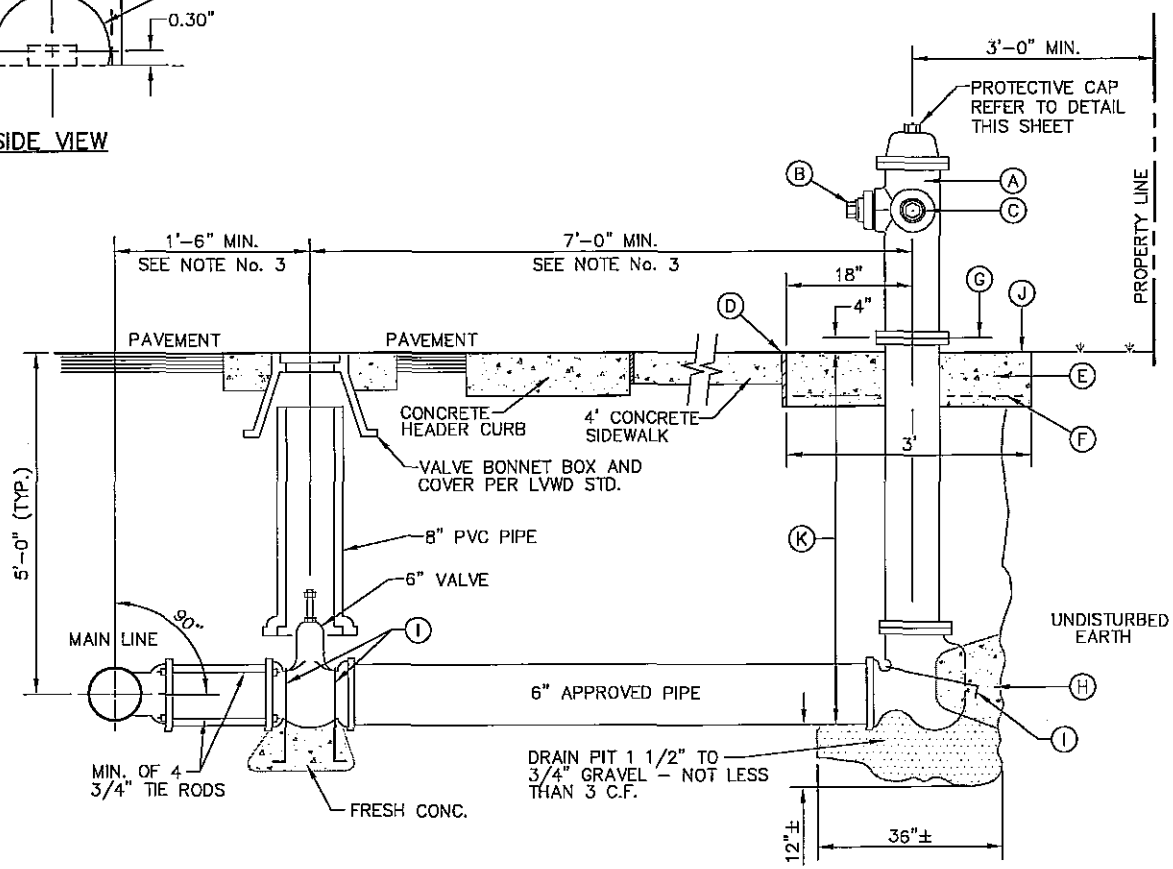
TOP VIEW



SIDE VIEW

CAP NOTES:

1. STEEL CAPS TO BE MACHINED FROM STEEL PIPE:
   NOMINAL SIZE = 2 1/2" DIA.
   OUTSIDE DIA. = 2.875"
   WALL THICKNESS = 0.203
   LBS/FT. = 5.79
2. CAPS ARE TO BE TACK WELDED OR BRAZED ON FIRE HYDRANT BONNET OR WEATHER CAP.
3. THE CAPS OVER THE OPERATING NUT WILL PREVENT ACCESS TO THE UNAUTHORIZED USE OF HYDRANT WATER.



GENERAL NOTES:

1. NO OBSTRUCTIONS WILL BE PERMITTED WITHIN 3 FT. IN ALL DIRECTIONS OF FIRE HYDRANT. FIRE HYDRANT SHALL NOT BE PLACED IN WHEEL CHAIR RAMP OR DRIVEWAY.
2. FIRE HYDRANT SHALL BE LOCATED AT THE BEGINNING OF CURB RETURN OR AT THE PROPERTY LINE COMMON TO ADJOINING LOTS, UNLESS OTHERWISE SHOWN ON PLANS. REFER TO DETAIL No. 124 FOR SPECIAL CASES.
3. WHERE DISTANCE IS LESS THAN 7', HYDRANT SHALL BE INSTALLED IN ACCORDANCE WITH DETAIL No. 127.
4. VALVE MAY BE CONNECTED TO TEE AT MAIN LINE. USE FLANGED MECHANICAL JOINT ENDS. WHERE SPOOL IS REQUIRED BETWEEN TEE AND VALVE, USE FLANGED MECHANICAL ENDS WITH 3/4" DIAMETER TIE RODS.
5. COMPLY WITH REQUIREMENTS OF AWWA C-502, DRY BARREL FIRE HYDRANTS AND AWWA C-550, PROTECTIVE EPOXY INTERIOR COATINGS FOR VALVES AND HYDRANTS.
6. ALL JOINTS TO BE RESTRAINED WITH "MEGA-LUG" OR BETTER.
7. BOLLARDS WILL BE REQUIRED TO PROTECT FIRE HYDRANT IN AREAS OF HIGH TRAFFIC. COORDINATE WITH L.V.W.D.

CONSTRUCTION KEY NOTES:

A. FIRE HYDRANT TO BE MUELLER, KENNEDY MODEL OR APPROVED EQUAL.

B. PUMPER NOZZLE 4 1/2" TO BE FACING THE TRAVELED WAY, UNLESS OTHERWISE NOTED IN THE PLANS.

C. HOSE NOZZLE 2 1/2".

D. 1/2" PREMOLDED EXPANSION JOINT WITH 1" TOP FILLER.

E. 3'x3'x6" CONC. SQ. PAD, TO BE CONSTRUCTED AROUND FIRE HYDRANT'S CENTER LINE WHEN NOT LOCATED WITHIN SIDEWALK OR CONC. AREA.

F. #10; 6/6 WWF.

G. CONTROLLED ELEVATION LINE, LEVEL IN ALL DIRECTIONS. CONTRACTOR SHALL BE RESPONSIBLE FOR SETTING TOP FLANGE OF THE HYRANT TO CONTROLLED ELEVATION.

H. CONC. THRUST BLOCK, APPROX. 2'x2'x3' TO BE POURED AGAINST UNDISTURBED EARTH. F.H. WEEP HOLE MUST BE UNOBSTRUCTED.

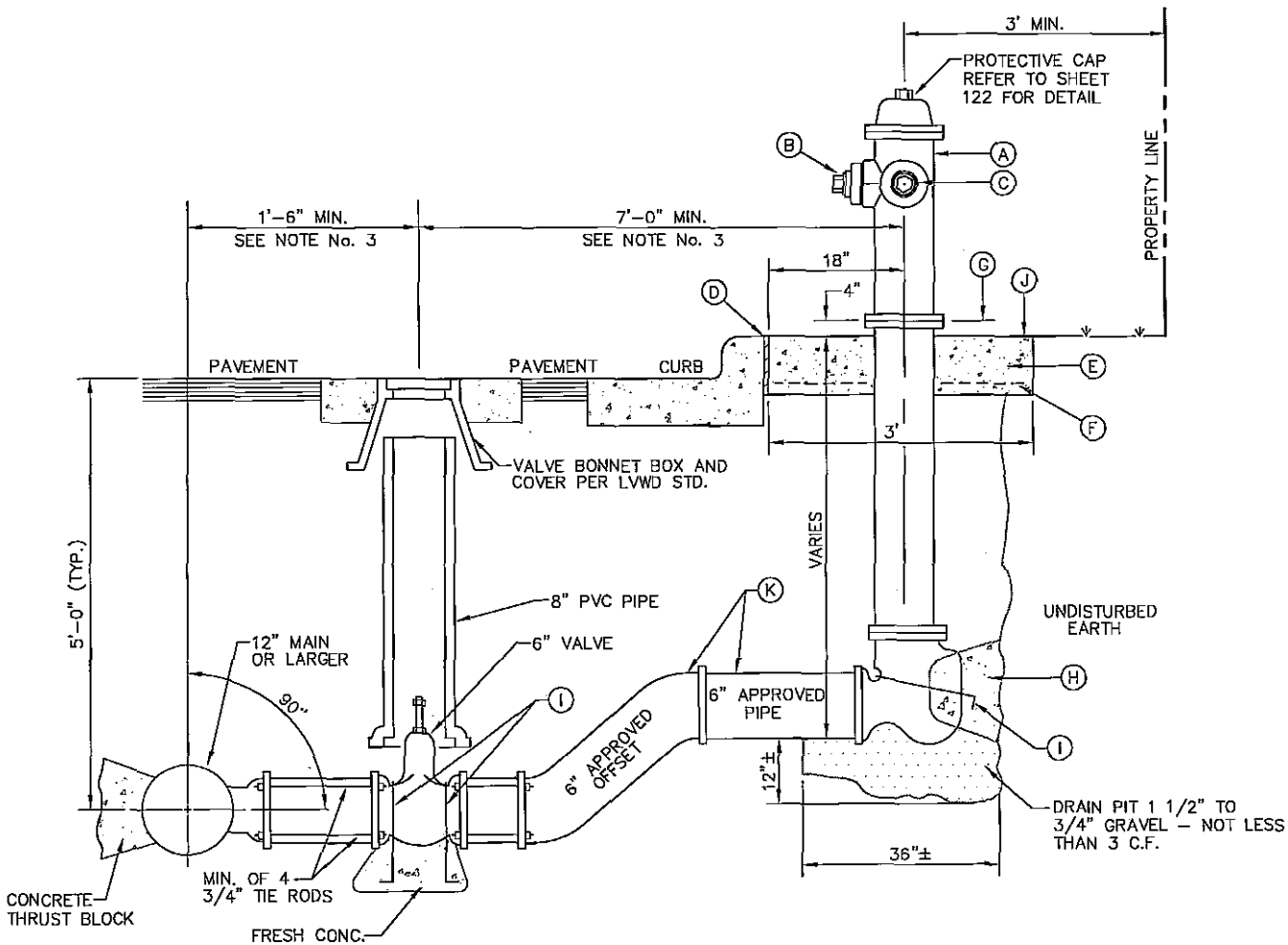
I. No. 5 REBAR ANCHOR PINS.

J. TOP OF SLAB SHALL BE AT CURB LEVEL 4" BELOW THE BREAK LINE OF THE HYDRANT. UNDER SPECIAL CONDITIONS THE ENGINEER MAY ALLOW VARIATIONS TO THIS CONSTRUCTION.

K. CONTRACTOR IS TO PROVIDE ADDITIONAL SPOOLS IF NEEDED TO MAINTAIN THE 4" MIN. CLEARANCE FROM THE CONTROLLED ELEV. LINE TO TOP OF SLAB.

L. GREASE ALL NUTS AND BOLTS PRIOR TO WRAPPING WITH POLYETHYLENE.

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES	DATE: APRIL 2005	No: 125
		DETAIL: STANDARD FIRE HYDRANT INSTALLATION		



GENERAL NOTES:

1. NO OBSTRUCTIONS WILL BE PERMITTED WITHIN 3 FT. IN ALL DIRECTIONS OF FIRE HYDRANT. FIRE HYDRANT SHALL NOT BE PLACED IN WHEEL CHAIR RAMP OR DRIVEWAY.
2. FIRE HYDRANT SHALL BE LOCATED AT THE BEGINNING OF CURB RETURN OR AT THE PROPERTY LINE COMMON TO ADJOINING LOTS, UNLESS OTHERWISE SHOWN ON PLANS. REFER TO DETAIL No. 127 FOR SPECIAL CASES.
3. WHERE DISTANCE IS LESS THAN 7', HYDRANT SHALL BE INSTALLED IN ACCORDANCE WITH DETAIL No. 127.
4. VALVE MAY BE CONNECTED TO TEE AT MAIN LINE. USE FLANGED MECHANICAL JOINT ENDS. WHERE SPOOL IS REQUIRED BETWEEN TEE AND VALVE, USE FLANGED MECHANICAL ENDS WITH 3/4" DIAMETER TIE RODS.
5. COMPLY WITH REQUIREMENTS OF AWWA C-502, DRY BARREL FIRE HYDRANTS AND AWWA C-550, PROTECTIVE EPOXY INTERIOR COATINGS FOR VALVES AND HYDRANTS.
6. ALL JOINTS TO BE RESTRAINED WITH "MEGA-LUG" OR BETTER.
7. BOLLARDS WILL BE REQUIRED TO PROTECT FIRE HYDRANT IN AREAS OF HIGH TRAFFIC. COORDINATE WITH L.V.W.D.

CONSTRUCTION KEY NOTES:

A. FIRE HYDRANT TO BE MUELLER, KENNEDY MODEL OR APPROVED EQUAL.

B. PUMPER NOZZLE 4 1/2" TO BE FACING THE TRAVELED WAY, UNLESS OTHERWISE NOTED IN THE PLANS.

C. HOSE NOZZLE 2 1/2".

D. 1/2" PREMOLDED EXPANSION JOINT WITH 1" TOP FILLER.

E. 3'x3'x6" CONC. SQ. PAD, TO BE CONSTRUCTED AROUND FIRE HYDRANT'S CENTER LINE WHEN NOT LOCATED WITHIN SIDEWALK OR CONC. AREA.

F. #10; 6/6 WWF.

G. CONTROLLED ELEVATION LINE, LEVEL IN ALL DIRECTIONS. CONTRACTOR SHALL BE RESPONSIBLE FOR SETTING TOP FLANGE OF THE HYRANT TO CONTROLLED ELEVATION.

H. CONC. THRUST BLOCK, APPROX. 2'x2'x3' TO BE POURED AGAINST UNDISTURBED EARTH. F.H. WEEP HOLE MUST BE UNOBSTRUCTED.

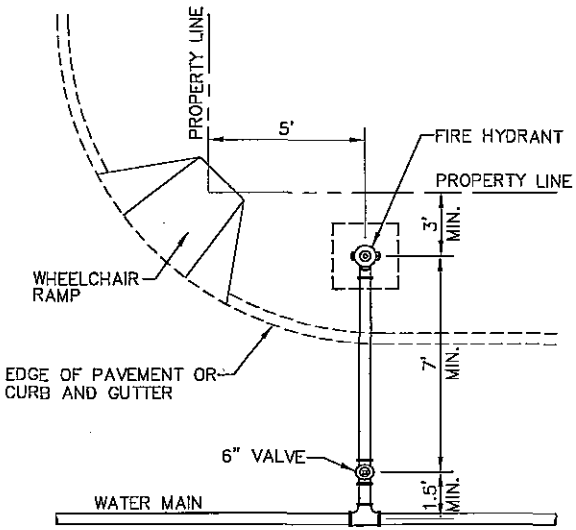
I. No. 5 REBAR ANCHOR PINS.

J. TOP OF SLAB SHALL BE AT CURB LEVEL 4" BELOW THE BREAK LINE OF THE HYDRANT. UNDER SPECIAL CONDITIONS THE ENGINEER MAY ALLOW VARIATIONS TO THIS CONSTRUCTION.

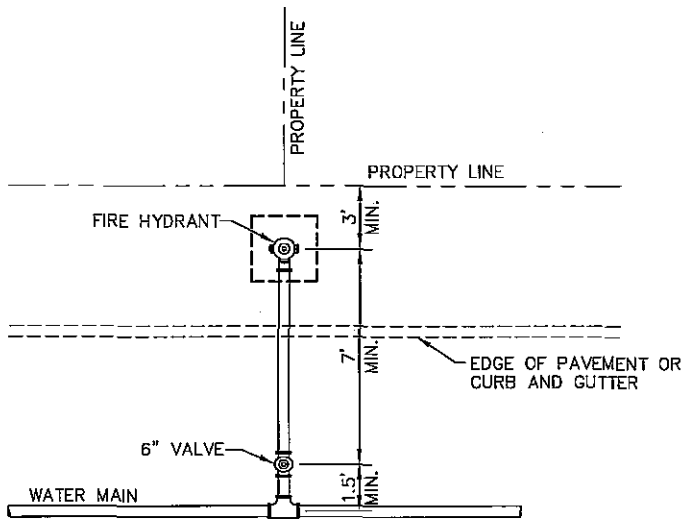
K. CONTRACTOR IS TO PROVIDE ADDITIONAL SPOOLS IF NEEDED TO MAINTAIN THE 4" MIN. CLEARANCE FROM THE CONTROLLED ELEV. LINE TO TOP OF SLAB.

L. GREASE ALL NUTS AND BOLTS PRIOR TO WRAPPING WITH POLYETHYLENE.

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES	DATE: APRIL 2005	No: 126
		DETAIL: FIRE HYDRANT INSTALLATION (12" MAIN OR LARGER)		

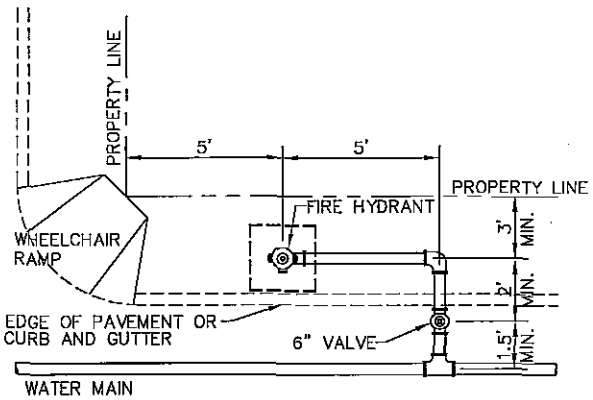


CASE I

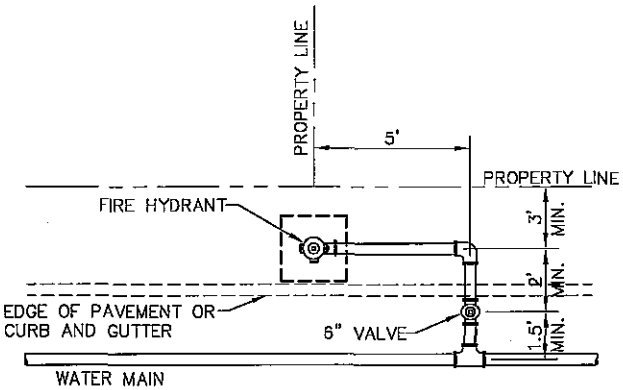


CASE II

STANDARD LOCATIONS



CASE III



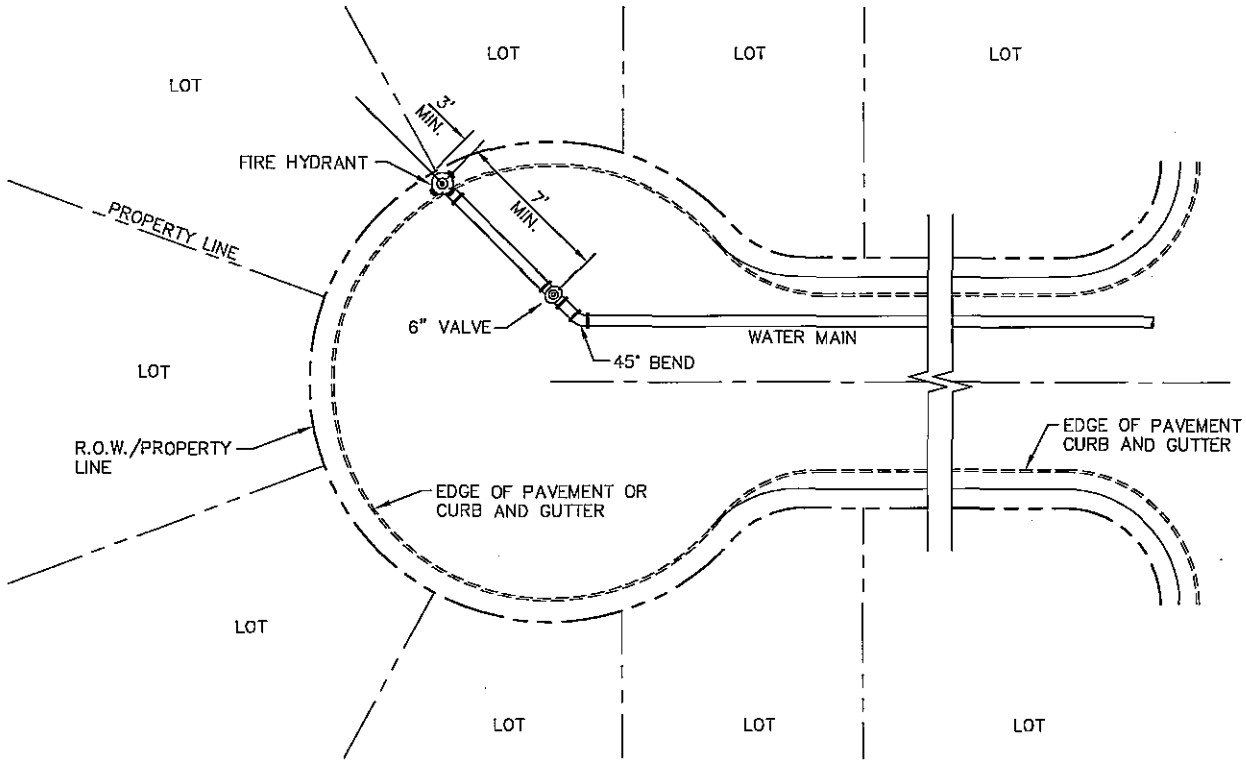
CASE IV

SPECIAL LOCATIONS

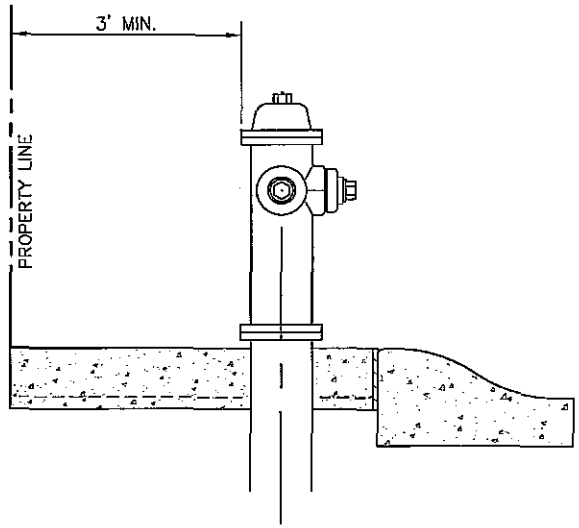
GENERAL NOTES:

1. FOR CASE I FIRE HYDRANT SHALL BE LOCATED AT A DISTANCE OF 5 FT. MINIMUM FROM THE PROPERTY LINE OR AT THE BEGINNING OF CURB RETURN.
2. FOR CASE II FIRE HYDRANT SHALL BE LOCATED AT THE PROPERTY LINE COMMON TO ADJOINING LOTS.
3. FOR CASE III AND IV WHERE THE DISTANCE BETWEEN THE VALVE AND THE HYDRANT IS LESS THAN 7 FT. PLACE HYDRANT AS SHOWN.
4. FOR INSTALLATION OF FIRE HYDRANT SEE DETAILS 125 AND 126 THIS MANUAL.
5. A MINIMUM CLEARANCE OF 3 FT. WILL BE PROVIDED BETWEEN A FIRE HYDRANT AND PROPERTY LINE OR A PERMANENT OBSTRUCTION (UTILITY POLE, LIGHT STANDARD, TRAFFIC SIGNAL, WHEEL CHAIR RAMP, FENCE PROTECTIVE POSTS, ETC.)
6. LOCATION OF FIRE HYDRANT WITHIN SIDEWALK AND/OR PARKWAY SHALL CONSIDER ALL A.D.A. REQUIREMENTS.

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES	DATE: APRIL 2005	No: 127
		DETAIL: FIRE HYDRANT LOCATIONS		



"CUL-DE-SAC" SENARIO

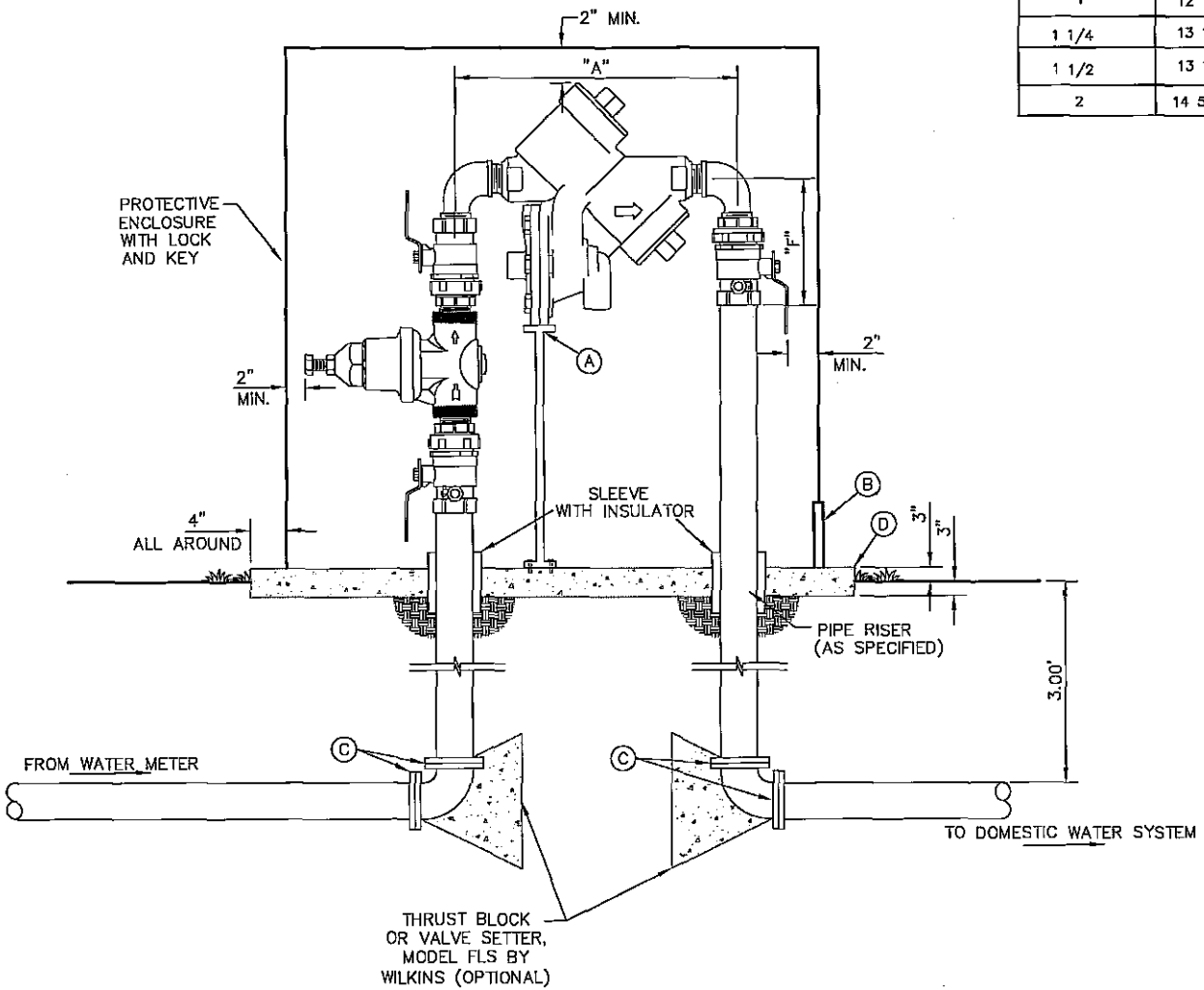


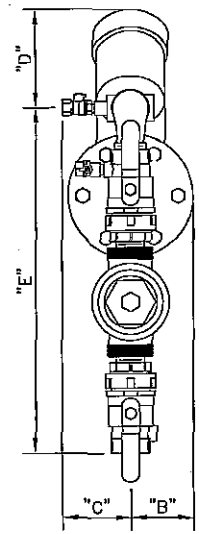
GENERAL NOTES:

1. FOR INSTALLATION OF FIRE HYDRANT SEE DETAILS 125 AND 126 THIS MANUAL.
2. A MINIMUM CLEARANCE OF 3 FT. WILL BE PROVIDED BETWEEN A FIRE HYDRANT AND PROPERTY LINE OR A PERMANENT OBSTRUCTION (UTILITY POLE, LIGHT STANDARD, TRAFFIC SIGNAL, WHEEL CHAIR RAMP, FENCE PROTECTIVE POSTS, ETC.)
3. LOCATION OF FIRE HYDRANT WITHIN SIDEWALK AND/OR PARKWAY SHALL CONSIDER ALL A.D.A. REQUIREMENTS.

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES	DATE: APRIL 2005	No: 128
		DETAIL: FIRE HYDRANT LOCATIONS IN "CUL-DE-SAC"		

975XLVBR PRE-SET	DIMENSIONS IN INCHES (APPROXIMATE)						WEIGHT
	A	B	C	D	E	F	LBS.
3/4	12 1/4	2 1/8	3	3 1/2	11 3/4	5	18
1	12 1/4	2 1/8	3	3 1/2	13	5 1/4	22
1 1/4	13 1/2	2 3/4	3 1/2	5	14 7/8	5 3/8	41
1 1/2	13 1/2	2 3/4	3 1/2	5	16 3/4	6 1/4	46
2	14 5/16	2 3/4	3 1/2	5	19	7 11/16	58





GENERAL NOTES:

1. REFER TO DETAIL 130 FOR PROTECTIVE ENCLOSURE & THERMAL EXPANSION REQUIREMENTS.

CONSTRUCTION KEY NOTES:

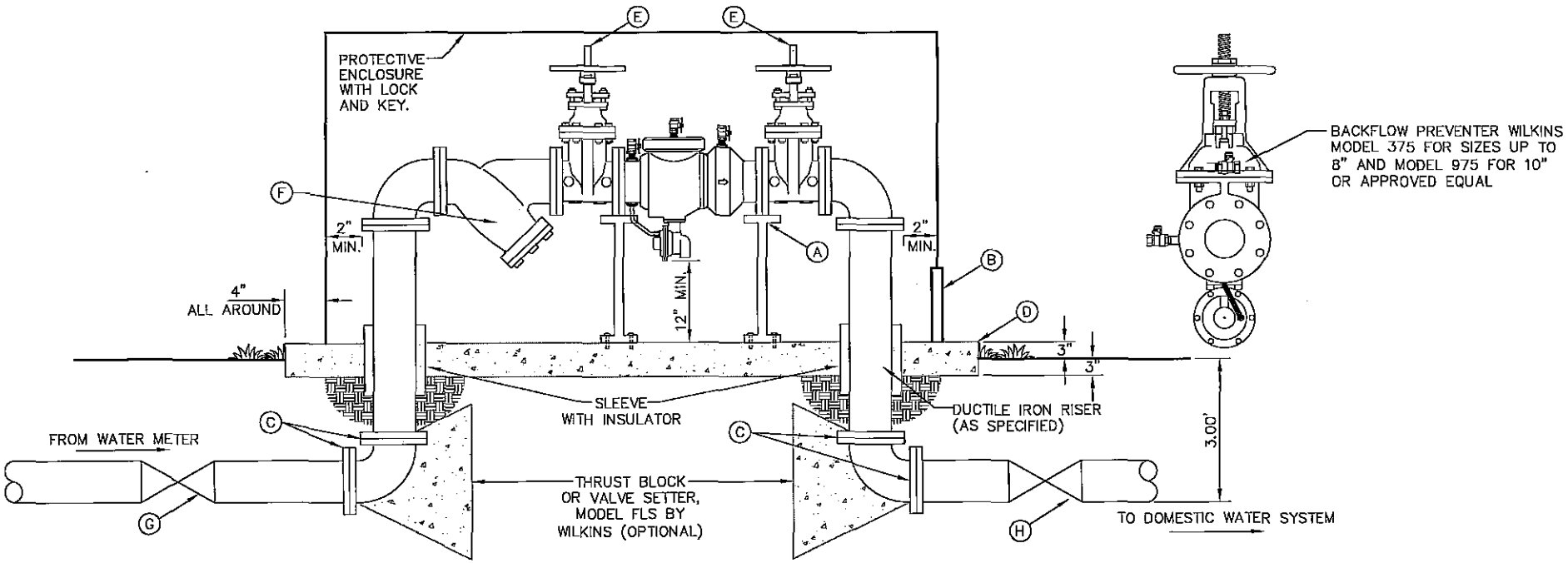
A. PIPE SUPPORTS BOLTED TO FLANGE.

B. DRAIN OPENING SIZED PER MANUFACTURER'S RECOMMENDATIONS.

C. RESTRAINED JOINT, "MEGA-LUG" OR APPROVED EQUAL.

D. 6" CONCRETE PAD (3000 P.S.I., REINFORCED WITH 6x6x6 WIRE MESH).

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES	DATE: APRIL 2005	No: 129
		DETAIL: 3/4"-2" REDUCED PRESSURE BACKFLOW PREVENTOR		



PROTECTIVE ENCLOSURE NOTES:

1. BACKFLOW PREVENTION ASSEMBLIES MAY BE INSTALLED INDOORS PROVIDED PROVISIONS FOR DRAINAGE AND ACCESSIBILITY FOR TESTING AND MAINTENANCE ARE MET.
2. BACKFLOW PREVENTION ASSEMBLIES INSTALLED OUTDOORS SHALL BE PROTECTED FROM FREEZING AND VANDALISM BY A METHOD ACCEPTABLE TO THE CROSS-CONNECTION CONTROL PROGRAM MANAGER. PROTECTIVE ENCLOSURE DESIGN, INSTALLATION, AND MAINTENANCE SHALL COMPLY WITH OSHA 29 CFR, PART 1910.146-"CONFINED SPACES."
3. THE USE OF INSULATION WRAPPED AROUND THE ASSEMBLY AND/OR ITS CONNECTING PIPING, WITH OR WITHOUT ALUMINUM OR SIMILAR JACKETING, SHALL BE PROHIBITED.
4. PROTECTIVE ENCLOSURES SHALL PROVIDE FOR ADEQUATE DRAINAGE FROM TESTING, FLUSHING, OF RELIEF VALVE DISCHARGING. ENCLOSURES MUST BE INSTALLED AND MAINTAINED SO THAT BACKFLOW PREVENTION ASSEMBLIES ARE SAFELY ACCESSIBLE FOR TESTING, MAINTENANCE, AND REPAIR.

THERMAL EXPANSION:

1. THE INSTALLATION OF "NON-RETURN DEVICES" SUCH AS BACKFLOW PREVENTION ASSEMBLIES, CHECK VALVES, DUAL CHECK VALVES, PRESSURE REDUCING OR PRESSURE REGULATING VALVES, AND WATER SOFTENERS BETWEEN THE WATER SERVICE CONNECTION AND THE DOMESTIC WATER HEATER MAY CREATE A "CLOSED DOMESTIC POTABLE WATER SYSTEM" PREVENTING PRESSURE RELIEF THROUGH THE BUILDING SUPPLY.
2. A UPC LISTED THERMAL EXPANSION TANK SHALL BE INSTALLED BETWEEN THE "NON-RETURN DEVICE" AND THE WATER STORAGE TANK HEATED BY INDIRECT MEANS AND HEAT INPUT LIMITED TO 200,000 BTU/HR, WATER TEMPERATURE LIMITED TO 210°F, AND WATER CAPACITY THAT DOES NOT EXCEED 120 GALLONS.

CONSTRUCTION KEYED NOTES:

A. PIPE SUPPORTS BOLTED TO FLANGE.

B. DRAIN OPENING SIZED PER MANUFACTURER'S RECOMMENDATIONS.

C. RESTRAINED JOINT, "MEGA-LUG" OR APPROVED EQUAL.

D. 6" CONCRETE PAD (3000 P.S.I., REINFORCED WITH 6x6x6 WIRE MESH).

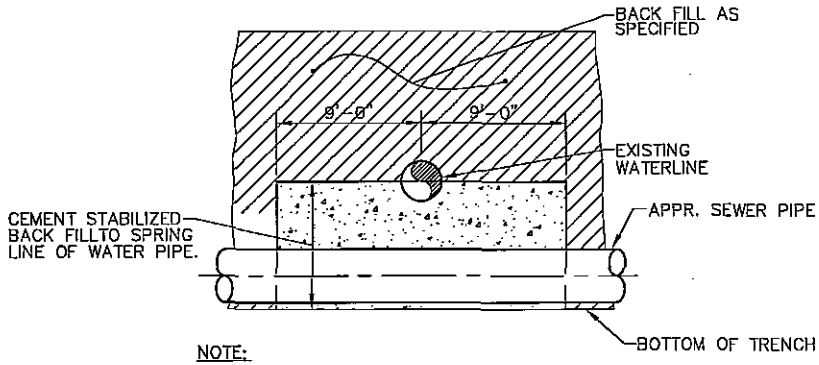
E. N.R.S. VALVES (USE OS&Y VALVES FOR FIRE PROTECTION).

F. OPTIONAL STRAINER, WILKINS MODEL 375-FSC OR APPROVED EQUAL (EPOXY COATED F.D.A. APPROVED INSIDE AND OUT). DO NOT USE FOR FIRE PROTECTION.

G. STANDARD GATE VALVE AND BONNET BOX.

H. RECOMMENDED POST INDICATOR VALVE FOR FIRE PROTECTION ONLY.

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES	DATE: APRIL 2005	No: 130
		DETAIL: 2 1/2"-10" REDUCED & PRESSURE BACKFLOW PREVENTOR		

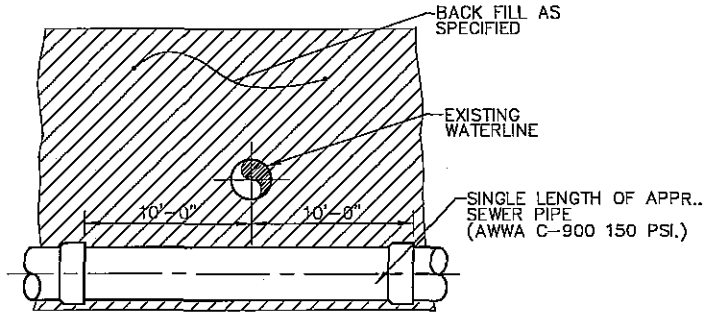


NOTE:

USE CEMENT STABILIZED BACK FILL WHEN WATER/SEWER VERTICAL SEPARATION IS BETWEEN 2'-0" AND 9'-0".

SEWER CROSSING UNDER EXISTING WATERLINE

(USING CEMENT STABILIZED BACK FILL)

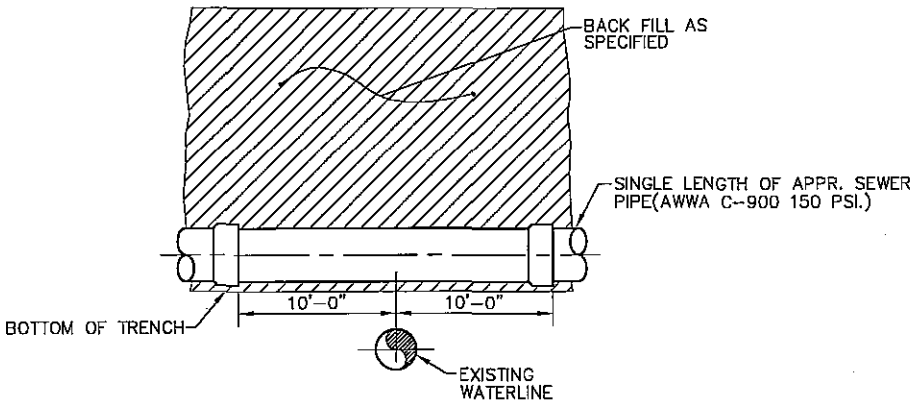


NOTE:

USE C-900 SEWER PIPE WHEN WATER/SEWER VERTICAL SEPARATION IS BETWEEN 6" AND 2'-0".

SEWER CROSSING UNDER

EXISTING WATERLINE

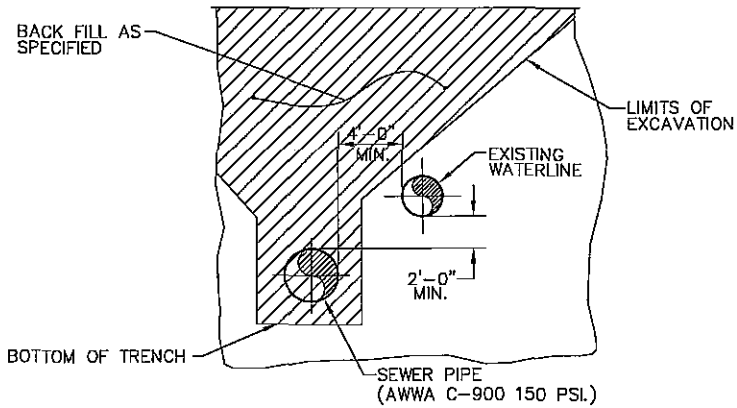


NOTE:

USE C-900 SEWER PIPE WHEN WATER/SEWER VERTICAL SEPARATION IS LESS THAN 9'-0".

SEWER CROSSING OVER

EXISTING WATERLINE



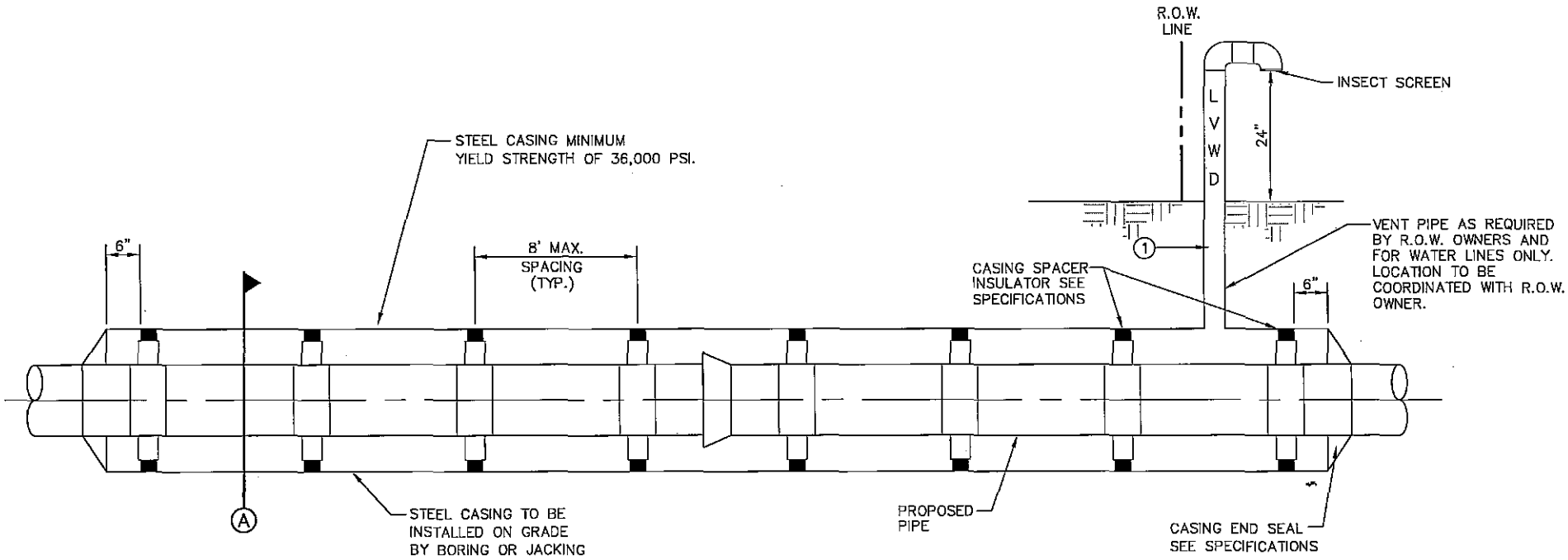
NOTE:

USE C-900 SEWER PIPE WHEN WATER/SEWER TOTAL SEPARATION IS BETWEEN 4'-0" AND 9'-0".

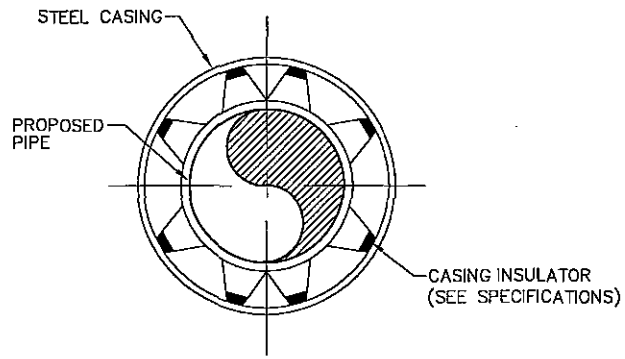
SEWER LINE AND EXISTING

WATERLINE ARE PARALLEL

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES DETAIL: WATER/SEWER LINE CROSSING	DATE: APRIL 2005	No: 131



CASING SECTION

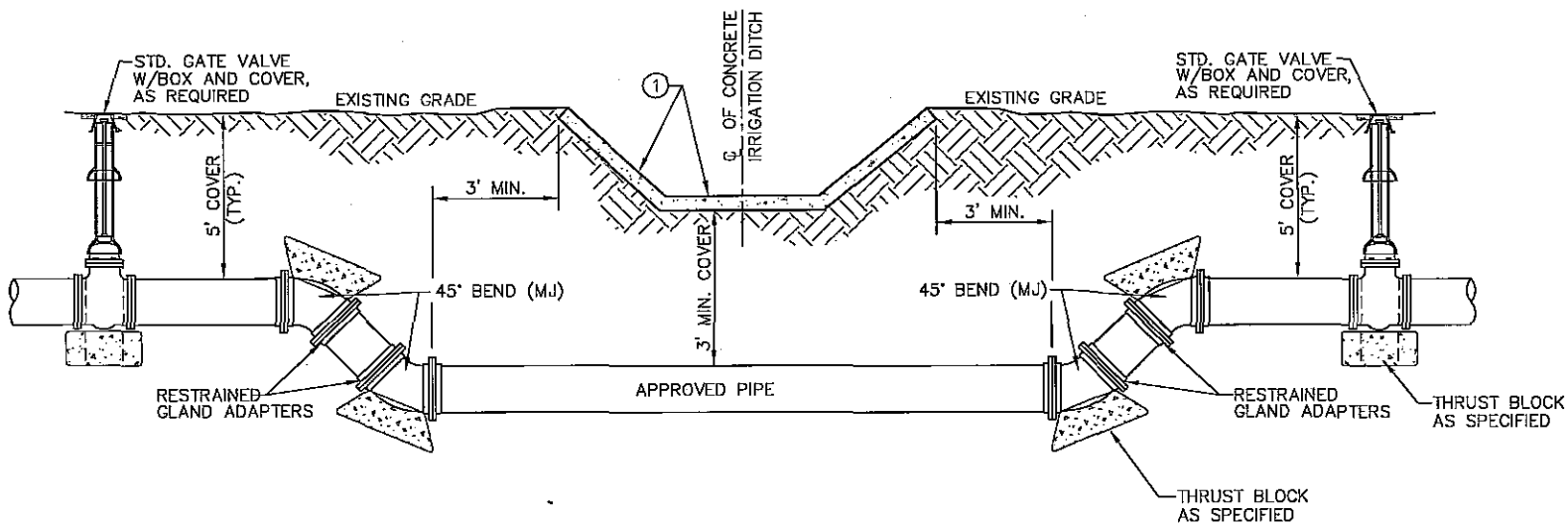


Ⓐ PIPE CASING DETAIL

GENERAL NOTES:

1. PIPING TO BE 4" DIA. SCHEDULE TO WELDED STEEL WITH FORGED STEEL WELD FITTINGS. BURIED VENT PIPING SHALL HAVE 2 COATS OF EPOXY POLYAMITE COATING AND ABOVE GROUND PIPING SHALL BE PRIMERED AND PAINTED WITH SEMI-GLOSS ENAMEL, WHITE LETTERS ON BLUE PIPE.
2. MINIMUM SPACING BETWEEN INSULATION AND CASING SHALL BE 1", MAXIMUM SPACING SHALL BE 2".
3. PRESSURE GROUT ANNULAR SPACE OUTSIDE CASING AFTER CASING IS INSTALLED, AS REQUIRED.

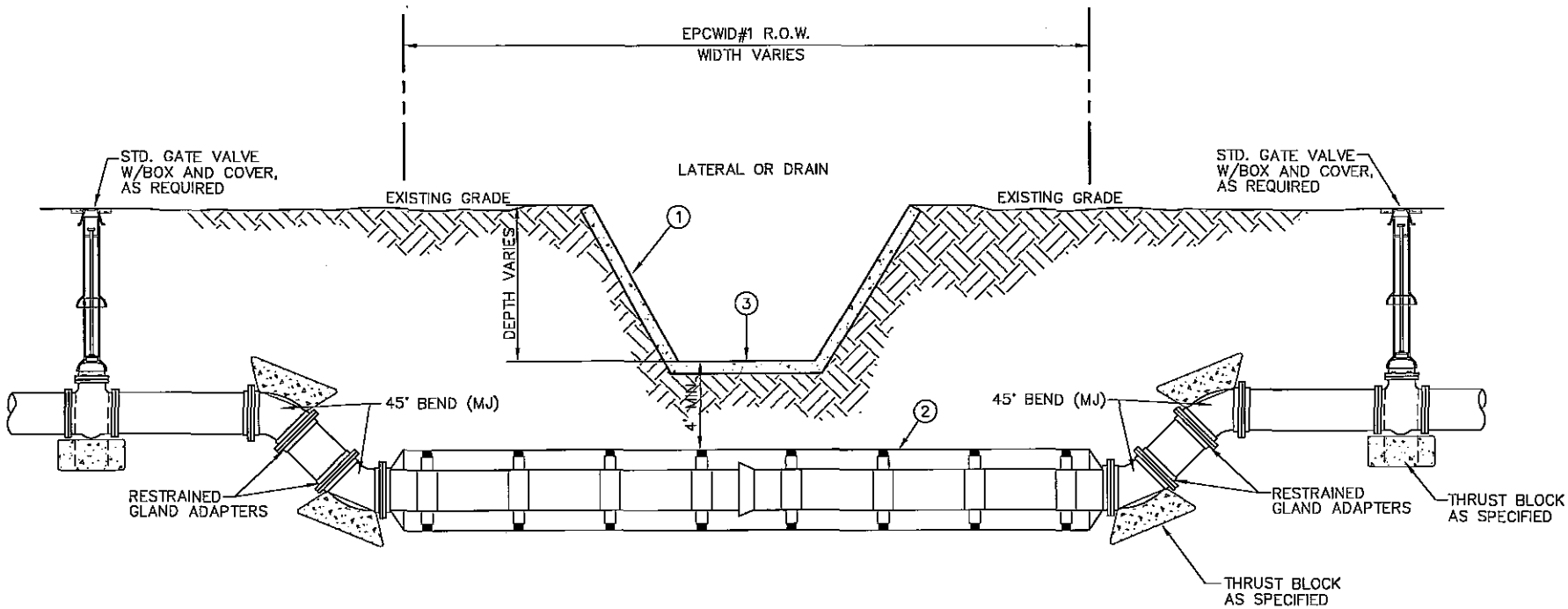
Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES	DATE: APRIL 2005	No: 132
		DETAIL: PIPE CASING DETAILS		



KEYED NOTES:

(1) SAW CUT, REMOVE AND REPLACE ±10' SECTION OF EXISTING CONCRETE IRRIGATION DITCH. MATCH EXISTING DITCH SECTION

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES DETAIL: TYPICAL PRIVATE DITCH CROSSING DETAIL	DATE: APRIL 2005	No: 133



GENERAL NOTES:

1. ALL PERMITS MUST BE OBTAINED FROM EPCWID#1 PRIOR TO BORING ACTIVITY.
2. BOTH EPCWID#1 AND L.V.W.D. MUST BE NOTIFIED AT LEAST 72 HOURS PRIOR TO CONTRUCTION (BORING) ACTIVITY.
3. REFER TO EPCWID#1 GUIDELINES FOR OTHER REQUIREMENTS.

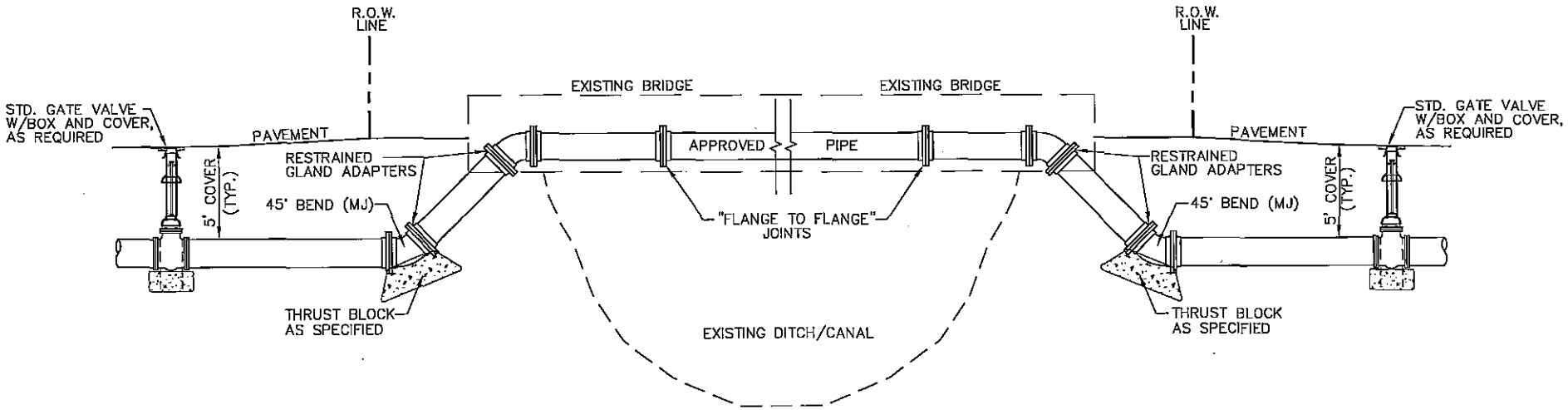
KEYED NOTES:

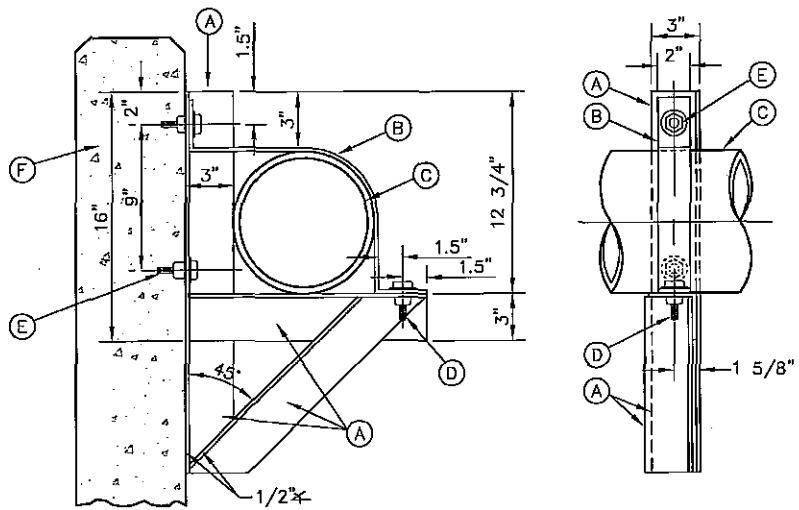
(1) SAW CUT, REMOVE AND REPLACE ±10' SECTION OF EXISTING CONCRETE IRRIGATION DITCH. MATCH EXISTING DITCH SECTION.

(2) CASING INSTALLED BY APPROVED JACKING AND BORING METHODS. STEEL CASING TO COVER ENTIRE R.O.W. WIDTH OF EPCWID#1 R.O.W. REFER TO DETAIL No. 132 FOR OTHER REQUIREMENTS.

(3) CONTRACTOR TO OBTAIN DESIGN INVERT ELEVATION FROM EPCWID#1.

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES	DATE: APRIL 2005	No: 134
		DETAIL: TYPICAL BORE CROSSING DETAIL		





BRIDGE PIPE SUPPORT

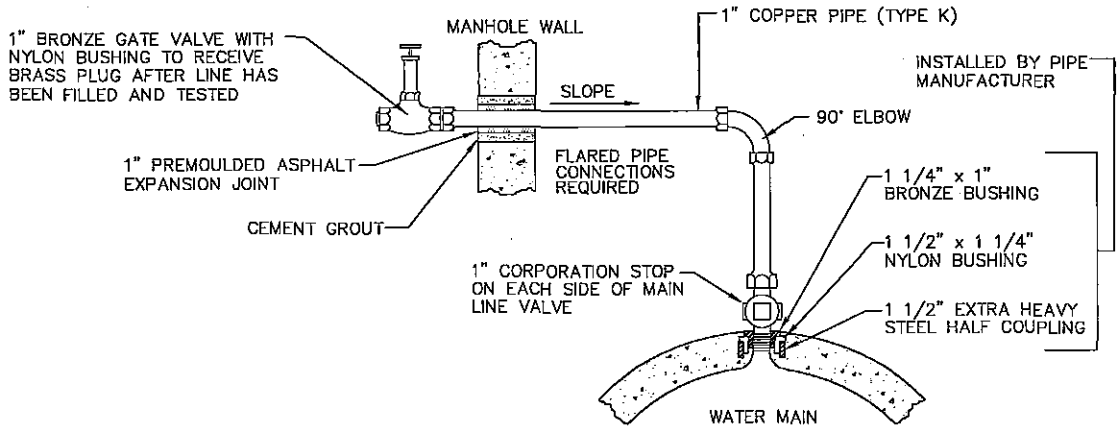
GENERAL NOTES:

1. CONCRETE ANCHOR BOLTS SHALL BE HIGH STRENGTH STEEL, MEETING OR EXCEEDING A.S.T.M. A-325 DESIGNATION.
2. ALL STEEL SURFACES SHALL BE HOT-DIPPED GALVANIZED OR FIELD COATED W/APPROVED EPOXY PAINT.
3. ALL JOINTS TO BE MECHANICALLY RESTRAINTED.
4. ALL BOLTS AND STRAPS SHALL BE STAINLESS STEEL.
5. COORDINATION WITH E.P.C.W.D.#1 SHALL BE REQUIRED FOR ALL CROSSINGS.

CONSTRUCTION KEY NOTES:

A. 3" X 3" X 1/2" FLAT STEEL ANGLE
B. 2" X 1/4" STEEL STRAP
C. 8" DIAMETER PIPE
D. 3" X 5/8" THRD. BOLT OR WELDED STRAP
E. 3/4" EXPANSION BOLTS (2) TO HAVE A 3" MIN. ANCHORAGE INTO EXIST. BRIDGE WALL.
F. EXIST. CONC. BRIDGE WALL

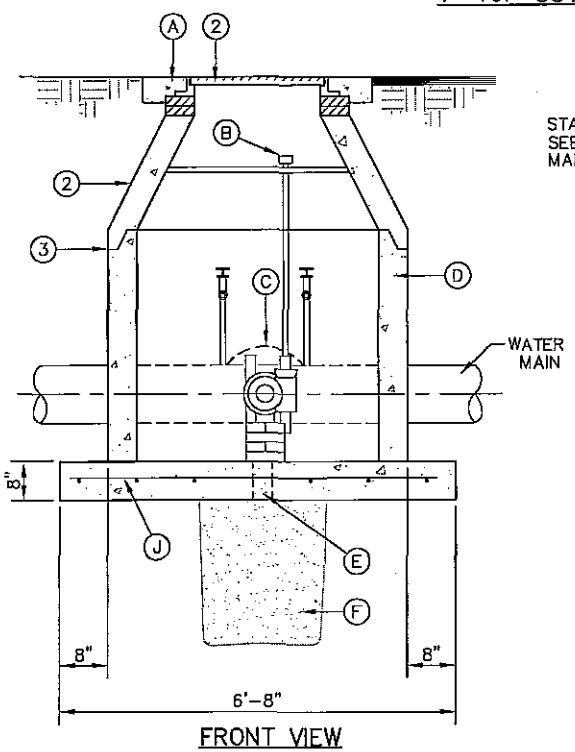
Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES	DATE: APRIL 2005	No: 135
		DETAIL: STANDARD BRIDGE CROSSING DETAIL		



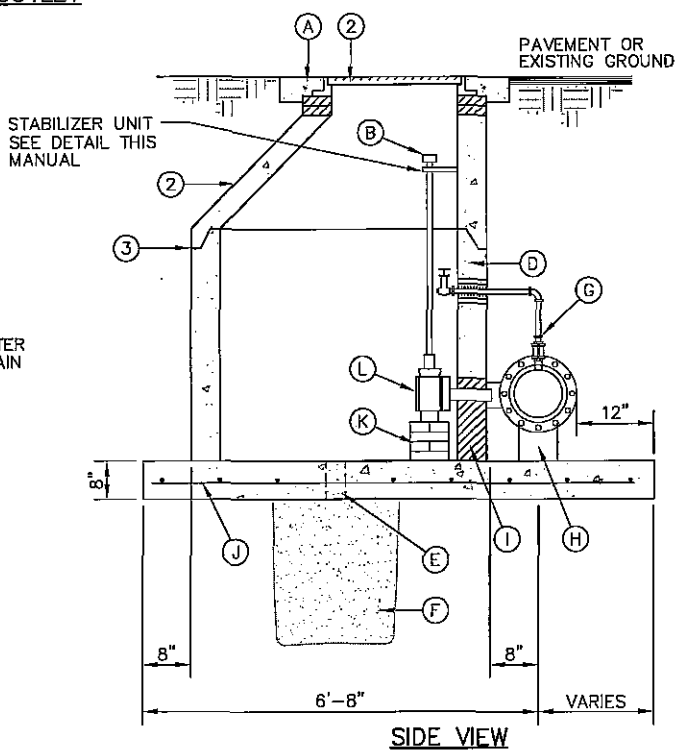
GENERAL NOTES:

1. PRE-CAST MANHOLE SECTIONS SHALL BE OF REINFORCED CONCRETE CONFORMING TO ASTM SPECIFICATION C-478.
2. ECCENTRIC CONE SECTION REINFORCEMENT IN ACCORDANCE WITH ASTM C-478. WITH STANDARD MANHOLE RING AND COVER PER L.V.W.D. STANDARD DETAILS.
3. ALL JOINTS TO BE TONGUE AND GROOVE AND SEALED WITH RAM-NEK OR EQUAL.
4. MANUFACTURER TO PROVIDE LIFTERS OF ADEQUATE SIZE AS NEEDED.

1" TOP OUTLET



FRONT VIEW



SIDE VIEW

CONSTRUCTION KEY NOTES:

A. 12"x6" THICK 3000 PSI CONCRETE COLLAR OVER BACKFILL COMPACTED TO SPECIFIED DENSITY.

B. 1 1/4" DIAMETER STEEL EXTENSION STEM WITH SQUARE SOCKET ON BOTTOM TO FIT 2" SQUARE VALVE NUT AND 2" SQUARE OPERATOR NUT ON TOP.

C. BOND WIRE, SEE CORROSION PROTECTION DETAILS.

D. 4' DIAMETER C-76 CLASS III PRECAST MANHOLE.

E. 4" DIAMETER DRAIN HOLE FILLED WITH GRAVEL.

F. 24" DIAMETER x 2'-6" DEEP GRAVEL SUMP.

G. 1" TOP OUTLET, SEE DETAIL ABOVE.

H. CONCRETE SUPPORT

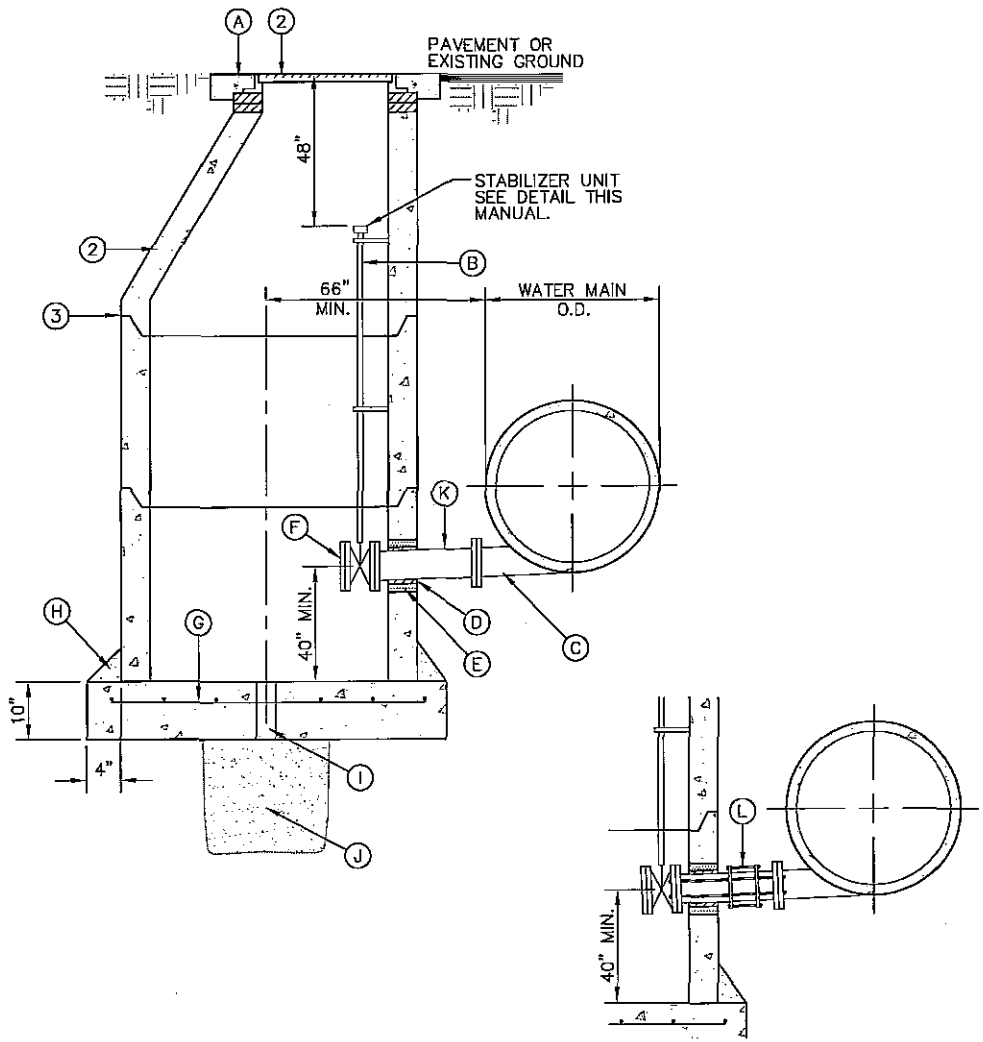
I. NOTCH MANHOLE SECTION FOR VALVE OPERATOR. FILL WITH BRICK AND MORTAR AFTER VALVE INSTALLATION.

J. No. 5 REBAR AT 12" ON CENTER BOTH WAYS

K. BRICK PIER

L. VALVE OPERATOR

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES	DATE: APRIL 2005	No: 136
		DETAIL: BUTTERFLY VALVE MANHOLE		



SEAL COULPING ALTERNATE

GENERAL NOTES:

1. PRE-CAST MANHOLE SECTIONS SHALL BE OF REINFORCED CONCRETE CONFORMING TO ASTM SPECIFICATION C-478.
2. ECCENTRIC CONE SECTION REINFORCEMENT IN ACCORDANCE WITH ASTM C-478. WITH STANDARD MANHOLE RING AND COVER PER L.V.W.D. STANDARD DETAILS.
3. ALL JOINTS TO BE TONGUE AND GROOVE AND SEALED WITH RAM-NEK OR EQUAL.
4. MANUFACTURER TO PROVIDE LIFTERS OF ADEQUATE SIZE AS NEEDED.

CONSTRUCTION KEY NOTES:

A. 12"x6" THICK 3000 PSI CONCRETE COLLAR OVER BACKFILL COMPACTED TO SPECIFIED DENSITY.

B. 1 1/4" DIAMETER SOLID STEEL EXTENSION STEM WITH SQUARE SOCKET ON BOTTOM TO FIT 2" SQUARE VALVE NUT AND 2" SQUARE OPERATOR NUT ON TOP.

C. 6" BOTTOM TANGENT OUTLET (SCCP OR STEEL PIPE). USE BOTTOM OUTLET FOR DIP.

D. 1" SPONGE RUBBER

E. NON-SHRINK GROUT

F. 6" FLANGED GATE VALVE

G. NO. 5 REBAR AT 12" ON CENTER BOTH WAYS.

H. 4"x4" GROUT ALL AROUND

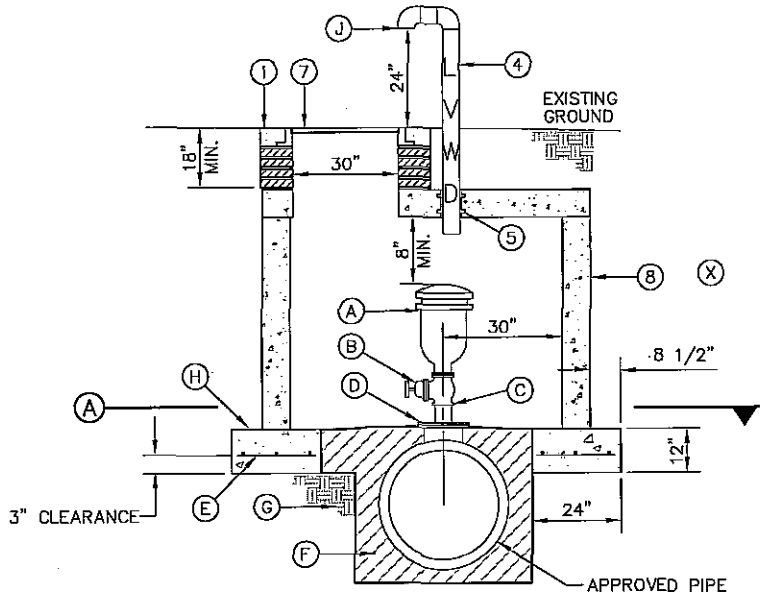
I. 6" DIAMETER HOLE FILL WITH GRAVEL

J. 24" DIAMETER, 2'-6" DEEP GRAVEL SUMP.

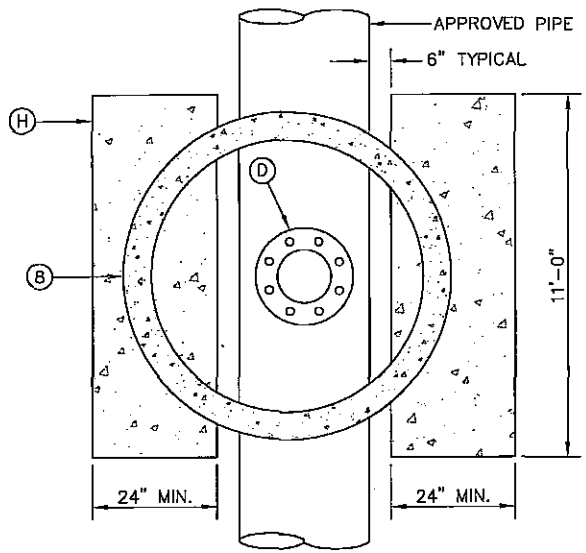
K. PROVIDE SPOOL PIECE WITH BOLTED FLANGES BOTH ENDS.

L. IF SEAL COUPLING IS USED, MUST INSTALL 3/4" STAINLESS STEEL HARNESS RODS WELDED OR BOLTED TO BOTH END FLANGES FOR PROPER RESTRAINT. COAT RODS WITH NON-CORROSIVE INHIBITIVE PAINT. WRAP ENTIRE COUPLING & ROD ASSEMBLY WITH POLYETHYLENE WRAP.

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES DETAIL: BLOWOFF ASSEMBLY	DATE: APRIL 2005	No: 137



SIDE VIEW



(A) SECTION

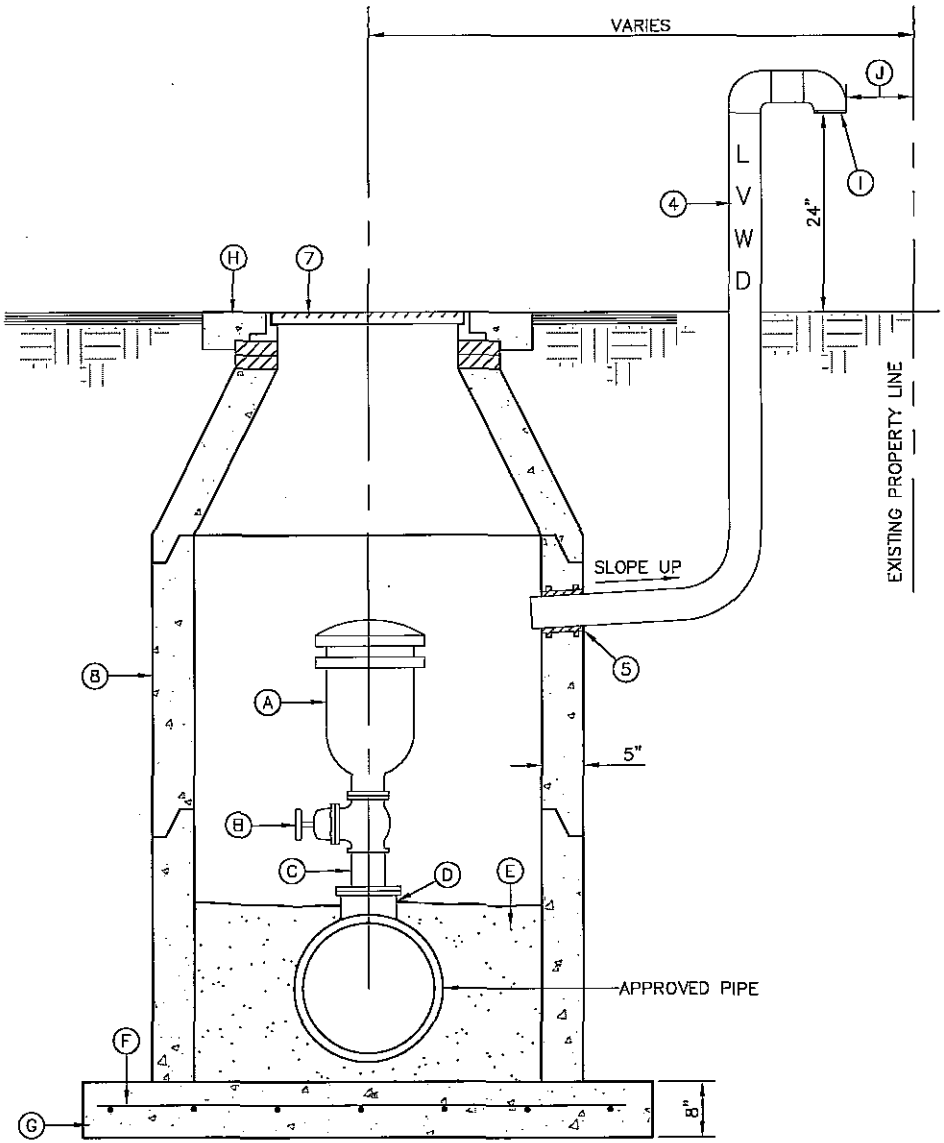
GENERAL NOTES:

1. INSTALLATION SHALL GENERALLY BE USED FOR UNPAVED CONDITIONS.
2. VALVE AND PIPE SIZES SHALL BE AS SPECIFIED.
3. AIR VENTS SHALL BE LOCATED CLEAR OF PAVED ROADWAY. DIMENSIONS TO BE DETERMINED IN THE FIELD. AIR VENT PIPING AND SLEEVE SIZE SHALL EQUAL AIR VALVE SIZE.
4. AIR VENT PIPING TO BE 4"ø SCHEDULE 40 WELDED STEEL WITH FORGED STEEL WELD FITTINGS. BURIED VENT PIPING SHALL HAVE 2 COATS OF EPOXY POLYAMIDE COATING AND ABOVE GROUND PIPING SHALL BE PRIMERED AND PAINTED WITH SEMI-GLOSS ENAMEL, WHITE LETTERS ON BLUE PIPE.
5. PIPE WALL SLEEVE SHALL HAVE LINK SEAL OR EQUAL.
6. WHERE TOP OUTLET FITTING IS NOT PROVIDED BY MANUFACTURER, PROVIDE TAPPING SLEEVE WITH VERTICAL FLANGE TO SIZE OF AIR VALVE. CONTRACTOR TO DRY TAP MAIN LINE.
7. STANDARD MANHOLE RING AND COVER PER L.V.W.D. STANDARD DETAILS.
8. STANDARD 72" MANHOLE AND CONCRETE COVER PER L.V.W.D. STANDARD DETAILS.
9. STANDARD BONNET BOX AND COVER PER L.V.W.D. STANDARD DETAILS.
10. PRECAST CONCRETE MANHOLE SHALL NOT BEAR ON PIPE.

CONSTRUCTION KEY NOTES:

A. FLANGED COMBINATION AIR AND VACUUM VALVE
B. FLANGED GATE VALVE
C. FLANGED PIPE WELDED TO BLIND FLANGE
D. FLANGED OUTLET ACCESS MANWAY FROM MANUFACTURER
E. No. 6 REBAR AT 12" ON CENTER, BOTH WAYS
F. BACKFILL AS SPECIFIED FOR PIPE
G. UNDISTURBED EARTH
H. CONCRETE FOOTING CLASS "A" CONCRETE MINIMUM 3500 PSI.
I. 6"x12" CLASS "A" CONCRETE COLLAR MINIMUM 3500 PSI.
J. INSECT SCREEN

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES	DATE: APRIL 2005	No: 138
		DETAIL: AIR RELEASE VALVE INSTALLATION – UNPAVED CONDITION		



GENERAL NOTES:

1. INSTALLATION SHALL GENERALLY BE USED FOR WATER MAINS 16" AND SMALLER UNDER PAVED CONDITIONS.
2. VALVE AND PIPE SIZES SHALL BE AS SPECIFIED.
3. AIR VENTS SHALL BE LOCATED CLEAR OF PAVED ROADWAY. DIMENSIONS TO BE DETERMINED IN THE FIELD. AIR VENT PIPING AND SLEEVE SIZE SHALL EQUAL AIR VALVE SIZE.
4. AIR VENT PIPING TO BE 4"ø SCHEDULE 40 WELDED STEEL WITH FORGED STEEL WELD FITTINGS. BURIED VENT PIPING SHALL HAVE 2 COATS OF EPOXY POLYAMIDE COATING AND ABOVE GROUND PIPING SHALL BE PRIMERED AND PAINTED WITH SEMI-GLOSS ENAMEL, WHITE LETTERS ON BLUE PIPE.
5. PIPE WALL SLEEVE SHALL HAVE LINK SEAL OR EQUAL.
6. WHERE TOP OUTLET FITTING IS NOT PROVIDED BY MANUFACTURER, PROVIDE TAPPING SLEEVE WITH VERTICAL FLANGE TO SIZE OF AIR VALVE. CONTRACTOR TO DRY TAP MAIN LINE.
7. STANDARD MANHOLE RING AND COVER PER L.V.W.D. STANDARD DETAILS.
8. STANDARD 48" MANHOLE PER L.V.W.D. STANDARD DETAIL.
9. PRECAST CONCRETE MANHOLE SHALL NOT BEAR ON PIPE.
10. PIPE OPENINGS IN MANHOLES RISERS SHALL HAVE COMPRESSION TYPE FLEXIBLE PIPE TO MANHOLE CONNECTORS (ASTM-923) "KOR-N-SEL" OR EQUAL.

CONSTRUCTION KEY NOTES:

A. FLANGED COMBINATION AIR AND VACUUM VALVE

B. FLANGED OR THREADED GATE VALVE

C. BLIND FLANGE AND WELDED, THREADED NIPPLE SAME SIZE AS AIR VALVE.

D. FLANGED OUTLET SAME SIZE AS AIR VALVE

E. GRAVEL BEDDING 12" DEEP

F. No. 5 AT 12" EACH WAY

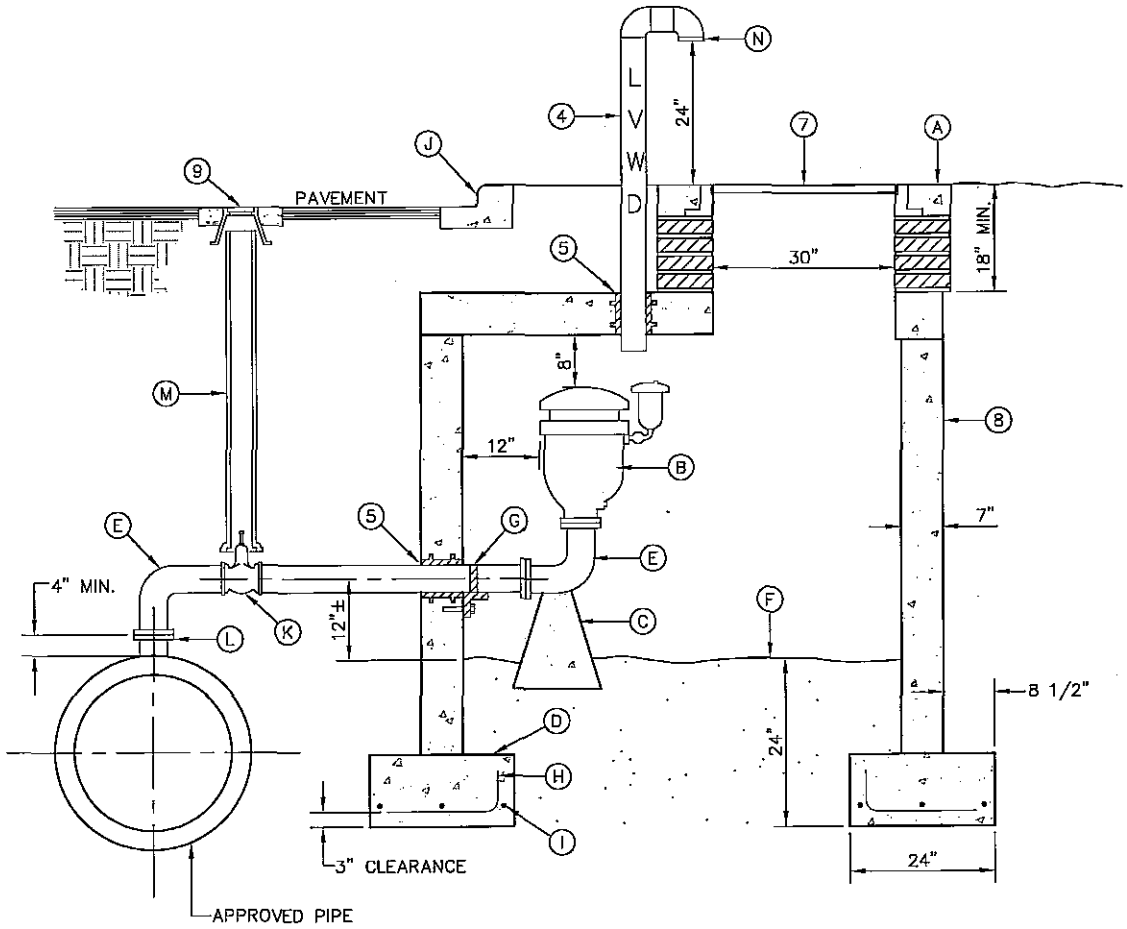
G. CONCRETE FOOTING CLASS "A" CONCRETE MINIMUM 3500 PSI.

H. 6"x12" CLASS "A" CONCRETE COLLAR MINIMUM 3500 PSI.

I. INSECT SCREEN

J. WHEN INSTALLATION IS WITH IN TXDOT RIGHT-OF-WAY, VENT PIPE SHALL BE LOCATED 6" FROM EXISTING TXDOT RIGHT-OF-WAY.

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES	DATE: APRIL 2005	No: 139
		DETAIL: AIR RELEASE VALVE INSTALLATION – PAVED CONDITION		



GENERAL NOTES:

1. INSTALLATION SHALL GENERALLY BE USED FOR LINE SIZES 20" AND LARGER UNDER PAVED CONDITIONS.
2. VALVE AND PIPE SIZES SHALL BE AS SPECIFIED.
3. AIR VENTS SHALL BE LOCATED CLEAR OF PAVED ROADWAY. DIMENSIONS TO BE DETERMINED IN THE FIELD. AIR VENT PIPING AND SLEEVE SIZE SHALL EQUAL AIR VALVE SIZE.
4. AIR VENT PIPING TO BE 4"ø SCHEDULE 40 WELDED STEEL WITH FORGED STEEL WELD FITTINGS. BURIED VENT PIPING SHALL HAVE 2 COATS OF EPOXY POLYAMIDE COATING AND ABOVE GROUND PIPING SHALL BE PRIMERED AND PAINTED WITH SEMI-GLOSS ENAMEL, WHITE LETTERS ON BLUE PIPE.
5. PIPE WALL SLEEVE SHALL HAVE LINK SEAL OR EQUAL.
6. WHERE TOP OUTLET FITTING IS NOT PROVIDED BY MANUFACTURER, PROVIDE TAPPING SLEEVE WITH VERTICAL FLANGE TO SIZE OF AIR VALVE. CONTRACTOR TO DRY TAP MAIN LINE.
7. STANDARD MANHOLE RING AND COVER PER L.V.W.D. STANDARD DETAILS.
8. STANDARD 72" MANHOLE AND CONCRETE COVER PER L.V.W.D. STANDARD DETAILS.
9. STANDARD BONNET BOX AND COVER PER L.V.W.D. STANDARD DETAILS.

CONSTRUCTION KEY NOTES:

A. 6"x12" CLASS "A" CONCRETE COLLAR, MINIMUM 3500 PSI.

B. COMBINATION AIR RELEASE AND VACUUM VALVE.

C. CLASS "C" CONCRETE PEDESTAL SUPPORT MINIMUM 2500 PSI.

D. CLASS "A" CONCRETE MINIMUM 3500 PSI.

E. 90° FLANGE BEND

F. GRAVEL

G. ANCHOR PIPING TO MANHOLE WALL WITH 3"x3"x1/4" ANGLE STRAP.

H. No. 4 REBAR AT 10" ON CENTER

I. 3 No. 5 REBAR CONTINUOUS

J. TYPICAL CURB AT MEDIAN OR STREET SIDE

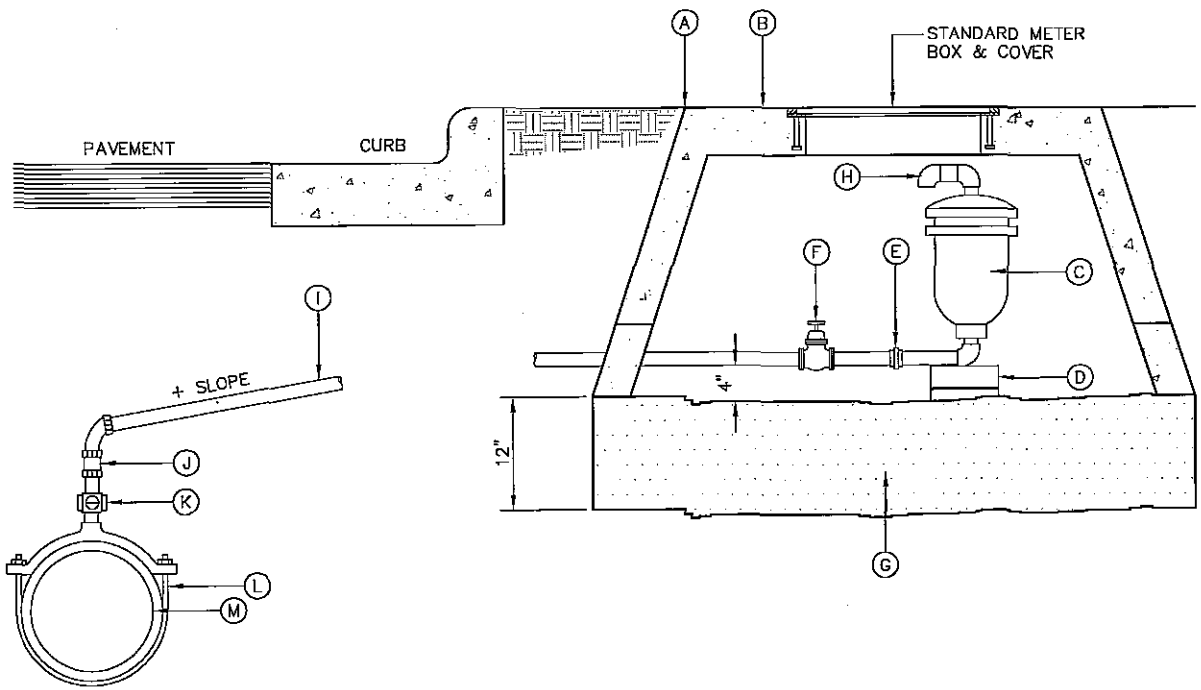
K. FLANGE GATE VALVE

L. TOP OUTLET (SIZE PER PLANS)

M. 8" VITRIFIED CLAY PIPE LENGTH AS REQUIRED

N. INSECT SCREEN

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES	DATE: APRIL 2005	No: 140
		DETAIL: AIR RELEASE VALVE INSTALLATION – PAVED CONDITION		



GENERAL NOTES:

1. INSTALLATION SHALL GENERALLY BE USED FOR 2" AND SMALLER AIR RELEASE VALVES.
2. VALVE AND PIPE SIZES SHALL BE AS SPECIFIED.
3. VALVE SHALL GENERALLY BE INSTALLED BEHIND THE CURB.

CONSTRUCTION KEY NOTES:

A. SET TOP OF METER BOX SLIGHTY HIGHER THAN SURROUNDING GROUND OR AT CURB LEVEL.

B. L.V.W.D. STANDARD METER BOX TYPE "C" FOR INSTALLATION BEHIND CURB, L.V.W.D. STANDARD BONNET BOX FOR INSTALLATION IN ROADWAYS.

C. AIR RELEASE VALVE OR SINGLE BODY COMBINATION AIR VALVE, AS SPECIFIED

D. BRICK PIER

E. UNION

F. GATE VALVE WITH HAND WHEEL OPERATOR

G. GRAVEL FILL

H. RETURN BEND

I. COPPER PIPE TO AIR RELEASE VALVE

J. FLARED TUBE CONNECTIONS

K. TAP WITH CORPORATION STOP

L. SERVICE SADDLE

M. WATER MAIN

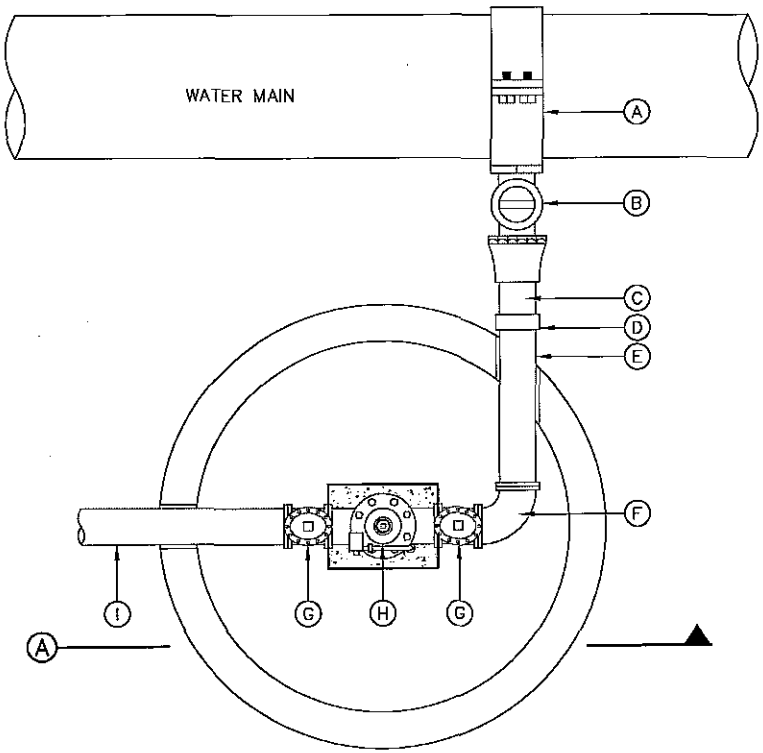
Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES	DATE: APRIL 2005	No: 141
		DETAIL: AIR RELEASE VALVE INSTALLATION		

GENERAL NOTES:

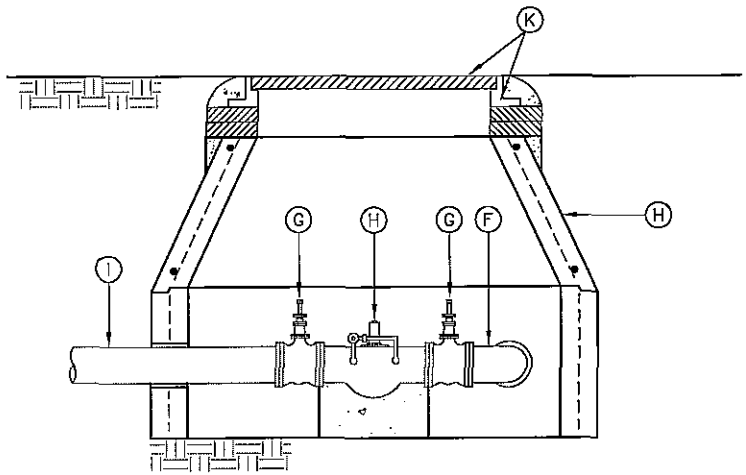
1. PRE-CAST MANHOLE SECTIONS SHALL BE OF REINFORCED CONCRETE CONFORMING TO ASTM SPECIFICATION C-478.
2. CONE SECTION REINFORCEMENT IN ACCORDANCE WITH C-478.

CONSTRUCTION KEY NOTES:

A. 2" SERVICE SADDLE
B. 2" CORPORATION STOP
C. 2" NIPPLE (BRASS)
D. 2" COUPLING (BRASS)
E. FLANGED SPOOL 2" DIAMETER (BRASS)
F. 2"-90° BEND FLANGED (BRASS)
G. 2" GATE VALVE FLANGED
H. 2" PRESSURE RELIEF VALVE
I. 2" COPPER LINE CONNECTED TO A STORM SEWER INLET
J. 2'x4'x2' MANHOLE CONICAL SECTION
K. STANDARD 24" C.I. MANHOLE FRAME AND COVER PER L.V.W.D. STANDARD DETAILS.

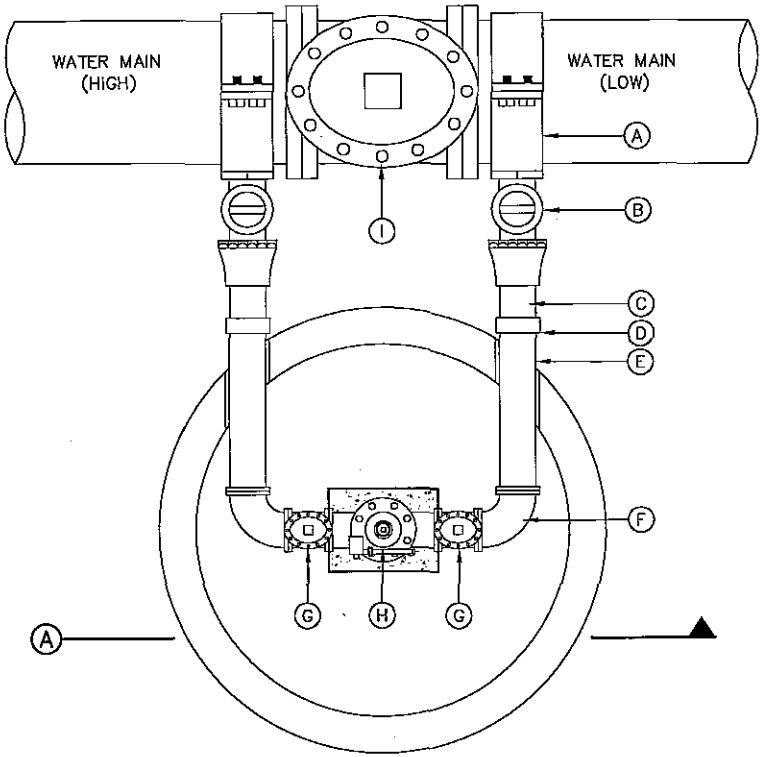


TOP VIEW



(A) SECTION

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES	DATE: APRIL 2005	No: 142
		DETAIL: PRESSURE RELIEF VALVE (DISCHARGE TO ATMOSPHERE)		



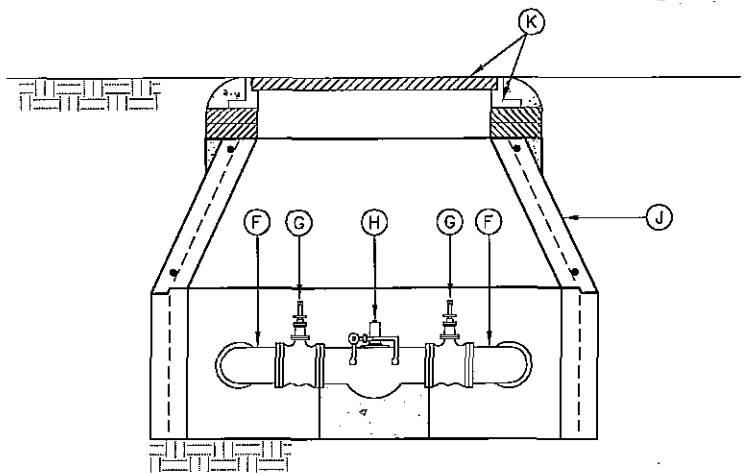
TOP VIEW

GENERAL NOTES:

1. PRE-CAST MANHOLE SECTIONS SHALL BE OF REINFORCED CONCRETE CONFORMING TO ASTM SPECIFICATION C-478.
2. CONE SECTION REINFORCEMENT IN ACCORDANCE WITH C-478.

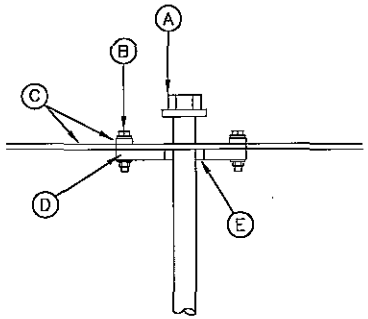
CONSTRUCTION KEY NOTES:

A. 2" SERVICE SADDLE
B. 2" CORPORATION STOP
C. 2" NIPPLE (BRASS)
D. 2" COUPLING (BRASS)
E. FLANGED SPOOL 2" DIAMETER (BRASS)
F. 2"-90° BEND FLANGED (BRASS)
G. 2" GATE VALVE FLANGED
H. 2" PRESSURE RELIEF VALVE
I. WATER MAIN VALVE (CLOSED TO ISOLATE HIGH & LOW PRESSURE SYSTEMS)
J. 2'x4'x2' MANHOLE CONICAL SECTION
K. STANDARD 24" C.I. MANHOLE FRAME AND COVER PER L.V.W.D. STANDARD DETAILS.

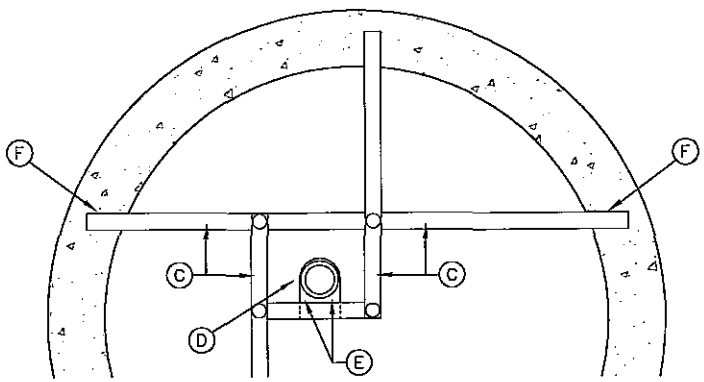


(A) SECTION

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES	DATE: APRIL 2005	No: 143
		DETAIL: PRESSURE RELIEF VALVE (BACK DISCHARGE TO LOW SIDE)		



ELEV. VIEW



PLAN

GENERAL NOTES:

1. 1 1/4" DIAMETER STEEL EXTENSION STEM WITH SQUARE VALVE NUT AND 2" SQUARE OPERATING NUT ON TOP.

CONSTRUCTION KEY NOTES:

A. 2" SQUARE OPERATOR NUT

B. 4–1/2" STAINLESS STEEL BOLTS

C. 1"x3/8" STEEL BARS

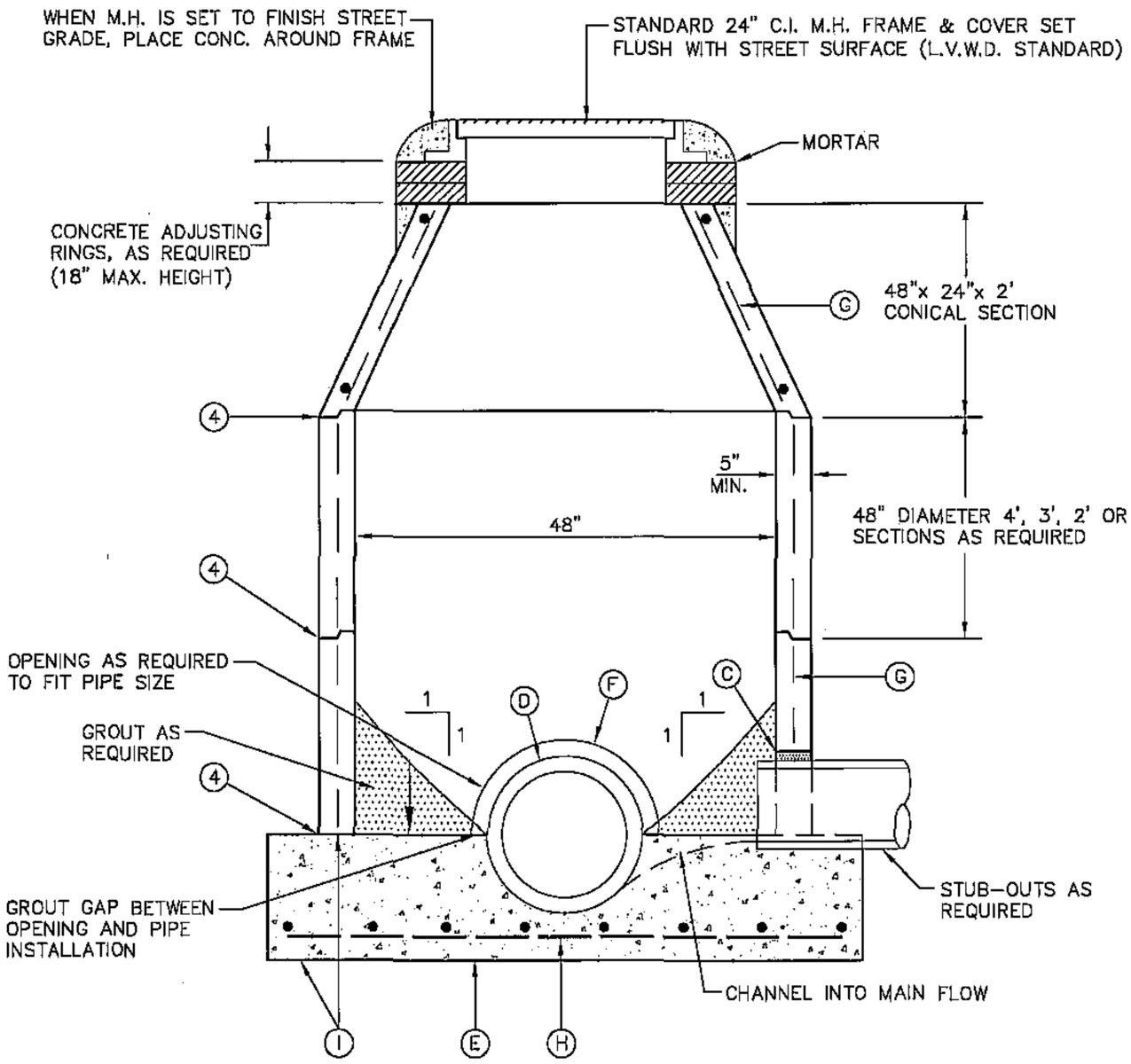
D. PLATE 6"x4"x1/4"

E. NOTCH PLATE TO ALLOW 1/16" CLEAR FOR STEM.

F. EMBED BARS IN MANHOLE WALL

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER FACILITIES	DATE: APRIL 2005	No: 144
		DETAIL: STABLIZER UNIT		

WASTEWATER FACILITIES
SECTION 200



GENERAL NOTES:

1. STANDARD MANHOLE TYPE "A" SHALL BE USED FOR LINES 24" AND SMALLER.
2. PRE-CAST MANHOLE SECTIONS SHALL BE OF REINFORCED CONCRETE CONFORMING TO ASTM SPECIFICATION C 478. CEMENT SHALL BE TYPE V (SULPHATE RESISTING).
3. THE BASE SHALL BE PRECAST OR CAST IN-PLACE CONCRETE. (MINIMUM 28 DAY COMPRESSIVE STRENGTH 4000 PSI.)
4. ALL JOINTS TO BE TONGUE, GROOVE AND SEALED WITH RAM-NEK OR EQUAL.
5. TOPS OF MANHOLES SHALL BE FLUSH WITH ROADWAY SURFACE OR FINISHED GRADE UNLESS OTHERWISE SPECIFIED BY THE ENGINEER.
6. MANUFACTURER TO PROVIDE LIFTERS OF ADEQUATE SIZE AS NEEDED.

CONSTRUCTION KEY NOTES:

A. MANHOLES BELOW GROUNDWATER TO BE EXTERNALLY COATED WITH BITUMINOUS COATING.

B. THE SUBGRADE UNDER THE BASE SHALL BE COMPACTED TO 95% DENSITY IN ACCORDANCE WITH ASTM D-1557.

C. PIPE OPENINGS IN MANHOLES RISERS SHALL HAVE COMPRESSION TYPE FLEXIBLE PIPE TO MANHOLE CONNECTORS (ASTM-923) "KOR-N-SEAL" OR EQUAL.

D. ON MAINLINE M.H.'s PIPE IS TO BE LAID THRU AND UPPER 1/2 CUT OUT.

E. CONCRETE BASE 6" + 1/2 OUTER DIAMETER OF THE PIPE.

F. PROVIDE REINFORCEMENT WITHIN 3" @ OPENINGS OR KNOCKOUTS.

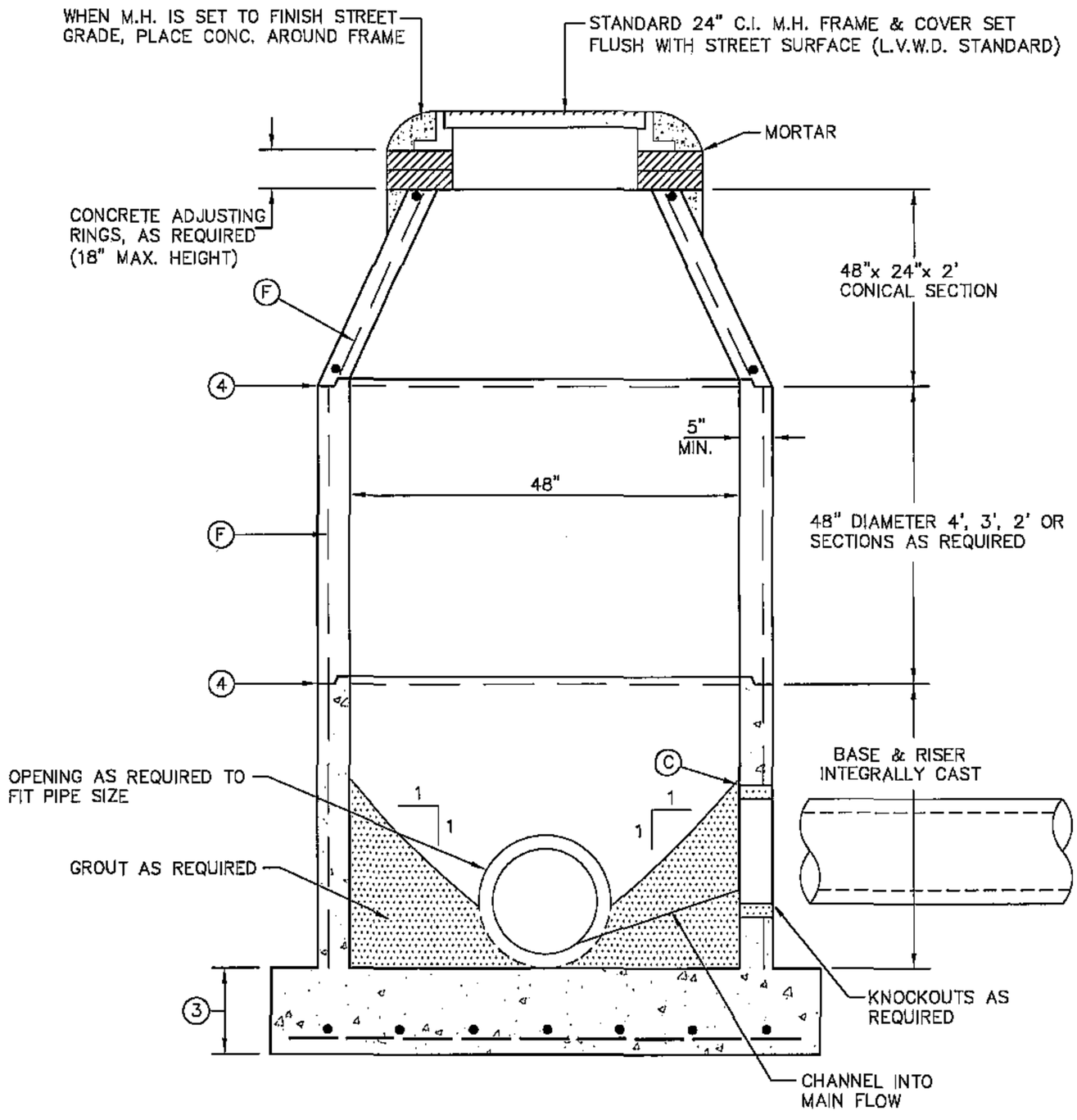
G. REINFORCING SHALL MEET ASTM C-478 AND TRAFFIC LOADING (HS-20).

H. No. 4 REBARS 8" ON CENTER, BOTH WAYS

I. MAY BE POURED MONOLITH WITH BASE.

J. ALL MANHOLES TO BE EPOXY COATED.

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WASTEWATER FACILITIES DETAIL: STANDARD MANHOLE TYPE "A"	DATE: APRIL 2005	No: 201



GENERAL NOTES:

1. STANDARD MANHOLE TYPE "A1" SHALL BE USED FOR LINES 24" AND SMALLER UNDER GROUND WATER CONDITIONS OR AS REQUIRED BY THE PROJECT ENGINEER.
2. PRE-CAST MANHOLE SECTIONS SHALL BE OF REINFORCED CONCRETE CONFORMING TO ASTM SPECIFICATION C 478. CEMENT SHALL BE TYPE V (SULPHATE RESISTING).
3. THE BASE SHALL BE PRECAST OR CAST IN-PLACE CONCRETE. (MINIMUM 28 DAY COMPRESSIVE STRENGTH 4000 PSI.)
4. ALL JOINTS TO BE TONGUE, GROOVE AND SEALED WITH RAM-NEK OR EQUAL.
5. TOPS OF MANHOLE SHALL BE FLUSH WITH ROADWAY SURFACE OR FINISHED GRADE UNLESS OTHERWISE SPECIFIED BY ENGINEER.
6. MANUFACTURER TO PROVIDE LIFTERS OF ADEQUATE SIZE AS NEEDED.

CONSTRUCTION KEY NOTES:

A. MANHOLES BELOW GROUNDWATER TO BE EXTERNALLY COATED WITH BITUMINOUS COATING.

B. THE SUBGRADE UNDER THE BASE SHALL BE COMPACTED TO 95% DENSITY IN ACCORDANCE WITH ASTM D-1557.

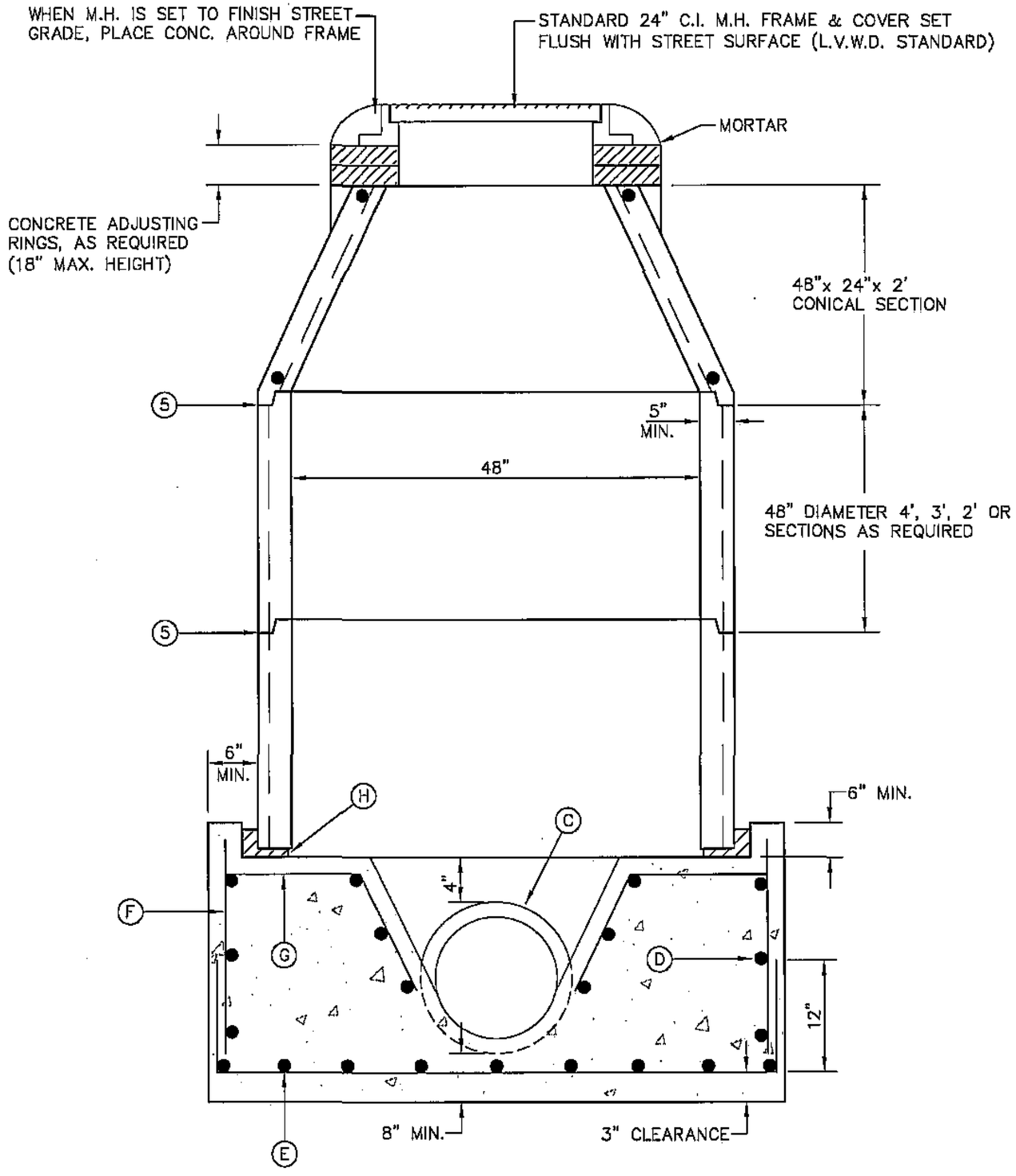
C. PIPE OPENINGS IN MANHOLE RISERS SHALL HAVE COMPRESSION TYPE FLEXIBLE PIPE TO MANHOLE CONNECTORS (ASTM-923) "KOR-N-SEAL" OR EQUAL.

D. PROVIDE REINFORCEMENT WITHIN 3" @ OPENINGS OR KNOCKOUTS, OPENINGS (UP TO 8") MADE IN FIELD SHALL BE CORE DRILLED.

E. CONCRETE BASE SHALL BE 8" FOR MH's 0 – 12' AND 12" FOR DEPTHS GREATER THAN 12'.

F. REINFORCING SHALL MEET ASTM C-478 AND TRAFFIC LOADING (HS-20).

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WASTEWATER FACILITIES	DATE: APRIL 2005	No: 202
		DETAIL: STANDARD MANHOLE TYPE "A1"		



GENERAL NOTES:

1. SPECIAL MANHOLE TYPE "A2" SHALL BE USED FOR LINES 24" AND SMALLER, WHEN SPECIAL SOIL CONDITIONS REQUIRE FOUNDATION TO BE STABILIZED.
2. PRE–CAST MANHOLE SECTIONS SHALL BE OF REINFORCED CONCRETE CONFORMING TO ASTM SPECIFICATION C 478. CEMENT SHALL BE TYPE V (SULPHATE RESISTING).
3. THE BASE SHALL BE CONCRETE (MINIMUM 28 DAY COMPRESSIVE STRENGTH 4000 PSI.) POURED ON UNDISTURBED OR THOROUGHLY COMPACTED SUB–BASE.
4. DEPTHS OVER 14' SHALL HAVE STRENGTHENED WALLS REFER TO CONTRACT DRAWINGS OR SPECIFICATIONS.
5. ALL JOINTS TO BE TONGUE, GROOVE AND SEAL WITH RAM–NEK OR EQUAL.
6. MANUFACTURER TO PROVIDE LIFTERS OF ADEQUATE SIZE AS NEEDED.

CONSTRUCTION KEY NOTES:

A. MANHOLES BELOW GROUNDWATER TO BE EXTERNALLY COATED WITH BITUMINOUS COATING.

B. SUBGRADE UNDER PRECAST MANHOLE BASES TO BE COMPACTED TO 95% DENSITY IN ACCORDANCE WITH ASTM D–1557.

C. ON MAINLINE MANHOLE"S PIPE IS TO BE LAID THRU AND UPPER 1/2 CUT OUT.

D. No. 4 AT 12" ON CENTER CIRCUMFERENTIAL BAR, LAP END 12".

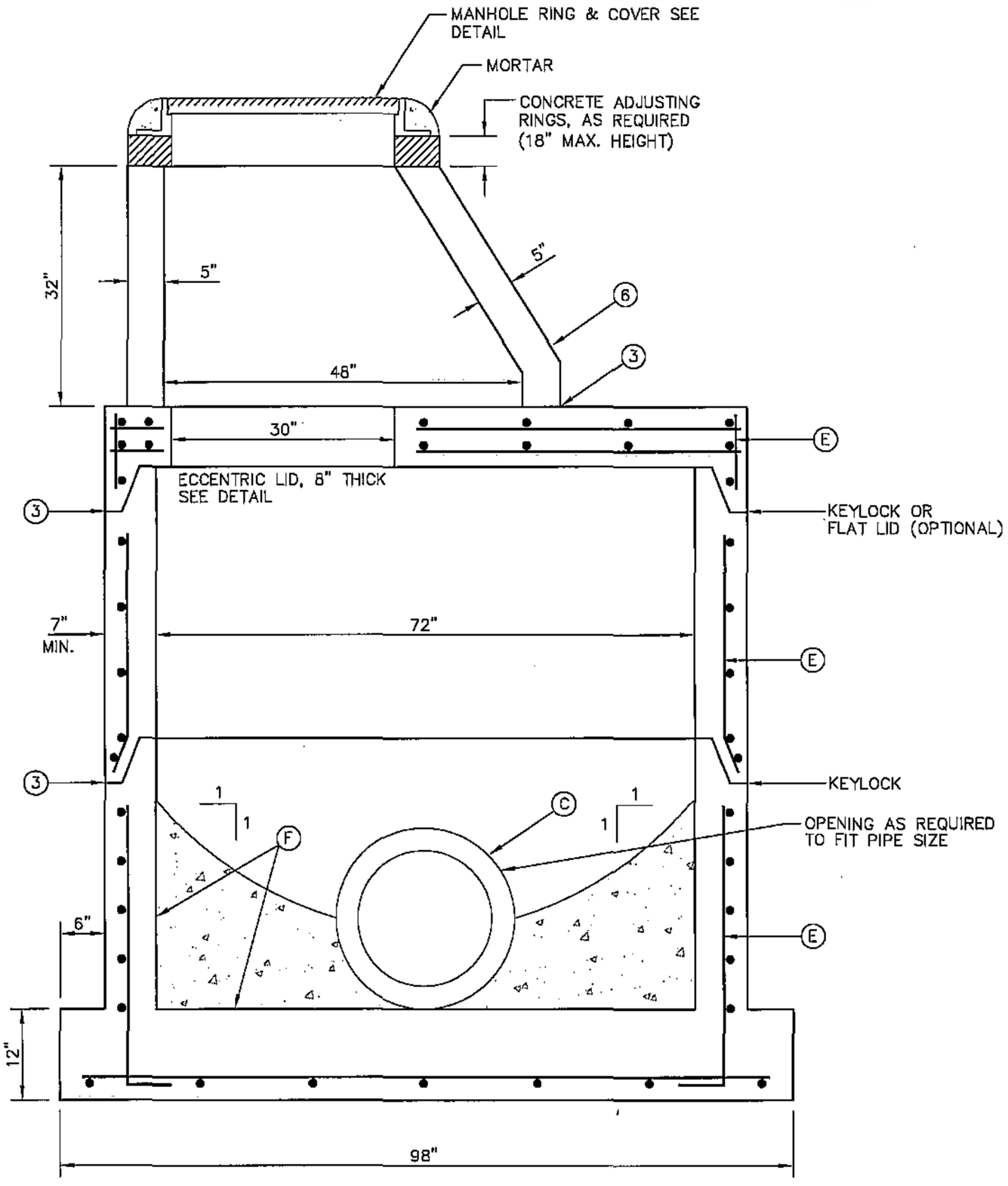
E. No. 4 AT 12" ON CENTER EACH WAY, TYPICAL.

F. No. 4 AT 2" ON CENTER VERTICAL.

G. No. 4 AT 12" ON CENTER.

H. 1" TO 2" GROUT SPACING.

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WASTEWATER FACILITIES	DATE: APRIL 2005	No: 203
		DETAIL: STANDARD MANHOLE TYPE "A2"		



GENERAL NOTES:

1. STANDARD MANHOLE TYPE "B" SHALL BE USED FOR LINES 27" AND LARGER OR WHEN SEWER MONITORING EQUIPMENT IS REQUIRED.
2. PRE-CAST MANHOLE SECTIONS SHALL BE OF REINFORCED CONCRETE CONFORMING TO ASTM SPECIFICATION C 478. CEMENT SHALL BE TYPE V (SULPHATE RESISTING).
3. ALL JOINTS TO BE TONGUE, GROOVE AND SEALED WITH RAM-NEK OR EQUAL.
4. TOPS OF MANHOLES SHALL BE FLUSH WITH ROADWAY SURFACE OR FINISHED GRADE UNLESS OTHERWISE SPECIFIED BY THE ENGINEER.
5. MANUFACTURER TO PROVIDE LIFTERS OF ADEQUATE SIZE AS NEEDED.
6. ECCENTRIC CONE SECTION REINFORCEMENT IN ACCORDANCE WITH ASTM C-478.

CONSTRUCTION KEY NOTES:

A. MANHOLES BELOW GROUNDWATER TO BE EXTERNALLY COATED WITH BITUMINOUS COATING.

B. SUBGRADE UNDER PRECAST MANHOLE BASES TO BE COMPACTED TO 95% DENSITY IN ACCORDANCE WITH ASTM D-1557.

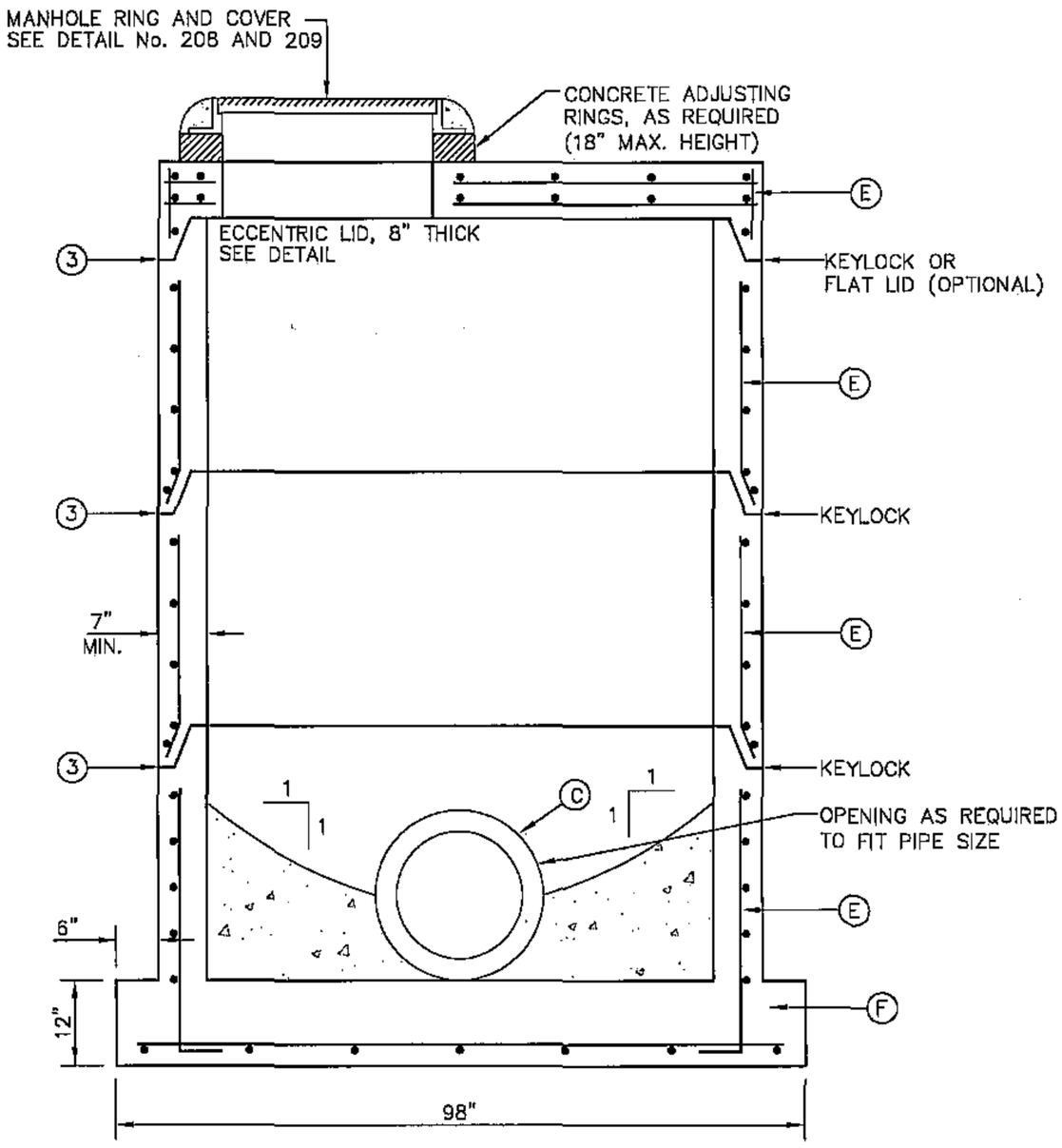
C. PIPE OPENINGS IN MANHOLES RISERS SHALL HAVE COMPRESSION TYPE FLEXIBLE PIPE TO MANHOLE CONNECTORS (ASTM-923) "KOR-N-SEAL" OR EQUAL.

D. 4000 P.S.I. CONCRETE 28 DAYS.

E. REINFORCING SHALL MEET ASTM C478 AND TRAFFIC LOADING (HS-20).

F. BOTTOM RISER SECTION PRECAST INTEGRALLY WITH BASE SLAB.

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WASTEWATER FACILITIES	DATE: APRIL 2005	No: 204
		DETAIL: STANDARD MANHOLE TYPE "B"		



GENERAL NOTES:

1. STANDARD MANHOLE TYPE "B1" SHALL BE USED FOR LINES 27" AND LARGER AND SPECIAL LOADING CONDITIONS. GENERALLY GREATER THAN H-20 OR WHEN REQUIRED BY OTHER GOVERNING AGENCIES.
2. PRE-CAST MANHOLE SECTIONS SHALL BE OF REINFORCED CONCRETE CONFORMING TO ASTM SPECIFICATION C 478. CEMENT SHALL BE TYPE V (SULPHATE RESISTING).
3. ALL JOINTS TO BE TONGUE, GROOVE AND SEALED WITH RAM-NEK OR EQUAL.
4. TOPS OF MANHOLES SHALL BE FLUSH WITH ROADWAY SURFACE OR FINISHED GRADE UNLESS OTHERWISE SPECIFIED BY THE ENGINEER.
5. MANUFACTURER TO PROVIDE LIFTERS OF ADEQUATE SIZE AS NEEDED.

CONSTRUCTION KEY NOTES:

A. MANHOLES BELOW GROUNDWATER TO BE EXTERNALLY COATED WITH BITUMINOUS COATING.

B. SUBGRADE UNDER PRECAST MANHOLE BASES TO BE COMPACTED TO 95% DENSITY IN ACCORDANCE WITH ASTM D-1557.

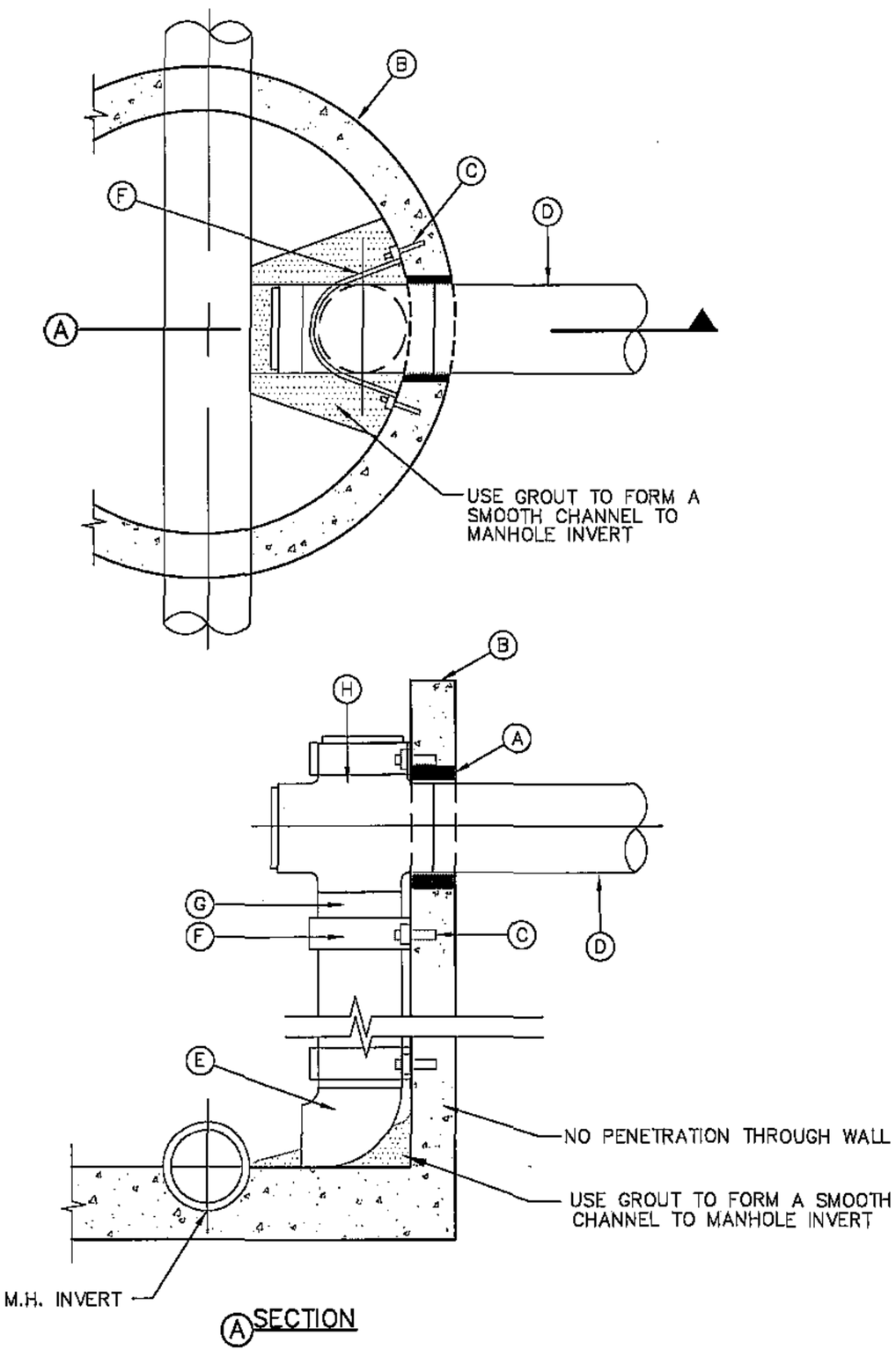
C. PIPE OPENINGS IN MANHOLES RISERS SHALL HAVE COMPRESSION TYPE FLEXIBLE PIPE TO MANHOLE CONNECTORS (ASTM-923) "KOR-N-SEAL" OR EQUAL.

D. 4000 P.S.I. CONCRETE 28 DAYS.

E. REINFORCING SHALL MEET ASTM C478 AND TRAFFIC LOADING (HS-20).

F. BOTTOM RISER SECTION PRECAST INTEGRALLY WITH BASE SLAB.

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WASTEWATER FACILITIES	DATE: APRIL 2005	No: 205
		DETAIL: STANDARD MANHOLE TYPE "B1"		



A SECTION

GENERAL NOTES:

1. ANCHOR STRAPS & BOLTS, SHALL HAVE ONE HEAVY COAT OF POLYAMIDE CURED COAL TAR EPOXY TO PREVENT CORROSION.
2. DROP CONNECTIONS TO BE USED ON MANHOLES TYPE A, & B.
3. DROP CONNECTIONS SHOWN HERE ARE LIMITED TO INCOMING COLLECTOR LINES 8" OR LESS DIAMETER, UNLESS OTHERWISE SHOWN IN THE PROJECT DRAWINGS.

CONSTRUCTION KEY NOTES:

A. PIPE OPENINGS IN MANHOLE RISERS SHALL HAVE COMPRESSION TYPE FLEXIBLE PIPE TO MANHOLE CONNECTORS (A.S.T.M.– C923) "KOR–N–SEAL" OR EQUAL.

B. MANHOLE WALL

C. 1/2" EXPANSION BOLT TO HAVE 2" MIN. ANCHORAGE INTO MANHOLE EVERY 2'.

D. APPROVED SEWER PIPE.

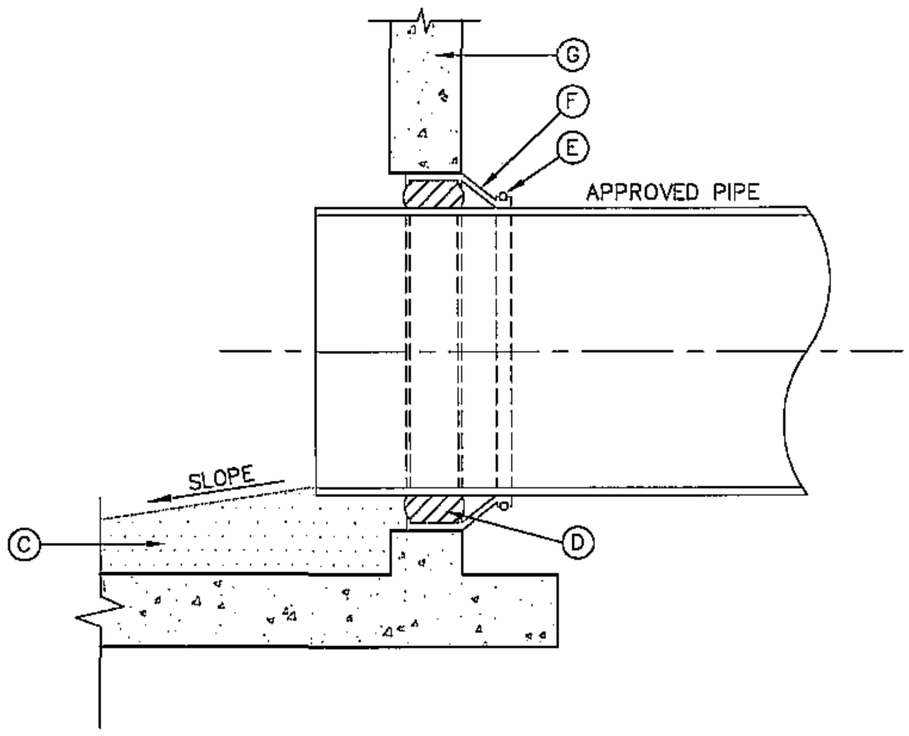
E. 8"–90° BEND (P.V.C.)

F. 2" WIDE X 3/16" THICK METAL STRAP (S.S.) @ 4' O.C. (AS REQUIRED)

G. 8" P.V.C. PIPE (SDR. 35)

H. 8" X 8" CROSS

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WASTEWATER FACILITIES	DATE: APRIL 2005	No: 206
		DETAIL: STANDARD DROP CONNECTION MANHOLE		



GENERAL NOTES:

1. MANHOLE CONNECTOR SHALL BE KOR-N-SEAL OR EQUAL MEETING THE REQUIREMENTS OF ASTM C-923. CONNECTOR SHALL BE FURNISHED BY CONTRACTOR.

CONSTRUCTION KEY NOTES:

A. AN EPOXY COATING SHALL BE APPLIED TO THE MANHOLE INTERIOR WHEN SPECIFIED.

B. ON MAINLINE MANHOLES PIPE IS TO BE LAID THRU AND UPPER 1/2 CUT OUT.

C. GROUT AS REQUIRED TO FORM SMOOTH CHANNEL TO MANHOLE INVERT.

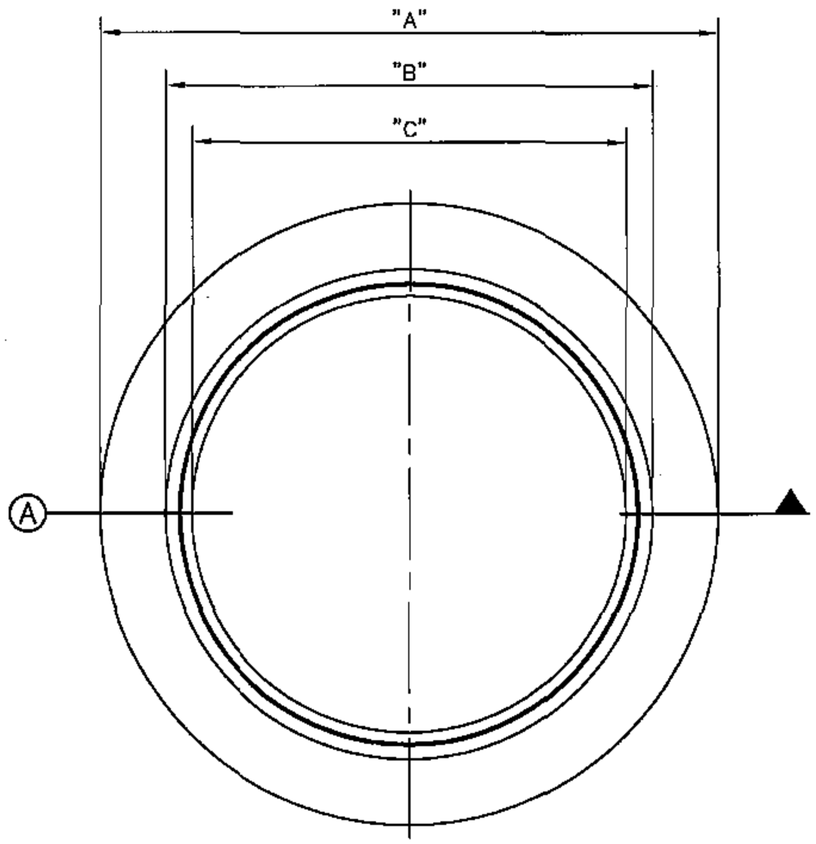
D. KOR-N-SEAL, CAVITY-O-RING OR EQUAL

E. PIPE CLAMP SS 316

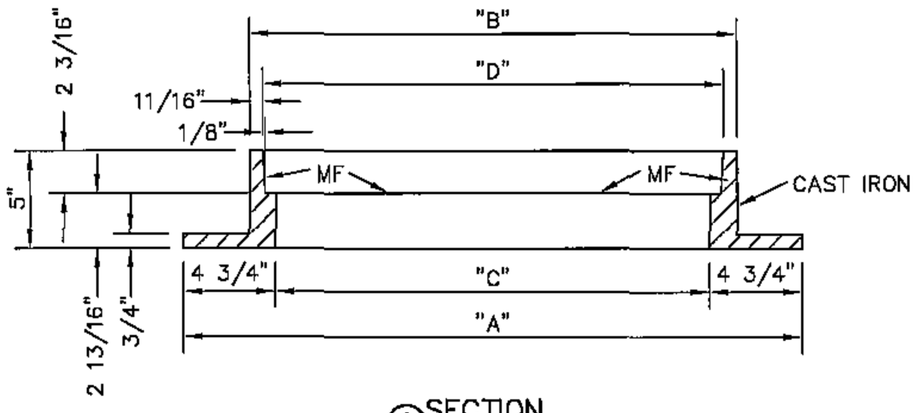
F. FLEXIBLE CONNECTOR

G. PRECAST MANHOLE

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WASTEWATER FACILITIES DETAIL: PIPE CONNECTION TO MANHOLE	DATE: APRIL 2005	No: 207



TOP VIEW



A SECTION

GENERAL NOTES:

1. MATCHING SURFACES MARKED "MF" TO BE FINISHED OF ANY IRREGULARITIES THAT WOULD PREVENT A SNUG FIT.

2. CASTING TO BE SMOOTH & VOID OF AIR HOLES.

MH. RING	MH. TYPE "A & A1"	MH. TYPE "B & B1"
WEIGHT	165 LBS.	225 LBS.
A	2'-8"	3'-3 1/2"
B	2'-1 1/4"	2'-8 3/4"
C	1'-10 1/2"	2'-6"
D	1'-11 7/8"	2'-7 3/8"

Lower Valley WATER DISTRICT

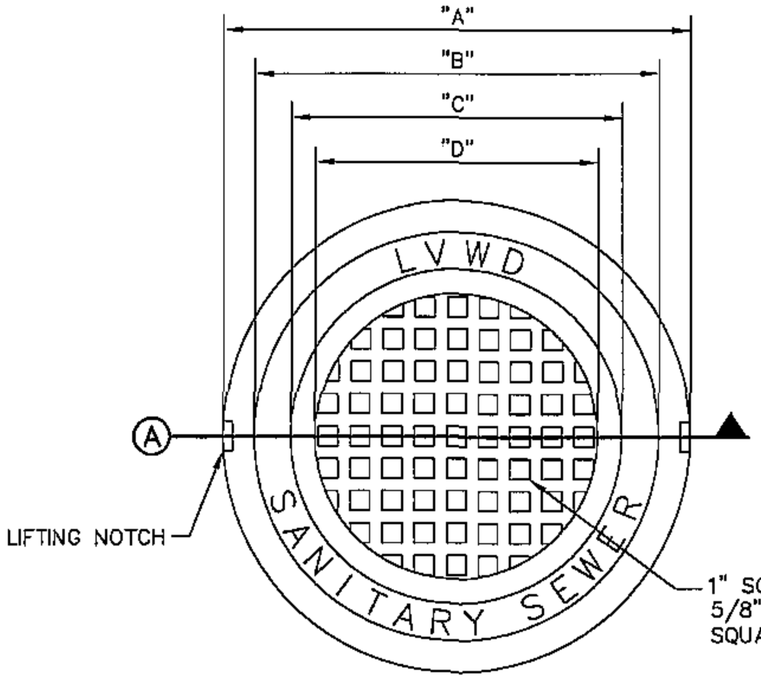
DESIGN STANDARDS

SECTION: WASTEWATER FACILITIES

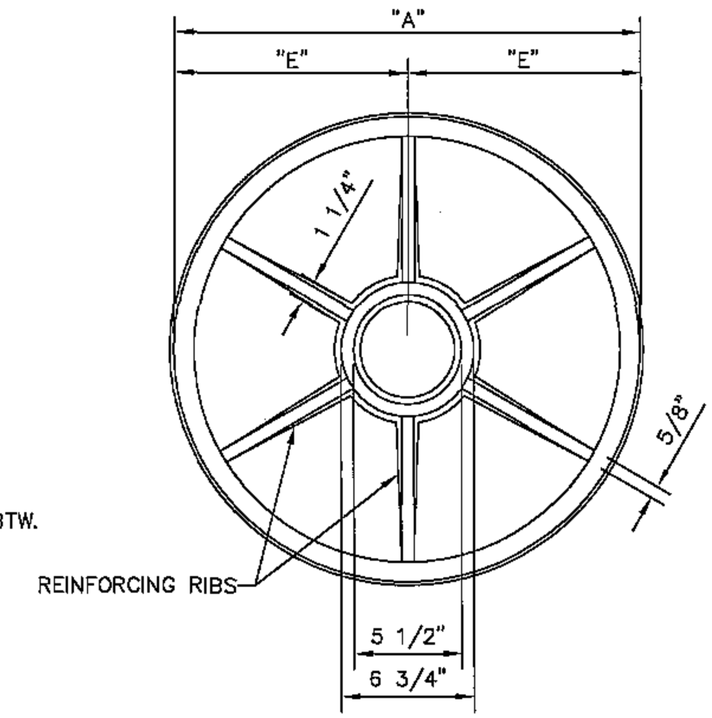
DETAIL: SEWER MANHOLE RING

DATE: APRIL 2005

No: 208



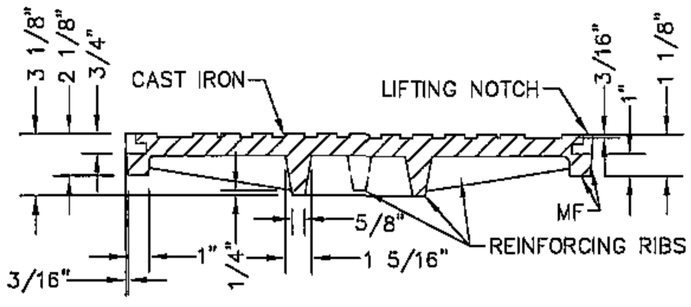
MANHOLE COVER (TOP VIEW)



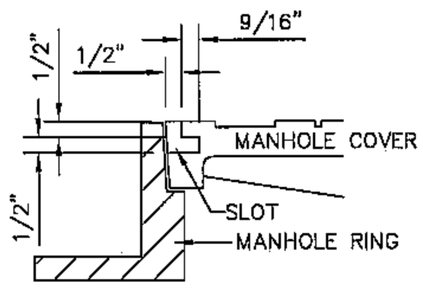
MANHOLE COVER (BOTTOM VIEW)

GENERAL NOTES:

1. MATCHING SURFACES MARKED "MF" TO BE FINISHED OF ANY IRREGULARITIES THAT WOULD PREVENT A SNUG FIT.
2. CASTING TO BE SMOOTH & VOID OF AIR HOLES.



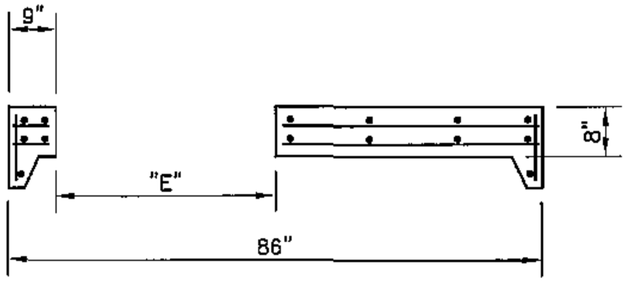
Ⓐ SECTION



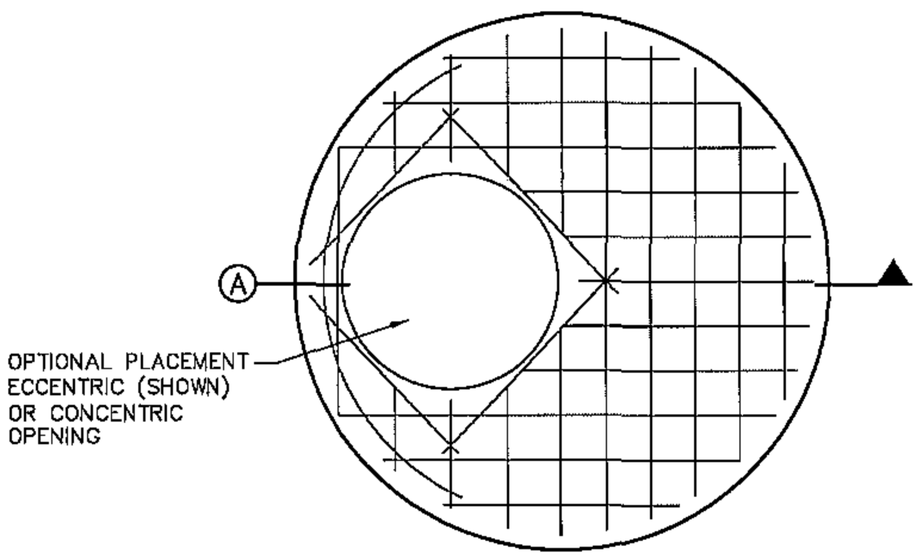
LIFTING NOTCH

MH. RING	MH. TYPE "A & A1"	MH. TYPE "B & B1"
WEIGHT	175 LBS.	310 LBS.
A	1'-11 7/8"	2'-7 3/8"
B	1'-8 5/8"	2'-4 1/8"
C	1'-4 7/8"	2'-3/8"
D	1'-2 3/8"	1'-9 7/8"
E	11 15/16"	1'-3 11/16"

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WASTEWATER FACILITIES DETAIL: SEWER MANHOLE COVER	DATE: APRIL 2005 / No: 209



Ⓐ SECTION



GENERAL NOTES:

1. ALL JOINTS TO BE TONGUE & GROOVE AND SEALED WITH RAM–NEK OR EQUAL.
2. MANUFACTURER TO PROVIDE LIFTERS OF ADEQUATE SIZE AS NEEDED.

CONSTRUCTION KEY NOTES:

A. 4000 P.S.I. CONCRETE 28 DAYS.

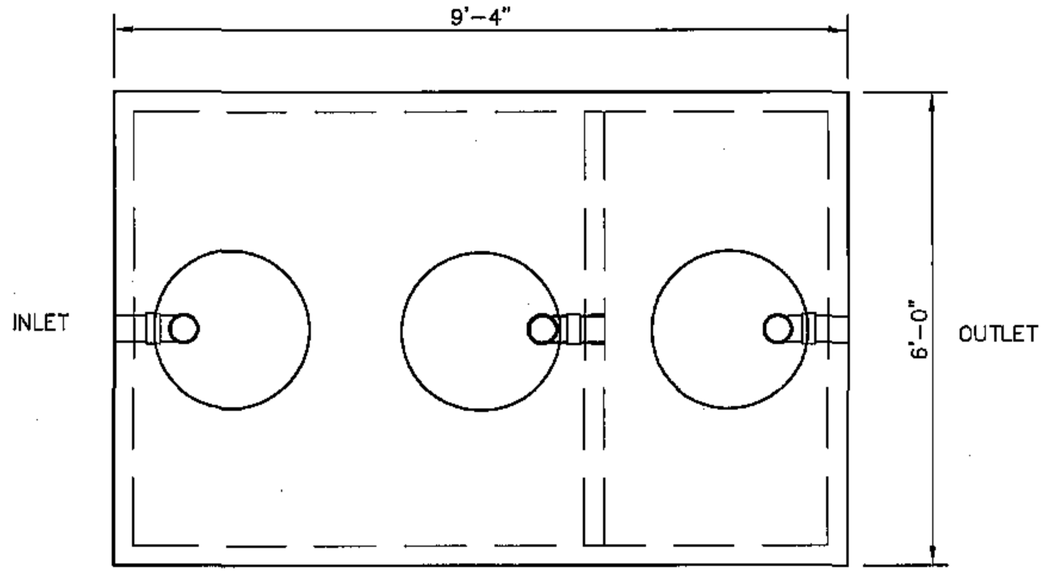
B. KEYLOCK ADDS 8" TO VERTICAL HEIGHT.

C. RING & COVER OR SPECIAL LIDS TO MEET REQUIREMENTS, MAY BE CAST IN PLACE.

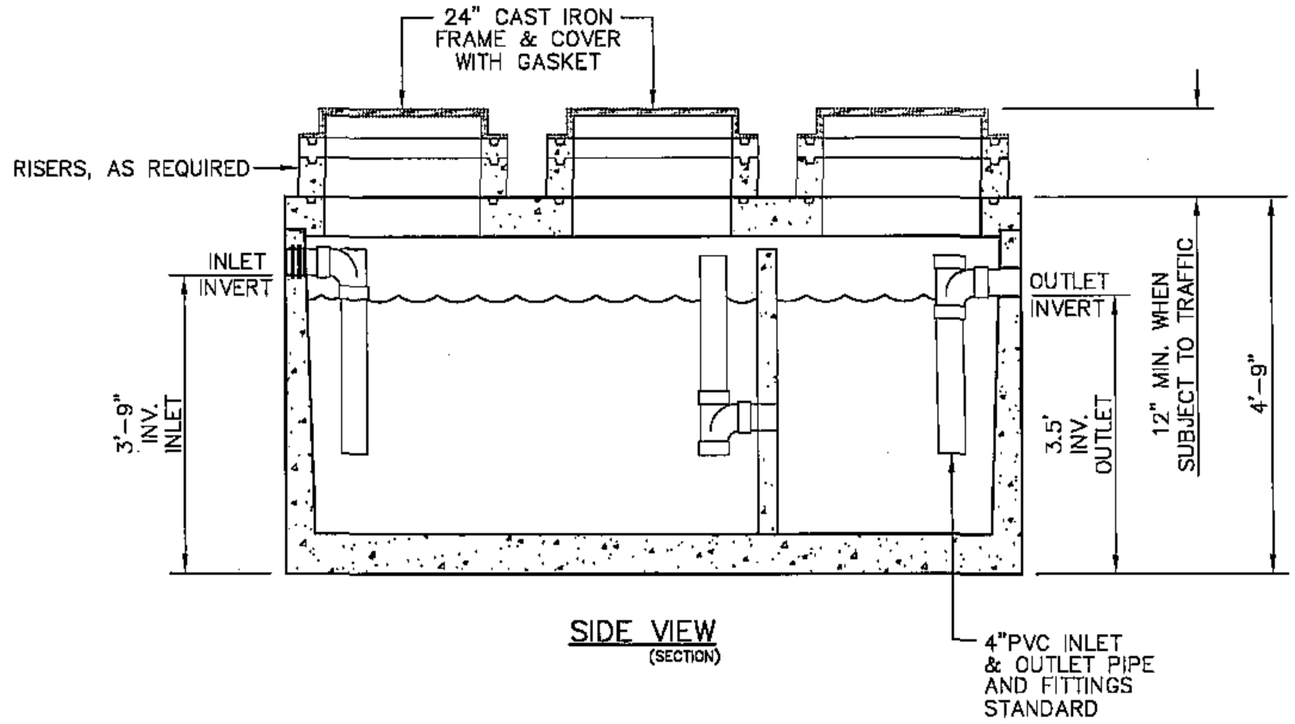
D. REINFORCING SHALL MEET A.S.T.M. C478–87 AND TRAFFIC LOADING (HS–20).

E. SIZE TO ACCOMMODATE TYPE B & B1 MANHOLE RING, SEE DETAIL.

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WASTEWATER FACILITIES	DATE: APRIL 2005	No: 210
		DETAIL: CONCRETE MANHOLE COVER FOR 72" I.D.		



TOP VIEW
(COVERS & RISERS REMOVED)



SIDE VIEW
(SECTION)

GENERAL NOTES:

1. LIQUID CAPACITY: DIMENSIONS SHOWN FOR 1000 GALLONS.
2. TANK DESIGNED FOR H-20 TRAFFIC WHEEL LOAD WITH 1' TO 6' MAX. EARTH COVER AND WATER TABLE AT ONE FOOT BELOW GRADE.
3. SUITABLE NATIVE SOIL OR GRANULAR SUB-BASE SHALL BE COMPACTED AND LEVELED TO HANDLE ANTICIPATED LOADS. SEE INSTALLATION PROCEDURES SHEET FOR ADDITIONAL INFO.
4. EXTERIOR AND INTERIOR CONCRETE SURFACES TO BE COATED WITH AN APPROVED BITUMINOUS MATERIAL.
5. FOR COMPLETE DESIGN AND PRODUCT INFORMATION CONTACT WESTERN PRE-CAST.
6. REFER TO SAMPLE WORKSHEET ON NEXT PAGE TO DETERMINE SIZE OF TRAP.

WEIGHTS IN LBS.

TOP SLAB	3,700
BODY	10,400
TOTAL TANK	14,100

Lower Valley WATER DISTRICT

DESIGN STANDARDS

SECTION: WASTEWATER FACILITIES

DETAIL: GREASE AND SAND TRAP DETAIL

DATE: APRIL 2005

No: 211

Grease Interceptor Sizing Worksheet

The Uniform Plumbing Code Formula

Company		**Calculated By**		**Date**	
Project		**Location**			

Follow these six simple steps to determine grease interceptor size.

	No of Meals Per Peak Hours		Waste Flow Rate		Retention Time		Storage Factor		Calculated Interceptor Size		Grease Interceptor
Enter Calculations > Here		X		X		X		=			
	Step 1		Step 2		Step 3		Step 4		Step 5		Step 6

1

Number of Meals Per Peak Hour (Recommended Formula):

Seating Capacity		Meal Factor		Meals per Peak Hour
	X		=	

Establishment Type:	**Meal Factor**
Fast Food (45 min)	1.33
Restaurant (60 min)	1.00
Leisure Dining (90 min)	0.67
Dinner Club (120 min)	0.50

Notes:

2

Waste Flow Rate:

Condition	**Flow Rate**
With a Dishwashing Machine	6 Gallons
Without a Dishwashing Machine	5 Gallons
Single Service Kitchen	2 Gallons
Food Waste Disposer Only	1 Gallon

Notes:

3

Retention Time

Commercial Kitchen Waste	
Dishwasher	2.5 Hours
Single Service Kitchen	
Single Serving	1.5 Hours

Notes:

4

Storage Factor

Kitchen Type	**Storage Factor**
Fully Equipped Commercial	
Hours of Operation	
8 Hours	1.00
12 Hours	1.50
16 Hours	2.00
24 Hours	3.00
Single Service Kitchen	1.50

Notes:

5

Calculate Liquid Capacity

Multiply the values obtained from step 1, 2, 3 and 4. The result is the approximate grease interceptor size for this application

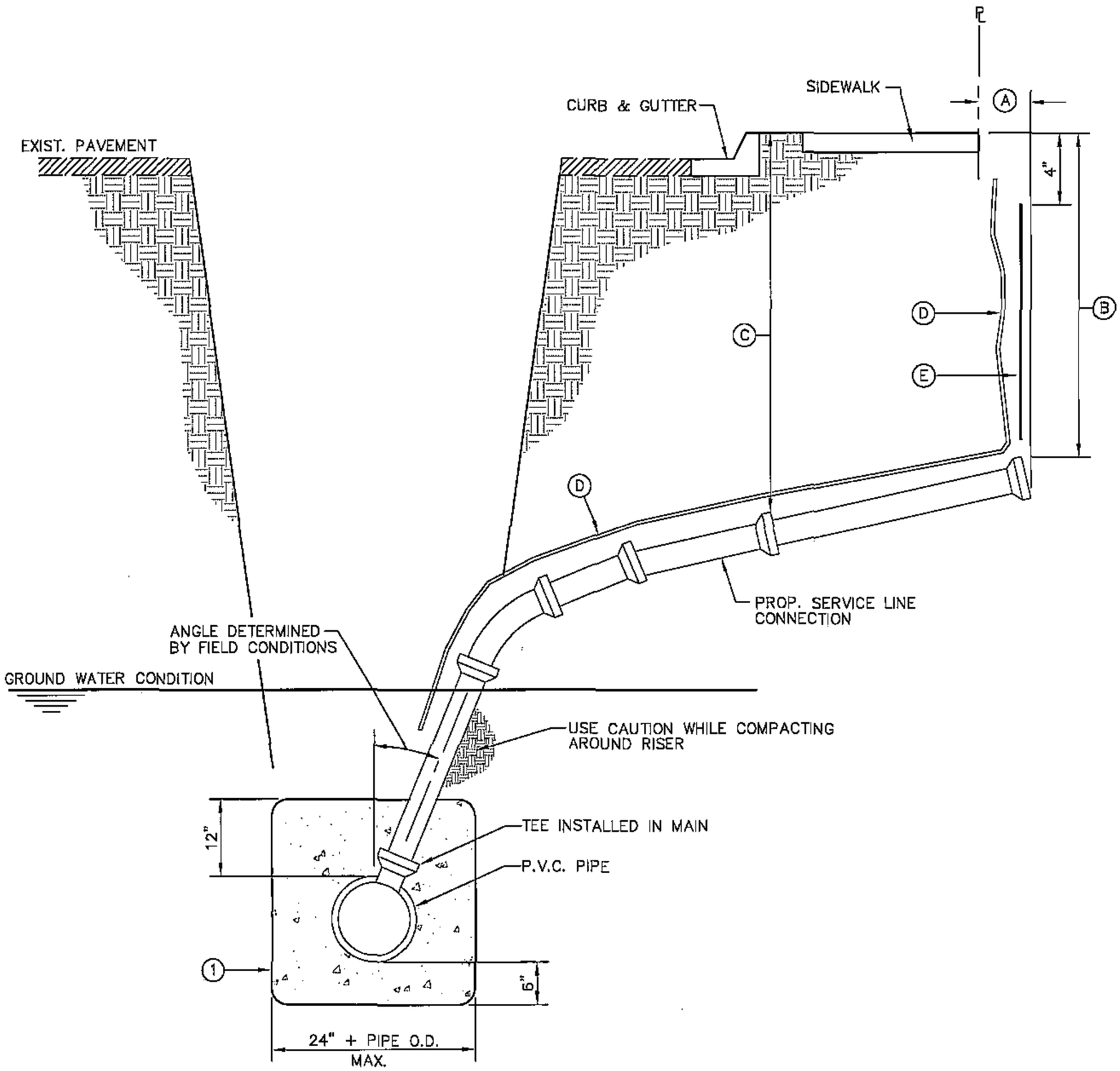
Notes:

6

Select Grease Interceptor

Using the approximate required liquid capacity from step 5, select an appropriate size as recommended by the manufacturer.

Notes:



GENERAL NOTES:

1. WHEN P.V.C. SADDLES ARE USED THEY ARE TO BE ENCASED WITH A 3" MINIMUM LAYER OF CLASS B CONCRETE.
2. UNDER CERTAIN CONDITIONS FIELD INVESTIGATIONS WILL BE REQUIRED TO DETERMINE THE ADEQUACY OF THE DEPTH ON THE LATERAL.
3. WHEN GROUND WATER IS ENCOUNTERED SERVICE RISER SHALL BE EXTENDED ABOVE ANTICIPATED WATER TABLE LEVEL.

CONSTRUCTION KEY NOTES:

A. CONTRACTOR TO INSTALL SEWER SERVICE LINE FROM THE MAIN TO A LOCATION 6" BEHIND THE PROPERTY LINE UNLESS CONDITIONS REQUIRE OTHERWISE.

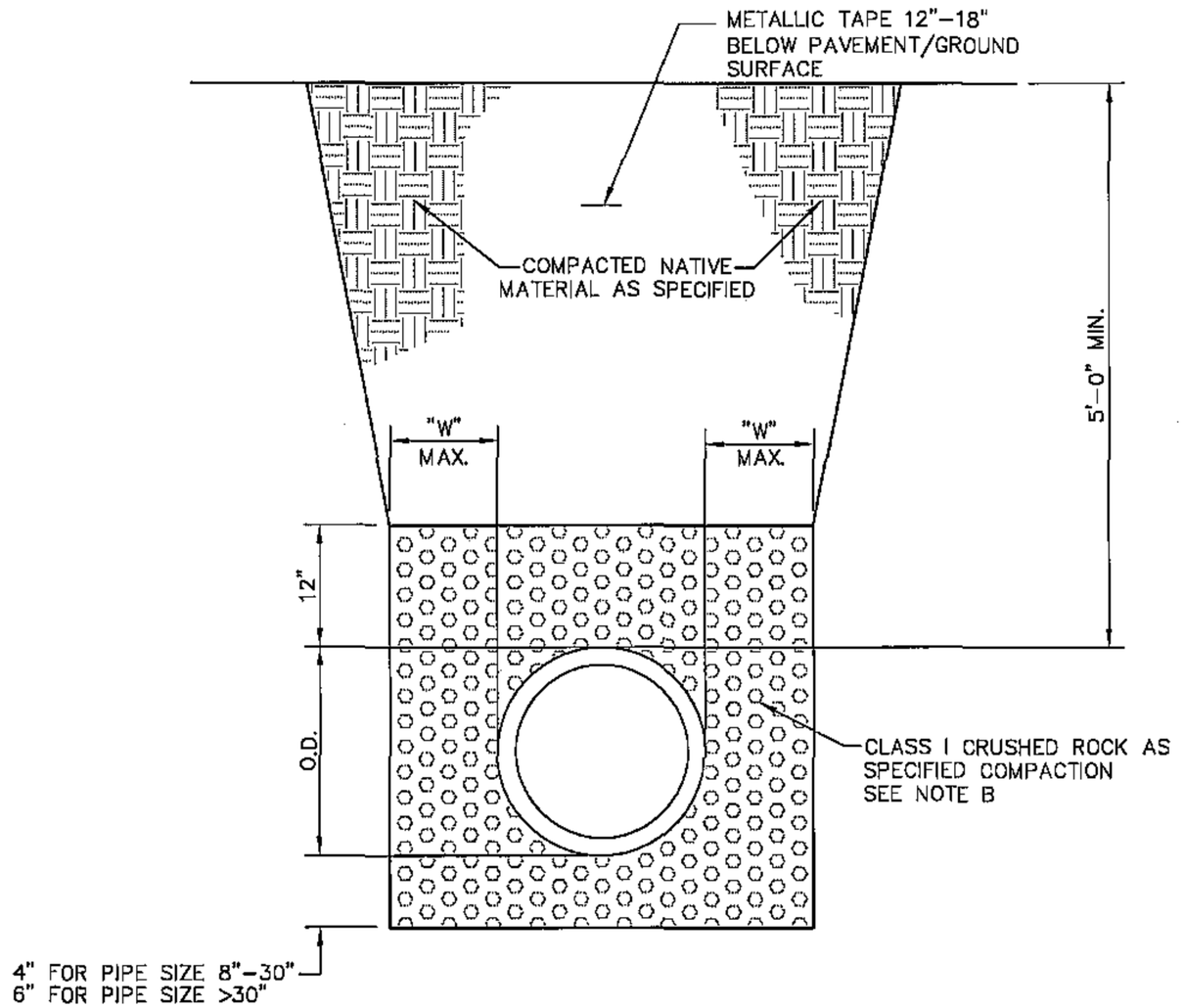
B. 36" FOR STANDARD SUBDIVISION, 42" FOR SUBDIVISIONS WITH ON-SITE PONDING OR FLAT TERRAIN.

C. RISERS OR LATERALS EXTENDING BEYOND EXISTING PAVING SHALL BE INSTALLED TO 4' MINIMUM TOP OF GROUND OR PAVEMENT, UNLESS CONDITIONS REQUIRE OTHERWISE.

D. PLASTIC METALLIC MARKING TAPE RISING TO WITHIN 6" OF GROUND SURFACE OR METALLIC DISK.

E. NO. 4 REBAR VERTICALLY PLACED AT PLUGGED END OF PROPOSED SERVICE LINE.

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WASTEWATER FACILITIES DETAIL: SEWER SERVICE RISER & SERVICE LINE CONNECTION	DATE: APRIL 2005	No: 212



CONSTRUCTION KEY NOTES:

A. USE CLASS I CRUSHED ROCK MAXIMUM 1 1/2 INCH SIZE PER ASTM D–2321.

B. NO COMPACTION REQUIRED. USE MINIMAL TAMPING, RODDING OR HAUNCH SLICING CAREFULLY IN THE EMBEDMENT ZONE. IF REQUIRED BY THE ENGINEER, TEST PER ASTM D–4254 PERCENT OF RELATIVE DENSITY.

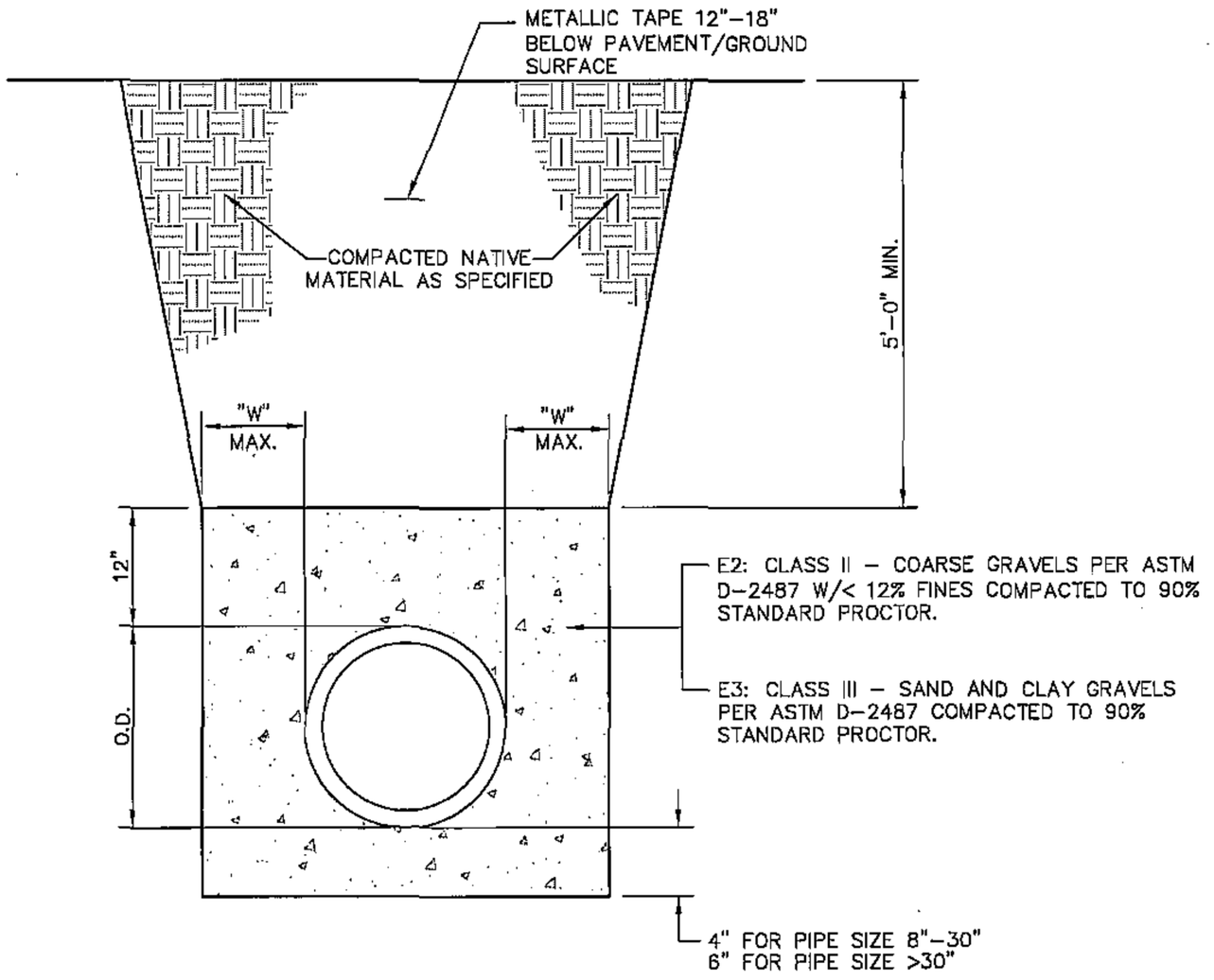
C. TRENCH DIMENSION "W" AS FOLLOWS FOR FLEXIBLE SEWER PIPE.

PIPE DIAMETER	"W" AS FOLLOWS
LESS THAN 24"	9"
24" – 48"	12"
GREATER THAN 48"	O.D./4

D. TRENCH DIMENSION "W" AS FOLLOWS FOR RIGID PIPE:

PIPE DIAMETER	"W" AS FOLLOWS
LESS THAN 18"	16"
18" – 24"	19"
27" – 39"	22"
42" & LARGER	1/2 PIPE O.D.

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WASTEWATER FACILITIES DETAIL: EMBEDMENT CLASS E1 FOR RIGID PIPE & FLEXIBLE SEWER PIPE	DATE: APRIL 2005	No: 213



GENERAL NOTES:

1. NATIVE MATERIAL MAY BE USED PROVIDED IT MEETS THE SPECIFICATIONS FOR CLASS II OR III MATERIALS.
2. EMBEDMENT CONDITIONS SHOWN FOR DRY TRENCH.

CONSTRUCTION KEY NOTES:

A. PLACE EMBEDMENT MATERIAL IN 8" LIFTS AND COMPACT AS SPECIFIED.

B. TRENCH DIMENSION "W" AS FOLLOWS:

PIPE DIAMETER	"W" AS FOLLOWS
LESS THAN 24"	9"
24" – 48"	12"
GREATER THAN 48"	O.D./4

Lower Valley WATER DISTRICT

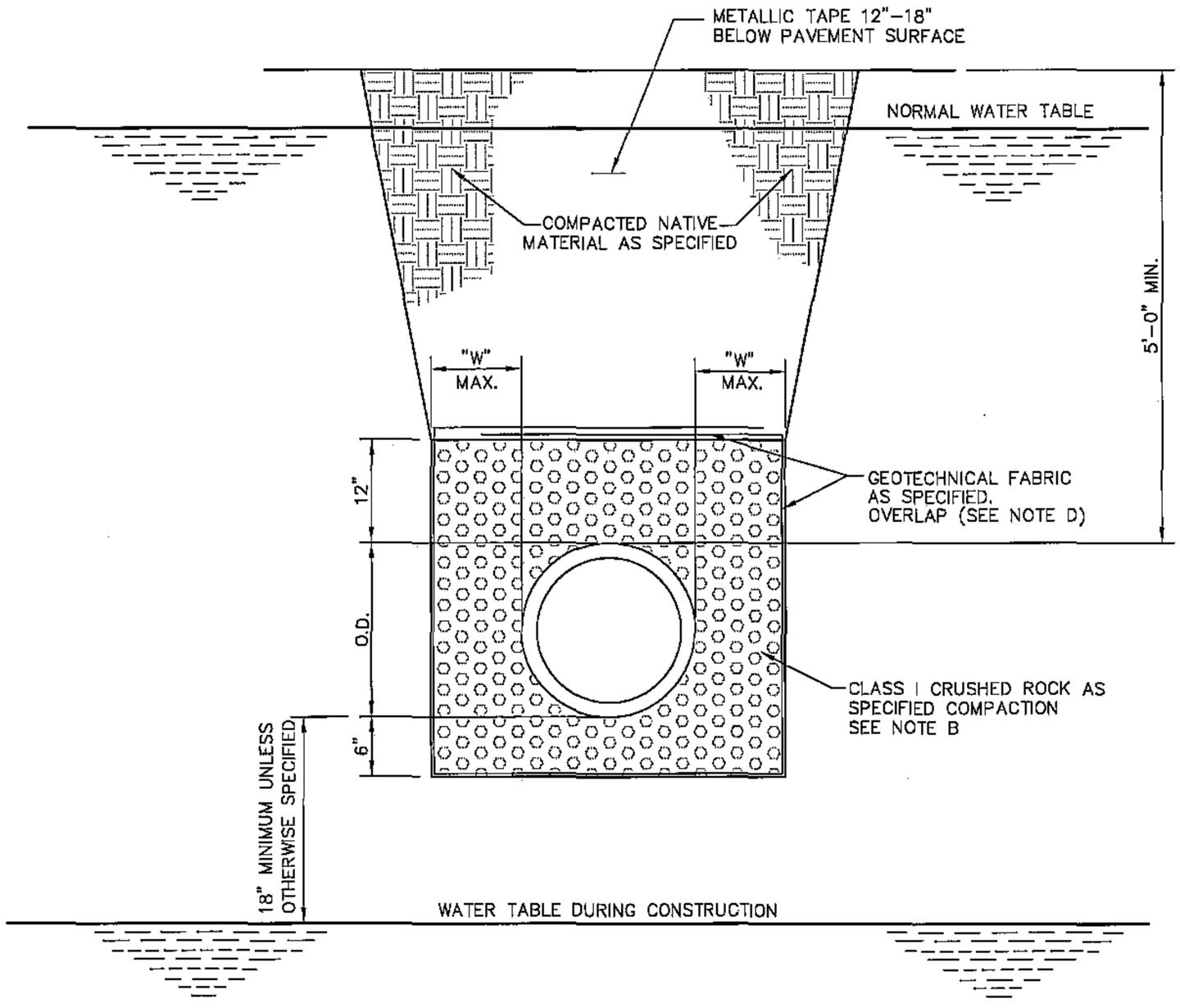
DESIGN STANDARDS

SECTION: WASTEWATER FACILITIES

DETAIL: EMBEDMENT CLASS E2 & E3 FOR FLEXIBLE SEWER PIPE

DATE: APRIL 2005

No: 214



GENERAL NOTES:

1. EMBEDMENT CONDITION SHOWN FOR WET TRENCH.

CONSTRUCTION KEY NOTES:

A. USE CLASS I CRUSHED ROCK 1 1/2 INCH MAXIMUM SIZE PER ASTM D–2321.

B. NO COMPACTION REQUIRED. USE MINIMAL TAMPING, RODDING OR HAUNCH SLICING CAREFULLY IN THE EMBEDMENT ZONE. IF REQUIRED BY THE ENGINEER, TEST PER ASTM D–4254 PERCENT OF RELATIVE DENSITY.

C. TRENCH DIMENSION "W" AS FOLLOWS:

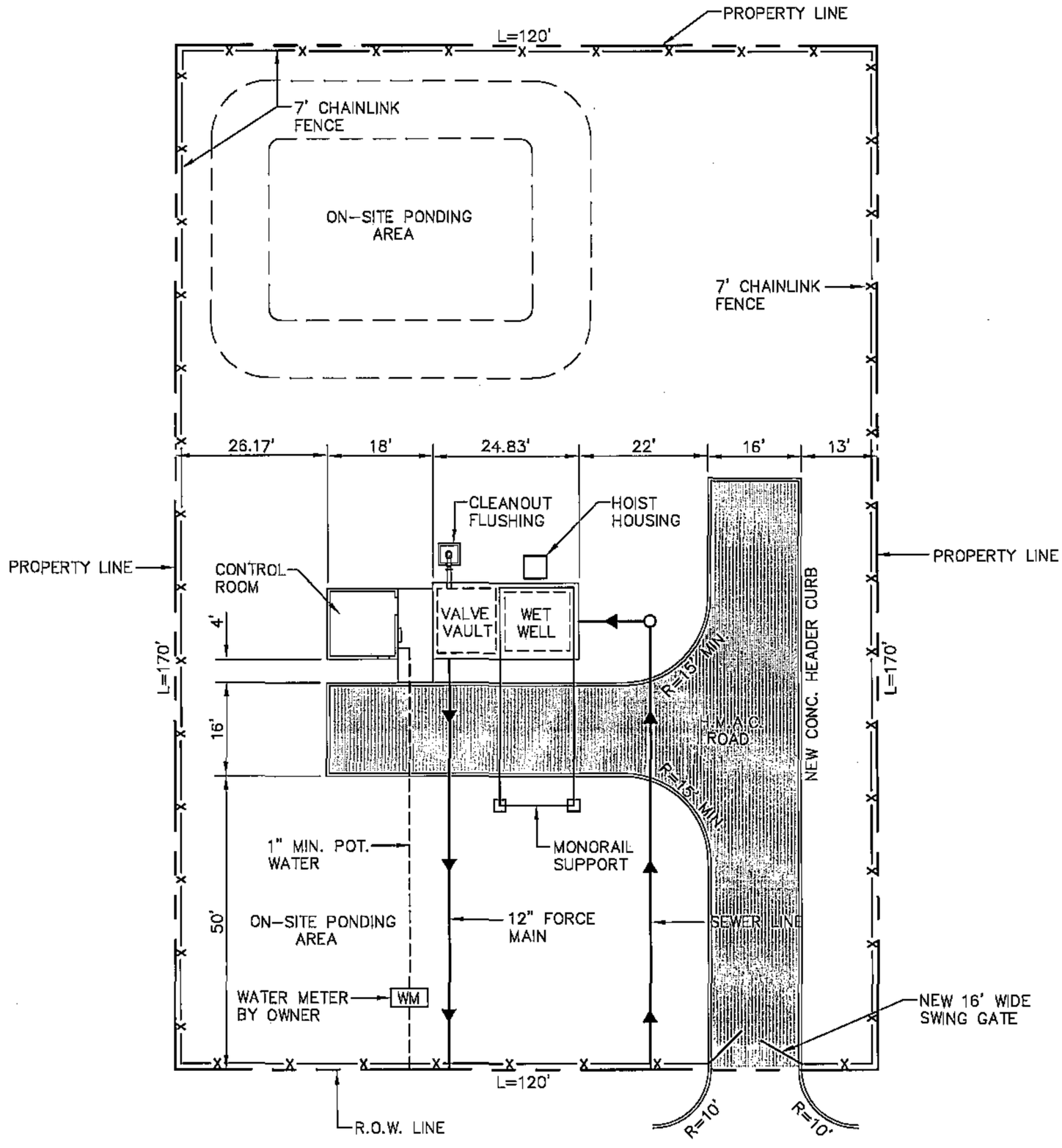
PIPE DIAMETER	"W" AS FOLLOWS
LESS THAN 24"	9"
24" – 48"	12"
GREATER THAN 48"	O.D./4

D. STANDARD OVERLAP IS 2 FEET EXCEPT WHERE TRENCH WIDTH EXCEEDS 3 FEET THE OVERLAP AT TOP SHALL BE 3' FEET.

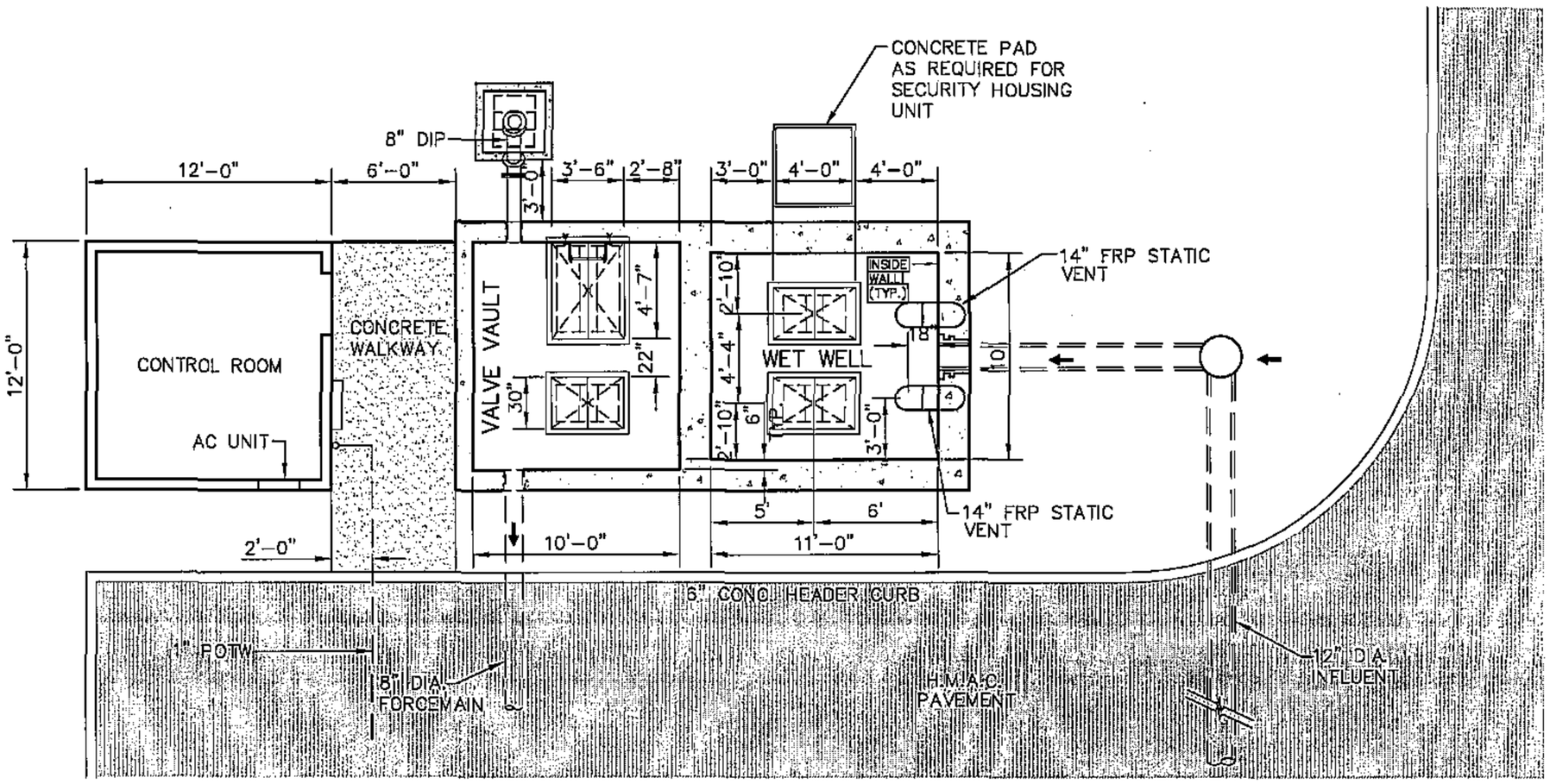
E. MAINTAIN A DRY TRENCH WHILE PLACING BEDDING AND FABRIC.

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WASTEWATER FACILITIES	DATE: APRIL 2005	No: 215
		DETAIL: EMBEDMENT CLASS F FOR FLEXIBLE SEWER PIPE		

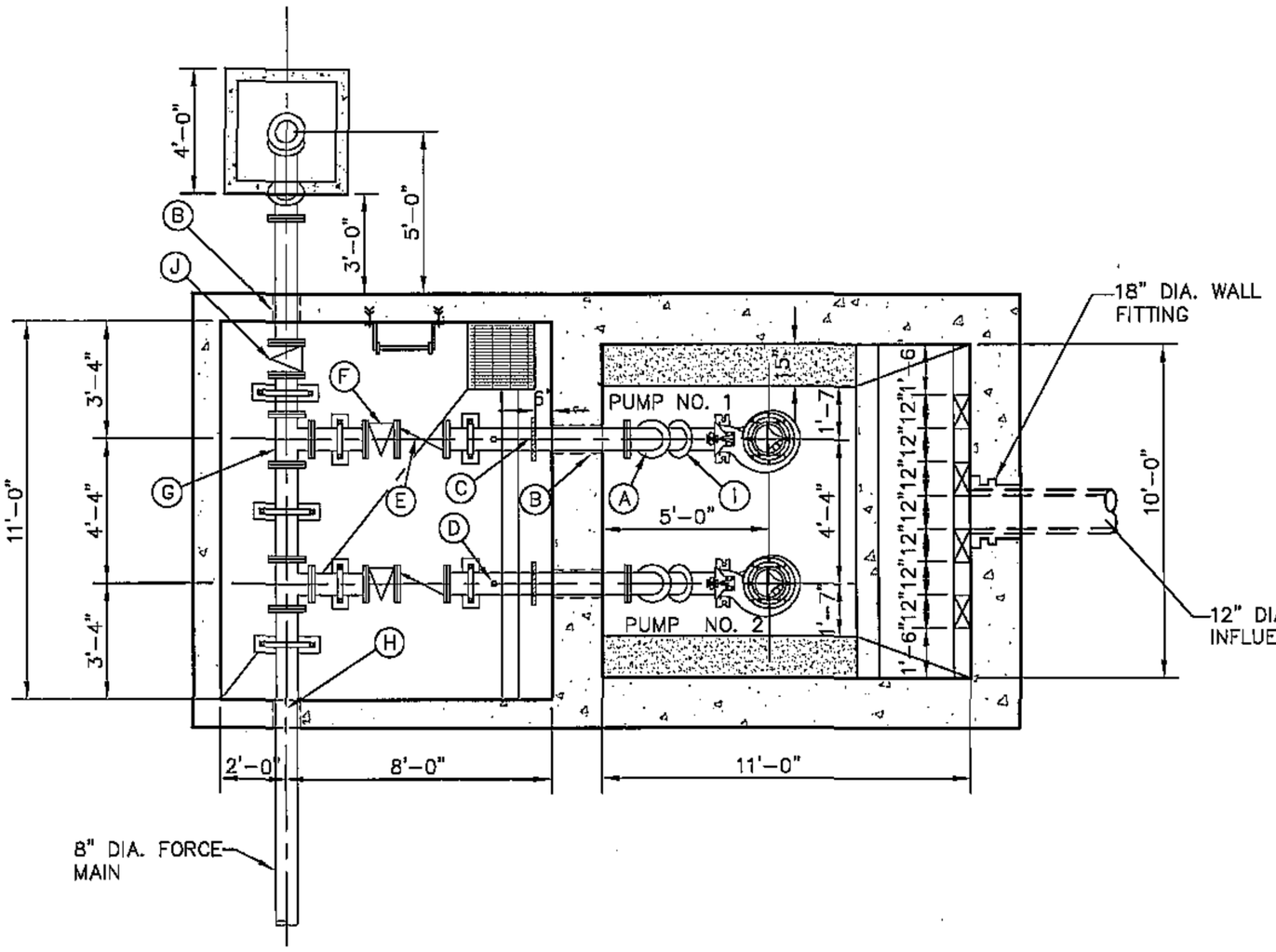
LIFT STATION FACILITIES
SECTION 300



Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: LIFT STATION FACILITIES DETAIL: TYPICAL SITE PLAN	DATE: APRIL 2005	No: 301



Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: LIFT STATION FACILITIES	DATE: APRIL 2005	No: 302
		DETAIL: TYPICAL LIFT STATION PLAN		



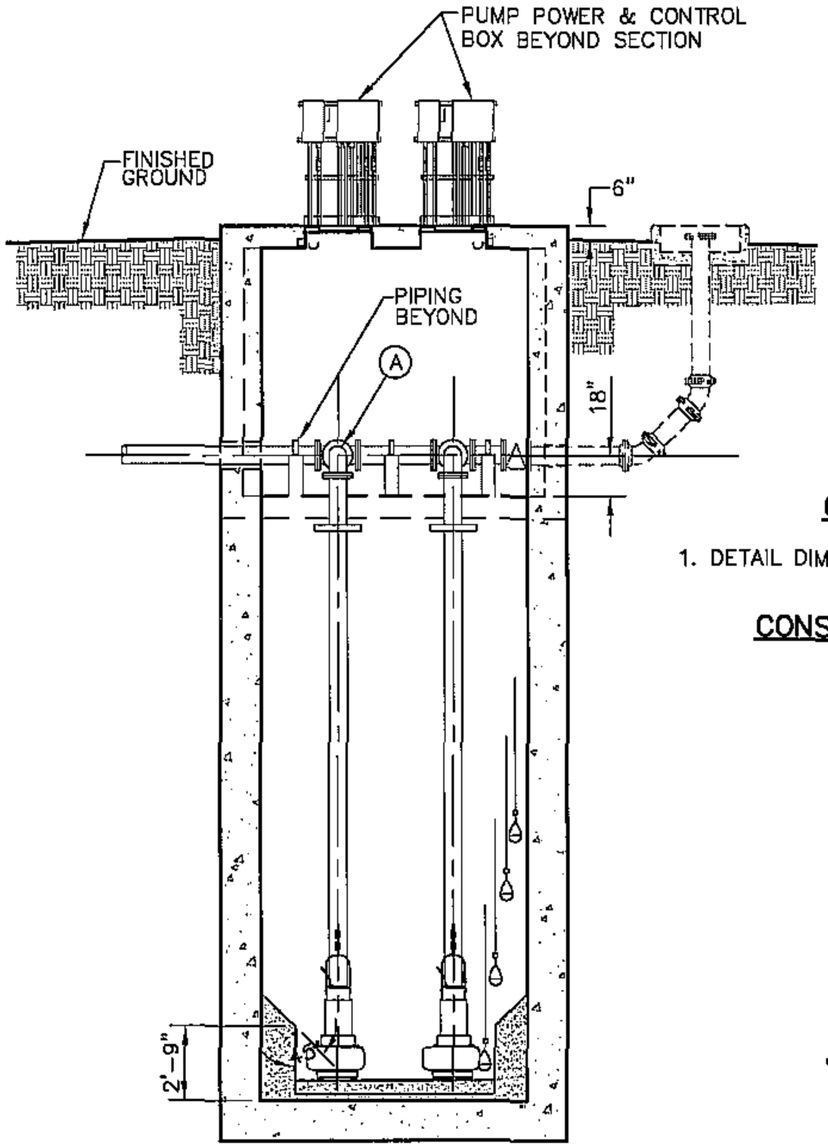
GENERAL NOTES:

1. DETAIL DIMENSIONS SHOWN FOR 8" SIZE PIPING.

CONSTRUCTION KEY NOTES:

A. 8" 90° BEND
B. 8" WALL SLEEVE
C. 8" VICTAULIC COUPLING
D. 1" SEWAGE COMBINATION AIR VALVE
E. 8" CHECK VALVE
F. 8" PLUG VALVE
G. 8"x8"x8" TEE
H. 8" WALL SLEEVE
I. 8" 45° BEND
J. 8" PLUG VALVE

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: LIFT STATION FACILITIES DETAIL: LIFT STATION PLAN – BELOW GRADE	DATE: APRIL 2005	No: 303



NOTES:

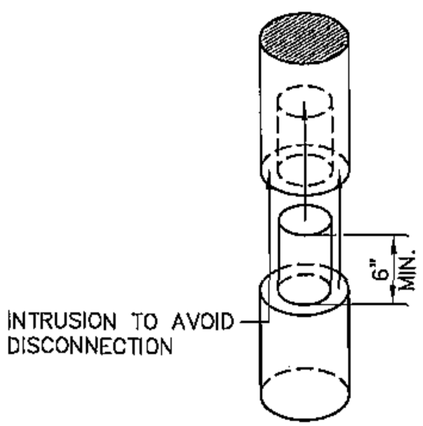
1. ELEVATIONS FOR PUMP CONTROLS SHALL BE PROVDIED FOR THE BOTTOM OF EACH FLOAT.
2. ACCESSORIES, INCLUDING STEEL CHAINS, GUIDE BARS, BRACKETS AND SUPPORTS SHALL BE MADE OF STAINLESS OF APPROPRIATE GAGE.

GENERAL NOTES:

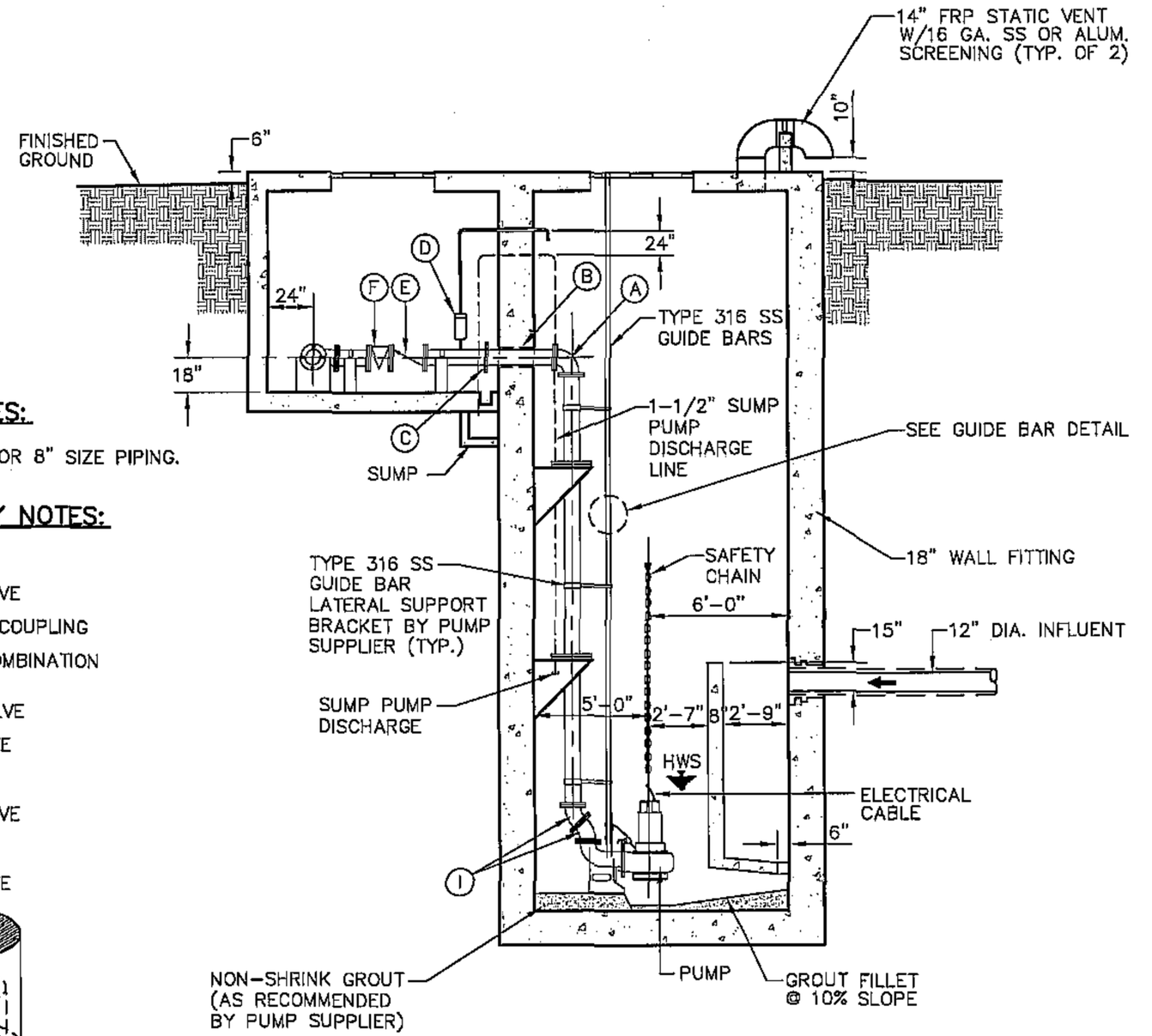
1. DETAIL DIMENSIONS SHOWN FOR 8" SIZE PIPING.

CONSTRUCTION KEY NOTES:

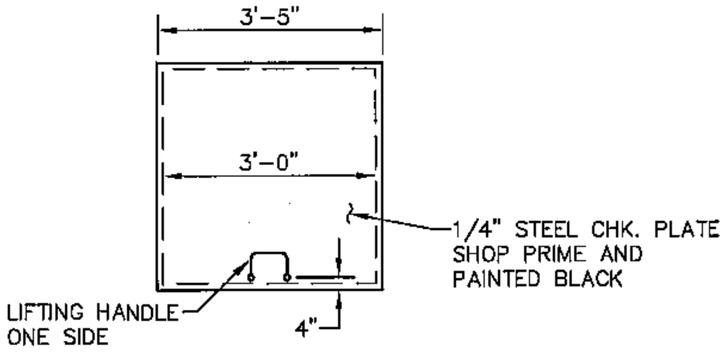
A. 8" 90° BEND
B. 8" WALL SLEEVE
C. 8" VICTAULIC COUPLING
D. 1" SEWAGE COMBINATION AIR VALVE
E. 8" CHECK VALVE
F. 8" PLUG VALVE
G. 8"x8"x8" TEE
H. 8" WALL SLEEVE
I. 8" 45° BEND
J. 8" PLUG VALVE



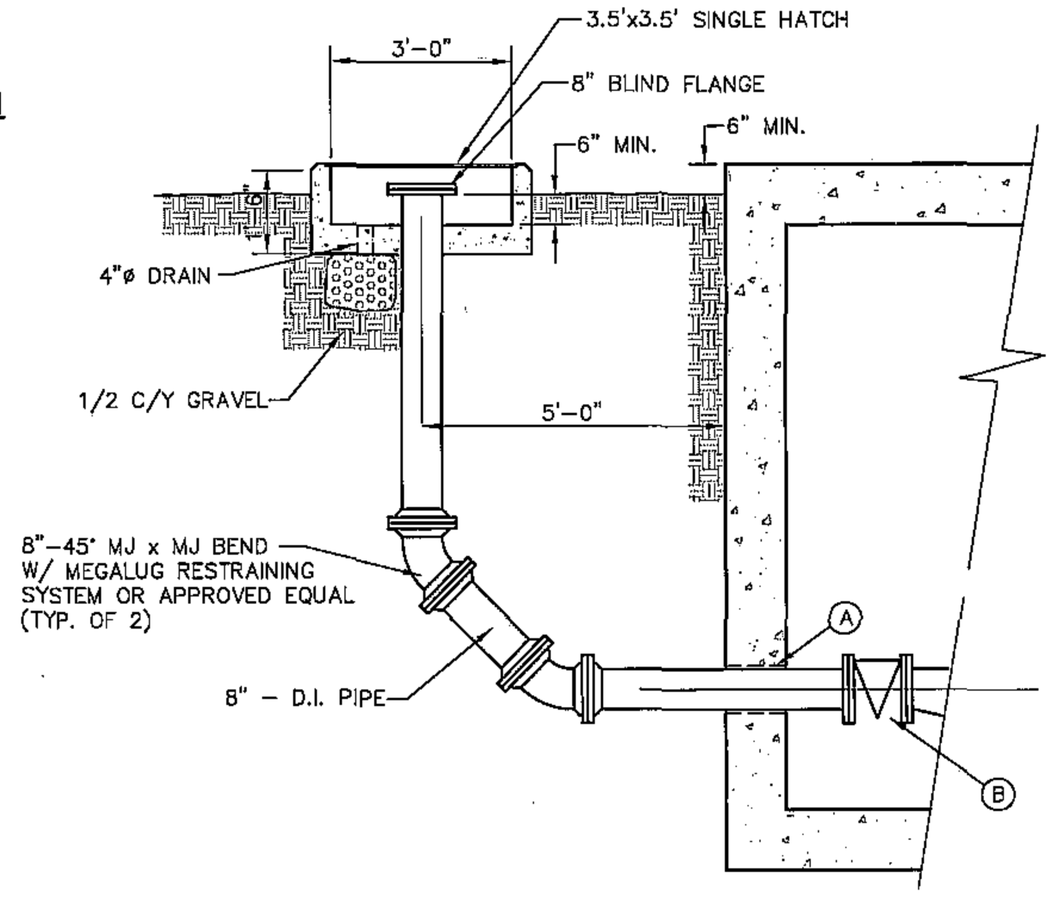
GUIDE BAR DETAIL



Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: LIFT STATION FACILITIES DETAIL: LIFT STATION SECTIONS – BELOW GRADE	DATE: APRIL 2005	No: 304



CLEAN-OUT HATCH



CLEANOUY / FLUSHING DETAIL

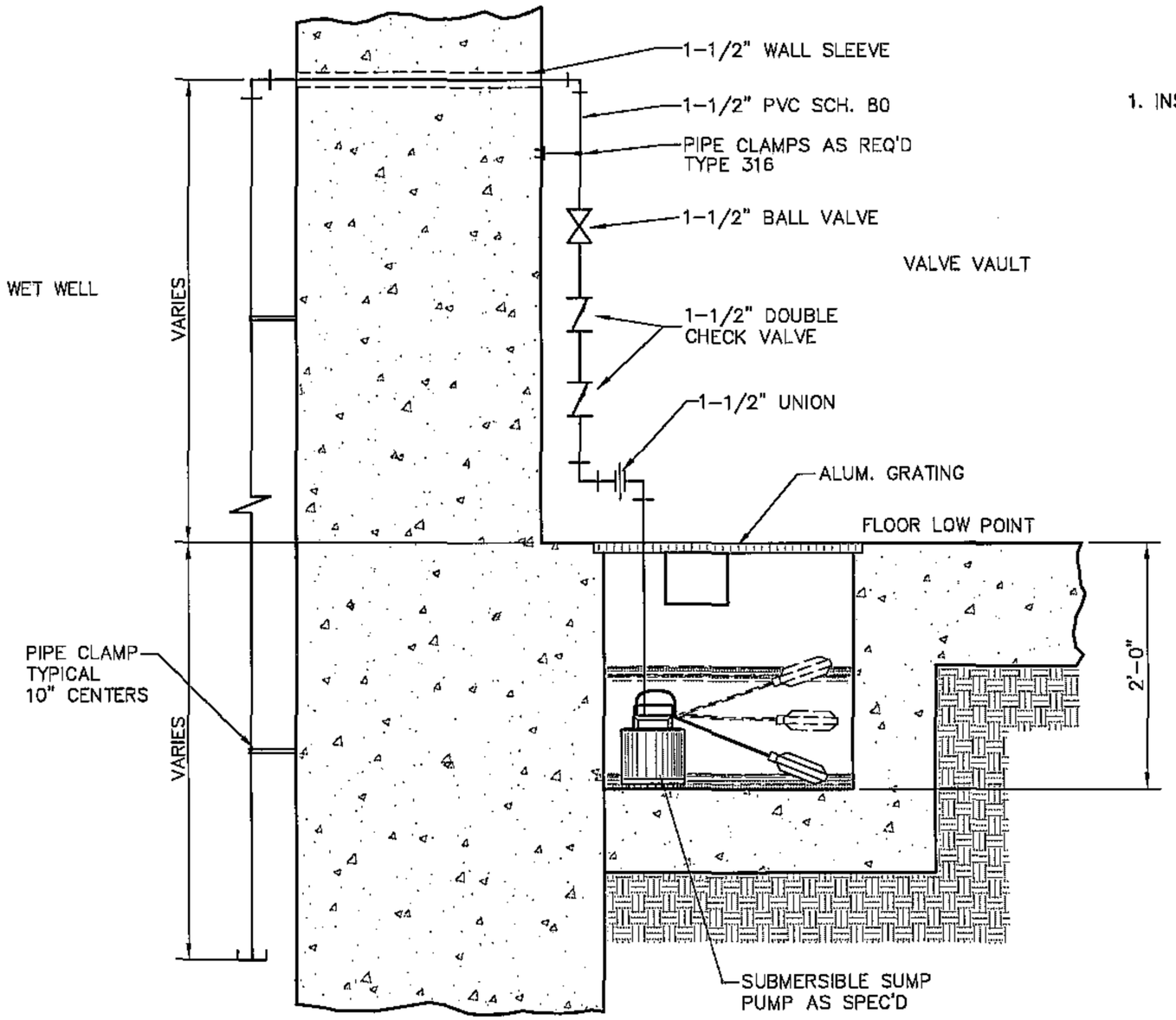
GENERAL NOTES:

1. DETAIL DIMENSIONS SHOWN FOR 8" SIZE PIPING.

CONSTRUCTION KEY NOTES:

A. 8" WALL SLEEVE
B. 8" PLUG VALVE

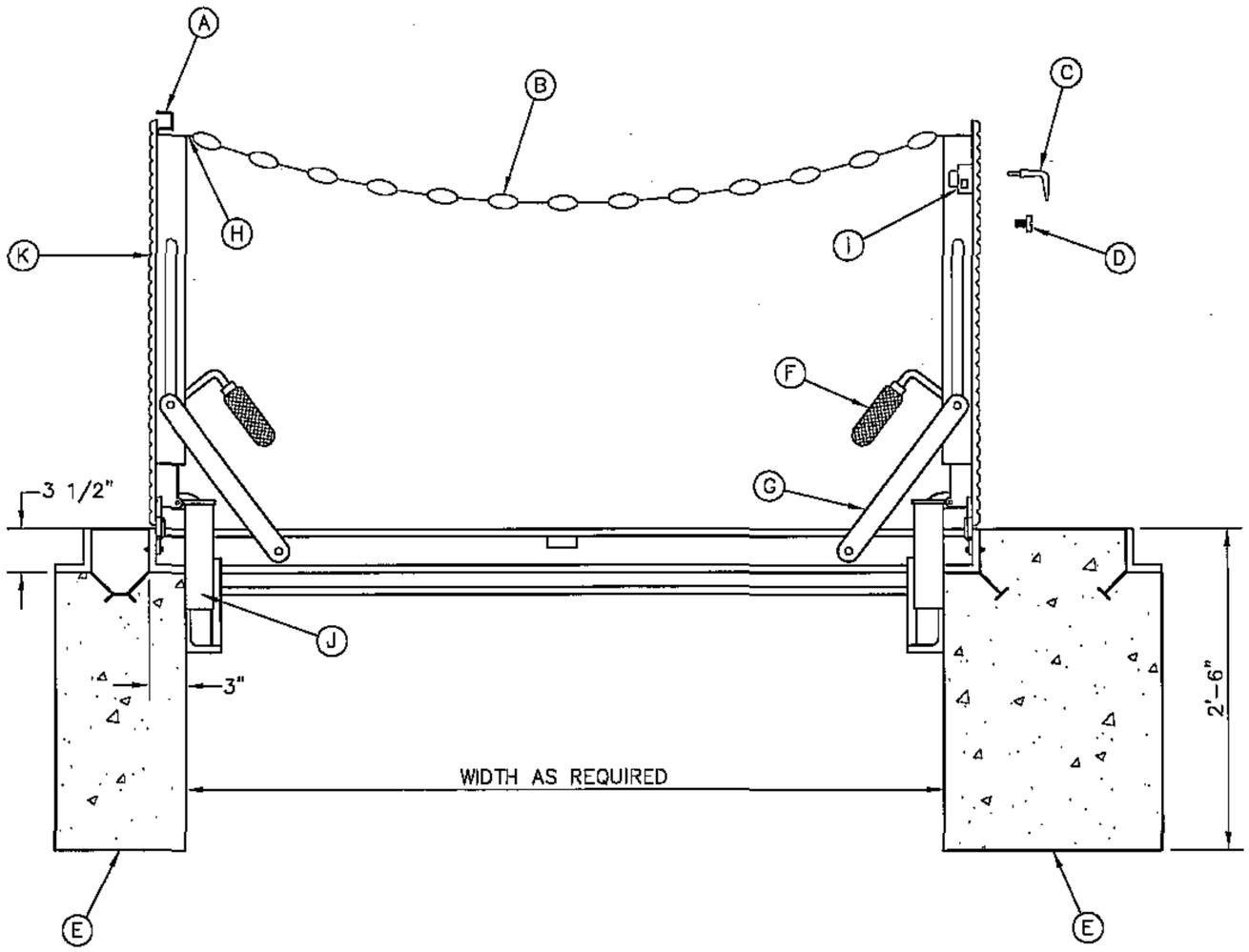
Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: LIFT STATION FACILITIES DETAIL: CLEAN-OUT HATCH AND FLUSHING DETAIL	DATE: APRIL 2005	No: 305



GENERAL NOTES:

1. INSTALL BY-PASS SWITCH FOR MANUAL/MAINTENANCE USE.

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: LIFT STATION FACILITIES DETAIL: SUMP PUMP DETAIL	DATE: APRIL 2005	No: 306



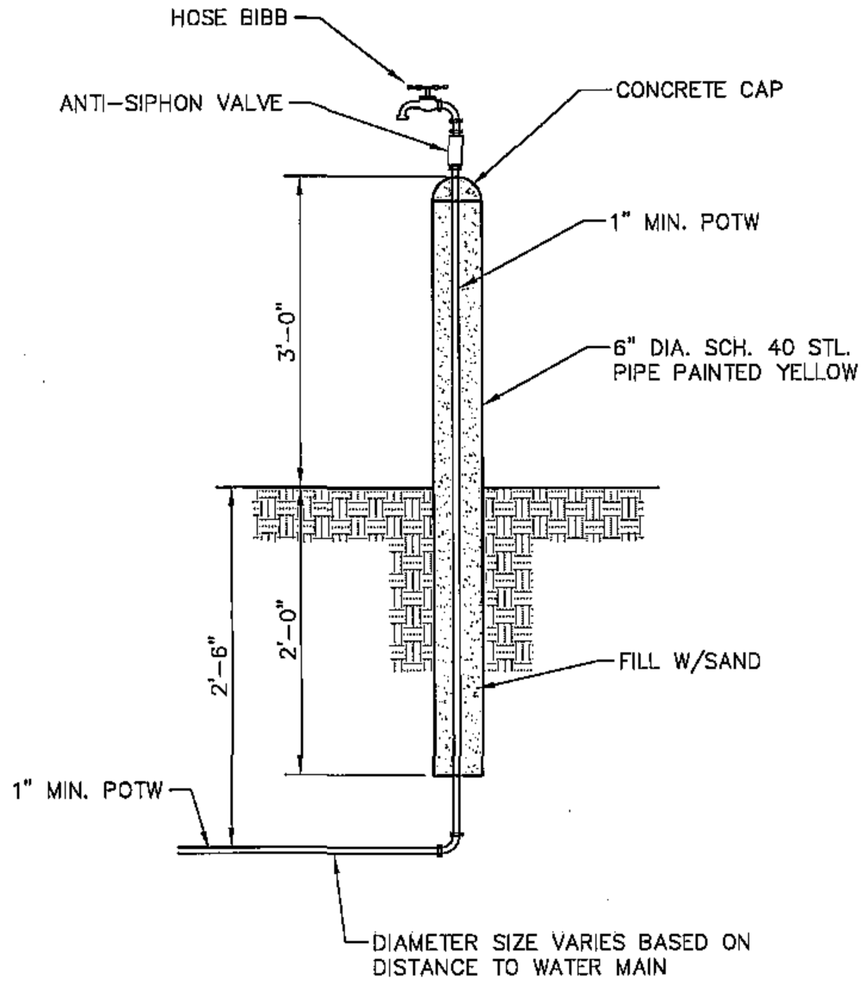
GENERAL NOTES:

1. HATCH TO BE SUPPLIED BY PUMP SUPPLIER.

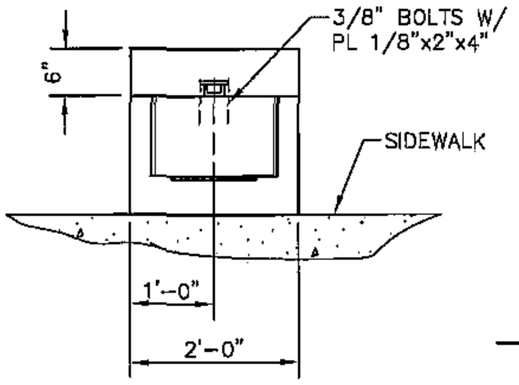
CONSTRUCTION KEY NOTES:

A. CENTER DRIP CHANNEL CUT INTO MAIN CHANNEL FRAME AT EACH END.
B. SS SAFETY CHAIN AT EACH END
C. REMOVABLE KEY WRENCH
D. REMOVABLE PLUG
E. CONCRETE BEAM
F. VINYL GRIP
G. AUTOMATIC HOLD–OPEN ARM
H. DOOR REINFORCING
I. SLAM LOCK
J. LIFTING MECHANISM HOUSING
K. 1/4" DIAMOND PLATE COVERS

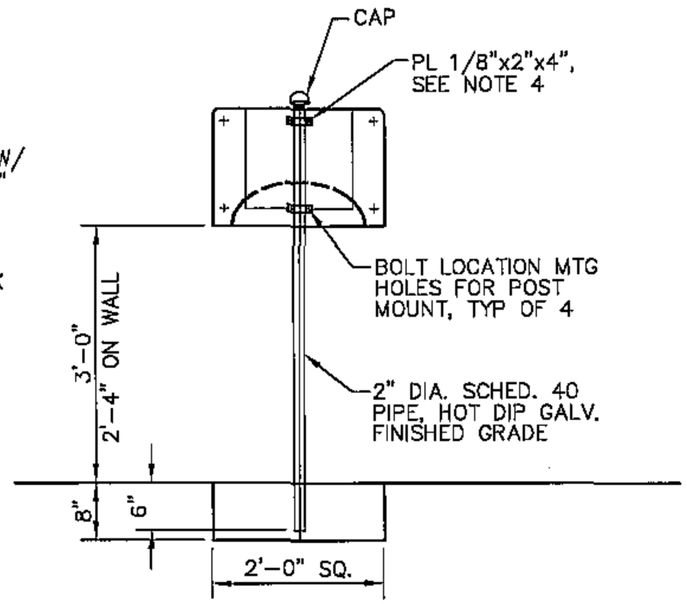
Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: LIFT STATION FACILITIES	DATE: APRIL 2005	No: 307
		DETAIL: DOUBLE HATCH ACCESS COVER		



Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: LIFT STATION FACILITIES DETAIL: HOSE BIB DETAIL	DATE: APRIL 2005	No: 308

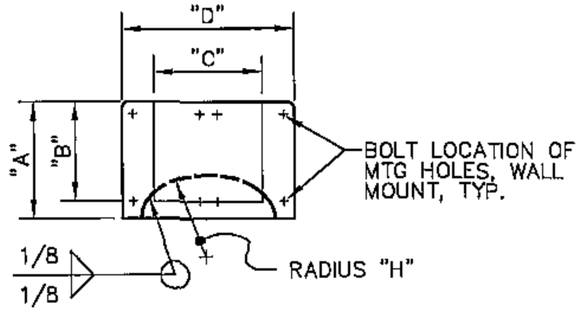


PLAN



SECTION

POST MOUNTED



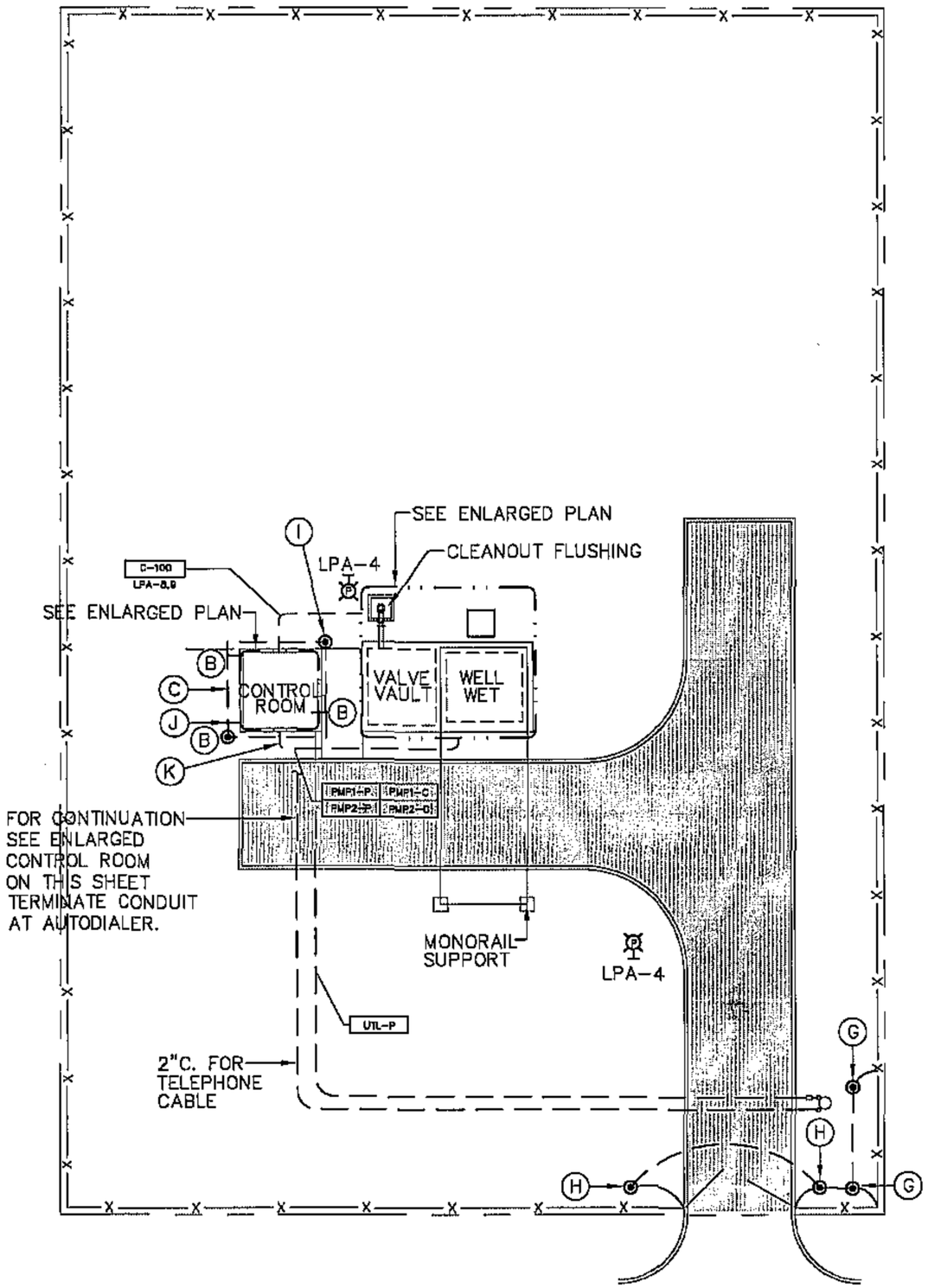
WALL MOUNTED

RACK TYPE	DIMENSIONS IN INCHES								
	A	B	C	D	E	F	G	H	I
TYPE A-3/4" HOSE	10-1/2	9	9	18	3	6	7-1/2	9-3/4	1-1/2

GENERAL NOTES:

1. EXTERIOR UNITS SHALL BE FABRICATED FROM 3/16" 6061-T6 ALUMINUM ALLOY PLATE
2. ATTACH TO CONCRETE WALL WITH (4)-1/4" STAINLESS STEEL STUD TYPE WEDGE ANCHORS.
3. ATTACH TO INDIVIDUAL POST WITH PLATES AND (4)-1/4" STAINLESS STEEL BOLTS.
4. ATTACH TO STEEL COLUMN WITH (4)-1/4" ROUND HEAD BOLTS, ONE IN EACH CORNER. INSERT DOUBLE SPACER NUTS BETWEEN COLUMN AND HOSE RACK.
5. HOSE RACK MAY BE MOUNTED ON EITHER POST OR WALL AS DIRECTED BY THE ENGINEER.

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: LIFT STATION FACILITIES	DATE: APRIL 2005	No: 309
		DETAIL: EXTERIOR HOSE RACK DETAIL		



CONSTRUCTION KEY NOTES:

A. FOR ALL ELECTRICAL SYMBOLS, ABBREVIATIONS AND GENERAL NOTES REFER TO PLANS.

B. CONNECT 4/0 GROUND CONDUCTOR TO REBAR WHICH IS AT LEAST THE LENGTH OF THE BUILDING AND MINIMUM 1/2" DIAMETER.

C. CONNECT 4/0 GROUND WIRE FROM GROUND LOOP TO THE PANEL PP-1 GROUND BUS.

D. CONTACT CLOSES WHEN DOOR IS OPENED.

E. INSTALL EXPLOSION PROOF SEALS ON ALL CONDUITS LEAVING THIS AREA.

F. ELECTRICAL CONTRACTOR SHALL COORDINATE LOCATION OF DISCONNECT SWITCH WITH THE HOIST CONTRACTOR.

G. CADWELD FENCE POSTS ON BOTH SIDES OF OVERHEAD SERVICE TO GROUND CONDUCTOR.

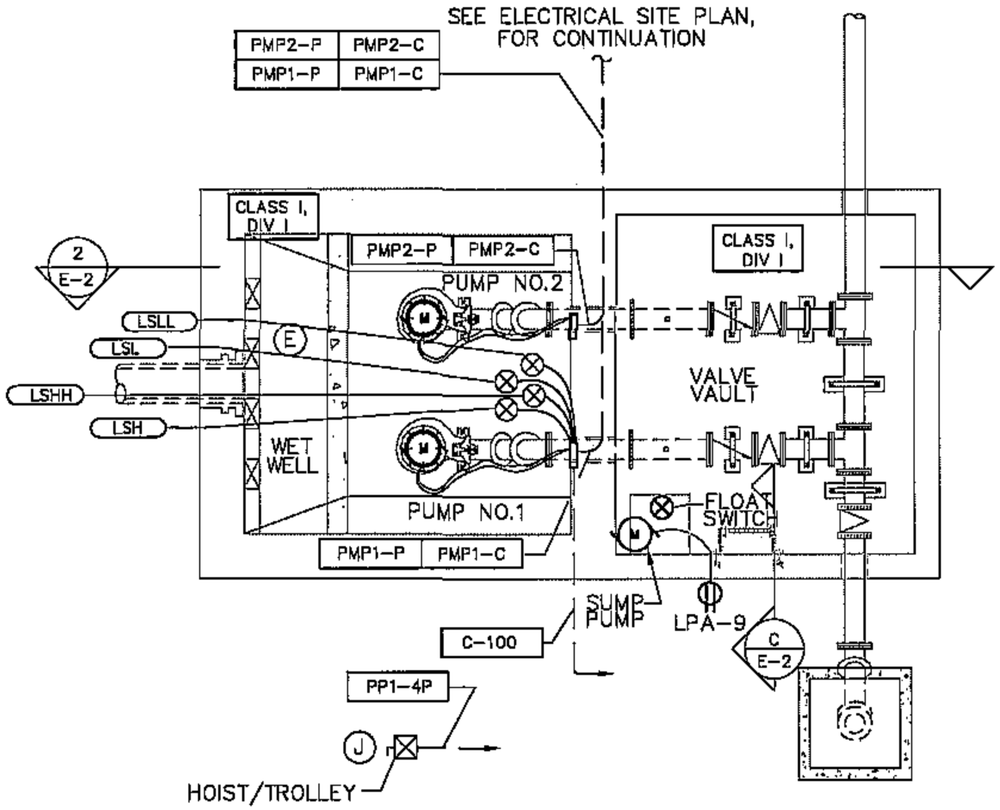
H. CADWELD FENCE POSTS ADJACENT TO GATE TO GROUND CONDUCTOR.

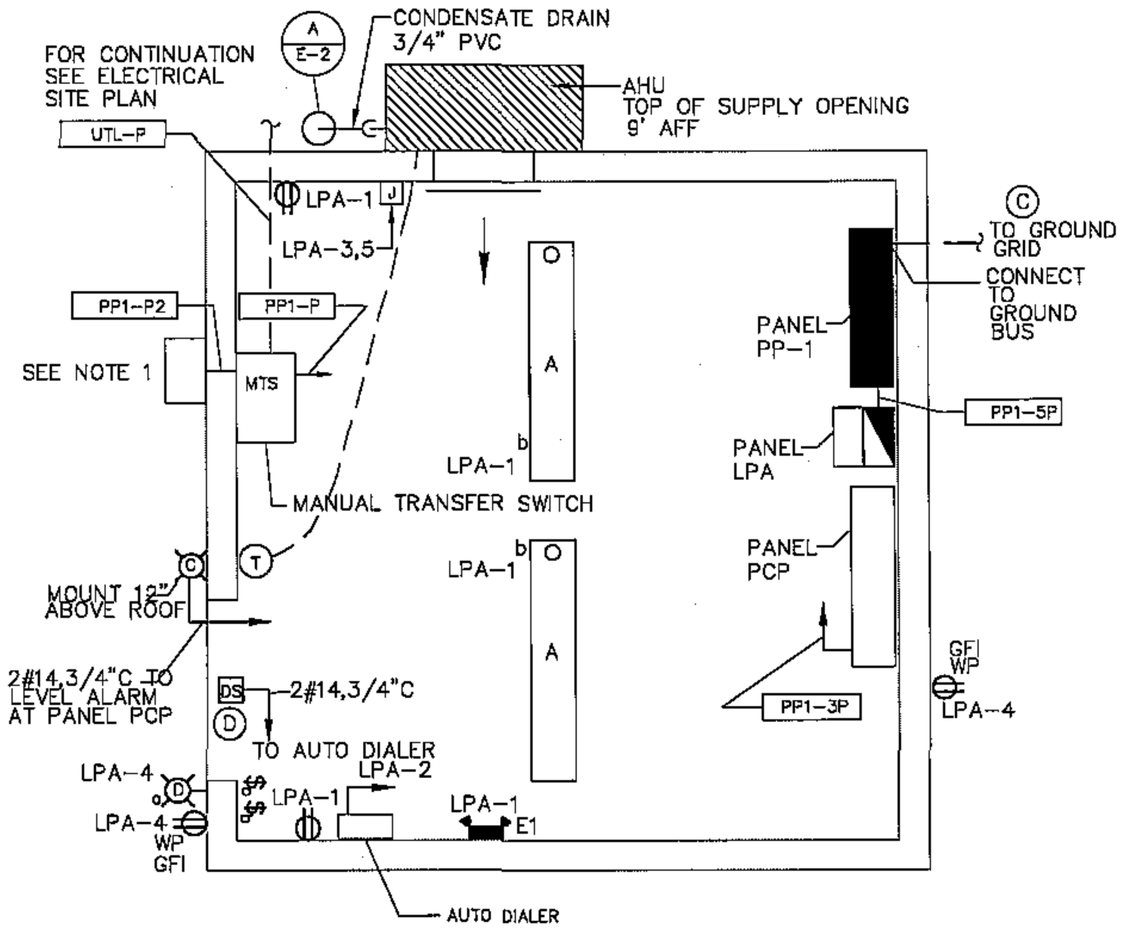
I. GROUND ROD AND WELL.

J. GROUND BUS CONNECTION TO GROUND ROD.

K. CONDUIT OR CABLE IN TRENCH.

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: LIFT STATION FACILITIES DETAIL: TYPICAL ELECTRICAL SITE PLAN	DATE: APRIL 2005	No: 310

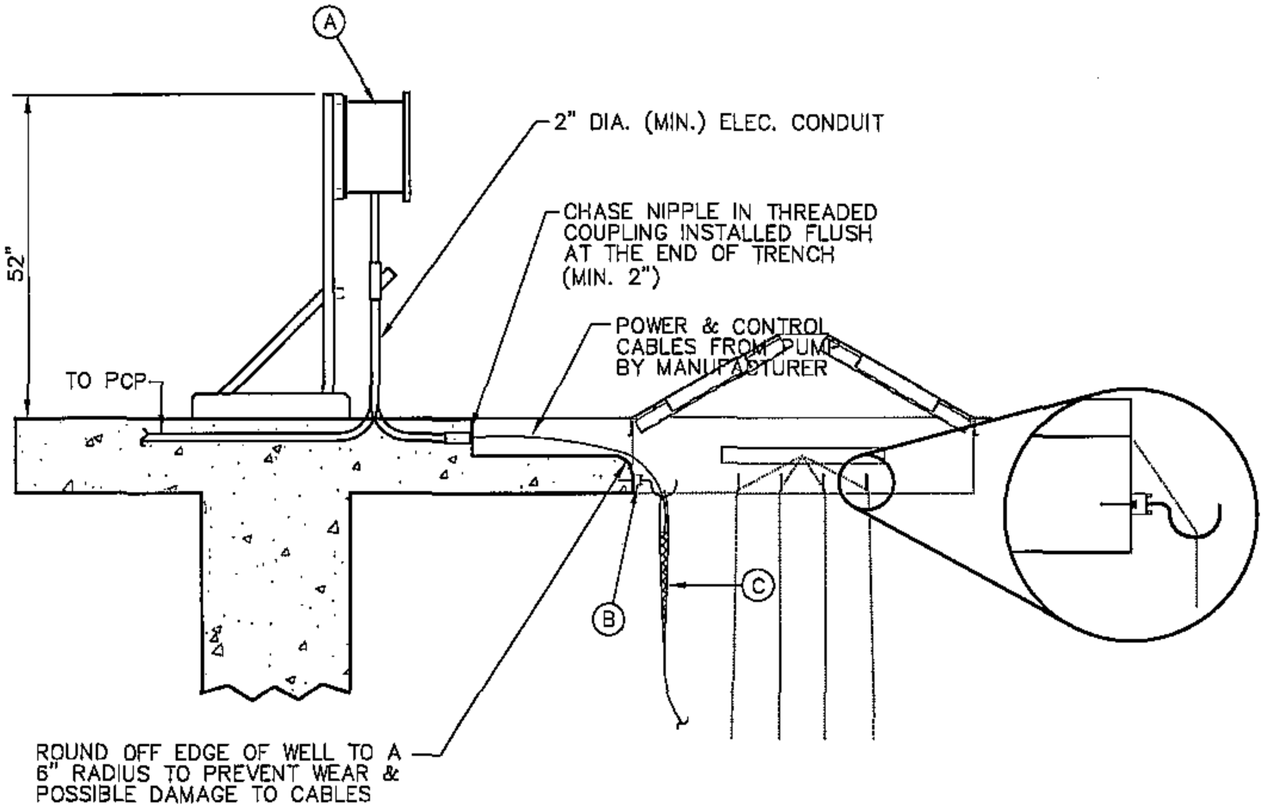




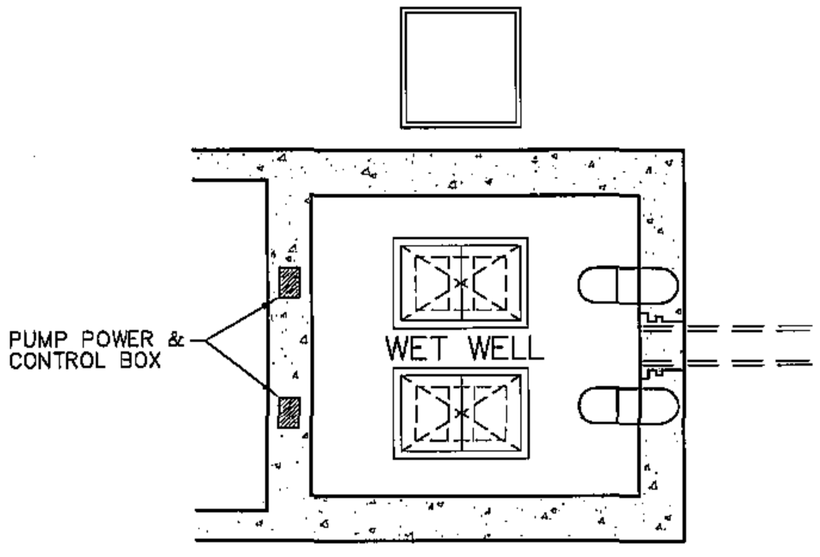
FIXTURE SCHEDULE		
TYPE	DESCRIPTION	MANUFACTURER
A	2 LAMP 4' STRIP, PAINTED AFTER FABRICATION AND FUSED	USI COLUMBIA CSR240-4-120-FF4
C	RED ALARM LIGHT	EDWARDS 49R-N5
D	100W METAL HALIDE WALLPACK FIXTURE, FUSED WITH PHOTOCELL	GENERAL ELECTRIC V2FW-10-M-1-A-2-PWA-GR-F
E1	2 HEAD, 12V, 56W, EMERGENCY LIGHT WITH LEAD CALCIUM BATTERIES AND CORD SET	PRESCOLITE ESB7-12
P	400W FORWARD THROW, FUSED METAL HALIDE LUMINARY, WITH 25' SQUARE STEEL BREAKOVER POLE AND POLE LOWERING APPARATUS, DRILL MOUNDED, WITH PHOTOCELL	GENERAL ELECTRIC DSMT-40-M-1-A-2-G-FWT-DB-F POLE: ASH-S-25-4T-6.4-11-DB

GENERAL NOTES:

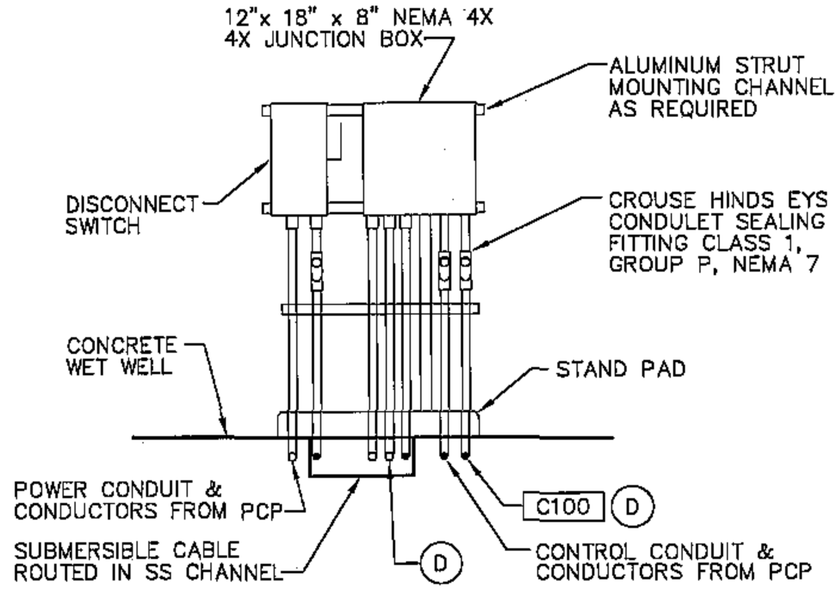
1. CROUSE-HINDS 400A/600VAC/3PH/3W ARKTITE HEAVY DUTY WEATHERPROOF RECEPTACLE ASSEMBLY WITH SPRING DOOR.
2. FOR CONSTRUCTION KEYED NOTES SEE SHEET 310 AND FOR "FIXTURE SCHEDULE" SEE THIS SHEET FOR MORE INFORMATION.



DETAIL



PLAN



PUMP CONTROL STAND NOTES:

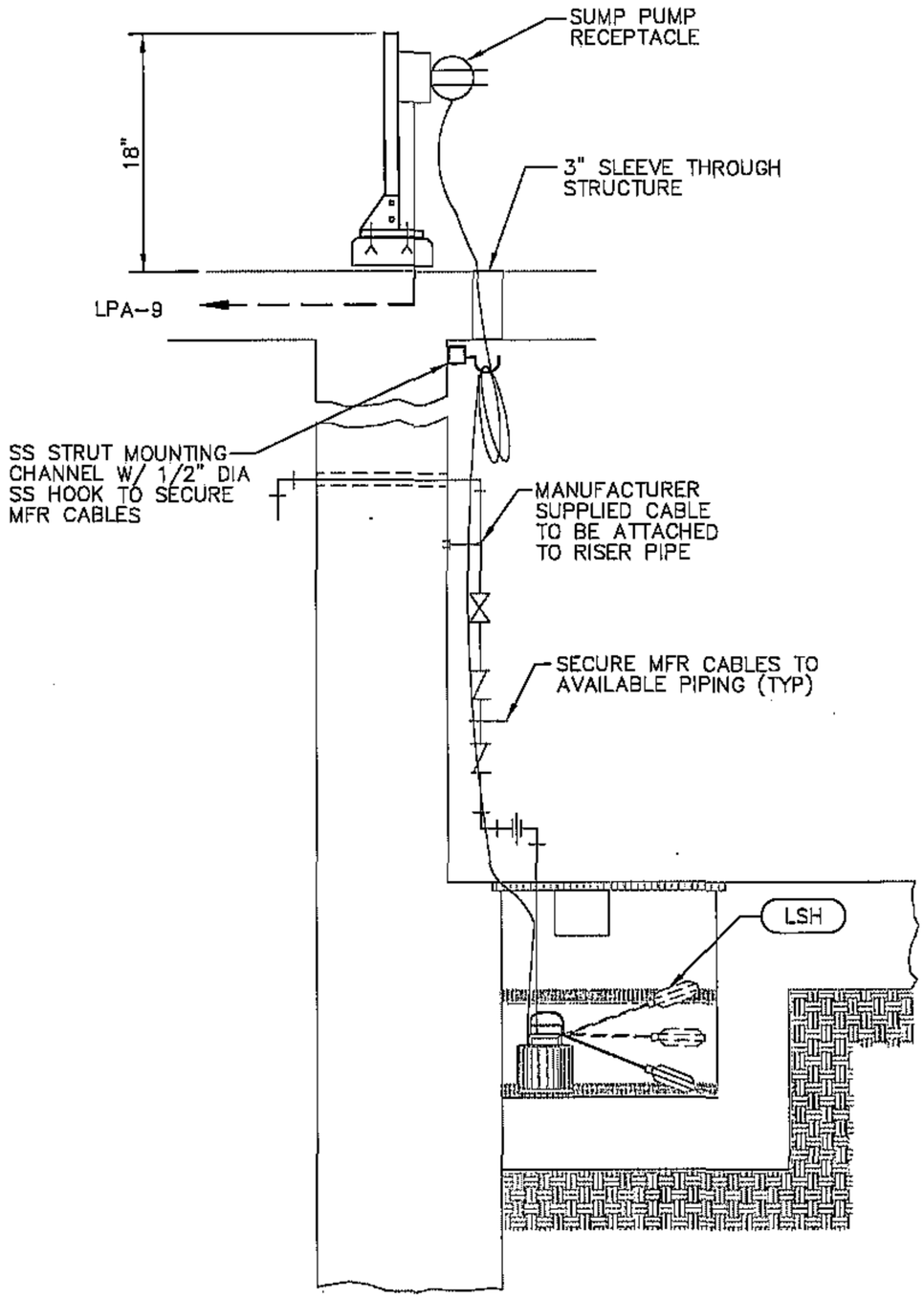
(A) CROUSE HINDS NEMA 4X STAINLESS STEEL JUNCTION BOX OR APPROVED EQUAL, WITH (1) 3-POLE AND (1) 1-POLE POWER BLOCKS, ALLEN-BRADLEY CAT. NO. 1492-PDM3111 AND 492-50Y RESPECTIVLY. ALSO PROVIDE (7) 1-POLE PANEL MOUNT BLOCKS, ALLEN-BRADLEY CAT. NO. 1492-15T FOR CONTROL CABLING.

(B) 2'-0" STAINLESS STEEL UNISTRUT CHANNEL WITH (1) 1/2" DIAMETER STAINLESS STEEL HOOK FOR EACH CABLE TO BE SUPPORTED. ALL HARDWARE REQUIRED FOR THIS INSTALLATION SHALL BE STAINLESS STEEL.

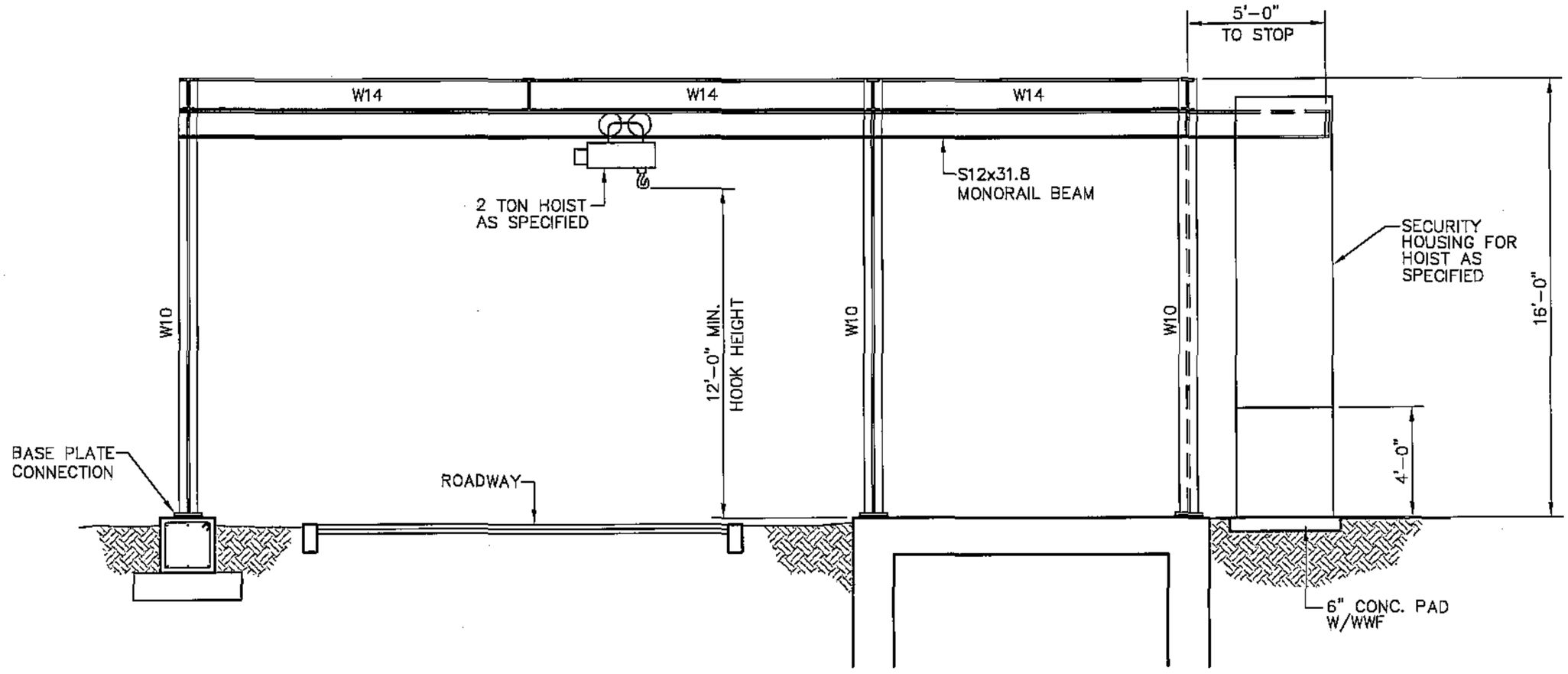
(C) STAINLESS STEEL HEAVY DUTY, SINGLE EYE, CLOSED MESH KELLUM GRIPS. FOR THE POWER CABLE THE CONTRACTOR SHALL PROVIDE A HUBBELL CAT. NO. 02206012 OR APPROVED EQUAL. FOR THE CONTROLS CABLE THE CONTRACTOR SHALL SELECT THE APPROPRIATE SUPPORT FROM THE HUBBELL CAT. NO. 022170xx SERIES, OR APPROVED EQUAL.

(D) 1"C FOR FLOAT SWITCH CABLES. PROVIDE NECESSARY TERMINAL BLOCKS FOR FLOAT SWITCHES IN TERMINATION BOX FOR PUMP 1 ONLY.

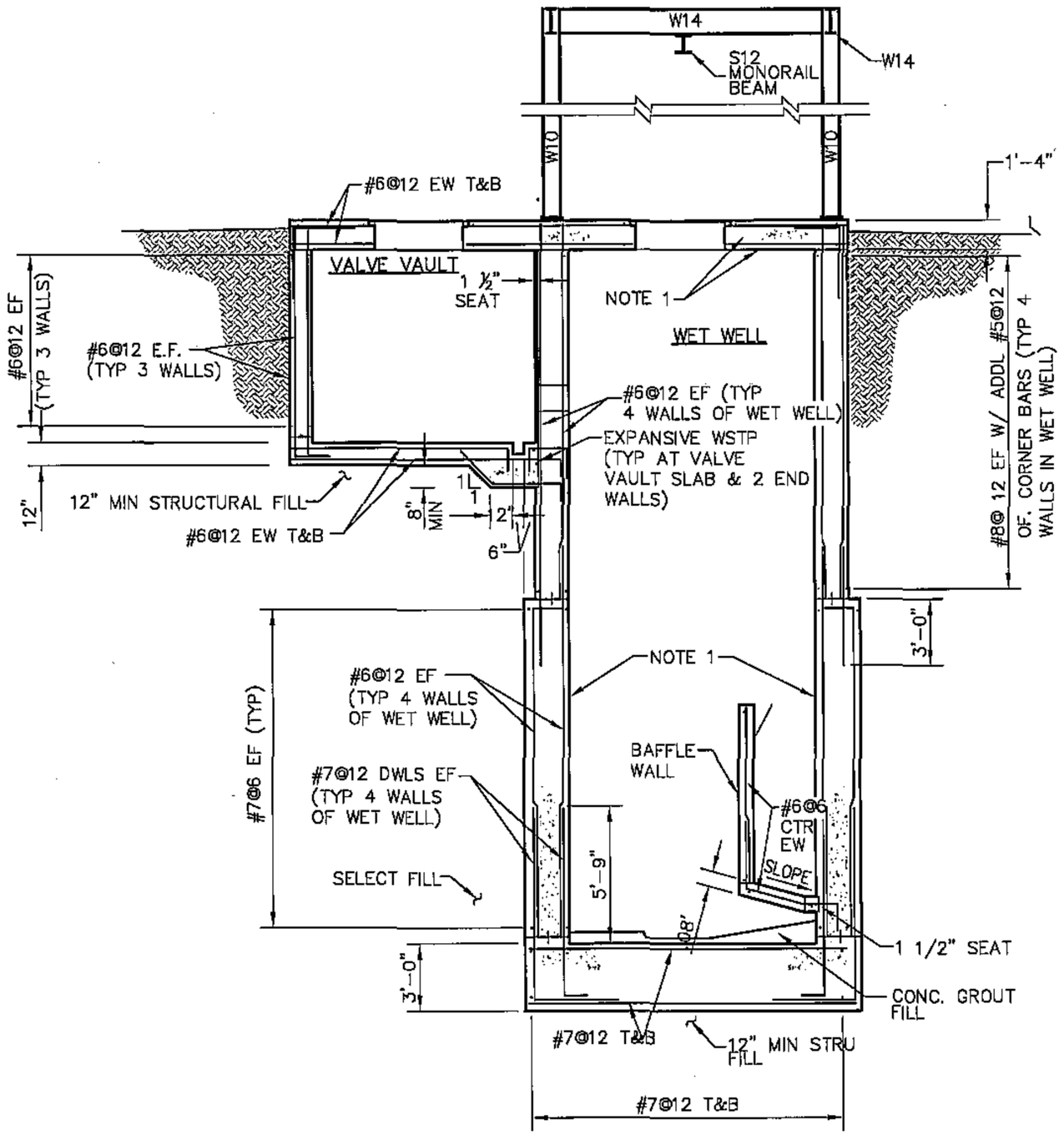
Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: LIFT STATION FACILITIES DETAIL: TYPICAL PUMP POWER & CONTROL BOX MOUNTING STAND	DATE: APRIL 2005	No: 312



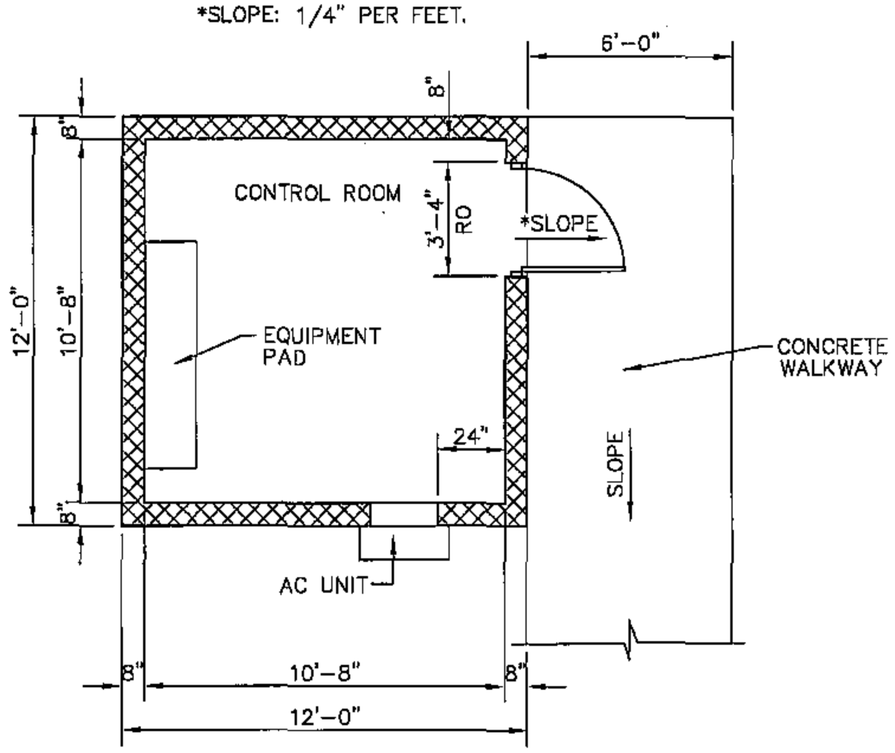
Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: LIFT STATION FACILITIES DETAIL: SUMP PUMP ELECTRICAL DETAIL	DATE: APRIL 2005	No: 313



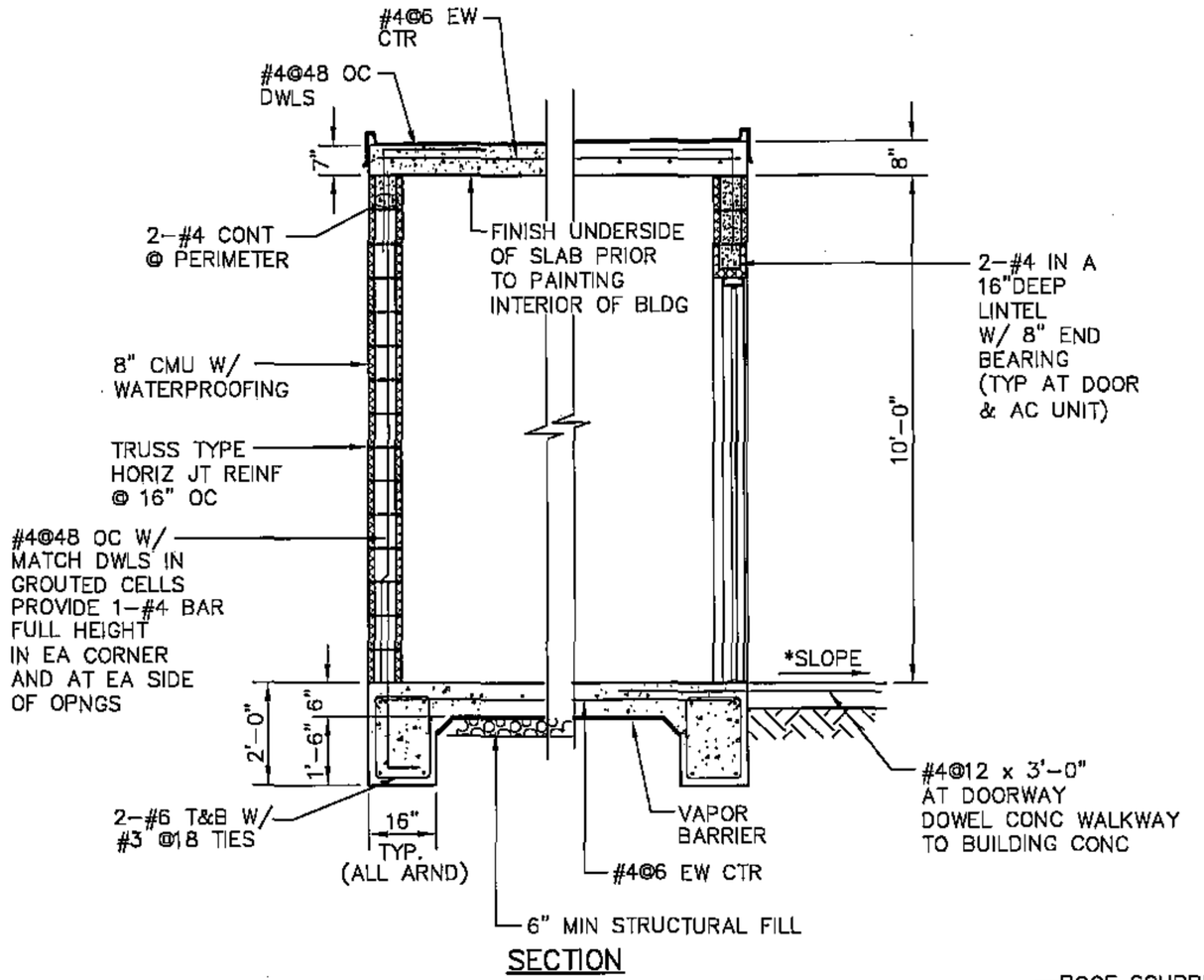
Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: LIFT STATION FACILITIES DETAIL: TYPICAL MONORAIL SYSTEM	DATE: APRIL 2005	No: 314



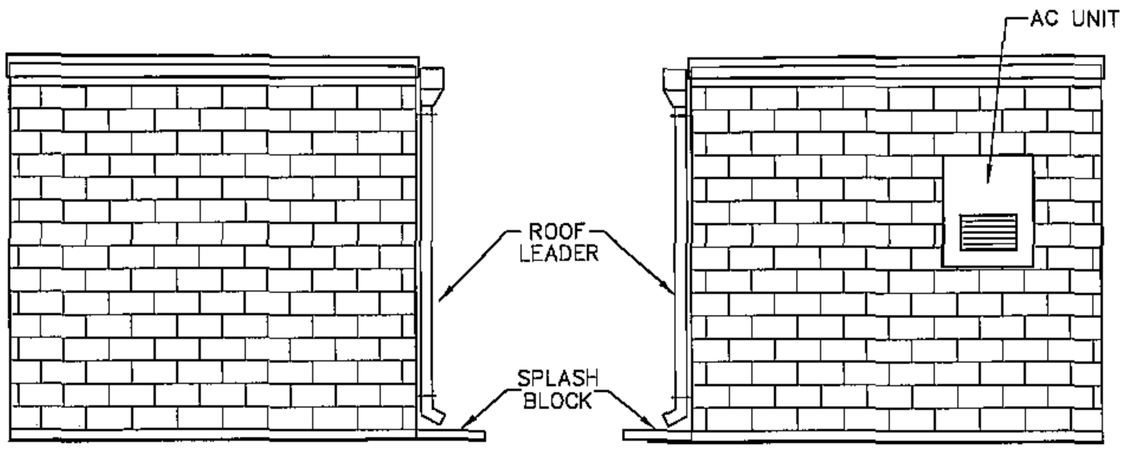
Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: LIFT STATION FACILITIES DETAIL: TYPICAL STRUCTURAL LAYOUT	DATE: APRIL 2005	No: 315



PLAN

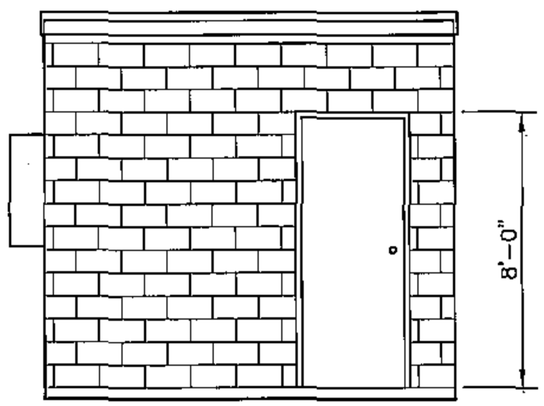


SECTION

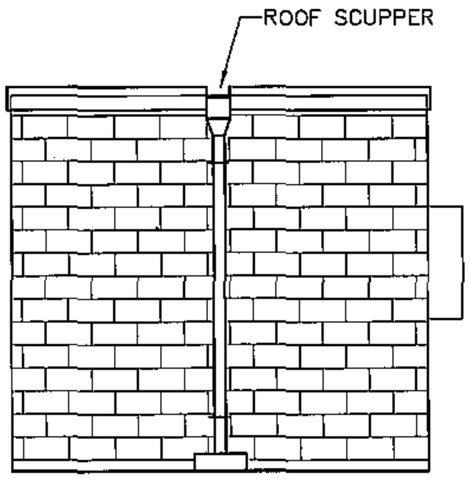


RIGHT SIDE ELEVATION

LEFT SIDE ELEVATION



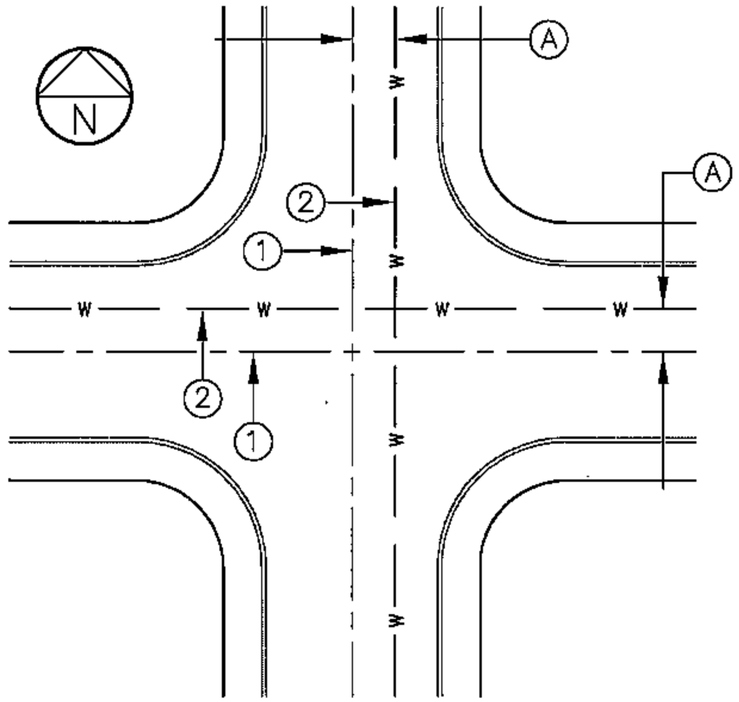
FRONT ELEVATION



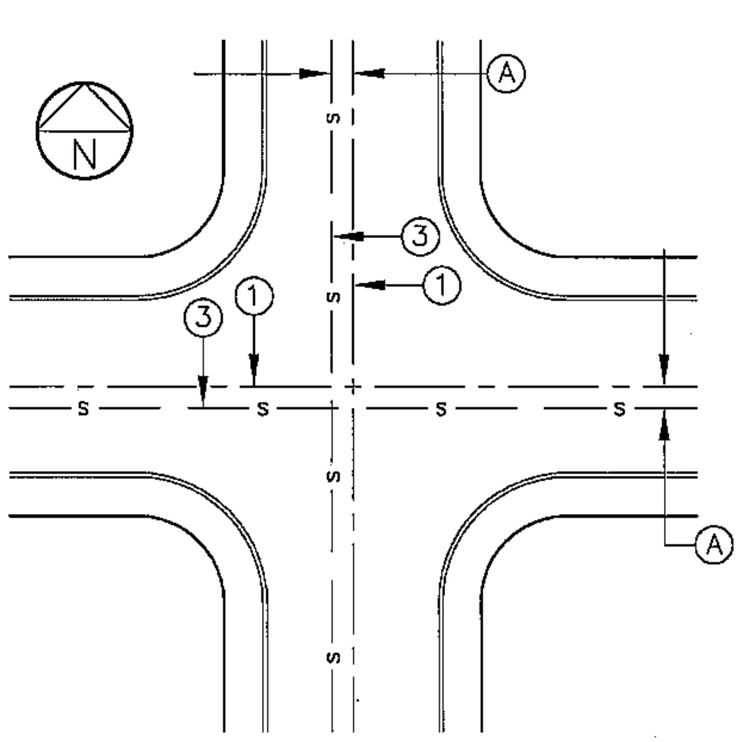
REAR ELEVATION

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: LIFT STATION FACILITIES DETAIL: TYPICAL CONTROL BUILDING	DATE: APRIL 2005	No: 316

GENERAL – WATER AND WASTEWATER
SECTION 400



WATER LOCATIONS



SANITARY SEWER LOCATIONS

GENERAL NOTES:

1. REFERENCE CENTERLINE SHALL BE CENTERLINE OF RIGHT OF WAY PROVIDED IT COINCIDES WITH STREET CENTERLINE. WHERE THESE CENTERLINES DO NOT COINCIDE, THEN REFERENCE SHALL BE STREET CENTERLINE.
2. WATER EXTENSIONS SHALL BE LOCATED ON NORTH OR EAST SIDES OF DEDICATED STREETS OR ALLEYS.
3. SEWER EXTENSIONS SHALL BE LOCATED ON SOUTH OR WEST SIDES OF DEDICATED STREETS OR ALLEYS.

CONSTRUCTION KEY NOTES:

A. DISTANCES FROM CENTERLINE VARIES AND SHALL BE ACCORDING TO THE FOLLOWING:

PIPELINE LOCATION WITHIN NEW RIGHT-OF-WAY		
RIGHT-OF-WAY WIDTH	DISTANCE "A" FROM CENTERLINE	
	WATER	SEWER
46 FT.	8 FT.	5 FT.
50 FT.	7 FT.	5 FT.
52 FT.	8 FT.	5 FT.
56 FT.	10 FT.	5 FT.
60 FT.	10 FT.	5 FT.
70 FT.	10 FT.	5 FT.
90 FT.	20 FT.	5 FT.
120 FT.	25 FT.	5 FT.

Lower Valley WATER DISTRICT

DESIGN STANDARDS

SECTION: WATER AND SEWER DETAILS

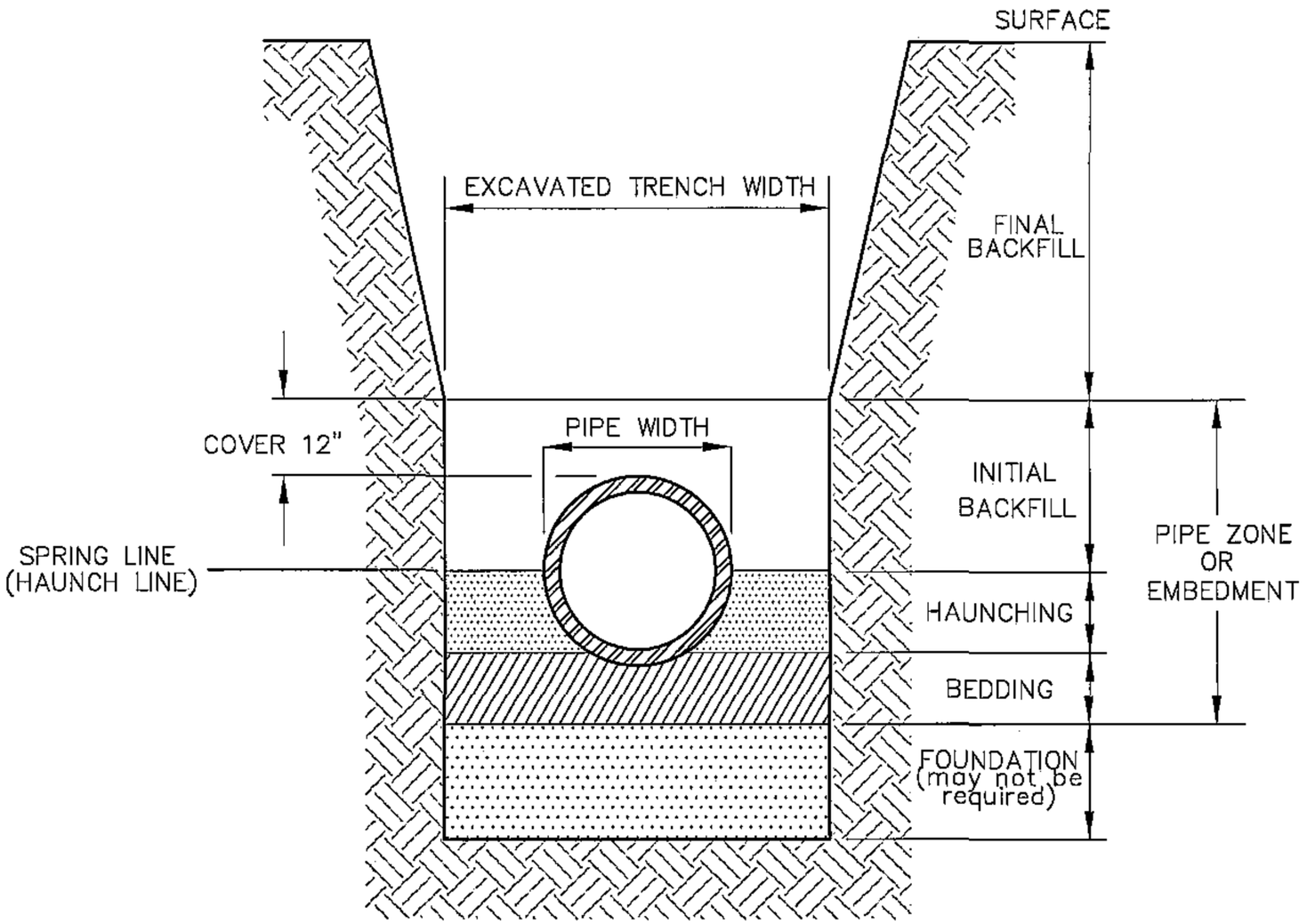
DETAIL: STANDARD LOCATION FOR EXTENSION

DATE: APRIL 2005

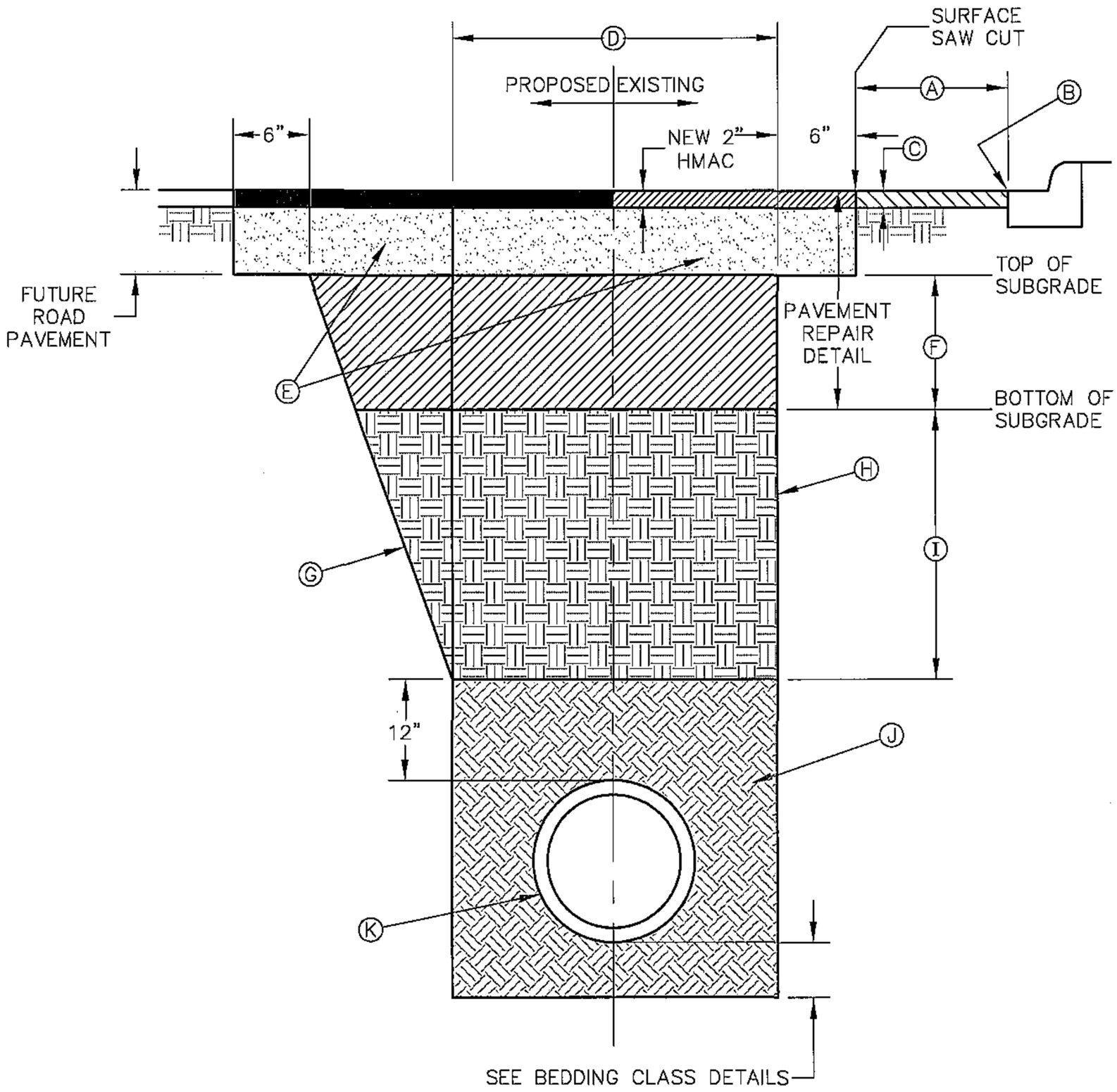
No: 401

GENERAL NOTES:

1. DETAIL DRAWING TERMINOLOGY IS IN ACCORDANCE WITH ASTM D-2321
2. UNLESS OTHERWISE PERMITTED BY THE ENGINEER. ALL MATERIAL IN THE EMBEDMENT ZONE SHALL BE HOMOGENEOUS.



Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER AND SEWER DETAILS	DATE: APRIL 2005	No: 402
		DETAIL: STANDARD TRENCH CROSS-SECTION TERMINOLOGY		



CONSTRUCTION KEY NOTES:

A. DIMENSION VARIES. WHERE GUTTER FACE, ETC. IS WITHIN 3'–0" OF SAW CUT EDGE, CONTRACTOR SHALL REMOVE & REPLACE EXISTING H.M.A.C. IN THIS AREA.

B. EXISTING GUTTER FACE EDGE OF PAVEMENT OR BEGINNING OF SHOULDER.

C. EXISTING HMAC THICKNESS MAY VARY.

D. REFER TO SPECS FOR LIMIT OF PAVING WIDTH.

E. BASE COURSE: THICKNESS 8" STANDARD UNLESS OTHERWISE SPECIFIED. COMPACT TO 100% A.S.T.M. D–1557.

F. SUBGRADE LAYER THICKNESS 18" UNLESS OTHERWISE SPECIFIED. COMPACT TO A.S.T.M. D–1557: 90% IF COHESIVE SOIL, 95% IF NONCOHESIVE.

G. SLOPED TRENCH CONDITION.

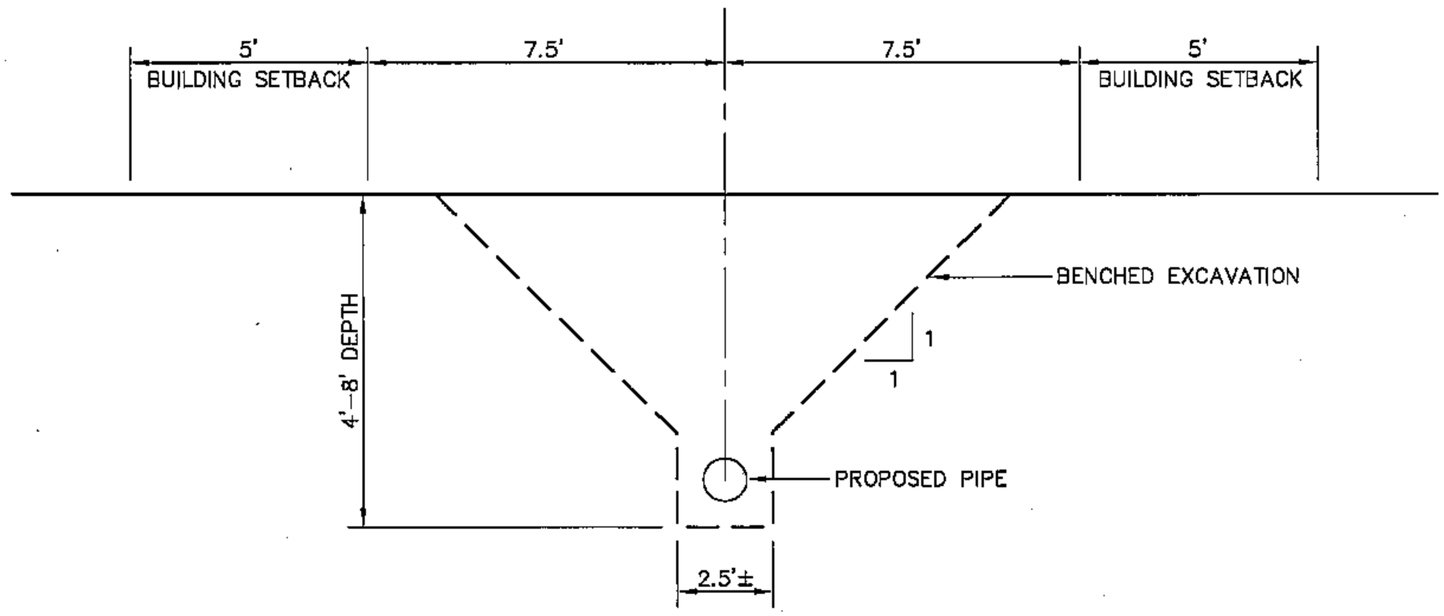
H. VERTICAL TRENCH CONDITION.

I. DEPTH VARIES. MATERIAL AS SPECIFIED, COMPACT TO 85% PER A.S.T.M. D–1557.

J. EMBEDMENT AS SPECIFIED.

K. APPROVED PIPE.

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER AND SEWER DETAILS DETAIL: TYPICAL TRENCH BACKFILL & PAVEMENT RESTORATION FOR PROPOSED OR EXISTING PAVED STREET	DATE: APRIL 2005	No: 403

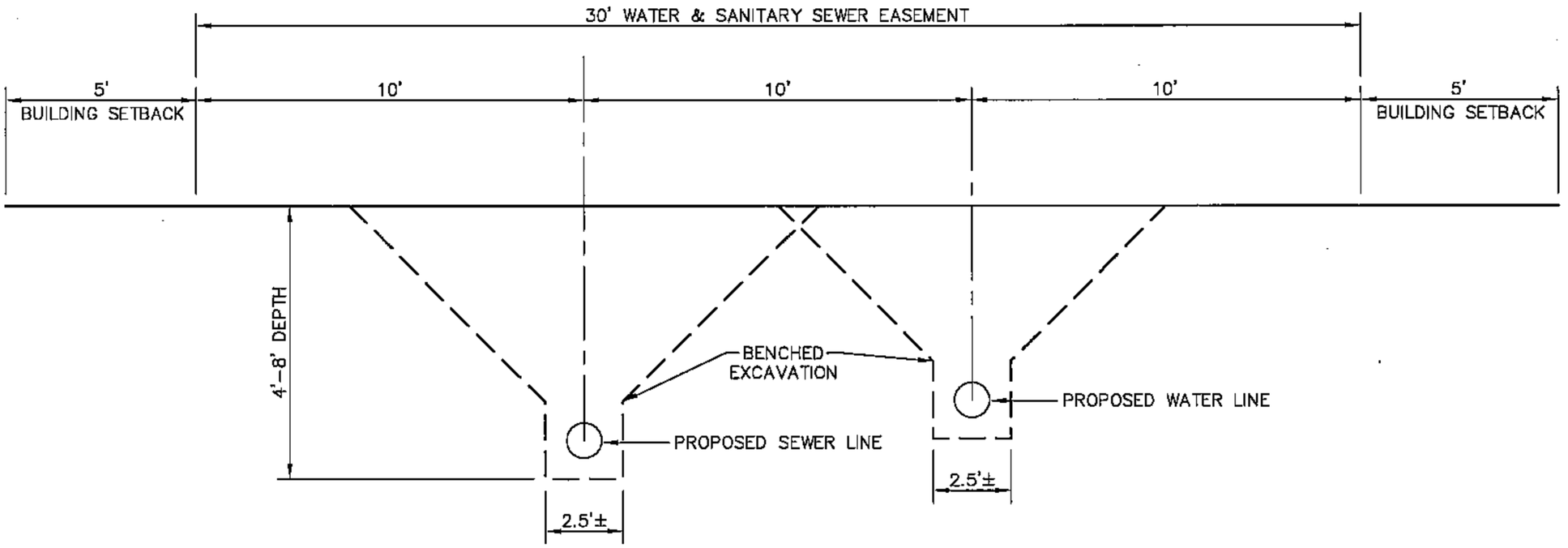


SINGLE UTILITY (4'–8' DEPTH)

GENERAL NOTES:

1. FOR LINES GREATER THAN 16" IN DIAMETER ADDITIONAL CONDITIONS ARE NEEDED.

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER AND SEWER DETAILS DETAIL: 15' WATER OR SANITARY SEWER EASEMENT	DATE: APRIL 2005	No: 404

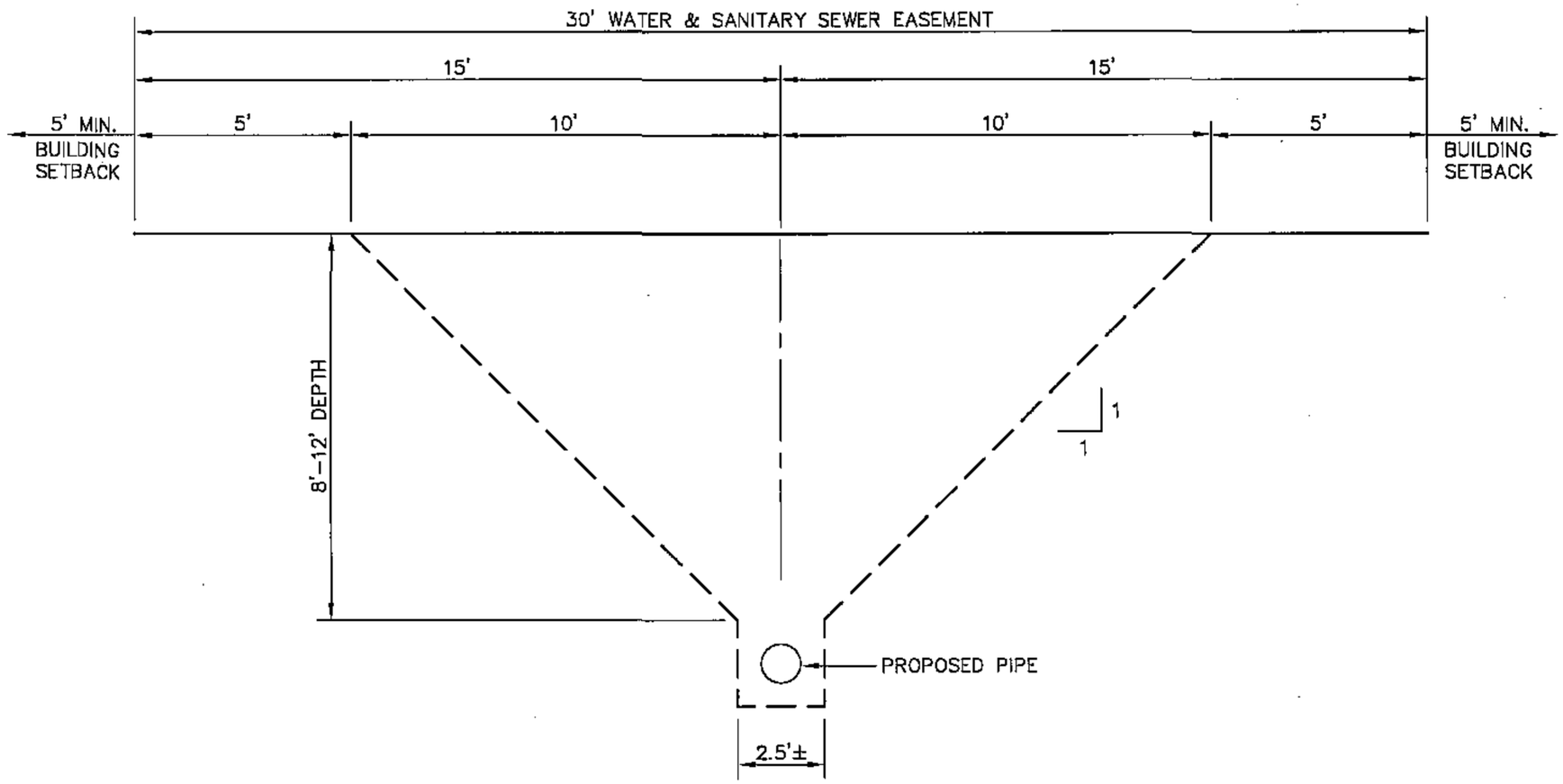


COMBINED WATER & SEWER UTILITIES

GENERAL NOTES:

1. FOR LINES GREATER THAN 16" IN DIAMETER ADDITIONAL CONDITIONS ARE NEEDED.

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER AND SEWER DETAILS DETAIL: 30' WATER OR SANITARY SEWER EASEMENT	DATE: APRIL 2005	No: 405



EXCAVATION 8'–12' DEPTH

GENERAL NOTES:

1. FOR DEPTHS GREATER THAN 12" DEEP OR LINES GREATER THAN 16" IN DIAMETER ADDITIONAL CONDITIONS ARE NEEDED.

Lower Valley WATER DISTRICT	DESIGN STANDARDS	SECTION: WATER AND SEWER DETAILS DETAIL: 30' WATER OR SANITARY SEWER EASEMENT	DATE: APRIL 2005	No: 406

APPENDIX C

Lower Valley Water District
Rules and Regulations

Chapter VIII
Extension of Service to New Areas/Subdivisions

CHAPTER VIII.

EXTENSION OF SERVICE TO NEW AREA/SUBDIVISIONS

§8.001. Purpose.

This Procedure applies to applications for the extension of water service and wastewater service to areas not currently served by the District's public water system or wastewater system and where construction of an extension to the District's water distribution facilities or wastewater collection system is required. The purpose is to assure that any extension of service is in accordance with the laws and regulations governing public water and wastewater systems and serves the public interest. Projects funded under the Economically Distressed Areas program of the Texas Water Development Board and other state or federal assistance programs will be governed by the applicable laws, regulations and loan conditions rather than this Chapter.

§8.002. Ownership of Facilities.

Any water distribution or wastewater collection facilities constructed within the District to serve new areas/subdivisions will become the property of the District, whether constructed by the District or by the Applicant/owner's contractor. If constructed by the Applicant/owner's contractor, upon completion and acceptance by the District, the Applicant/owner will dedicate or convey the system to the District in accordance with the District's requirements.

§8.003. Water and Wastewater Agreements.

Water and Wastewater Agreements are required in the areas of El Paso County, Texas. The City of Socorro and Town Of Clint make no stated requirements for Water and Wastewater Agreements. Water and Wastewater Agreements will be given to Subdivisions that are capable of receiving these services. Water and Wastewater Agreements are for providing water and wastewater services for a period of 30 years to the subdivision. Developers/ Owners can apply for Water and/or Wastewater Agreement by providing a PE certified preliminary subdivision design or RPLS certified preliminary subdivision plat and pay all necessary fees. In the event that the El Paso County denies the subdivision the Water and Wastewater agreement will be null and void. Lower Valley Water District can refuse or deny Water and Wastewater Agreement due to system restrictions, moratoriums, and poor design.

§8.004. Development Agreements.

Development Agreements will be signed by the Developer/Owner and Contractor. This agreement will be made in order to ensure that the Lower Valley Water District Rules and Regulations and Design Standards are being met by both parties. Lower Valley Water District will and can at any time dictate the wording of the Development Agreement. Developer/Owner and Contractor must comply with Development Agreement; if non compliance occurs the Lower Valley Water District can reject the project and deny service.

§8.005. Refunding Agreements.

As part of the Development Agreement which is entered into between the District and Applicants/owners (hereinafter referred to in this Chapter as "Applicants") for the extension of service into new areas/subdivisions the Applicant/owner may request that the District enter into a

refunding agreement, which shall include provisions for the refund of frontage fees and cost-sharing if appropriate. All lines outside the sub-division required to serve the sub-division will be eligible for refunds as provided in these Rules and Regulations. However, the refunds collected will not exceed 50% of the cost of installation. Contract format shall be dictated by the LVWD Legal Council, General Manager, and Engineering Department in order to assure that the District's and future Customers interests are fully served. The District Board of Directors reserves the right to determine whether such agreements are appropriate and to determine a fair method to provide for the payment of costs under such agreements.

§8.006. Applications and Fees

Developers/Owners, or otherwise known as Applicants, shall file a written application with the District for the extension of services to new subdivisions or areas not currently served. The application will describe the proposed project, to include the size and number of proposed water connections, the anticipated water usage (demand) requirements, warranty deed if applicable, and provide the preliminary plans for the proposed subdivision or new area to be served for review by the District's Engineering Department in order for the proposed design to meet LVWD Design standards. Designs not complying with LVWD design standards will be turned away. In addition, the applicant will furnish any additional information regarding the project as requested by the District which is necessary to fully evaluate the project. The District at anytime can deny service based on the proposed design due to possible hindrance to the current District Infrastructure, unfeasible maintenance structure, not complying with TCEQ Standards, or not within the best interest of the District's overall system design. The application will be accompanied by the administrative fee of at least $500.00 for water and $500.00 wastewater to defray the expenses of processing the application. A proposed cost estimate from a professional contractor (contractor must have previous water and wastewater experience) based on the water and wastewater design must be submitted in order to invoice applicant for review of plans and inspection which will be three percent of the proposed contractors cost of water and three percent of the proposed contractors cost of wastewater. Right to connect fees will be paid as specified in Section §8.005

(a) Right to Connect Water Fees: The developer for all new commercial and residential subdivisions will pay Right to Connect Water Fees. Each Residential lot will be charged $500.00. Commercial Developments which include apartment complexes will be charged $500.00 per commercial division or per apartment.

(b) Right to Connect Wastewater Fees: Where the wastewater infrastructure has been provided by the District through grants or subsidized loans, the developer for all new commercial and residential subdivisions will pay Right to Wastewater Connect Fees. Each Residential lot will be charged $500.00. Commercial Developments which include apartment complexes will be charged $500.00 per commercial division or per apartment.

§8.007. Subdivision/ Line Extension Procedures

(a) Applicants will pay and submit application(s) as well as proposed plans of water and sewer design of needed infrastructure for proposed project. After the design is reviewed and redlined by the District's Engineering Department, the Applicant may then submit the design for quotations by a contractor. Applicant will submit proposed cost estimate given by the Contractor in order for the LVWD to invoice Applicant for review of plans and inspection which will be three percent of the proposed contractors cost water and three percent of the proposed contractors cost of wastewater.

(b) The LVWD has the right, as the water and wastewater authority, to design the project at the Applicants cost if the personnel and resources are available. The Applicant may submit a written request for the LVWD to release these services to the Applicant's chosen Engineer. In order for the LVWD to make this consideration the Applicant's Engineer must submit license information valid in the State of Texas.

(c) When project is designed by Applicant's Engineer the Applicant's Engineer will submit the proposed change to the District's water system to the Executive Director of the TCEQ. TCEQ must be notified in accordance with 30 T.A.C. §290.39, this notification will be made and TCEQ will determine whether plans and specifications must be submitted to TCEQ for approval. Applicant will send notifications through certified mail and then submit return receipt to the LVWD as well as turning in any further correspondences between the Engineer and TCEQ. At the time of TCEQ approval the Applicant will enter into a Development Agreement with the LVWD.

(d) If the project is within the City of Socorro or Town of Clint then all fees shall be paid at the time that the LVWD issues a formal invoice and no Water and Wastewater Agreement will be needed. If the project is within El Paso County then a Water and Wastewater Agreement shall be filled. The Water and Wastewater Agreement is provided by the District, not by El Paso County. For more details, refer to "Agreements" section bellow. All applicable fees shall be paid at this time through a formal Invoice issued by the LVWD. All Right to connect fees will be paid by Applicant at this time as well, yet if the Applicant shows that lots will be sold to professional registered home builders the Right to connect fee will be paid by the Home builder at the time of residential application. All fees must be paid in order so that project can be allowed to continue through the process.

(e) After signing Water and Wastewater Agreements as well as the signing the Developments Agreement, applicant will submit 3 sets of the final set of water and/or wastewater design plans to the District. Plans must have original Applicant's Engineer signed and sealed license. The Applicant's contractor will submit material submittals for review, modification, and approval by the LVWD. At any time, the LVWD can request materials or documents that are outside of the LVWD Design Standards or outside of standard use. Other required items are: Registered Professional Land Surveyor (RPLS) Cut or Depth Sheets for wastewater pipe slope verification, trench safety details, detailed construction schedule, dewatering plan and schedule, and all needed street permits. Permits needed for work on the Texas State Right of Way or Water Improvement District Right of Way will require a Texas Department of Transportation (TxDOT) Permit or a Water Improvement District (WID) Permit. TxDOT or WID permits will be submitted by the LVWD yet all needed designs, fees, submittals, construction, and any TXDOT or WID requests will be performed by the Applicant. Applicant will make arrangements for these permits prior to construction.

(f) Preconstruction meeting will be held with all parties, being the LVWD, Applicant, Applicant's Engineer, Applicant's Contractor, and any other entities affected by the project. It will be the responsibility of the Applicant to organize the preconstruction meeting. Preconstruction meetings will be scheduled a week in advance and be held one week prior to start of construction all street curbs shall be installed prior to construction. No variance shall be given to this standard. The Applicant must have the project area staked out with all property lines, water system, and wastewater stakes prior to construction. The stake-out must be reviewed by the LVWD Inspector.

(g) Construction will occur once all items have been addressed and all paperwork and/or requirements have been submitted. The LVWD will issue a notice to proceed for the project, and it is at that time that the Applicants Contractor will be responsible for all work and safety on the job site. At no time is the LVWD responsible for damages or injuries out in the field. The LVWD's inspector will revise the water and wastewater installation. This inspection will not mean approval of main line, safety, or any other issue. The contractor will be responsible for collecting the as-built documentation. As-builds will be documented as per LVWD Design Standards and if they are collected improperly the project will not be allowed to be dedicated to the LVWD's infrastructure. Water and wastewater connections must be scheduled 48 hours ahead of time. Connections on to LVWD system cannot occur without District Inspector being present. Water will be allowed to flow through to fill the system for testing yet valves must be shut after this takes place. Manhole connections must be plugged after connection. Testing of infrastructure shall be scheduled 48 hours ahead of time and the LVWD inspector has to be present. The inspector can at any time reschedule or cancel test if a contractor is late, not fully set up, inspector scheduling conflict, and/or an emergency comes up. Inspector will wait no longer than 15 minutes from time scheduled after that contractor must reschedule. Test must be performed as per LVWD Design Standards. At any time the LVWD can request tests or methods that are outside of these standards.

(h) Substantial Completion Walkthroughs shall be scheduled one week in advance and after all testing and construction has been completed. Manhole vaccum testing will be held pending to final adjustment. Walkthroughs will check for overall operation of project such as manhole inverts, water valve operation, fire hydrant operation, water service conditions, etc. At the Applicants cost, arrangements must be made to televise the condition of all wastewater mains in the project. This recording must be turned in to the LVWD in CD or DVD format. The Lower will review the tape and make assessment of condition as a result of this the walkthrough can then be scheduled. Walkthroughs will be organized by Applicant and must have project Engineer, Contractor, appropriate government entities representatives, and LVWD Engineering Department representatives. LVWD can at any time reschedule or cancel the walkthrough. After all items are seen and reviewed, the LVWD will make an assessment of what condition the project is in and will make a determination of the project being Substantially Complete. LVWD will issue the Applicant a Letter of Substantial Completion, in the letter a list items will be given to correct that will dictate Substantial Completion or call for another walkthrough. Substantial Completion will signify a milestone that the majority of the project is complete, that the system is in operational condition, and that the project can open connections to the LVWD Infrastructure to provide flow and circulation. This in no way signifies that the LVWD will provide services (water, wastewater, and solid waste) to the project area and does not signify that a subdivision is ready to be legally recorded with the appropriate government entity. No service will be provided until the project has been dedicated to the LVWD and acceptance has been accomplished by the Board of Directors.

(i) Final Completion Walkthroughs will be scheduled once a Substantial Completion Walkthrough is passed and completed. All street must be paved and all water and wastewater infrastructure must be set to final grade. Walkthroughs must be scheduled one week in advance. Walkthroughs will check for Final Completion of project. Such as manhole inverts, water valve operation, fire hydrant operation, water service conditions. Walkthroughs will be organized by Applicant and must have project Engineer, Contractor, appropriate government entities representatives, and LVWD Engineering Department representatives. LVWD can at any time reschedule or cancel the walkthrough. After all item are seen and reviewed LVWD will make an assessment of what condition the project is in and will make a determination of the project being Finally Complete. LVWD will issue the Applicant a Letter of Final Completion, in which a list of items to correct will be given. This letter will dictate Final Completion or call for another

walkthrough. Final Completion will signify a milestone that the entire project is complete, that the system is in operational condition, and Applicant can move their efforts towards Dedication of the project. This in no way signifies that the LVWD will provide services (water, wastewater, and solid waste) to the project area. This does signify that a subdivision is ready to be legally recorded with the appropriate government entity. No service will be provided until the project has been dedicated to the LVWD and acceptance by the Board of Directors has been accomplished.

(j) Dedication of project will require that Final Completion be passed and completed. Applicant may request Dedication through a Certificate of Dedication, which is provided by the District and filled out by the Applicant. If project is not dedicated the Applicant will maintain ownership of water and wastewater infrastructure. Dedication will require all needed documentation turned in to the LVWD Engineering Department. Documents that will be required will be specified at the time of request. LVWD Engineering Department can at any time request documentation outside of standard procedure in order to ensure the best interest of the LVWD. All paper work must be submitted one week before regularly scheduled Board Meetings. The LVWD Engineering Department will present and propose to the Board of Directors the acceptance of the project.

(k) Applicant as stated in the Development Agreement and Certificate of Dedication will have one year warranty as of day of Board approval. Two months from stated termination date of warranty the Applicant will organize a warranty walkthrough. Walkthrough will check for overall workmanship. At the Applicants cost and responsibility must make arrangements to televise the condition of all wastewater mains in the project. This recording must be turned in to the LVWD in CD or DVD format. The Lower will review tape and make assessment of condition. If corrections are needed the Applicant will be responsible for repairs and rehabilitation at his or her cost. If corrections are not made then the LVWD will stop providing individual water, wastewater, and solid waste services to the project area until improvements are made.

(l) Modification of Procedures. The District, through its General Manager and Engineering Department, may make modifications of the procedures, deposits, fees, and contractual arrangements provided for in this Section to assure that the District's interests are fully served and as special circumstances may require.

§8.008. Provision of Water Taps Within a New Subdivision.

The Applicant of a subdivision will also make a water tap and, if applicable, a sewer connection, and extend the services to the property line for each lot in the subdivision. Similar arrangements will be made regarding sewer service in accordance with the directions of the LVWD Design Standards. The service lines will normally be placed in the middle of the property when the water main passes completely in front of the lot. All services will have magnetic tape installed above the water service, so as to be able to locate the pipe after the ditch is backfilled and be inspected by the Lower Valley Water District.

§8.009. Application for Individual Water Service within a New Subdivision.

The approval of extension of service to a subdivision and the related agreement(s) with a Applicant in accordance with this procedure does not reserve any meters or sewer connection for individual customers within the subdivision. Individual applicants for meters, water, and wastewater service must comply with the applicable rules and regulations of the District in order to obtain these individual services.

APPENDIX D

Lower Valley Water District
Rules and Regulations

Chapter VI
Design and Ownership of Facilities

CHAPTER VI

DESIGN AND OWNERSHIP OF FACILITIES

§6.001. Operations, Maintenance and Ownership.

The District or its agents shall design, operate and maintain all of its water and sewer facilities with due regard and concern for present and future requirements of system capacity, operations and efficiency; the anticipated life of the existing system and any improvements made. Title to all such facilities shall remain with or be dedicated to the District upon completion of the construction of such facilities, meeting District Design Standards, and submitting all needed District documentation. Facilities not properly dedicated to the District will stay into ownership and maintenance of applicant and will hinder area from receiving proper services. Any backflow prevention assembly or enclosure provided by the District becomes the Customer's property for purposes of operation and maintenance.

§6.002. Utility Furnished Material

The District will furnish or provide for the installing and maintenance of all meters, related piping, equipment and materials used for connecting the water meter to the water main as required and defined in the Service Connection Charge; and title to all such installations shall remain in the District. This will be at the Districts discretion that at any time the District can change these requirements and criteria to better fit the needs of the customer and the District. The District is under no obligation to provide piping, equipment and materials used for connecting the water meter to the water main.

§6.003. Line Location.

Water main extensions shall be located on the north and east sides and sewer extensions on the south and west sides of dedicated streets or alleys, as has been the designated location since the early installation of the existing system, except that of such location is not practical or available, or if in the interest of the operations, maintenance and efficiency of the system, the District may designate some other location more suitable. Under no circumstances shall any structure be placed over or around any water main or extension unless by prior written approval by the Board and in a manner which provides for ready and easy access to any or all parts of the main or extension. If temporary variance is allowed, removal will be at the Owners expense when the allowable time has expired if not already accomplished.

§6.004. Right-of-Way.

Before water or wastewater line extensions being financed in whole or in part by the District are made in public street and/or public alleys, the public right-of-ways shall be legally dedicated and brought to grade as approved by the District's Engineer. The District will not place meters or services on the outside of the curb line on any existing or newly constructed streets unless the grading is within four (4) inches of finished grade for a distance of (10) feet from the curb.

§6.005. Conditional Services.

When a service is requested that is not adjacent to a water main from which an adequate service can be provided and, when in the opinion of the District, it is not feasible to construct a new main that would provide an adequate service, the District may grant permission to the Customer to take "conditional" service at the nearest existing adequate main. The Customer shall pay the appropriate charges as provided herein, computed as though the main were adjacent to the property unless, in the opinion of the District, the quality of service is such that the frontage charge should be waived. The Customer shall pay all cost of the installation and maintenance of pipe line from the water meter to this property, and assume all responsibility and liability for such installation, maintenance and operation or failure of said pipe line. Such a connection and pipe line shall be installed and used as a temporary arrangement only; and, at such time as an adequate water main is installed adjacent to the property, and on written demand by the District, the Customer will have installed a regular service at his own expense, and will discontinue the use of the temporary connection and pipe line and will pay the District the appropriate charges for a regular service.

§6.006. House Connections.

The line from the meter to a dwelling will be of Type K Copper or PVC schedule 40 pipe and sized by the Applicant or Owner. Also, the customer service line in the property will require a dual backflow preventer device, cut-off valve and a pressure regulator and meter coupling. (See Chapter IV of these Rules and Regulations.)

§6.007. Easements.

No water or wastewater mains will be constructed in easements unless extensions, project areas, properties, and subdivisions are fronting Texas Department of Transportation (TXDOT) or El Paso County Water Improvement District (EPWID) Right of Way. Easements must be in a minimum 15 feet wide per utility (water and wastewater) line. Easements must be cleared of any and obstructions on, along, and fronting the easement prior to acceptance and recording. Obstructions will be deemed as follows; such as rock walls in excess of 2', foliage, fences, homes (mobile home or otherwise), other utility lines, and any other structure deemed as permanent or possible hindrance to maintenance. Easements must be recorded at El Paso County Records under the Lower Valley Water District.

§6.008. Premises With Private Wells.

Customers with premises which have private wells and who wish to connect to the District's water supply shall have the following two options:

(a) Agree to permanently abandon use of the private wells by plugging the well, prior to connect to the public water supply, in accordance with the TCEQ requirements; and

(b) Agree to completely and permanently server the private well from the premises water supply system in accordance with the TCEQ requirements, prior to connecting to the District's water supply and Customer shall install an approved backflow prevention assembly at the water service connection.

APPENDIX E

Lower Valley Water District
Rules and Regulations

Chapter IX
Extension Services

CHAPTER IX

SECTIONS 9.009 THRU 9.012

§9.009. Extension Charge.

(a) An Extension Charge is a non-refundable payment to the District for installing or having previously installed a water main in a dedicated street or alley adjacent to the property to be served. The Extension Charge shall be determined by applying the appropriate sub-subsections (1),(2),(3),(4),or (5) of this section. The District shall determine which of these sub-paragraphs shall be applicable to the property to be served. It is the intent of this policy that each property be charged an Extension Charge before obtaining service.

(1) Extension Charges To Connect To Existing Lines. The Extension Charge for property obtaining water service from existing mains when the property obtaining such service did not participate in the cost of construction of the lines shall be based on the "Frontage" of the property multiplied by the frontage rate per foot of **$7.00** for water service. This charge shall not apply to property on which a frontage or extension charge has been paid previously except that such property on which the frontage charges were paid at the special rate of ¾ inch residential service shall pay an additional water frontage charge of $1.00 per front foot if the property is used for other than single family resident purposes, or if a larger than ¾ inch water service connection is desired.

(A) The Frontage Charge for a property obtaining water and sewer service from existing lines contributed by a funding agency shall be based on the "Frontage" of the property multiplied by a ratio calculated based on the percentage of loan portion or cost of the extension, if applicable. The charge for the following funding programs are:

Program	Water Frontage (per foot)	Sewer Frontage (per foot)
CBDB (COUNTY AND/OR SOCORRO)	$0.00	$0.00
USDA/RD PROJECTS		
ORCA PROJECTS		
OTHER / SELF-HELPED PROJECTS	$0.00	

(B) This will be only for eligible contributors to the project or meet the eligible grant criteria. The Frontage Charge as referred to above will be in effect for a period of one year from the date the referenced water and/or sewer system is in operation. Thereafter, the Frontage Charge will be as determined in the Subsections entitled "Extension Charges to Connect to Existing Lines for Water and Sewer".

(2) The frontage to be used in determining the Extension Charge shall be the distance across the property, measured along a line parallel to the center line of the street

which abuts the property or is the average length midway between the front and rear property lines.

(A) In no case shall the frontage for each water meter be less than 50 feet.

(B) If the property is occupied or is to be occupied by a single family or duplex residence and abuts on two or more streets, the frontage is to be measured as though the property abutted only on that street which produces the smallest frontage.

(C) If any property other than those provided for in Subsections (B) and (E) of this Section abuts on two or more streets and has a depth greater than 150 feet, the frontage to be used shall be equal to the sum of the frontage for each abutting street less a credit of 150 feet for each street intersection adjacent to the frontage, but not twice the aggregate water demand in gallons, whichever is greater.

(D) If the aggregate demand of all water meters, in gallons per minute, on any property exceeds one-half of the frontages in feet, then such excess demand shall be charted as excess frontage at the rate of two feet of frontage for each additional gallon of demand. The demand shall be determined by using the following flow rates for the various sizes of meters.

Meter Size	**Gallons per Minute**
¾"	15
1"	37
1 ½"	75
2"	120
3"	240
4"	375
6"	750
8"	1,400
10"	2,000

(E) The frontage for public schools, parks, churches and United Fund agencies may be the longest dimension of the property which abuts a single dedicated street, or as determined by the aggregate water demand as specified in Subsection (D), whichever is greater.

(F) The frontage to be used for a single family residence situated on a tract of land of two acres or more in area may be reduced to a minimum of 174 feet, provided that all of the water supplied by the District shall be used within an area of 175 feet wide fronting on the street from which service is taken and less than 500 feet in depth.

(G) When, in the opinion of the District, none of the above methods yield an equitable and appropriate charge within the intent of this Rule, the frontage may be determined on the basis of the demand for water as provided in Subsection (D) or by other equitable methods to derive a charge that is proportionate to the water demand and/or size of the property in relationship to the charge for another similar property, but will not be less than a 50 foot frontage.

(2) Extension Charges For Small Tracts.

(A) The water Extension Charge for lots within subdivisions when such lots are individually owned shall be the same as described in (a) provided the extension charge is paid on the property that is adjacent to the required extension or which could conceivably be considered to obtain service from said extension. When more than one-half of the property adjacent to the extension does not pay the extension charge prior to the construction of the line, the Customer or Customers desiring water service must pay the cost of the line required to reach their property and be eligible for a refund. Payment of the Extension charge on an individually owned property shall entitle that property to water services if the extension required reaching that property is 150 feet or less and if the property is owned by an individual who has not previously been granted an extension for other property.

(B) When water service is desired to a tract of land of 20 acres or less in size and the owner of said tract does not at the time of application for service own any other land immediately adjacent to the property to be served and when a line 12-inches or larger is required, he may pay the Frontage Charges provided for in (a) on all of the property I lieu of paying the total cost of the extensions required within or adjacent to his subdivision. When the property to be served is not adjacent to an existing line from which service lines can be extended, the Customer shall pay the total cost of the "off-site" or "approach" main required to reach the property to be served and be eligible for refunds in accordance with these Rules and Regulations.

(3) Extension Charges for Other Areas.

(A) The Extension Charge for water or wastewater service to new subdivisions and all other areas not included in Subsections (1) or (2) of this Section shall be the total cost of all the lines and appurtenances required to serve the property as determined by the District. This cost shall include the furnishing and installing of all lines, valves, manholes, paving repair and other appurtenances completely in-place I accordance with the District's plans and specifications. Lines in all dedicated streets that are adjacent to the property, including boundary street, shall be included as part of the cost and "off-site" or "approach" mains that are necessary to provided service shall also be included. The Customer or Developer may also be required to pay for the construction of reservoirs, pumping stations, and other facilities that are needed to adequately serve that area. Payment and refunds for such facilities will be as provided for in Section 9.010. No street shall be approved to be paved until lines required in that street have been installed by the adjacent owner who desires the paving. The property owner shall be eligible for the refund for lines that are installed where there is other property perpendicular to the line that can be expected to take service directly form that main ;however,

property owners will not be eligible for refunds when property owners/applicants extend water or wastewater infrastructure from that point to serve a new area.

(B) In addition to the cost of the lines as required by District's plans and specifications for construction to provide service to the Customer's or Developer's property, the Customer or Developer shall also be obligated to pay his proportionate part of the cost of all lines that were constructed by others which are adjacent to the boundaries of their properties. The charge shall be based on the average lineal foot cost of the facility as determined by the refund agreement for lines that are installed where there is other property adjacent to the line that can be expected to take service directly or indirectly from that main.

(4) Extension Charges For Water Mains Constructed Crossing Drains and Easements of El Paso County Water Improvement District No.1 (EPWID#1)

(A) Subject to availability of District funds as determined by the General Manager and subject to approval of the Boards, in the exercise of absolute discretion, the District may promote extensions of water mans crossing over drains and easements of EPWID with the District advancing sixty (60%) percent of the cost of such extensions and the initial customers seeking to connect to such extensions advancing forty (40%0 percent of the cost prior to commencement of work on the extensions.

On completion of the extension, the initial customers shall commence repayment of the 60% costs advanced by the District and 40% of any costs advanced by a Third Party Sponsor as permitted in Section 4(C) below. The costs shall be apportioned and repaid on a per meter/customer basis i.e. six initial customers shall be responsible for on sixth of the cost. No interest shall be required to be paid on either the costs advanced by the District or any Third Party Sponsor.

(B) The costs advanced by the District and any Third Party Sponsor shall be repaid by equal monthly payments amortized over a term not to exceed ten (10) years. Failure of any customer to pay the portion of the cost for which such customer is liable shall entitle the District to exercise all of the remedies set forth in Chapter VII and additionally to foreclose the lien on the customers real property which is served by the extension. A real estate lien note payable to the District and deed of trust securing such note in form satisfactory to the District shall be required to be executed by all owners of the real property.

(C) The Third Party Sponsor may advance all or any portion of the 40% of the costs required to complete the extension and shall be repaid the costs in the same manner as above provided for 60% of the costs advanced by the District. The 60% costs to be repaid to the District and the 40% of any costs advanced by a Third Party Sponsor shall be combined in one real estate lien note payable to the District and payment shall be remitted to the Third Party Sponsor only if as and when payments are received by the District. The District shall reserve exclusively unto itself the right to exercise the remedies set forth in Chapter VII and the District shall have no obligation whatsoever to the Third Party Sponsor except to remit 40% of the payments as and when received by the District.

(D) As subsequent customers are connected to the extension, a reallocation of the costs shall be made according to the following example:

EXAMPLE:

$25,000	Total Costs
15,000	District Share
10,000	Initial Customers and/or Third Party Sponsor

Assume 6 initial customers each to pay 1/6 of $25,000 i.e. $4,166.
As monies are repaid the District receives 60% of the payments and the Third Party Sponsor receives 40%.

As subsequent customers may be added, a reallocation would occur in the following manner:

6 initial customers
4 subsequent customers
10 Total Customers Each to pay a total of $2,500 or 1/10 of the total cost.

The four subsequent customers will pay a total of $10,000 which will be paid 60% to the District and 40% to the Initial Customers and/or Third Party Sponsor.

IF NO THIRD PARTY SPONSOR

This same program will be followed if no Third Party Sponsor and the initial customers will provide the 40% cost portion and repay the 60% in the same manner set forth above.

Initial, as well as subsequent customers, shall be required to execute such documents as the District shall require to provide for repayment to the District of costs advanced. The District shall be under no obligation n and assumes no duty to any parties entitled to repayment of costs advanced except to remit to such parties 40% of the payment for such costs if as and when received by the District.

(5) Extension Charges For Water Mains Not Crossing Over Drains and Easements of El Paso County Water Improvement District No. 1 (EPCWID#1)

(A) Subject to availability of District funds as determined by the General Manager and subject to approval of the Board, in the exercise of absolute discretion, the District may promote extension of water mains which do not cross over drains and easements of EPWID and which are located in public right of way. The District may advance sixty (60 %) percent of the cost of such extensions subject to the initial customers seeking to connect to such extensions advancing forty (40%) percent of the cost prior to commencement of work on the extension.

On completion of the extension, the initial customers shall commence repayment of the 60% costs advanced by the District and 40% of any costs advanced by a Third Party Sponsor as permitted in Section 5 (C) below. The costs shall be apportioned and repaid on the frontage basis set forth in Chapter IX. No interest shall be required to be paid on either the costs advanced by the District or any Third Party Sponsor.

(B) The terms and conditions set forth in Sections 4 (B), (C) and (D) shall apply to the costs advanced under this Section.

§9.010. Refunds.

(a) The Customer or Developer shall be entitled to a refund providing that:

(1) The customer is required to construct or pay to construct "boundary" water lines along the perimeter of the area to be served when such lines are adjacent to other property that can be expected to obtain service directly or indirectly from the lines;

(2) The customer is required to construct or pay to construct lines that are outside the area (off-site) from where he desires service when the property on either side of the line is owned by others and when such property may be expected to obtain service directly or indirectly from said line;

(3) The customer is required to construct or pay to construct water lines larger than 12-inches in size;

(b) In order to obtain a refund, contracts providing for refunds must be entered into with the District. Monies to make refunds for facilities included in (1) and (2) below shall be obtained from property owners who receive service directly or indirectly from the lines eligible for refunds and the District shall not be obligated to make any refunds until it has received payment from those properties which benefit from the lines. The district obligation to make such refunds shall never exceed 50% of the amount which it receives from the owners adjacent to the extensions and never exceed 50% of the actual cost of construction. Collection method will be also dictated by the amount of property owners abutting the line extension. If property owners that are on either side of the extension the developer/owner will only be entitled to half of the frontage fee. This will divide the frontage fee into half for property owners of either side of the extension and will be the set amount for the area. Such refund contracts shall provide for the District to make refunds no more frequently than once each year for a period of 20 years from the date of the contract without interest.

(1) Refunds for Boundary Lines. The refunds for "boundary" lines shall be limited to one-half of the estimated cost of the line as installed. The estimated cost of the line installed shall be considered to be the price of the pipe as determined by the actual cost of construction.

(2) Refunds for Off-Site Lines. The refunds for "off-site" lines shall be limited to one-half of the estimated cost of the line as installed. That are constructed outside of the limits of the area to be served, but necessary to provide service, shall be eligible for a refund based on the actual cost of facilities. The applicant will provide all needed construction data.

(c) Refund contracts will not take effect until the extension/project is dedicated to the Lower Valley Water District. Contracts will be reviewed by Lower Valley Water District. All contracts will comply with Lower Valley Water District Rules and Regulations.

§9.011. Special Deposits.

(a) Special Deposits are for "off-site" facilities such as reservoirs, pump stations, and line outside the boundaries of the property to be served, but will become part of the total water system. The total cost of these facilities shall be paid by the Customer or Developer first requiring the facilities. The District shall determine the size and type of facility required with consideration towards future growth.

(b) A special refund contract will be executed with the Customer or Developer which will provide for a portion or all of the cost to be eligible for a refund as development takes place which the facility serves. The refund on water facilities shall be pro-rated based on the number of residences it will serve. For other than residential connections, refunds will be based on the anticipated water usage proportional to the residential use rate.

§9.012. Fire Hydrant Installations.

This District will not participate in the cost to install fire hydrants where deemed to be required. If the Customer or Developer chooses to install any fire hydrants it will also be at their own cost.

APPENDIX F

Cross-Connection Program Standards and Guidelines

LOWER VALLEY WATER DISTRICT
CROSS-CONNECTION CONTROL PROGRAM

Date: March 24, 2005

INTRODUCTION

The Texas Commission on Environmental Quality (TCEQ) is responsible for implementing the standards of Public Law 93-523 – Federal Safe Drinking Water Act and Amendments of 1986. In doing so, the Commission requires public water suppliers to prohibit connections to establishments where an actual or potential contamination or system hazard exists unless the public water supply is protected by approved backflow prevention assemblies. The public water supplier also is required to establish a program whereby the backflow prevention assemblies are tested upon installation and at least annually thereafter.

The Lower Valley Water District (LVWD) has established and will provide the maintenance for a Cross-Connection Control Program pursuant to Title 30, Texas Administrative Code, Chapter 290, Public Drinking Water This program protects the public water supply from contamination or pollution due to cross connections by containing hazards at the service connection. The program assigns or clarifies responsibilities of LVWD, the customer, and the certified backflow prevention technician.

This manual is intended to augment the LVWD's Cross-Connection Control Program and to serve as the minimum standard for implementing the program. The LVWD adopted, in reference, the latest editions of The Manual for Cross-Connection Control by the Foundation for Cross-Connection Control and Hydraulic Research at the University of Southern California and the Uniform Plumbing Code. Included in the manual are technical specifications and standards to define proper backflow prevention assembly applications, installation details and criteria, assembly test procedures, care of test equipment, and forms.

No manual can remain current indefinitely. All holders of this manual should anticipate additions, deletions, and amendments. Subsequent changes will be available from the LVWD.

DEFINITIONS

Approved Backflow Prevention Assembly

An approved backflow prevention assembly that has been manufactured in full compliance with the American Water Works Association standards C510 and C511, is currently listed by the Foundation for Cross-Connection Control and Hydraulic Research of the University of Southern California, and meets the design specifications of the LVWD.

Backflow

The unintended or undesirable reversal of the normal water flow.

Backsiphonage
A form of backflow due to negative or decreased pressure in the water supply.

Backpressure
A form of backflow due to an increase of system pressure that is greater than supply pressure.

Backflow Prevention Assembly Tester
A person in possession of a valid TCEQ Backflow Prevention Assembly Tester license and agrees to comply with the requirements of the LVWD.

Backflow Prevention Methods, Devices, and Assemblies
The types of backflow prevention methods, devices, and assemblies shall be based on the existing or potential degree of hazard, and backflow condition as follows:
Air gap Method
Atmospheric vacuum breaker Device
Double check valve
Double check detector
Pressure vacuum breaker
Reduced pressure principle
Reduced pressure principle detector
Spill-resistant pressure vacuum breaker

Containment Cross-Connection Control
Provides protection of the LVWD water supply from the backflow of contaminants or pollutants from any residence or establishment by the use of an air gap or an approved backflow prevention assembly at the water service connection. Containment cross-connection control does not provide protection to the occupants of the premises, but shall be considered as additional backflow protection and shall not negate the use of backflow prevention on internal hazards within the customer's water system.

Contamination
The presence of any foreign substance (organic, inorganic, radiological, or biological) in water that tends to degrade its quality to constitute a health hazard or impair the usefulness of the water.

Continuous Pressure
A point in the water system that may be subjected to operating pressure for more than twelve hours in a twenty-four hour period.

Cross Connection
A point in the LVWD water supply that is connected directly, or has the potential of being connected, to a source of nonpotable substance through which contaminants or pollutants may enter the LVWD water supply.

Cross Connection Controlled
A cross connection with an approved backflow prevention method, device, or assembly properly installed and maintained so that it will continuously afford

protection commensurate with the degree of hazard.

Cross-Connection Control Program Manager
A person designated by the LVWD to administer the cross-connection control program and who is currently recognized as a backflow prevention assembly technician.

Customer Classifications
For the purpose of determining containment cross-connection control, the following classifications are used:

Class A - Single-metered domestic water service connection. Limited to singlefamily dwelling or mobile home without private water system or well.
Class B - All service connections excluded from Class A.

Lower Valley Water District
A publicly owned water and sewer agency located in and serving the people of El Paso County, Texas.

Health Hazard
An actual or potential cross connection involving any substance that could, if introduced into the public water supply or the customer's water system, cause death, injury, illness or spread of disease.

High Hazard
See Health Hazard.

Low Hazard
See Non-Health Hazard.

Non-Health Hazard
A substance that generally would not be a health hazard but would constitute a nuisance, or be aesthetically objectionable, if introduced into the potable water system.

System Hazard
A premise where LVWD believes there is an actual or imminent threat of contamination to LVWD's system presenting a danger to public health warranting an approved backflow prevention assembly to be installed at the point of delivery.

Isolation Cross-Connection Control
Provides protection to the occupants of a premises by the installation of approved backflow prevention methods, devices, or assemblies at each cross connection within the customer's water system.

Premise
A premise is any and all areas on a customer's property that is served or has the potential to be served by the LVWD.

Pollution
The presence of any foreign substance in water that tends to degrade its quality so as to not constitute a health hazard or impair the usefulness of the water.

Water Service Connection
The terminal end of the LVWD water supply system where the customer's water supply system is connected (i.e., where LVWD may lose sanitary control of the water at its point of delivery to the customer's water system). The service connection is generally considered the outlet end of the water meter. If there is a containment backflow prevention assembly installed, the terminal end of the LVWD is the outlet of the assembly.

RESPONSIBILITIES

Lower Valley Water District

1. The LVWD shall be responsible for the protection of the public water supply from the backflow of contaminants or pollutants through the water service connection.

2. The LVWD shall administer and enforce all the provisions of the cross-connection control program.

Cross-Connection Control Manager

1. The manager shall coordinate program activities with designated representatives of the LVWD.

2. The manager shall be responsible to maintain an information management system that tracks customers, inspections, backflow prevention assemblies, and testing information.

3. The manager shall be responsible for the inspection of customer premises to determine compliance with the program.

4. The manager shall be responsible for the inspection of installations of approved backflow prevention assemblies and methods, devices.

5. The manager shall be responsible for all of the backflow prevention assembly testing within the jurisdictional limits of the LVWD.

6. The manager shall strive to maintain customer satisfaction and clarify the requirements of the program.

Customer

1. The Customer shall be responsible for the prevention of contaminants or pollutants originating on the customer's premises from entering the public water supply as well as the customer's water system.
2. The Customer is responsible for the expenses incurred for the proper installation, testing, maintenance of approved backflow prevention assemblies, and coordination and cooperation with the LVWD.
4. The Customer's responsibility begins at each water service connection and extends throughout the entire length of the water system within the premises.

Backflow Prevention Assembly Tester

1. The Tester's primary responsibility is to safeguard the LVWD.
2. Testers shall register with the cross-connection control program manager prior to testing backflow prevention assemblies within the jurisdiction of LVWD. Each tester will be issued a number that must appear on all backflow prevention assembly test report forms.
3. The tester shall submit reports of assembly testing and repairs to the cross-connection control program manager within one week from the time the testing and/or repairs were completed.
4. The tester shall inform the customer and/or the cross-connection control program manager if any existing backflow prevention assembly is not installed commensurate with the degree of hazard and pressure conditions or if the assembly is not installed in its required orientation. It is the responsibility of the cross-connection control program manager to enforce the provisions of the Cross-Connection Control Program to bring the assembly into compliance. The tester does not have the authority to discontinue the customer's water service or to alter the design or operation of approved backflow prevention assemblies.

GENERAL REQUIREMENTS

Containment Cross-Connection Control

No water connection from the public water supply shall be made to any residence or establishment handling substances deleterious or hazardous to the public health without an air gap separation or an approved backflow prevention assembly installed at the water service connection.

Mandatory Containment Cross-Connection Control

An approved backflow prevention assembly shall be required at all new and existing Class B water.

Containment Inspections of Premises

Any residence or establishment considered to pose an actual or potential threat of contamination or pollution to the public water supply shall be subject to a water use inspection. Employees or representatives of LVWD shall have the right to go on any premises at reasonable times to make water use examinations or inspections.

1. In the event, a system hazard is determined to exist, the LVWD shall immediately terminate water service to the premises. The LVWD shall restore water service to the premises when the system hazard has been controlled or eliminated. LVWD reserves the right to install backflow prevention assemblies in emergencies where there is an eminent threat to the public water supply. Any backflow prevention assembly or enclosure provided by the LVWD shall become the property of the customer for the purposes of operation, testing, and maintenance.

2. In the event no system hazards exist, but containment control is warranted, the LVWD shall give the customer written notice to install an approved backflow prevention assembly at the water service connection within 30 days of the date of the notice. The

LVWD shall terminate water service to the premises for failure, refusal, or inability on the part of the customer to install, and maintain such assembly(s) until the requirements are met.

Premises with Private Wells

Any residence or establishment with an existing private wells and a water service connection to the LVWD supply system shall have the following two options:

1. Agree to permanently abandon use of the private wells by plugging the well in accordance with the LVWD, or

2. Agree to completely and permanently sever the private well from the premises water supply system in accordance with the LVWD procedures prior and shall
install an approved backflow prevention assembly, at the water service connection.

Parallel Installations

Parallel installations of two or more backflow prevention assemblies is an effective means insuring that uninterrupted water service is maintained during testing or repair of assemblies and is strongly recommended when the customer desires such continuity. The decision opting for a parallel installation and its design rests solely with the customer. The customer shall submit a design and plan of implementation to the Cross-Connection Control Manager for approval before the installation of the assemblies.

Fire Protection Systems

1. Fire protection systems are systems of pipes and equipment used exclusively to supply water for extinguishing fire. All water service connections to new and existing fire protection systems, including but not limited to standpipes, hydrants, and automatic sprinkler systems shall be protected with an air gap or a reduced pressure principle detector assembly.

2. Whenever a backflow prevention assembly is installed in the potable water supply to a fire protection system, the customer shall be responsible that the hydraulic design of the system shall account for the pressure drop through the assembly.

Thermal Expansion

The installation of "non-return devices" such as backflow prevention assemblies, check valves, dual check valves, pressure reducing or regulating valves, and in some instances water softeners between the water service connection and the premises domestic water heater may create a "closed domestic water system." It is the responsibility of the customer to control thermal expansion created by the installation of any device that prevents pressure relief through the building supply.

Isolation Cross-Connection Control

1. As a condition of continuous water service, the customer shall install, maintain, and operate their plumbing systems for the safety and protection of the their water system as well as the LVWD. In the event actual or potential cross connections require isolation

control, the customer shall have approved backflow prevention methods, devices, and assemblies installed at specific locations within the customer's water system.

2. LVWD shall respond to customer's water quality complaints by conducting inspections of the customer's premises to determine compliance with the provisions of cross connection isolation requirements.

3. All backflow prevention assemblies shall be installed in their required orientation, in accordance with the proper degree of hazard, and pressure condition as indicated in this manual.

Backflow Prevention Assembly Enclosures

1. Backflow prevention assemblies shall be protected from freezing and vandalism by a method acceptable to the LVWD. Protective enclosure design, installation and maintenance shall comply with OSHA 29 CFR, Part 1910.146 "Confined Spaces."

2. The customer shall be responsible for the cost of design, installation and maintenance of protective enclosures to prevent the backflow prevention assemblies from freezing and vandalism. The protective enclosure shall provide for adequate drainage from testing, flushing or relief valve discharging.

3. Protective enclosures must be installed and maintained so that backflow prevention assemblies are safely and readily accessible for testing, maintenance, and repairs.

Inactive Services

All inactive water services with containment backflow prevention assemblies installed shall have the water supply closed and locked. The cross-connection control program manager shall test the assemblies on those services where it is impracticable to close and lock the water supply. The LVWD shall bear the costs for such testing.

Backflow Prevention Assembly Testing

1. All backflow prevention assemblies within the jurisdiction of LVWD shall be tested for proper operation by a backflow prevention assembly testers at the time of installation, repair, or relocation and at least on an annual schedule thereafter or more often when required by the cross-connection control program manager.

2. Assemblies shall be tested in accordance with the criteria set forth in this manual. Copies of all test reports shall be kept on file by the Cross-Connection Program Manager.

4. Assemblies that fail the operational test shall be repaired, overhauled, and retested immediately by a TCEQ licensed backflow prevention assembly tester. Testing of the assemblies shall not be considered to be complete until the cross-connection control program manager has certified that the assembly has passed the operational test.

Test Equipment Calibration

Backflow prevention assembly test equipment shall be calibrated annually in accordance with A.N.S.I. and A.S.S.E 1064 standards by a qualified calibration facility. Th1e test equipment manufacturer, model, serial number, and last date of calibration shall be recorded on the backflow prevention assembly test report form.

Backflow Prevention Method, Device, and Assembly Application Table

METHOD	HAZARDS PRESSURES	SEWAGE HIGH	SEWAGE LOW	BACK-PRESSURE	BACK-SIPHONAGE	CONTINUOUS PRESSURE
AG	YES	YES	YES	YES	YES	YES
AVB	NO	YES	YES	NO	YES	NO
DC	NO	NO	YES	YES	YES	YES
DCDA	NO	NO	YES	YES	YES	YES
PVB	NO	YES	YES	NO	YES	YES
RP	NO	YES	YES	YES	YES	YES
RPDA	NO	YES	YES	YES	YES	YES
SVB	NO	YES	YES	NO	YES	YES

AG Air gap
AVB Atmospheric vacuum breaker
DC Double check valve assembly
DCDA Double check detector assembly
PVB Pressure vacuum breaker assembly
RP Reduced pressure principle assembly
RPDA Reduced pressure principle detector assembly
SVB Spill-resistant pressure vacuum breaker assembly

Mandatory Containment Requirements

Typical facilities or water uses that require delivery from the LVWD through an air gap or specified type of backflow prevention assembly:
Method or type of assembly

Agricultural AG or RP
Animal grooming AG or RP
Animal processing AG or RP
Automotive repair AG or RP
Auxiliary water supply AG or RP
Beverage processing AG or RP
Canneries AG or RP
Car washing AG or RP
Chemical manufacturing AG or RP
Clinics AG or RP
Commercial laundries AG or RP
Complex piping systems AG or RP
Construction water service points AG or RP
Containing toxic substances AG or RP
Cooling systems AG or RP

Dairy product processing AG or RP
Dental offices and laboratories AG or RP

Drawing water from public hydrants for filling trucks AG or RP
Dye plants AG or RP
Electroplating AG or RP
Fire protection systems AG or RPDA
Food processing plants AG or RP
Garment finishers AG or RP
Green houses AG or RP
Heating systems AG or RP
Hospitals AG or RP
Industrial systems AG or RP
Laundries AG or RP
Lawn irrigation systems AG or RP
Lease space (shopping centers, warehouses) AG or RP
Manufacturing natural or synthetic rubber AG or RP
Medical and surgical AG or RP
Metal finishing AG or RP
Metal molding and forming AG or RP
Metal plating AG or RP
More than one connection to the public water supply AG or RP
Mortuaries and morgues AG or RP
Multi-storied buildings AG or RP
Nursing and convalescent homes AG or RP
Paper processing AG or RP
Petroleum processing or storage facilities AG or RP
Photographic processing AG or RP
Plastic injection AG or RP
Plumbing hazards AG or RP
Power plants AG or RP
Private wells AG or RP
Radiator shops AG or RP
Radioactive materials AG or RP
Ready mix concrete AG or RP
Reclaimed water systems AG or RP
Sand and gravel plants AG or RP
Schools with laboratories AG or RP
Sewage lift stations AG or RP
Sewage treatment plants AG or RP
Steam generating AG or RP
Tall buildings AG or RP
Taxidermy AG or RP
Temporary service AG or RP
Totally or partially outside the LVWD AG or RP
Uncontrolled cross connections AG or RP
Veterinary AG or RP
Water treatment AG or RP
Where inspection is restricted AG or RP
This table is not an all-inclusive list and may be supplemented by the Cross-Connection Control Manager.

AIR GAP

Defined

An air-gap is the unobstructed vertical distance through the free atmosphere between the discharge end of a potable water supply pipe and the flood level rim of an open or non-pressure vessel

Installation Requirements

1. The air gap must either be at least twice the diameter of the water supply outlet above the flood level rim of a non-vessel or one inch, whichever is greater.
2. The air gap shall be installed with adequate access and clearance for inspection and located outside any enclosure or hooded area containing fumes that are toxic, poisonous, or corrosive.
3. A permanent platform is necessary whenever the air gap is installed more than five feet above floor or grade. The platform must be within five feet of the lowest part of the assembly and must meet all applicable safety standards and codes.

Inspection Requirements

Air gaps shall be inspected at the time of installation and on an annual schedule thereafter or more often when required by LVWD.

ATMOSPHERIC VACUUM BREAKER

Defined

An atmospheric vacuum breaker consists of a float check, a check seat, and an air inlet port. This device is not acceptable for use in the LVWD.

DOUBLE CHECK VALVE ASSEMBLY

Defined

A double check valve backflow prevention assembly consists of two independently acting internally loaded check valves, four properly located resilient seated test ports, and two resilient seated isolation valves at each end of the assembly. This assembly is not acceptable for use in the LVWD.

DOUBLE CHECK VALVE DETECTOR ASSEMBLY

Defined

A double check detector assembly consists of a line sized approved double check valve assembly with a bypass containing a water meter and another approved double check valve assembly. The meter shall register accurately for low flow rates from 0 to 3 gpm and shall register for all rates of flow. The double check detector assembly is primarily used on fire sprinkler systems. This assembly is not acceptable for use in the LVWD.

PRESSURE VACUUM BREAKER ASSEMBLY

Defined

A pressure vacuum breaker assembly consists of an independently operating internally loaded check valve, an independently operating loaded air inlet valve on the discharge side of the check valve. The assembly shall be equipped with two properly located resilient seated test ports and two resilient seated isolation valves at each end of the assembly. This assembly is not acceptable for use in the LVWD.

REDUCED PRESSURE PRINCIPLE ASSEMBLY

Defined

A reduced pressure principle backflow prevention assembly consists of two independently acting internally loaded check valves, a hydraulically operating, mechanically independently pressure differential relief valve located between the check valves and below the first check valve. The assembly shall be equipped with two properly located resilient seated test ports, and two resilient seated isolation valves at each end of the assembly.

Installation Requirements

1. The RP must be installed between 12" and 36" above grade from the lowest part of the assembly for containment installations, and between 12" and 60" above floor or grade from the lowest part of the assembly for isolation installations. The assembly shall not be subjected to flooding.

2. Drainage requirements for the RP must be hydraulically calculated to handle the maximum relief valve discharge rate. Most manufacturer's air-gap drains are designed to only handle occasional spitting from the relief valve and will not accommodate a full discharge. An approved air-gap separation at the relief valve is required.

3. RPs must be installed in locations where intermittent and continuous discharge from the relief valve will not be objectionable.

4. In cold climates, RPs must be protected from freezing with a positive heat source. Whenever the RP is insulated, precautions must be taken to prevent blockage of the relief valve opening and access to components. The insulation must be easy to remove in order to facilitate testing and repair.

5. RPs must be installed horizontal and plumb unless specifically noted in the "List of Approved Backflow Prevention Assemblies" published by the Foundation for Cross-Connection Control and Hydraulic Research of the University of Southern California.

6. Thermal expansion and/or water hammer in the outlet piping of the assembly can cause excessive pressure (backpressure). A water hammer arrestor, thermal expansion tank, resilient seated check valve, or surge suppresser installed in the outlet piping is recommended to avoid damage to the piping system and the assembly.

7. Fluctuating inlet pressure may cause intermittent discharge of the relief valve and eventual fouling of the assembly. In a static condition, the zone between the two check valves must be maintained at least 2.0 psi below the supply pressure. A resilient seated check valve installed in the inlet piping of the RP is recommended to maintain constant pressure of the zone during water supply pressure fluctuations.

8. Assemblies 2-1/2" and larger must be adequately supported.

9. Immediately after installation and before the assembly is tested or service is restored, the assembly must be thoroughly flushed. This is accomplished by completely removing the No. 1 check valve and opening the No. 1 shut-off valve to flush debris that may foul the assembly.

10. The size of the RP shall not be less than the size of the water supply piping.

11. The RP shall be installed in accordance with the assembly's operating pressure and temperature rating.

12. The RP shall be installed with adequate access and clearance for testing, maintenance, and repairs and outside any enclosure or hooded area containing fumes that are toxic, poisonous, or corrosive.

13. A permanent platform is necessary whenever the assembly is installed more than five feet above floor or grade. The platform must be within five feet of the lowest part of the assembly and must meet all applicable safety standards and codes.

14. The RP shall be installed in accordance with the manufacturer's flow rate specifications. The flow rates and pressure loss due to increasing or decreasing flow rates will vary from one manufacturer to another.

Testing Requirements

1. Reduced pressure principle assemblies must be tested to ensure proper operation by a certified backflow prevention technician upon installation, repair, or relocation and at least annually thereafter.

2. The following steps shall be used by certified backflow prevention technicians when testing reduced pressure principle assemblies within the jurisdiction of LVWD:

a. Determine the apparent static pressure drop across check valve No. 1 in the direction of flow.
b. Test that the differential pressure relief valve operates to maintain the zone between the two check valves at least 2.0 psi less than supply pressure.
c. Determine that check valve No. 2 closes tight in reverse flow.
d. Determine that the confirmed static pressure drop across check valve No. 1. is at least 3.0 psi greater than the relief valve opening point.
e. Determine that the static pressure drop across check valve No. 2 is a minimum of 2.0 psid.
f. Determine that the comparison of the two readings of check valve No. 1 is within 1.0 psid.

REDUCED PRESSURE PRINCIPLE DETECTOR ASSEMBLY

Defined

A reduced pressure principle detector assembly consists of a line sized approved reduced pressure principle assembly with a bypass containing a water meter and another approved reduced pressure principle assembly. The meter shall register accurately for low flow rates from 0 to 3 gpm and shall register for all rates of flow. The reduced pressure principle detector assembly is primarily used on fire sprinkler systems.

Installation Requirements

The installation requirements for the reduced pressure principle detector assembly are the same as the requirements for the reduced pressure principle assembly.

Testing Requirements

The testing requirements for the mainline and bypass assemblies are the same as the reduced pressure principle assembly. However, in order to force water through the metered bypass, the total differential across the main line assembly must be greater than the bypass assembly. At the conclusion of the test, water flow must be verified through the assembly; this may be accomplished by opening the main drain of the fire sprinkler system.

SPILL-RESISTANT PRESSURE VACUUM BREAKER

Defined

A spill-resistant pressure vacuum breaker assembly consists of an independently operating internally loaded check valve, an independently operating loaded air inlet valve on the discharge side of the check valve. The assembly shall be equipped with one properly located resilient seated test port and vent valve and two resilient seated isolation valves at each end of the assembly. This assembly is not acceptable for use in the LVWD.

FEES

The LVWD shall assess fees associated with the implementation of Cross- Connection Control Program as follows:

Cross-Connection Control Program Fee

Because all active customers benefit from the Cross-Connection Control Program, the LVWD shall charge all active customers a Cross-Connection Control Program Maintenance Fee on their monthly water bill.

SEVERABILITY / VIOLATIONS

Severability

If any provision, section, subsection, sentence, clause, or phrase of these regulations, or the application of same to any person or set of circumstances, is for any reason held to be unconstitutional void, or invalid the validity of the remaining portions of these regulations shall not be affected and all provisions of the regulations are declared to be severable for that purpose.

Violations

1. Any customer who willfully removes or bypasses any backflow prevention methods, devices, assembly, or dual check valve; falsifies test reports; obtains water from a fire hydrant in violation of cross-connection control requirements; allows uncontrolled cross connections to exist; connects a fire protection system to a domestic water service; or fails to cooperate in the installation, maintenance, testing or inspection of backflow prevention assemblies as required by these regulations; shall be grounds for the discontinuance of water service to the customer's premises or the requirement for an air-gap separation from the public water supply. Water service shall not be restored until such conditions are corrected.

2. Discontinuance of water service may be summary, immediate, and without written notice whenever, in the judgment of LVWD, such action is necessary to protect the purity or the safety of the public water supply.

APPENDIX G

Testing Forms
Water and Sewer Facilities

Lower Valley
WATER DISTRICT

WATER PRESSURE TEST (150 PSI)

INSPECTED BY: _____ DATE: _____

NAME OF SUBDIVISION: _____ CONTRACTOR REPRESENTATIVE: ___

_____ _____

STREET	STA	TO STA	PIPE SIZE	DISTANCE	TIME	DATE REINSPECTED	RESULTS

Lower Valley
WATER DISTRICT

EXFILTRATION AIR TEST – SEWER LINE

INSPECTED BY: _____ DATE: _____

NAME OF SUBDIVISION: _____ CONTRACTOR REPRESENTATIVE: ___

_____ _____

NOMINAL PIPE SIZE (d) INCHES	*TIME (t) MINUTES/100 ft.
8	1.2
10	1.5
12	1.8
15	2.1
18	2.4
21	3.0
24	3.6
30	4.8
36	6.0
42	7.3

*Anything less than 400' shall require a four (4) minute test.

STREET	STA	TO STA	PIPE SIZE	DISTANCE	TIME	DATE REINSPECTED	RESULTS

Lower Valley
WATER DISTRICT

MANDRELL TEST – SEWER LINE

INSPECTED BY: _____ DATE: _____

NAME OF SUBDIVISION: _____ CONTRACTOR REPRESENTATIVE: ___

_____ _____

STREET	STA	TO STA	PIPE SIZE	DISTANCE	TIME	DATE REINSPECTED	RESULTS

Lower Valley
WATER DISTRICT

VACUUM TEST (MANHOLE)

INSPECTED BY: _____ DATE: _____

NAME OF SUBDIVISION: _____ CONTRACTOR REPRESENTATIVE: ___

_____ _____

Plug all inlets and outlets and inset rubber ring "donut" type plug in cone opening. Attach vacuum pump to hose connected to plug in cone and apply 27.60 KPa (4-psi) of vacuum (install vacuum regulator on pump such that maximum applied vacuum is 69 KPa or 10 psi). After vacuum has stabilized at 24.13 KPa (3.5 psi) for 1 minute, test shall begin. During test period, manhole shall lose no more than 3.5 KPa (0.5 psi) of vacuum. Specified test periods are as follows:

Manhole Depth, Feet	Test Period, Min.
0-5	4.5
5-10	5.5
10-15	6.0
>15	6.5

STREET	STA	TO STA	PIPE SIZE	DISTANCE	TIME	DATE REINSPECTED	RESULTS

APPENDIX H

Application
Water and Sewer Services
To New Developments

Lower Valley
WATER DISTRICT

Date: _____

APPLICATION FORM FOR WATER & SEWER SERVICES TO NEW DEVELOPMENTS

Name of Developer/Development: Phone No.
Location & Address:
Consulting Engineer: Contact Person & Phone No:
Type of Development: ☐ Business ☐ Subdivision ☐ Residential Home ☐ Residential Apartments
General Description of Development:
Type of Water and Sewer Services Required:

Lower Valley
WATER DISTRICT

Contract # _____

APPLICATION FOR NEW WATER OR SANITARY SEWER SERVICE

Owner's Name _____ Mailing Address _____
Last Name First Name Zip Code

LEGAL DESCRIPTION OF PREMISES

Official Address _____ Name of Addition _____

Addition Block Number _____ Lot Numbers _____
Include numbers of all full lots and numbers and description of partial lost within the boundaries of the Premises

TYPE OF OCCUPANCY

Single Residence ☐ Duplex Residence ☐ Apartment House ☐ Store ☐ Other Type _____ (Specify)

SERVICE OR SERVICES DESIRED

INSTALL WATER SERVICE: Domestic ☐ Yardmeter ☐ Fireline ☐ Standpipe ☐

Size _____ Location _____ Want Service Frozen ☐

ENLARGE PRESENT SERVICE: ☐ Size _____ ☐ Relocate _____

PROVIDE SANITARY SEWER TAP: ☐ Size _____ Location _____ Taps Required _____

☐ Existing Mains _____ ☐ Extension Required ☐ Water ☐ Sewer

CHARGES

Description	Footage	Rate	Frontage Deposits	Sub-Total
Water Frontage				
Sewer Frontage				
☐ Credit ☐ Deposit WTR Frontage				
☐ Credit ☐ Deposit SWR Frontage				
Paving				
Installation				
Meter Deposit				
Add Frontage Deposits to Sub Total		Sub Total		
Dist./Sect. _____			Total Cost	

PREVIOUS SERVICE:

Folios:

Date:

Code:

Legal:

Contract #:

W.S. #:

Notes:

This filing is to obtain costs on the above installations and it is understood that there the necessary contract or contracts will be prepared for the above indicated work, if the Rules and Regulations of the Lower Valley Water District so permit. It is further understood that the filing of this application in no way obligates the applicant to the Lower Valley Water District, or is an indication that the applicant will make contract, or contracts, for the service applied. Nothing herein creates a contractual obligation on Lower Valley Water District, and the prices or charges quoted herein are subject to charge. No price or charges quoted will remain valid for a period of more than 60 days from the date of this application.

Applicant _____
Please Type or Print Signature

Address _____ Phone _____

Space Below for System Office Record

Installation and Service Contract Number _____

Taken by _____ Date _____ Charges Computed by _____ Date _____

DEVELOPMENT AGREEMENT
(Subdivision Extensions)

STATE OF TEXAS:
COUNTY OF EL PASO:

This is a Development Agreement executed as of the ___day of _____, 20___ between the Lower Valley Water District and the Owner/Developer, ("Owner") _____.

WHEREAS, Owner has requested the opportunity to install water and sewer mains in Owner's new subdivision known as _____ an addition to the County of El Paso, Texas, in lieu of extension charges required by the District's Rules and Regulations, the LVWD is willing to grant this opportunity under certain terms and conditions;

WHEREAS, State government code authorizes the District to enter into a contract with a Developer of subdivision or land in the municipality to construct public improvements related to development,

NOW, THEREFORE, in consideration of the mutual covenants set forth herein, the parties agree as follows:

SECTION 1 – SYSTEM DESIGN:

A. Owner must first make written application for service in order to initiate the design process. A full set of subdivision improvement plans, water and wastewater design as defined in the LVWD Designs & Standards that will include plat, grading and drainage plans and street grades, must be submitted along with an AutoCadd compact disk or mylars of the plat, a current construction schedule, and a concept plan. Before the final design is released for construction, the Owner must submit one set of Final subdivision plans, including Phasing, if any, as approved by City Engineering for LVWD review. Once the LVWD has reviewed and approved the final utility Plans, and the design and other fees and fees assessed by other entities through the LVWD have been paid, the LVWD will execute the Development Agreement. The Owner will construct the Facilities under with the most current LVWD Design Standards. The Owner hereby acknowledges he has received copies of these documents, commencement of the construction is deemed to be approval and acceptance of the Plans by the Owner and his contractor. If the Owner fully complies with the terms and conditions of this Contract, LVWD will refund any amounts which may become due in accordance with Chapter 6 of the LVWD's Rules and Regulations, or other applicable laws and regulations. Applicable refunds are set forth on the Refund Supplement attached hereto as Exhibit A and made a part of this Contract for all purposes.

B. These Plans include the following Facilities:

I. Water distribution system showing mains and sizes thereof, location in street, location valves, fire hydrants and other information.

Water Job No. _____

Description _____

_____

II. Sewer collection system showing mains and size thereof, location in street, manholes, and profiles which show elevations of invert and ground and grades.

Sewer Job No. _____

Description _____

_____

SECTION 2 – INSURANCE AND CHANGES IN THE WORK:

The Owner will enter into a construction contract for this work with a utility contractor who is experienced in performing similar water and sewer construction. The Contractor is an independent Contractor and shall be required to hold the LVWD harmless from any damages or claims which may arise during construction. The Owner's contractor shall execute a hold harmless agreement, attached hereto as Exhibit B, which shall become part of this Development agreement. The Owner agrees to integrate this Development Agreement into his construction contract and require expressly in the construction contract that the contractor will be bound to comply with the provisions hereof. The Owner and his contractor confirm that they are familiar, and will fully comply, with the additional insurance and other requirements set forth on Exhibit C, which is attached to and made a part of this contract for all purposes. The LVWD shall be provided with a copy of the Insurance Certificate evidencing coverage for the full term of the Project and shall be named as an additional insured on the General Liability policy. Notwithstanding anything in this Agreement to the contrary, Owner agrees and represents that his contractor will be so bound; that Owner remains responsible for additional work on the facilities at the site as may be required by the LVWD due to changes in the work or for other reasons determined by the LVWD to be necessary in order to ensure that the work is constructed satisfactorily and in accordance with the terms of this contract & LVWD Design Standards.

The Owner has engaged the following Contractor for this work:

_____

Contractor's Name

_____

Address

_____

Phone Number

SECTION 3 – COORDINATION OF CONSTRUCTION:

The Owner is responsible for coordinating the construction with the Engineering Department of the LVWD. Curbs must be installed and the Streets graded to, but not more than, six inches above sub-grade. The LVWD is entitled to inspect and observe the work at all times; but is understood and agreed that the responsibility for conforming the work to the Plans is the sole responsibility of the Owner. The fact that the LVWD has inspected the work at any stage shall not be deemed to be acceptance or approval by the LVWD of the work performed. Approval and acceptance of the work shall be effective only when done so in writing, as provided for below. Nothing herein shall make the LVWD responsible for the Owner or his contractor's failure to perform the work in accordance with Contract Documents, nor shall the LVWD be responsible for the means, methods, techniques, sequences or procedures of construction, or the safety precautions incident thereto.

SECTION 4 – PAVING CUTS:

If any paved city streets are to be cut during the conduct of the work under this Agreement, the Owner shall notify the City of Socorro Planning Department, City of Socorro, Town of Clint, El Paso County, Road & Bridge in advance of the location and nature of the cut, when it is to be done, and the name of the sub-contractor for paving. The Owner's contractor shall continuously, and not less frequently than once daily, maintain backfilled cuts in streets or alleys in order to assure a smooth riding surface for vehicular traffic. He shall also wet down the surface of unpaved cuts regularly in order to minimize dust, and make every effort to have the street surface repaved as soon as possible. In no case shall a cut be left unpaved for more than seven days after the initial backfilling. On arterial streets, a temporary paving patch of HMAC or cold mixed asphaltic concrete shall be place immediately after backfill, to be removed when the permanent patch is placed. When any cut in a street is not so maintained or repaired within the required time, the LVWD is entitled to authorize the Governing Entity to perform the work, or to perform the work with its own forces, at the expense of the Owner, including a charge for reasonable overhead. The Owner shall pay this expense within ten (10) days of receipt of an invoice for such work.

SECTION 5 – AFFIDAVIT OF COMPLETION:

It is understood and agreed by the parties that the purpose of this Agreement is to ultimately assure that the public utilities and streets involved will be constructed in accordance with the Plans therefore, in a workmanlike manner, utilizing normal industry standards, and dedicated to the City entities as fit for their intended use, free and clear of any liens or encumbrances.

Once the work is complete, and upon receipt of a Completion Certificate from its Field Inspector certifying that all facilities have bee constructed in compliance with the Plans, the LVWD will issue a Paving Release to the City Engineer with a copy to the Owner. The Owner shall then cause his contractor to set the manholes and valve boxes to final grade; verify that meter boxes are in a condition acceptable to the LVWD for setting meters; and certify that the streets are acceptable to the City of Socorro, Town of Clint, or El Paso County Road and Bridge Department, Prior to dedication of Board of Directors. The Owner will then send a request to the LVWD asking that the Facilities be conveyed to the LVWD, in writing, free and clear of all liens and encumbrances.

Owner will then execute and deliver to the LVWD its affidavit stating that the Facilities have been completed in accordance with the Plans and in accordance with the terms of this Development Agreement, the specifications, and all applicable laws; that all final adjustments have been made as requested; that the Owner has paid for all labor and materials; that there are no outstanding claims relating to the work; and that all debts with the LVWD have been paid. The Owner must include a specific Release of Liens from its utility contractor and engineer with the signed conveyance form.

SECTION 6 – PARTIAL ACCEPTANCE:

When Partial Acceptance of a facility is agreed upon between the LVWD and the Owner, it is understood and agreed that the one year Warranty period will not begin until Final Acceptance of all facilities to be installed under this Development Agreement.

The Developer shall submit a letter of request to the Utility and shall include a highlighted map of the area to be conditionally accepted with the number of linear feet, valve to valve, to be conveyed to the Utility. He shall also provide the address for each requested temporary construction water meter. Upon approval by the Utility's Engineer, the Field Inspector will certify that portion of line as acceptable for inclusion to the Utility's Engineer, a Partial Condition Completion Certificate indicating the facilities and addresses of temporary water services accepted. The Developer shall deliver a Conveyance and a Partial Release of Liens and the Utility will issue a partial Conditional Acceptance Letter. The Developer may then authorize his agents to contact Customer Service to request a construction meter.

SECTION 7 – ONE YEAR WARRANTY:

A. Owner represents and warrants to the LVWD that all work was performed in a good and workmanlike manner, strictly in accordance with the Plans, and as otherwise provided in this Agreement. This warranty shall remain in full force and effect for a period of one year from and after the date of Dedication from the Board of Directors of the facilities shown on the plans under this Developer Agreement by the LVWD. No mechanics liens shall ever be threatened or filed against the subdivision or property which is the subject of this Contract. It is understood and agreed that, notwithstanding the acceptance of the Facilities by the LVWD, Owner remains responsible for a period of one year from the date of the dedication of final acceptance by the LVWD for conforming the work to the Plans and otherwise complying with the warranty granted in this paragraph. Owner further agrees to be fully responsible for the repair and maintenance of the Facilities for a period of one year from the date of issuance of the letter of the letter of Final Acceptance.

The Owner may include applicable warranty provisions in its contracts with other utilities, paving or other contractors employed by him on the work, or those with subsequent purchasers of lots in the subdivision. However, the Utility will look to the Owner for correction of defects or damage to the facilities constructed under this Development Agreement.

Thirty (30) days prior to the expiration of the one year warranty period, Owner agrees to an inspection of the Facilities by the LVWD. In the event Owner determines to sell lots in the subdivision prior to acceptance of the Facilities by the LVWD, Owner agrees to include a provision in the sales contract stating that the Facilities have not yet been accepted by the LVWD and that services will not be activated until such acceptance has been obtained.

SECTION 8 – DEFAULT

In the event Owner or his contractor fail to comply with the provisions hereof, the LVWD may take such actions to which it may be entitled by law or equity, including, but not limited to: stopping the work; seeking specific performance of this Contract; or suing for damages.

SECTION 9 – INDEPENDENT CONTRACTOR/INDEMNIFICATION

A. INDEPENDENT CONTRACTOR:

The Owner, and his Contractor, shall operate as an independent Contractor, not subject to the direct or continuous supervision and control of the LVWD. The parties agree that in no event shall the Owner or his Contractor be deemed to be an agent, officer or employee of the LVWD.

B. INDEMNIFICATION:

The Owner, for himself, his Contractor, sub-contractors, officers, agents, employees and representatives, hereby indemnifies and holds harmless the LVWD, its officers, agents and employees from and against all claims, damages, losses and expenses (including attorney's fees, expert fees and overhead) in any way arising out of or resulting from their performance under this contract, including the construction of the facilities by the Contractor, any subcontractor, anyone directly or indirectly employed by the Contractor, or anyone for whose acts the Contractor or sub-contractor may be liable, including any claims, damages, losses or expenses resulting in injury or death.

SECTION 10 – TITLE:

Owner represents that it currently hold title, or has presented evidence that it has entered into a contract to purchase and obtain title, to the property in exactly the same manner in which it signs this Agreement. The terms and provisions thereof shall be binding upon, and inure to the benefit of, the parties hereto and their successors, assigns, heirs and personal representatives.

SECTION 11 – ASSIGNABILITY:

The Owner shall not assign any interest in this Agreement (whether by assignment or novation) without the prior written consent of the LVWD.

SECTION 12 – COMPLIANCE WITH LAWS:

The Owner shall comply with all applicable laws, ordinances, rules and regulations and codes of the federal, state, and local governments, as they may now read or hereinafter be amended.

SECTION 13 – SERVERABILITY:

Venue and jurisdiction of any suit or right or cause of action arising under or in connection with this Agreement shall be exclusively in a court of competent jurisdiction sitting in El Paso County, Texas; and this Agreement shall be interpreted in accordance with the laws of the State of Texas.

SECTION 14 – SEVERABLITIY:

The sections, paragraphs, sentences, clauses, and phrases of this Agreement are severable and if any phrase, clause, sentence, paragraph or section of this Agreement should be declared invalid by a final decision of a court of competent jurisdiction, such invalidity will not affect any of the remaining provisions of the Agreement.

SECTION 15 – CAPTIONS:

The captions of this Agreement are for informational purposes and shall not in any way affect the substantial terms and conditions of this Agreement.

IN WITNESS HEREOF THE LOWER VALLEY WATER DISTRICT, has caused this Agreement to be executed by its General Manager and by the Owner, or by their duly authorized representatives on this _____day of _____, 20_____.

Owner

_____
Company Name

_____
Authorized Signature

_____
Type or Printed Name Title

_____
Date

_____
Owner's Address

_____ _____
Phone Number Fax Number

Lower Valley Water District

_____
Mario Aguilar
General Manager

_____
Date

EXHIBIT A
DEVELOPMENT AGREEMENT (SUBDIVISION EXTENSIONS)
REFUND SUPPLEMENT

In accordance with Section 2 of the Agreement and Section II-G and III-E of the Lower Valley Water District Rules and Regulations No. 7, as amended, the Developer may become eligible for the following refunds:

II-G-1 for Water Boundary Lines _____

_____

III-E-2 for Sewer Boundary Lines _____

_____

II-G-2 for Water "Off-Site Line" _____

_____

III-E-3 for Sewer "Off-Site Line" _____

_____

OWNER: _____

_____

_____

_____

Subdivision: _____

_____

_____

_____

Job Number: _____

_____

Date: _____

EXHIBIT B
LOWER VALLEY WATER DISTRICT
HOLD HARMLESS CLAUSE

_____, an independent Contractor, has been retained by

_____, Owner, to install water and/or sewer lines and

appurtenances in the subdivision known as _____, in El Paso, Texas. The work will be

performed in connection with a Developer Agreement between the OWNER and the Lower Valley Water District in accordance with

the plans and specifications under Job # _____ for water and Job # _____ for sewer.

The Contractor hereby certifies that it, its principals, heirs and assigns will hold the City of El Paso, the Lower Valley Water District, their officers, employees, agents and assigns, harmless from any and all damages or claims which may arise out of the performance of this work.

NAME OF CONTRACTOR

_____
Typed Name
Title

_____
Date

LOWER VALLEY WATER DISTRICT

_____
Mario Aguilar
General Manager

_____
Date

EXHIBIT C
INSURANCE REQUIREMENTS

The Contractor shall not commence work under the contract until he/she has obtained all the insurance required under this paragraph and satisfactory evidence of such has been provided and the insurance has been approved by the Owner or the Developer; nor shall the Contractor allow any subcontractor to commence work on his/her subcontract until the insurance required of the subcontractor has been so obtained and approved.

COMPENSATION INSURANCE:

The Contractor shall procure and maintain during the period of performance of said contract Worker's Compensation Insurance as required by applicable State law for all his/ her employees to be engaged in work of this project; in the case of any work sublet, the Contractor shall require the subcontractor similarly to provide Worker's Compensation Insurance for all the latter's employees to be engaged in such work unless such employees are covered by the protection afforded by the Contractor's Worker's Compensation Insurance. In case any class of employees engaged in hazardous work on the project under said contract is not protected under the Worker's Compensation Statute, the Contractor shall provide, and shall cause each subcontractor to provide, adequate Employer's Liability Insurance for the protection of such of his/her employees as are not otherwise protected.

CONTRACTOR'S PUBLIC LIABILITY AND PROPERTY DAMAGE INSURACNCE AND VEHICLE LIABILITY INSURANCE:

The Contractor shall procure and maintain during the period of performance of said Contract Contractor's Public Liability and Property Damage Insurance and Vehicle Liability Insurance in the amounts specified herein, or if said limits are subsequently superseded by statute such new limits shall apply:

TABLE 1: **LIMITS OF COVERAGE FOR ALL CONSTUCTION PROJECTS**	AUTOMOBILE (5.3.7) {Combined Single Limit}	COMMERCIAL LIABILITY (5.3.3 through 5.3.6)	WORKER'S COMPENSATION (5.3.2) {Employer's Liability} Per Accident Per Employee Per Disease
CONTRACTS LESS THAN $100,000: Occurrence Aggregate	$ 300,000	$ 500,000	$ 500,000
CONTRACTS LESS THAN $ 500,000: Occurrence Aggregate	$ 500,000	$ 500,000 $ 1,000,000	$ 500,000 $ 500,000
CONTRACTS $ 500,000 TO $ 10,000,000 Occurrence Aggregate	$ 1,000,000	$ 1,000,000 $ 2,000,000	$ 1,000,000 $ 1,000,000

SUBCONTRACTOR'S PUBLIC LIABILITY AND PROPERTY DAMANGE INSURANCE AND VEHICLE LIABILITY INSURANCE:

The Contractor shall either (1) require each of his/her subcontractors to procure and to maintain, during the life of his/her subcontract, Subcontractor's Public Liability and Property Damage Insurance and Vehicle Liability Insurance in the amounts specified; or (2) insure the activities on the Contractor's own policy.

SCOPE OF INSURANCE AND SPECIAL HAZARDS:

The Insurance required under the above referenced paragraphs shall provide adequate protection for the Contractor and his/her subcontractors against damage claims which may arise from operations under this contract whether such operations are by the insured or by anyone, directly or indirectly, employed by him/her; and also against any of the special hazards which may be encountered in the performance of this contract as enumerated herein:

HAZARD: _____

AMOUNT: _____

BUILDER'S RISK INSURANCE (FIRE AN EXTENDED COVERAGE):

This Insurance shall only be required only for building projects as opposed to street, bridge, water and drainage projects/

Until this project is completed and accepted by the Owner, the Contractor is required to maintain Builder's Risk Insurance (Fire and Extended Coverage) on a one hundred percent (100%) completed value basis on the insurable portion of the project for the benefit of the Owner, the Contractor and the Subcontractor, as their interest may appear. The Contractor shall not include any costs for Builder's Risk Insurance premiums during construction unless the Contractor is required to provide such insurance; however, this provision shall not release the Contractor from his specifications for the project covered by the Contract. The Contractor and the Surety shall be obligated to full performance of the Contractor's undertaking.

PROOF OF CARRIAGE OF INSURANCE:

The Contractor shall furnish the Owner with certificated, and the Owner shall provide the Utility a copy of such certificated, or other satisfactory evidence of insurance, showing the type, amounts, class of operations covered, effective dates, and dated of expiration of insurance policies. Such certificates shall also contain substantially the following statement: "The Insurance covered by this Certificate will not be canceled or materially altered except after ten (10) consecutive calendar days' written notice of intent to cancel or materially alter said Insurance has been provided to the Owner."

The LVWD shall be named an additional insured on the General Liability policy.

APPENDIX I

Sample
Water and Sewer Service Agreement

"SAMPLE"

WATER SERVICE AGREEMENT

AGREEMENT REGARDING WATER SERVICE FOR THE PROPOSED SUBDIVISION of Chavez Estates Unit #2, Block 27, Lot 19A and 19B.

PARTIES: This Agreement is by and between the Utility and the Subdivider, to wit:

The Utility is the governing board or owner of a retail public utility which supplies of drinking water known as Lower Valley Water District. The Subdivider is Jorge Chavez who is the owner, or the authorized agent of the owner, of a tract of land in El Paso County, Texas, that has been proposed to be divided into a subdivision known as Chavez Estates Unit #2, Block 30, Lot 19A and 19B.

TERMS: This Agreement is entered into in partial satisfaction of requirements under the Texas Water Development Board's Economically Distressed Areas Program Model Subdivision Rules. The Subdivider has prepared a plat of the Subdivision for submission to El Paso County for its approval. The Subdivider plans to construct for the Subdivision a drinking water distribution system to be connected to the Utility's public water system. The Utility has reviewed the plans for the Subdivision (the Plans) and has estimated the drinking water flow anticipated to be needed by the Subdivision under fully built-out conditions (the anticipated water flow) to be approximately 280 gallons daily.

The Utility covenants that it has or will have the ability to provide the anticipated water flow for at least thirty years, and that it will provide that water flow. These covenants will be in effect until thirty years after the plat of the Subdivision has been recorded and the Subdivision's water distribution system has been connected to the Utility's water supply system.

The Subdivider covenants that the water distribution system will be constructed as shown in the Plans and as provided for through the plat-approval process so that the residents of the lots of the Subdivision may receive drinking water service from the Utility. Upon completion of the water distribution system and upon its approval and acceptance by the Utility, the Subdivider will convey to the Utility all right and title to the water distribution system.

The Subdivider has paid the Utility the necessary fees for the District to accept dedication of water infrastructure.

The above provisions notwithstanding, this Agreement shall no longer be in effect if the plat of the Subdivision is not approved by El Paso County or by a municipality whose approval is required. No contractual liability is assumed by the Utility for any damages caused which are referable to Utility improvements, systems or to factors beyond the control of Utility.

By affixing his or her signature to this Agreement, the person signing for the Utility warrants that he or she is authorized to sign this Agreement on behalf of the Utility. By affixing his or her signature to this Agreement, the person signing for the Subdivider warrants that he or she is authorized to sign this Agreement on behalf of the Subdivider.

This Agreement is effective on this _____ day of March 2005.

Lower Valley Water District:

By:_____
Mario Aguilar, General Manager

Chavez Estates Unit #2,
Block 27, Lot 19A and 19B

By:_____
Jorge Chavez, Owner

"SAMPLE"

SEWER SERVICE AGREEMENT

AGREEMENT REGARDING WASTEWATER SERVICE FOR THE PROPOSED Chavez Estates Unit #2, Block 27, Lot 19A and 19B SUBDIVISION.

PARTIES: This Agreement is by and between the Utility and the Subdivider, to wit:

The Utility is the governing board or owner of a retail public utility which provides wastewater treatment known as Lower Valley Water District.

The Subdivider is Jorge Chavez, who is the owner, or the authorized agent of the owner, of a tract of land in El Paso County, Texas, that has been proposed to be divided into a subdivision (the Subdivision) known as Chavez Estates Unit #2, Block 27, Lot 19A and 19B.

TERMS: This Agreement is entered into in partial satisfaction of requirements under the Texas Water Development Board's Economically Distressed Areas Program Model Subdivision Rules. The Subdivider has prepared a plat of the Subdivision for submission to El Paso County for its approval. The Subdivider plans to construct for the Subdivision a wastewater collection system to be connected to the Utility's wastewater treatment system. Such wastewater will consist of domestic sewage, i.e., waterborne human waste and domestic activities such as bathing, washing, and food preparation. The Utility has reviewed the plans for the Subdivision (the Plans) and has estimated the wastewater flow projected from the Subdivision under fully built-out conditions (the projected wastewater flow) to be approximately 280 gallons daily.

The Utility covenants that it has or will have the capacity to treat the projected wastewater flow, and that it will treat that wastewater for at least thirty years. These covenants will be in effect until thirty years after the plat of the Subdivision has been recorded and the Subdivision's wastewater collection system has been connected to the Utility's wastewater treatment plant.

The Subdivider covenants that they will pay and construct the wastewater collection system as shown in the Plans and as provided for through the plat approval process so that the residents of the lots of the Subdivision may receive wastewater treatment service from the Utility. Upon completion of the wastewater collection system and upon its approval and acceptance by the Utility, the Subdivider will convey to the Utility all right and title to the wastewater collection system. The Subdivider has paid the Utility the required fees associated with wastewater connection.

The above provisions notwithstanding, this Agreement shall no longer be in effect if the plat of the Subdivision is not approved by El Paso County or by a municipality whose approval is required. No contractual liability is assumed by the Utility for any damages

caused which are referable to Utility improvements, systems or to factors beyond the control of the Utility.

By affixing his or her signature to this Agreement, the person signing for the Utility warrants that he or she is authorized to sign this Agreement on behalf of the Utility. By affixing his or her signature to this Agreement, the person signing for the Subdivider warrants that he or she is authorized to sign this Agreement on behalf of the Subdivider.

This Agreement is effective on March 23, 2005.

Lower Valley Water District:

By:_____
Mario Aguilar, General Manager

Land owner, Chavez Estates Unit #2, Block 27, Lot 19A and 19B:

By:_____
Jorge Chavez, Owner

APPENDIX J

Samples
Certificates of Dedication of Water And Wastewater Facilities

CERTIFICATE OF DEDICATION
OF
WATER FACILITIES
TO
THE LOWER VALLEY WATER DISTRICT

State of Texas }
}
County of El Paso }

(Owner)_____, is the owner of certain water and wastewater facilities (the "Facilities) located in El Paso County, Texas and more particularly described in the attached Exhibit A. The Lower Valley Water District (the "District") is a municipal utility district in El Paso County created pursuant to Chapters 49 and 54 of the Texas Water Code and Article XVI section 59 of the Texas Constitution. For and in consideration of the mutual covenants set forth in this Dedication, Owner intends to and does herby dedicate to the District and the District hereby accepts the Facilities upon the conditions and warranties provided for in this Dedication.

Owner hereby represents and warrants as follows:

1. Owner has constructed certain water and wastewater facilities as described in the attached Exhibit and located in the area known as (Name of Subdivision)____ Subdivision, which is located within the jurisdiction of the District. The Facilities are within the County of _____, Texas;

2. Owner represents and warrants that all components of the Facilities have been constructed strictly in accordance with the plans and specifications provided to the District, are in compliance with District's requirements for water and sewer systems, and are suitable for inclusion in the District's water and wastewater systems.

3. The Owner has paid for all labor and material used in the construction of the Facilities, there are no outstanding claims relating to the work, and there are no outstanding unpaid liens on the property.

4. For one year from the date of acceptance by the District, Owner will remain responsible for conforming the Facilities to the District's requirements and otherwise be fully responsible for repairing and maintaining the Facilities.

5. A plat of the (Name of Subdivision) Subdivision has been reviewed and approved by and has been files in accordance with the laws of the State of Texas, the County of El Paso and any municipalities in which the Facilities may be located.

6. The Facilities located in areas marked on the plat map dedicated to utility easements or in areas, which Owner has secured a recorded easement for the purpose of improving and maintaining the Facilities.

7. Owner has sufficient title and interest in the facilities to dedicate the Facilities to the District and is dedicating the Facilities in the same manner in which it signs this dedication.

The District hereby warrants and represents:

1. Upon the expiration of the one year warranty period by the Owner, and Final Acceptance by the District, the District will assume responsibility for the maintenance and repair of the Facilities and shall relieve Owner of any further responsibility for the Facilities.

2. Upon Final Acceptance by the District, the Facilities shall be used and maintained as part of the District's water and wastewater system.

State of Texas }
}
County of El Paso }

Before me, the undersigned authority, appeared *Name and title of contractor representative* who acknowledge to me that he executed the foregoing document for the purpose and consideration therein expressed and has the act and deed of said corporation.

Subscribed and sworn to me before this _____ day of _____, 200__.

_____ _____
Notary Public in and for the State of Texas My Commission Expires

_____
Owner:
Title:

"SAMPLE"
CONVEYANCE FORM
(Contractor)

TO: Lower Valley Water District
ATTN:Mario Aguilar, General Manager
Rosalinda Vigil, Board Member President

The water and sewer mains and facilities have been completed in:

(Name of the Subdivision)

Estrada Drive

Water

60 linear feet of 8" PVC (Class 150)
40 linear feet of 6" PVC (Class 150)
2 – 8" gate valve
1 – 6" gate valve
1 – fire hydrant with 6" gate valve
13 – ¾" copper service lines

Sewer

65 linear feet of 8" PVC (SDR 35)
7 manholes
15 – 4" PVC service lines

Taylor Lane

Water

60 linear feet of 6" PVC (Class 150)
2 – 6" gate valves
1 fire hydrant with 6" gate valve
11 – ¾" copper service lines

Sewer

45 linear feet of 8" PVC (SDR 35)
2 manholes
12 – 4" PVC service lines

Manholes and valve boxes have been set to final grade and meter boxes are in a condition acceptable to the Lower Valley Water District (LVWD) for setting meters. I herby certify that as the individual executing this Conveyance Form, I have the legal right and authority to transfer ownership of these facilities and herby convey to the LVWD ownership and all rights to these facilities.

I certify all costs of labor and materials employed in this project have been paid in full and that there are no outstanding claims relating to this work.

Developer:

JJ Associates
By: JJ, Inc.
Its General Partner

By: _____
Julissa E. Soto, President

Date:_____

WAIVER OF LIENS
(Contractor)

THE STATE OF TEXAS }
COUNTY OF EL PASO }

The undersigned contracted (or agreed) with SOCORRO ASSOCIATES, to furnish water and/or sewer mains and appurtenances in connection with certain improvements to real property located in El Paso County, Texas and owned by SOCORRO ASSOCIATES, which improvements are located and described as follows:

_____
(Name of Subdivision)

In consideration of payment in full in the amount of _____ _____($_____) dollars and other good and valuable consideration, the receipt and sufficiency of which is herby acknowledged and confessed, the undersigned does herby waive and release any mechanic's or material men's lien of Affidavit of Lien or unasserted claim of lien that the undersigned has or hereafter may assert on the above mentioned real property on account of any labor performed or materials furnished by the undersigned or its employees or subcontractor pursuant to the above-mentioned contract or agreement, including a waiver and release of any constitutional or statutory lien that the undersigned may have or assert.

Company: _____

By:_____

Title: _____

SWORN TO AND SUBSCRIBED BEFORE ME, on this the _____ day of _____ 2004, to certify which witness my hand and seal of office.

_____
Notary Public in and for the State of Texas

My Commission expires

_____

OWNER'S RELEASE OF LIENS
AFFIDAVIT

SOCORRO ASSOCIATES, herby swears and affirms that the receipt of release in full include all labor, services, materials and equipment for which a Lien could be filed, and that all payrolls, materials and equipments bills and other indebtedness connected with the work, described as ___(Name of Subdivision)___, for which the Owner or Owner's property might in any way be responsible, have been paid or otherwise satisfied.

IN WITNESS WHEREOF, the Owner has signed and sealed this Instrument this _____ day of _____ 2004.

SOCORRO PARTNERS I, LTD.

By: _____

Title:_____

STATE OF TEXAS }
COUNTY OF EL PASO }

This instrument was acknowledged before me on this ____ day of _____ 2004, by Jean Mar, President of Socorro Associates, a Texas corporation, on behalf of such Corporation.

_____
Notary Public for The State of Texas

FINAL COST OF CONSTRUCTION
(Owner)

Date:

Lower Valley Water District
1557 FM Road 1110
Clint, TX. 79836-0909

Re: (Name of Subdivision)

The final cost of construction for water is: $100,300.00

The final cost of construction for sewer is: $124,600.00

By: _____

Title: _____

Note: The letter of final cost of construction shall only contain water and sewer infrastructure. If pavement, curbs, or any other miscellaneous items not having to do with water and sewer costs are included, the letter will not be accepted.

FINAL COST OF CONSTRUCTION
(Contractor Invoice form)

INVOICE

Lower Valley Constructions
1234 Villa Grande
Clint, TX. 79836

DATE	*INVOICE #*
12/12/04	*46518*

Description	*Qty*	*Rate* .....
Installation of C-900 water line	*800*	*9.00*
Fire Hydrant Installation	*2*	*2,000.00*
TOTAL		*11,000.00*

*P.O. No.:*_____
*Terms:*_____
*Due Date:*_____

Note: The total amount shown in this invoice shall be the same as the total amount stated by the owner on the Final Cost of Construction. In other words, this invoice shall only reflect water and sewer cost and no miscellaneous cost shall be reflected.

WARRANTY FORM
(Contractor)

Lower Valley Water District
1557 FM Road 1110
Clint, Texas, 79836

Re: (Name of Subdivision)

WARRANTY OF CONSTRUCTION

Lower Valley Constructions warrants that the work performed under the above referenced contract conforms to the standard requirements of the Valley Water District and is free of any defects of equipment, material or workmanship performed by Valley Constructions or any subcontractors or suppliers. This warranty shall continue for a period of one (1) year from Final Completion on *mm/dd/yy*.

Valley Constructions

_____

By:
Title:

Note: This is just an example of the content that should be on the warranty. Each contractor could/shall have its own wording as long as it covers 1 year of warranty after final completion.

FINAL ACEPTANCE LETTER

I, *(Owner)*_____have contracted Valley Constructions to install water and sewer infrastructure on (Name of Subdivision). This will be serving approximately XX lots according to plans from (Engineering Firm) . Valley Constructions has completed 100% of the construction and has fulfilled my expectative.

Sincerely,

_____

Owner:
Company:

SUMMARY OF FORMATS

CONVEYANCE FORM
Format stating how many linear feet of pipe, size and quantity of valves, fire hydrants, service lines, etc. Also stating in which street this infrastructure was installed. This format is made by the contractor.

WAIVER OF LIENS
From the contractor. Given to the owner by the contractor meaning that the owner has fully paid the contractor. The contractor won't have any claims to the Lower Valley Water District for past debts once the infrastructure is fully dedicated.

OWNER'S RELEASE OF LIENS (AFFIDAVIT)
This form states that the owner has paid all debts from the project. Contractors, Engineers, subcontractors, material, and other expenses created during the project have been paid already.

FINAL COST OF CONSTRUCTION
The final cost of construction format is a letter from the owner stating the final cost of sewer and water infrastructure on the project. It should not have any pavement, curbs, and/or any other costs. The amount on this letter should coincide with the final invoice from the contractor also stating the cost of water and/or sewer infrastructure.

FINAL COST OF CONSTRUCTION INVOICE
Invoice from the contractor stating the final cost of the water and sewer infrastructure. This should not include paving, curbs or anything else than water and sewer costs. This figure should coincide with the amount given by the owner on the *Final Cost of Construction* letter.

WARRANTY FORM
This warranty is presented to the owner by the contractor. The Lower Valley Water District will require a copy for the record. States a warranty from the contractor of one (1) year after official final completion has been achieved on the project. On the other hand, the owner will have a one (1) year warranty with the Lower Valley Water District when signing the Certificate of Dedication. This warranty by the owner will be valid even if the warranty by the contractor has expired; therefore the importance of dedicating the infrastructure (with all proper paperwork) as soon as the construction is completed.

CERTIFICATE OF DEDICATION

The owner of the subdivision/construction agrees to dedicate the water and/or sewer infrastructure to the Lower Valley Water District. Also, one of the most important warranties the owner signs is the warranty of one (1) year after Dedication (refer to Certificate of Dedication for more details). This is not the same as the warranty provided by the contractor. This warranty is for one year after Dedication, even when Dedication takes place 6 months after the construction was completed.

FINAL ACCEPTANCE LETTER

This is a letter from the owner stating that he/she is satisfied with the job done by the contractor.

Note: These formats presented here are just a sample to follow. Each company/contractor can have its own wording as long as it has the most important information, presented in this summary.

RULES AND REGULATIONS NO. 9

RULES AND REGULATIONS
GOVERNING THE DISCHARGE OF WASTEWATER
INTO EL PASO'S WASTEWATER SYSTEM

BY THE AUTHORITY GRANTED TO THE PUBLIC SERVICE BOARD BY VIRTUE OF ARTICLES 1111-1118, REVISED CIVIL STATUTES OF TEXAS, THE TEXAS WATER CODE, EL PASO MUNICIPAL CODE § 15.12.010, AND ORDINANCE 752, PASSED AND APPROVED BY THE CITY COUNCIL OF THE CITY OF EL PASO, TEXAS, ON MAY 22, 1952, AS AMENDED; NOW, THEREFORE, BE IT RESOLVED BY THE PUBLIC SERVICE BOARD OF THE CITY OF EL PASO THAT THE FOLLOWING RULES FOR GOVERNING THE DISCHARGE OF WASTEWATER INTO EL PASO'S WASTEWATER SYSTEM ARE HEREBY ESTABLISHED AND SHALL SUPERSEDE THE RULES AND REGULATIONS PREVIOUSLY ADOPTED FOR DISCHARGE OF WASTEWATER; KNOWN AS RULES AND REGULATIONS NO. 9.

THAT PUBLIC SERVICE BOARD RULES AND REGULATIONS NO. 9, GOVERNING THE DISCHARGE OF WASTEWATER INTO EL PASO'S WASTEWATER SYSTEM, ARE HEREBY AMENDED BY ADOPTING NEW RULES AND REGULATIONS NO. 9, WHICH SUPERSEDE AND REPLACE THE EXISTING RULES AND REGULATIONS NO. 9, AND WHICH SHALL READ AS FOLLOWS:

SECTION I TABLE OF CONTENTS

The following headings or captions are adopted as the Table of Contents for Public Service Board Rules and Regulations No. 9.

SECTION II GENERAL PROVISIONS

A. PURPOSE AND POLICY

These Rules and Regulations of the Public Service Board (PSB), together with applicable provisions of PSB Rules and Regulations No. 1, No. 5, and No. 6, set forth the uniform requirements for the discharge by any person of wastewater into El Paso's wastewater system. The purposes of this Rules and Regulations No. 9 are as follows:

1. To protect the health and safety of PSB employees and of the citizens of El Paso.

2. To prevent the introduction of pollutants into El Paso's wastewater system which will interfere with the operation of the system or contaminate the sludge it produces.

3. To prevent the introduction of pollutants into El Paso's wastewater system which will pass through the system, inadequately treated, into receiving waters or the atmosphere, or otherwise be incompatible with the system.

4. To improve the ability of the system to reclaim wastewater and sludge for beneficial use.

5. To achieve compliance with NPDES Permit conditions, sludge use and disposal requirements and other federal or state laws.

6. To provide equitable distribution of the cost of improvements to, operation and maintenance of El Paso's wastewater system.

B. DEFINITIONS AND ABBREVIATIONS

The following abbreviations, when used in this rule, shall have the designated meanings as follows:

BOD
Biochemical Oxygen Demand

C.F.R.
Code of Federal Regulations

EPA
United States Environmental Protection Agency

mg/l
Milligrams per liter

NPDES
National Pollutant Discharge Elimination System

POTW
Publicly Owned Treatment Works

PSB
Public Service Board

SIU
Significant Industrial User

T.A.C.
Texas Administrative Code

TNRCC
Texas Natural Resource Conservation Commission

TSS
Total Suspended Solids

U.S.C.
United States Code

Unless the context specifically indicates otherwise, the following terms and phrases, as used in this Rules and Regulations No. 9, shall have the following meanings:

Act or "the Act"
The Federal Water Pollution Control Act, also known as the Clean Water Act, as amended, 33 U.S.C. 125 *et. seq.*

Aboveground Storage Tank
A nonvehicular device (including any associated piping) that is made of nonearthen materials; located o above the surface of the ground, or on or above the surface of the floor of a structure below ground, suc mineworking, basement, or vault; and designed to contain an accumulation of regulated substances.

Authorized Representative

a. If the user is a corporation, the president, secretary, treasurer, or a vice-president of the corporation in charge of the principal business function, or any other person who performs similar policy or decision-making functions for the corporation; the manager of one or more manufacturing, production, or operational facilities employing more than two hundred fifty (250) persons or having a gross annual sales or expenditures exceeding twenty-five (25) million dollars, if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

b. If the user is a partnership or a sole proprietorship: a general partner or proprietor, respectively.

c. If the user is a Federal, State or local governmental facility: a director or highest official appointed or designated to oversee the operation and performance of the activities of the government facility, or their designee.

d. The individuals described in paragraphs (a) through (c) above, may designate another authorized representative if the authorization is in writing, the authorization specifies the individual or position responsible for the overall operation of the facility from which the discharge originates or having overall responsibility for environmental matters for the company, and the written authorization is submitted to the PSB.

Biochemical Oxygen Demand
The quantity of oxygen utilized in the biochemical oxidation of organic matter under standard laboratory procedures for five (5) days at 20° Celsius, expressed as a concentration.

Categorical Standards
National Categorical Pretreatment Standard or Pretreatment Standard.

City or El Paso
The City of El Paso, Texas or the City Council of El Paso, Texas.

Discharge
Any solid, liquid or gas introduced into El Paso's wastewater system.

Environmental Protection Agency
The United States Environmental Protection Agency or, where appropriate, the term may also be used as a designation for the Administrator or other duly authorized official of said agency.

Free Product
A regulated substance in its free-flowing non-aqueous liquid phase at standard conditions of temperature and pressure (e.g, liquid not dissolved in water).

Grab Sample
A sample which is taken from a wastestream without regard to the flow in the wastestream and over a period of time not to exceed fifteen (15) minutes.

Hazardous Substance
Any substance defined or listed in the Federal Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), §101(14)(42 U.S.C. §9601, *et seq.*), and which is not regulated as a hazardous waste under the Federal Solid Waste Disposal Act, Subtitle C (42 U.S.C. §6921, *et. seq.*).

Hazardous Waste
Any waste which is regulated under the Federal Resource Conservation and Recovery Act (RCRA) as listed hazardous waste in 40 C.F.R. 261, Subpart D, or as a characteristic waste as per 40 C.F.R., Subpart C.

Industrial User
Any person who contributes, causes or permits the contribution of industrial wastewater into El Paso's wastewater system, except from a vehicle.

Industrial Wastewater
Liquid and water-carried non-domestic solid, gas and liquid wastes from dwellings, commercial buildings, and industrial facilities, whether treated or untreated, together with any groundwater, surface water or stormwater that may be present.

Interference
A discharge which, alone or in conjunction with a discharge or discharges from other sources, both: inhibits or disrupts a POTW, its treatment processes or operations, or its sludge processes, use or disposal; and, therefore is a cause of a violation of any requirement of a POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of wastewater sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

Categorical Pretreatment Standard or Pretreatment Standard
Any regulation containing pollutant discharge limits promulgated by the EPA in accordance with Section 307(b) and (c) of the Clean Water Act (33 U.S.C. 1347), which applies to Industrial Users, including the prohibitive discharge limits established pursuant to 40 C.F.R. § 403.5. Local limits shall also be considered Pretreatment Standards.

National Pollution Discharge Elimination System Permit
A permit issued pursuant to Section 402 of the Act (33 U.S.C. 1342).

New Source

a. Any building, structure, facility or installation (facility) from which there is, or may be, a discharge of pollutants, the construction of which commenced after the publication of proposed pretreatment standards under Section 307(c) of The Act which will be applicable to such source if such standards are thereafter promulgated in accordance with that section provided that:
   (i) the facility is constructed at a site at which no other source is located; or
   (ii) the facility totally replaces the process or production equipment that causes the discharge of pollutants at an existing source; or
   (iii) the production or wastewater generating processes of the facility are substantially independent of an existing source at the same site. In determining whether these are substantially independent, factors such as the extent to which the new facility is integrated with the existing plant, and the extent to which the new facility is engaged in the same general type of activity as the existing source, shall be considered.

b. Construction on a site at which an existing source is located results in a modification rather than a new source if the construction does not create a new facility meeting the criteria of paragraphs (a)(ii) or (iii) above but otherwise alters, replaces or adds to existing process or production equipment.

c. Construction of a new source as defined under this paragraph has commenced if the owner or operator has:

(i) Begun, or caused to begin, as part of a continuous onsite construction program any placement, assembly or installation of facilities or equipment; or significant site preparation work including clearing, excavation or removal of existing buildings, structures or facilities which is necessary for the placement, assembly or installation of new source facilities or equipment; or,

(ii) Entered into a binding contractual obligation for the purchase of facilities or equipment which are intended to be used in its operation within a reasonable time. Options to purchase or contracts which can be terminated or modified without substantial loss, and contracts for feasibility, engineering and design studies do not constitute a contractual obligation under this paragraph.

Pass-through

A discharge which exits a POTW into waters of the United States in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit, or corresponding State permit (including an increase in the magnitude or duration of a violation); or which causes a violation of a State Water Quality Standard.

Person

Any individual, partnership, co-partnership, firm, company, corporation, association, joint stock company, trust, estate, governmental entity or any other legal entity, or their legal representatives, agents or assigns. The masculine gender shall include the feminine, the singular shall include the plural where indicated by the context.

Petroleum Substance

A crude oil or any refined or unrefined fraction or derivative of crude oil which is liquid at standard conditions of temperature and pressure. A "petroleum substance" shall be limited to one or a combination of the substances or mixtures of basic petroleum substances such as crude oils, crude oil fractions, petroleum feedstocks, and petroleum fractions; motor fuels used for the operation of internal combustion engines, including leaded or unleaded gasoline, aviation gasoline, No. 1 diesel fuel, No. 2 diesel fuel, and any grades of gasohol; aviation jet fuels; distillate fuel oil; residual fuel oils; gas turbine fuel oils; illuminating oils such as kerosene, mineral seal oil, long-time burning oils, 300 oil, and mineral colza oil; solvents such as stoddard solvent, petroleum spirits, mineral spirits, petroleum ether, varnish makers' and painters' naphthas, petroleum extender oils, and commercial hexane; automotive and industrial lubricants; building materials such as liquid asphalt and dust-laying oils; any other petroleum-based materials having physical and chemical properties similar to the above materials and receiving approval for designation as a petroleum substance. Exceptions to this classification are any listed substance regulated as a hazardous waste under the federal Solid Waste Disposal Act, Subtitle C (42 United States Code §6921, *et. seq.*).

pH

The measure of the acidity or alkalinity of a solution expressed in standard units.

Pollutant

Any dredged spoil, solid waste, incinerator residue, sewage, garbage, wastewater sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discharged equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water.

Pretreatment or Treatment

The reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater prior to or in lieu of discharging or otherwise introducing such pollutants into a POTW. The reduction or alteration can be obtained by physical, chemical or biological processes, or process changes or other means, except as prohibited by 40 C.F.R. § 403.6(d).

Pretreatment Requirements
Any substantive or procedural requirement related to pretreatment, other than a National Pretreatment Standard imposed on an Industrial User.

Producer
A person that produces liquefied wastes which are transported for disposal by Waste Haulers and includes residential, commercial or industrial producers.

Public Service Board
The Public Service Board of the City of El Paso, Texas acting on its own behalf or through the authorized acts of the El Paso Water Utilities (EPWU), which is charged with the day-to-day operation of El Paso's wastewater system.

Publicly Owned Treatment Works
A treatment works as defined by Section 212 of the Act, (33 U.S.C. 1292), and operated by the PSB. This definition includes any devices or systems used in the collection, storage, treatment, recycling and reclamation of sewage or industrial wastes of a liquid nature and any conveyances which convey wastewater to a treatment plant.

Significant Industrial User
Any Industrial User of El Paso's wastewater system who

a. is subject to Categorical Pretreatment Standards under 40 C.F.R. § 403.6 and 40 C.F.R. Chapter I, Subchapter N; or

b. discharges an average of 25,000 gallons or more per day of process wastewater to a POTW; or

c. contributes a process wastestream which makes up 5% or more of the average dry weather capacity of the POTW into which it discharges; or

d. is found by the PSB to have a reasonable potential to adversely impact, either singly or in combination with other contributing industries, the wastewater system, the quality of sludge, the system's effluent quality, or air emissions generated by the system.

Slug Load
Any discharge at a flow rate or concentration which could cause a violation of the prohibited discharge standards listed in this rule.

State
State of Texas.

Storm Water
Any flow occurring during or following any form of natural precipitation and resulting from such precipitation including snowmelt.

Total Suspended Solids
The total suspended matter that floats on the surface of, or is suspended in, water, wastewater or other liquids, and which is removable by laboratory filtering.

Underground Storage Tank
Any one or combination of underground tanks and any connecting underground pipes used to contain an accumulation of regulated substances, the volume of which, including the volume of the connecting underground pipes, is ten percent or more beneath the surface of the ground.

User
Any person who contributes, causes or permits the contribution of wastewater into El Paso's wastewater system.

Vehicle
A mobile receptacle or device in which or by which waste may be transported upon public streets, highways or roadways.

Wastewater
Liquid and water carried industrial or domestic solid, gas or liquid wastes from dwellings, commercial buildings, industrial facilities, and institutions, whether treated or untreated, together with any groundwater, surface water and storm water that may be present.

Wastewater System or System
El Paso's POTWs owned and operated through the Public Service Board.

C. ADMINISTRATION

El Paso Water Utilities, under the direction of its General Manager and acting through its employees and agents, is hereby authorized to administer this Rules and Regulations No. 9, and to take all steps necessary to implement them. Unless explicitly stated otherwise, references to the Public Service Board in this Rules and Regulations No. 9 shall include El Paso Water Utilities.

SECTION III GENERAL SEWER USE REQUIREMENTS

A. PROHIBITED DISCHARGE STANDARDS

1. No User shall discharge or cause to be discharged into El Paso's wastewater system any pollutant or wastewater except in conformity with this Rules and Regulations No. 9, the requirements of the Act, the General Pretreatment Regulations in 40 C.F.R. Part 403, and applicable state laws. Significant Industrial Users (see Section IV) must obtain a discharge permit from the PSB prior to any discharge. All other Users must notify the PSB of the nature and characteristics of their wastewater prior to commencing their discharge to determine if a discharge permit is required. If a permit is not required, the User must enter into a wastewater service contract with the PSB prior to any discharge.

2. No User may discharge or cause to be discharged into the wastewater system any pollutant or wastewater which will cause Pass-through or Interference. In addition, a User may not introduce the following substances into the wastewater system:

   a. Any liquids, solids or gases, which by reason of their nature or quantity are, or may be sufficient, either alone or by interaction with other substances, to cause fire or explosion; or which have a closed-cup flashpoint of less than 60° Celsius.

   b. Solid or viscous substances in such quantities and/or qualities which may cause obstruction to the flow in the system resulting in interference, such as, but not limited to: grease, garbage with particles greater than 1 centimeter in any dimension, animal guts or tissues, paunch manure, bones, hair, hides, fleshings, entrails, blood, feathers, ashes, cinders, sand, mud, lime, stone dust, marble dust, metal, glass, straw, shavings, grass clippings, rags, grains, hops, paper, wood, plastics, grinding or polishing wastes or substances which may solidify or become viscous at temperatures between 0· Celsius and 60· Celsius.

c. Petroleum substances, whether emulsified or not, in excess of 100 mg/l.

d. Any wastewater having a pH less than 5.5 or greater than 10.5, or wastewater having any other corrosive property capable of causing significant damage or hazard to structures, equipment, and/or personnel of the system.

e. Any wastewater containing toxic pollutants in sufficient quantity, either singly or by interaction with other pollutants, to injure or interfere with any wastewater treatment process, constitute a hazard to humans or animals, create a toxic effect in the receiving waters at the effluent end of the system, or to exceed a limitation set forth in a Categorical Pretreatment Standard. A toxic pollutant shall include but not be limited to any pollutant identified pursuant to Section 307(a) of the Act.

f. Any noxious or malodorous liquids, gases, or solids which either singly or by interaction with other wastes are sufficient to create a public nuisance or hazard to life or are sufficient to physically prevent reasonably safe and/or tolerable human and/or mechanical entry into the sewers for inspection, maintenance and repair purposes.

g. Any substance which may cause the system's effluent or any other product of the system such as residues, sludges, or scums, to be unsuitable for normal landfill disposal, land application reclamation or beneficial use, or to interfere with the reclamation process where the system is pursuing a reuse and reclamation program. In no case, shall a substance discharged to the system cause the system to be in noncompliance with sludge use or disposal criteria, guidelines or regulations developed under Section 405 or Section 503 of the Act; any criteria, guidelines, or regulations affecting sludge use or disposal developed pursuant to the Solid Waste Disposal Act, the Clean Air Act, the Toxic Substances Control Act, the Resource Conservation and Recovery Act, or State criteria applicable to sludge management and/or disposal methods being used including Chapter 312 of the Texas Administrative Code.

h. Any substance which will cause the system to violate its NPDES and/or State Disposal System Permit or the receiving water quality standards or an applicable Total Maximum Daily Load (TMDL) as established by the EPA or the TNRCC.

i. Any wastewater having a temperature which will inhibit biological activity in a treatment plant resulting in Interference, but in no case wastewater with a temperature at the introduction into a treatment plant which exceeds 40° Celsius.

j. Any pollutants, including oxygen demanding pollutants (BOD, etc.) released at a flow and/or pollutant concentration which will cause Interference to the system. In no case shall a slug load have a flow rate, or contain concentration or quantities of pollutants that exceed for any time period longer than fifteen (15) minutes more than five (5) times the average daily concentration, quantities, or flow during normal operation.

k. Trucked, drummed, containerized or hauled wastes or pollutants except as specified in the Rules and Regulations No. 13.

l. Any wastewater containing any radioactive wastes or isotopes of such half life or concentration as may exceed limits as permitted by the most current Federal or State regulations.

m. Any pollutants which result in the presence or formation of toxic gases, vapors or fumes within the system in a quantity that may cause acute workers' health and safety problems.

n. Stormwater, surface water, groundwater, roof run-off, subsurface drainage and unpolluted wastewater unless specifically authorized by Wastewater Discharge Permit.

o. Sludges, screenings or other residues from the pretreatment of industrial wastewater, including, but not limited to, the solid or liquid contents of sand, grit or grease traps.

p. Wastewater causing either alone or in conjunction with other sources, the POTW effluent to fail a toxicity or biomonitoring test.

q. Detergents, surfactants, surface-active agents or other substances which may cause foaming in the POTW.

r. Wastewater causing two readings on an explosion hazard meter at the point of discharge into the POTW or at any point in the POTW or more than 50 percent of the Lower Explosive Limit of the meter.

s. Mercury compounds.

Pollutants, substances or wastewater prohibited by this section shall not be processed or stored in such a manner that they could be discharged into the POTW except as allowed by the Wastewater Discharge Permit.

B. LOCAL LIMITS

1. The following pollutant limits are established to protect against pass-through and/or interference. No person shall discharge or cause to be discharged into the wastewater system any pollutant or wastewater in violation of the local limits listed below. These limits are based on either flow-proportional or time-proportional composite samples; or, a grab sample where composite sampling is not possible or practical. The limits apply at the point where the wastewater is discharged to the POTW. All concentrations are for the "total" pollutant.

Pollutant	Concentration	Units
arsenic	0.17	mg/l
cadmium	0.11	mg/l
chromium	1.22	mg/l
copper	2.39	mg/l
cyanide	1.31	mg/l
lead	0.66	mg/l
mercury	0.002	mg/l
molybdenum	0.15	mg/l
nickel	1.71	mg/l
selenium	0.35	mg/l
silver	0.98	mg/l
zinc	5.37	mg/l
Total dissolved solids (TDS)	6140	mg/l

2. No user shall discharge or cause to be discharged into the wastewater system any pollutant or wastewater containing any of the following:

a. Fat, grease, oil or wax of vegetable origin in excess of 100 mg/l unless otherwise allowed by the Wastewater Discharge Permit.

b. Wastewater containing dye, dye waste or any other coloring agent resulting in a wastewater color concentration in excess of 300 ADMI units.

c. The following limits are established for BTEX compounds and are based on grab sampling.

Pollutant	Units	Concentration
Benzene	mg/l	20.0
Toluene	mg/l	17.0
Ethyl benzene	mg/l	16.0
Xylene	mg/l	17.0

3. The PSB reserves the right to amend this Rules and Regulations No. 9 at any time to establish more stringent local limits as necessary to satisfy the purposes as set forth in Section II-A.

C. FEDERAL

1. The categorical pretreatment standards found at 40 C.F.R. Chapter I, Subchapter N, Parts 405 through 471 are hereby incorporated.

a. Where a categorical pretreatment standard is expressed only in terms of either the mass or the concentration of a pollutant in wastewater, the PSB may impose equivalent concentration or mass-based limits in accordance with 40 C.F.R. § 403.6(c).

b. When wastewater subject to a categorical pretreatment standard is mixed with wastewater not regulated by the same standard, the PSB shall impose an alternate limit using the combined wastestream formula in 40 C.F.R. § 403.6(e).

c. A Industrial User may obtain a variance from a categorical pretreatment standard if the Industrial User can prove, pursuant to the procedural and substantive provisions in 40 C.F.R. § 403.13, that factors relating to its discharge are fundamentally different from the factors considered by EPA when developing the categorical pretreatment standard.

d. A Industrial User may obtain a net gross adjustment to a categorical standard in accordance with 40 C.F.R. § 403.15.

2. No Industrial User subject to a Categorical Standard or to a state discharge limitation shall discharge or cause to be discharged into the wastewater system any pollutant or wastewater in violation of that standard or limitation.

3. After the promulgation of a Categorical Standard or state limitation, and upon expiration of any compliance grace period, the Categorical Standard or state limitation, if more stringent than limitations imposed on Industrial Users under this Rules and Regulations No. 9, automatically supersedes and replaces those limitations. Industrial Users which become subject to a Categorical Standard are subject to the reporting requirements at 40 C.F.R. § 403.12.

D. STATE

[This section is reserved.]

E. DILUTION PROHIBITED

Except where expressly authorized to do so, no Industrial User shall ever increase the use of process water, or in any other way attempt to dilute a discharge, as a partial or complete substitute for adequate treatment to achieve compliance with the specific pollutant limitations contained in the Categorical Standards, or in any local limit or standard promulgated by the PSB or the State of Texas.

F. PRETREATMENT OF WASTEWATER

1. Industrial Users shall provide wastewater treatment as necessary to comply with this ordinance and shall achieve compliance with all categorical pretreatment standards, local limits and the prohibitions set out in this Rules and Regulations No. 9 within the time-frame specified by EPA, the State or the PSB, whichever is more stringent. Any facilities necessary for compliance shall be provided, operated and maintained at the Industrial User's expense. At the request of the PSB, detailed plans describing such facilities and operating procedures shall be submitted to the PSB for review and shall be acceptable to the PSB before such facilities are constructed. The review of such plans and operating procedures shall in no way relieve the Industrial User from the responsibility of modifying such facilities as necessary to produce a discharge acceptable to the PSB under the provisions of its Rules and Regulations.

2. Whenever deemed necessary, the PSB may require users to restrict their discharge during peak flow periods, designate certain wastewater be discharged only into specific sewers, relocate and/or consolidate points of discharge, separate sanitary wastestreams from industrial wastestreams and such other conditions as may be necessary to protect the POTW and determine the Industrial User's compliance with the requirements of this Rules and Regulations No. 9.

3. The PSB may require the Industrial User to install and maintain, on their property and at their expense, a suitable storage and flow-control facility to ensure equalization of flow. A wastewater discharge permit may be issued solely for flow equalization.

4. Industrial Users with the potential to discharge flammable substances may be required to install and maintain an approved combustible gas detection device.

5. No Industrial User shall discharge or cause to be discharged into the wastewater system any pollutant or wastewater containing grease, oil, sand or any flammable wastes (including, but not limited to, restaurants, food processing plants, garages, service stations, machine shops and factories), except through a suitable grease, oil, and sand interceptor. No such interceptor shall be required for private living quarters or dwelling units. The Industrial User shall be responsible for the installation, proper operation and maintenance of the interceptor and the lawful disposal of the accumulated waste.

6. Any User discharging wastewater generated in a photo processing process shall be subject to pretreatment requirements. The PSB shall follow the Code of Management Practice (CMP) for Silver Dischargers to determine requirements on a site specific basis. The CMP, finalized in 1995 by the Silver Coalition and the Association of Metropolitan Sewer Association (AMSA) provides recommendations on technology, equipment and management practices for controlling silver discharges from facilities that process photographic materials. Copies of the document can be obtained through the National Association of Photographic Manufacturers (NAPM) at: 550 Mamaroneck Avenue, Suite 307, Harrison, New York 10528-1612. The document is also available at http://www.silvercouncil.org..

RULES AND REGULATIONS NO. 8

RULES AND REGULATIONS
CONCERNING THE RIGHT OF APPEAL

BY THE AUTHORITY GRANTED TO THE PUBLIC SERVICE BOARD BY VIRTUE OF ARTICLES 1111-1118, REVISED CIVIL STATUTES OF TEXAS, AND ORDINANCE 752, PASSED AND APPROVED BY THE CITY COUNCIL OF THE CITY OF EL PASO, TEXAS ON MAY 22, 1952; BE IT RESOLVED BY THE PUBLIC SERVICE BOARD OF THE CITY OF EL PASO, THAT THE FOLLOWING WATER RATES SUPERSEDE ALL RATES THERETO FIXED AND ALL ORDINANCES HERETO PASSED WITH REFERENCE TO THE FIXING OF RATES FOR THE FURNISHING OF WATER SERVICE:

SECTION I GENERAL

The Rules and Regulations of the Public Service Board have been promulgated to fairly and equitably distribute to each customer the cost to operate, maintain and construct the water and sewage systems of the City of El Paso, based on the actual service received and the cost of providing the service. It is realized, however, that there may be circumstances which are so unusual that they do not fall within the usual situation used in establishing these Rules and Regulations and, thus, may deserve special consideration. It is also realized that in the administration and interpretation of these Rules and Regulations there is the possibility of the original intent not being implemented and that clarification may be necessary. It is for these reason that the right of appeal is provided to permit adjustments in the policies or charges where these adjustments bring about greater equity between customers and do not merely give relief to one customer simply because that customer feels that the charges are excessive or the policy is unreasonable. The true test of the policies as well as requests for deviation from the policies is that the action taken by the Utility must be fair and equitable to all customers.

SECTION II ADMINISTRATIVE APPEAL

Inquiries concerning rates, charges and regulations may be made either in person, by telephone or in writing. Such inquiries may concern interpretation of the Rules and Regulations or the individual application of charges established by the Rules and Regulations. Customers desiring to make an inquiry should ask for a person who works in the section that administers the rule or charge that he desires to question. For example, if the inquiry is relative to an unusually high water bill which the customer feels is erroneous, then he should ask for a customer service clerk in the High Bill Section. If the question concerns the extension of water and/or sewer service, new service to a property or the charges relative to such service, the person should request to speak to someone in the New Service Section. Questions concerning special charges for industrial dischargers should be referred to the Manager of Sewage Treatment.

If the customer does not receive a satisfactory explanation and/or resolution of his questions or problems, he should then submit his complaint and request in writing. Complaints relative to Utility bills should be directed to the Customer Service Manager; complaints relative to charges for the extension or providing of new service to property should be directed to the Chief Engineer; complaints relative to special charges for industrial discharges should be directed to the General Manager. Complaints received in writing shall be fully investigated and a written answer provided to the customer regarding the decision of the Utility.

Should the customer not be satisfied with the written response of the Utility relative to his problem or complaint, he should then write a letter requesting an administrative hearing. An administrative hearing will be conducted before not less than three supervisory members of the Utility's staff. The Utility will notify the customer in writing of its decision after the administrative hearing.

In instances where the customer has followed the procedures stated herein and still feels that he has not received proper and adequate consideration through the appeal procedure, he may request a hearing before the Public Service Board at one of its regular meetings. Any customer who does not appeal in writing to the General Manager such a ruling or action in accordance with these procedures, within 60 days of the date of the issuance of the ruling or action appealed, shall waive any right to contest such action or ruling. The customer, who so appeals, will be notified of the Public Service Board's meeting at which he is to appear so that he may present his case to the Board for its consider-

ation and review. The Board, at its own discretion, may either affirm or change the ruling of the Utility. Any change of the ruling of the Utility or its staff by the Board shall be consistent with these Rules & Regulations, or if not consistent, shall constitute a variance from these Rules & Regulations. The reasons for such a variance shall be stated in the minutes of the Board. Action of the Public Service Board relative to disputes regarding the interpretation or application of the policies of the Board or complaints relative to administrative decisions shall be final and binding to the extent so allowed by law.

PASSED, APPROVED and ADOPTED this 23rd day of May, 1979.

RULES & REGULATIONS NO. 8, SECTION II, REVISED, APPROVED and ADOPTED this 9th day of December, 1992.

/s/ Joe G. Hanson, Chairman

ATTEST:
/s/ Nancy Heydemann, Secretary

APPROVED AS TO FORM:
/s/ Herbert L. Prouty, General Counsel

RULES AND REGULATIONS NO. 9

RULES AND REGULATIONS
GOVERNING THE DISCHARGE OF WASTEWATER
INTO EL PASO'S WASTEWATER SYSTEM

BY THE AUTHORITY GRANTED TO THE PUBLIC SERVICE BOARD BY VIRTUE OF ARTICLES 1111-1118, REVISED CIVIL STATUTES OF TEXAS, THE TEXAS WATER CODE, EL PASO MUNICIPAL CODE § 15.12.010, AND ORDINANCE 752, PASSED AND APPROVED BY THE CITY COUNCIL OF THE CITY OF EL PASO, TEXAS, ON MAY 22, 1952, AS AMENDED; NOW, THEREFORE, BE IT RESOLVED BY THE PUBLIC SERVICE BOARD OF THE CITY OF EL PASO THAT THE FOLLOWING RULES FOR GOVERNING THE DISCHARGE OF WASTEWATER INTO EL PASO'S WASTEWATER SYSTEM ARE HEREBY ESTABLISHED AND SHALL SUPERSEDE THE RULES AND REGULATIONS PREVIOUSLY ADOPTED FOR DISCHARGE OF WASTEWATER; KNOWN AS RULES AND REGULATIONS NO. 9.

THAT PUBLIC SERVICE BOARD RULES AND REGULATIONS NO. 9, GOVERNING THE DISCHARGE OF WASTEWATER INTO EL PASO'S WASTEWATER SYSTEM, ARE HEREBY AMENDED BY ADOPTING NEW RULES AND REGULATIONS NO. 9, WHICH SUPERSEDE AND REPLACE THE EXISTING RULES AND REGULATIONS NO. 9, AND WHICH SHALL READ AS FOLLOWS:

SECTION I TABLE OF CONTENTS

The following headings or captions are adopted as the Table of Contents for Public Service Board Rules and Regulations No. 9.

SECTION II GENERAL PROVISIONS

A. PURPOSE AND POLICY

These Rules and Regulations of the Public Service Board (PSB), together with applicable provisions of PSB Rules and Regulations No. 1, No. 5, and No. 6, set forth the uniform requirements for the discharge by any person of wastewater into El Paso's wastewater system. The purposes of this Rules and Regulations No. 9 are as follows:

1. To protect the health and safety of PSB employees and of the citizens of El Paso.

2. To prevent the introduction of pollutants into El Paso's wastewater system which will interfere with the operation of the system or contaminate the sludge it produces.

3. To prevent the introduction of pollutants into El Paso's wastewater system which will pass through the system, inadequately treated, into receiving waters or the atmosphere, or otherwise be incompatible with the system.

4. To improve the ability of the system to reclaim wastewater and sludge for beneficial use.

5. To achieve compliance with NPDES Permit conditions, sludge use and disposal requirements and other federal or state laws.

6. To provide equitable distribution of the cost of improvements to, operation and maintenance of El Paso's wastewater system.

B. DEFINITIONS AND ABBREVIATIONS

The following abbreviations, when used in this rule, shall have the designated meanings as follows:

BOD
Biochemical Oxygen Demand

C.F.R.
Code of Federal Regulations

EPA
United States Environmental Protection Agency

mg/l
Milligrams per liter

NPDES
National Pollutant Discharge Elimination System

POTW
Publicly Owned Treatment Works

PSB
Public Service Board

SIU
Significant Industrial User

T.A.C.
Texas Administrative Code

TNRCC
Texas Natural Resource Conservation Commission

TSS
Total Suspended Solids

U.S.C.
United States Code

Unless the context specifically indicates otherwise, the following terms and phrases, as used in this Rules and Regulations No. 9, shall have the following meanings:

Act or "the Act"
The Federal Water Pollution Control Act, also known as the Clean Water Act, as amended, 33 U.S.C. 1251, *et. seq.*

Aboveground Storage Tank
A nonvehicular device (including any associated piping) that is made of nonearthen materials; located on or above the surface of the ground, or on or above the surface of the floor of a structure below ground, such as mineworking, basement, or vault; and designed to contain an accumulation of regulated substances.

Authorized Representative

a. If the user is a corporation, the president, secretary, treasurer, or a vice-president of the corporation in charge of the principal business function, or any other person who performs similar policy or decision-making functions for the corporation; the manager of one or more manufacturing, production, or operational facilities employing more than two hundred fifty (250) persons or having a gross annual sales or expenditures exceeding twenty-five (25) million dollars, if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

b. If the user is a partnership or a sole proprietorship: a general partner or proprietor, respectively.

c. If the user is a Federal, State or local governmental facility: a director or highest official appointed or designated to oversee the operation and performance of the activities of the government facility, or their designee.

d. The individuals described in paragraphs (a) through (c) above, may designate another authorized representative if the authorization is in writing, the authorization specifies the individual or position responsible for the overall operation of the facility from which the discharge originates or having overall responsibility for environmental matters for the company, and the written authorization is submitted to the PSB.

Biochemical Oxygen Demand
The quantity of oxygen utilized in the biochemical oxidation of organic matter under standard laboratory procedures for five (5) days at 20° Celsius, expressed as a concentration.

Categorical Standards
National Categorical Pretreatment Standard or Pretreatment Standard.

City or El Paso
The City of El Paso, Texas or the City Council of El Paso, Texas.

Discharge
Any solid, liquid or gas introduced into El Paso's wastewater system.

Environmental Protection Agency
The United States Environmental Protection Agency or, where appropriate, the term may also be used as a designation for the Administrator or other duly authorized official of said agency.

Free Product
A regulated substance in its free-flowing non-aqueous liquid phase at standard conditions of temperature and pressure (e.g, liquid not dissolved in water).

Grab Sample
A sample which is taken from a wastestream without regard to the flow in the wastestream and over a period of time not to exceed fifteen (15) minutes.

Hazardous Substance
Any substance defined or listed in the Federal Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), §101(14)(42 U.S.C. §9601, *et seq.*), and which is not regulated as a hazardous waste under the Federal Solid Waste Disposal Act, Subtitle C (42 U.S.C. §6921, *et. seq.*).

Hazardous Waste
Any waste which is regulated under the Federal Resource Conservation and Recovery Act (RCRA) as listed hazardous waste in 40 C.F.R. 261, Subpart D, or as a characteristic waste as per 40 C.F.R., Subpart C.

Industrial User
Any person who contributes, causes or permits the contribution of industrial wastewater into El Paso's wastewater system, except from a vehicle.

Industrial Wastewater
Liquid and water-carried non-domestic solid, gas and liquid wastes from dwellings, commercial buildings, and industrial facilities, whether treated or untreated, together with any groundwater, surface water or stormwater that may be present.

Interference
A discharge which, alone or in conjunction with a discharge or discharges from other sources, both: inhibits or disrupts a POTW, its treatment processes or operations, or its sludge processes, use or disposal; and, therefore is a cause of a violation of any requirement of a POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of wastewater sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

Categorical Pretreatment Standard or Pretreatment Standard
Any regulation containing pollutant discharge limits promulgated by the EPA in accordance with Section 307(b) and (c) of the Clean Water Act (33 U.S.C. 1347), which applies to Industrial Users, including the prohibitive discharge limits established pursuant to 40 C.F.R. § 403.5. Local limits shall also be considered Pretreatment Standards.

National Pollution Discharge Elimination System Permit
A permit issued pursuant to Section 402 of the Act (33 U.S.C. 1342).

New Source

a. Any building, structure, facility or installation (facility) from which there is, or may be, a discharge of pollutants, the construction of which commenced after the publication of proposed pretreatment standards under Section 307(c) of The Act which will be applicable to such source if such standards are thereafter promulgated in accordance with that section provided that:
   (i) the facility is constructed at a site at which no other source is located; or
   (ii) the facility totally replaces the process or production equipment that causes the discharge of pollutants at an existing source; or
   (iii) the production or wastewater generating processes of the facility are substantially independent of an existing source at the same site. In determining whether these are substantially independent, factors such as the extent to which the new facility is integrated with the existing plant, and the extent to which the new facility is engaged in the same general type of activity as the existing source, shall be considered.

b. Construction on a site at which an existing source is located results in a modification rather than a new source if the construction does not create a new facility meeting the criteria of paragraphs (a)(ii) or (iii) above but otherwise alters, replaces or adds to existing process or production equipment.

c. Construction of a new source as defined under this paragraph has commenced if the owner or operator has:

(i) Begun, or caused to begin, as part of a continuous onsite construction program any placement, assembly or installation of facilities or equipment; or significant site preparation work including clearing, excavation or removal of existing buildings, structures or facilities which is necessary for the placement, assembly or installation of new source facilities or equipment; or,

(ii) Entered into a binding contractual obligation for the purchase of facilities or equipment which are intended to be used in its operation within a reasonable time. Options to purchase or contracts which can be terminated or modified without substantial loss, and contracts for feasibility, engineering and design studies do not constitute a contractual obligation under this paragraph.

Pass-through

A discharge which exits a POTW into waters of the United States in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit, or corresponding State permit (including an increase in the magnitude or duration of a violation); or which causes a violation of a State Water Quality Standard.

Person

Any individual, partnership, co-partnership, firm, company, corporation, association, joint stock company, trust, estate, governmental entity or any other legal entity, or their legal representatives, agents or assigns. The masculine gender shall include the feminine, the singular shall include the plural where indicated by the context.

Petroleum Substance

A crude oil or any refined or unrefined fraction or derivative of crude oil which is liquid at standard conditions of temperature and pressure. A "petroleum substance" shall be limited to one or a combination of the substances or mixtures of basic petroleum substances such as crude oils, crude oil fractions, petroleum feedstocks, and petroleum fractions; motor fuels used for the operation of internal combustion engines, including leaded or unleaded gasoline, aviation gasoline, No. 1 diesel fuel, No. 2 diesel fuel, and any grades of gasohol; aviation jet fuels; distillate fuel oil; residual fuel oils; gas turbine fuel oils; illuminating oils such as kerosene, mineral seal oil, long-time burning oils, 300 oil, and mineral colza oil; solvents such as stoddard solvent, petroleum spirits, mineral spirits, petroleum ether, varnish makers' and painters' naphthas, petroleum extender oils, and commercial hexane; automotive and industrial lubricants; building materials such as liquid asphalt and dust-laying oils; any other petroleum-based materials having physical and chemical properties similar to the above materials and receiving approval for designation as a petroleum substance. Exceptions to this classification are any listed substance regulated as a hazardous waste under the federal Solid Waste Disposal Act, Subtitle C (42 United States Code §6921, *et. seq.*).

pH

The measure of the acidity or alkalinity of a solution expressed in standard units.

Pollutant

Any dredged spoil, solid waste, incinerator residue, sewage, garbage, wastewater sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discharged equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water.

Pretreatment or Treatment

The reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater prior to or in lieu of discharging or otherwise introducing such pollutants into a POTW. The reduction or alteration can be obtained by physical, chemical or biological processes, or process changes or other means, except as prohibited by 40 C.F.R. § 403.6(d).

Pretreatment Requirements
Any substantive or procedural requirement related to pretreatment, other than a National Pretreatment Standard imposed on an Industrial User.

Producer
A person that produces liquefied wastes which are transported for disposal by Waste Haulers and includes residential, commercial or industrial producers.

Public Service Board
The Public Service Board of the City of El Paso, Texas acting on its own behalf or through the authorized acts of the El Paso Water Utilities (EPWU), which is charged with the day-to-day operation of El Paso's wastewater system.

Publicly Owned Treatment Works
A treatment works as defined by Section 212 of the Act, (33 U.S.C. 1292), and operated by the PSB. This definition includes any devices or systems used in the collection, storage, treatment, recycling and reclamation of sewage or industrial wastes of a liquid nature and any conveyances which convey wastewater to a treatment plant.

Significant Industrial User
Any Industrial User of El Paso's wastewater system who

a. is subject to Categorical Pretreatment Standards under 40 C.F.R. § 403.6 and 40 C.F.R. Chapter I, Subchapter N; or

b. discharges an average of 25,000 gallons or more per day of process wastewater to a POTW; or

c. contributes a process wastestream which makes up 5% or more of the average dry weather capacity of the POTW into which it discharges; or

d. is found by the PSB to have a reasonable potential to adversely impact, either singly or in combination with other contributing industries, the wastewater system, the quality of sludge, the system's effluent quality, or air emissions generated by the system.

Slug Load
Any discharge at a flow rate or concentration which could cause a violation of the prohibited discharge standards listed in this rule.

State
State of Texas.

Storm Water
Any flow occurring during or following any form of natural precipitation and resulting from such precipitation including snowmelt.

Total Suspended Solids
The total suspended matter that floats on the surface of, or is suspended in, water, wastewater or other liquids, and which is removable by laboratory filtering.

Underground Storage Tank
Any one or combination of underground tanks and any connecting underground pipes used to contain an accumulation of regulated substances, the volume of which, including the volume of the connecting underground pipes, is ten percent or more beneath the surface of the ground.

User
Any person who contributes, causes or permits the contribution of wastewater into El Paso's wastewater system.

Vehicle
A mobile receptacle or device in which or by which waste may be transported upon public streets, highways or roadways.

Wastewater
Liquid and water carried industrial or domestic solid, gas or liquid wastes from dwellings, commercial buildings, industrial facilities, and institutions, whether treated or untreated, together with any groundwater, surface water and storm water that may be present.

Wastewater System or System
El Paso's POTWs owned and operated through the Public Service Board.

C. ADMINISTRATION

El Paso Water Utilities, under the direction of its General Manager and acting through its employees and agents, is hereby authorized to administer this Rules and Regulations No. 9, and to take all steps necessary to implement them. Unless explicitly stated otherwise, references to the Public Service Board in this Rules and Regulations No. 9 shall include El Paso Water Utilities.

SECTION III GENERAL SEWER USE REQUIREMENTS

A. PROHIBITED DISCHARGE STANDARDS

1. No User shall discharge or cause to be discharged into El Paso's wastewater system any pollutant or wastewater except in conformity with this Rules and Regulations No. 9, the requirements of the Act, the General Pretreatment Regulations in 40 C.F.R. Part 403, and applicable state laws. Significant Industrial Users (see Section IV) must obtain a discharge permit from the PSB prior to any discharge. All other Users must notify the PSB of the nature and characteristics of their wastewater prior to commencing their discharge to determine if a discharge permit is required. If a permit is not required, the User must enter into a wastewater service contract with the PSB prior to any discharge.

2. No User may discharge or cause to be discharged into the wastewater system any pollutant or wastewater which will cause Pass-through or Interference. In addition, a User may not introduce the following substances into the wastewater system:

   a. Any liquids, solids or gases, which by reason of their nature or quantity are, or may be sufficient, either alone or by interaction with other substances, to cause fire or explosion; or which have a closed-cup flashpoint of less than 60° Celsius.

   b. Solid or viscous substances in such quantities and/or qualities which may cause obstruction to the flow in the system resulting in interference, such as, but not limited to: grease, garbage with particles greater than 1 centimeter in any dimension, animal guts or tissues, paunch manure, bones, hair, hides, fleshings, entrails, blood, feathers, ashes, cinders, sand, mud, lime, stone dust, marble dust, metal, glass, straw, shavings, grass clippings, rags, grains, hops, paper, wood, plastics, grinding or polishing wastes or substances which may solidify or become viscous at temperatures between 0. Celsius and 60. Celsius.

c. Petroleum substances, whether emulsified or not, in excess of 100 mg/l.

d. Any wastewater having a pH less than 5.5 or greater than 10.5, or wastewater having any other corrosive property capable of causing significant damage or hazard to structures, equipment, and/or personnel of the system.

e. Any wastewater containing toxic pollutants in sufficient quantity, either singly or by interaction with other pollutants, to injure or interfere with any wastewater treatment process, constitute a hazard to humans or animals, create a toxic effect in the receiving waters at the effluent end of the system, or to exceed a limitation set forth in a Categorical Pretreatment Standard. A toxic pollutant shall include but not be limited to any pollutant identified pursuant to Section 307(a) of the Act.

f. Any noxious or malodorous liquids, gases, or solids which either singly or by interaction with other wastes are sufficient to create a public nuisance or hazard to life or are sufficient to physically prevent reasonably safe and/or tolerable human and/or mechanical entry into the sewers for inspection, maintenance and repair purposes.

g. Any substance which may cause the system's effluent or any other product of the system such as residues, sludges, or scums, to be unsuitable for normal landfill disposal, land application reclamation or beneficial use, or to interfere with the reclamation process where the system is pursuing a reuse and reclamation program. In no case, shall a substance discharged to the system cause the system to be in noncompliance with sludge use or disposal criteria, guidelines or regulations developed under Section 405 or Section 503 of the Act; any criteria, guidelines, or regulations affecting sludge use or disposal developed pursuant to the Solid Waste Disposal Act, the Clean Air Act, the Toxic Substances Control Act, the Resource Conservation and Recovery Act, or State criteria applicable to sludge management and/or disposal methods being used including Chapter 312 of the Texas Administrative Code.

h. Any substance which will cause the system to violate its NPDES and/or State Disposal System Permit or the receiving water quality standards or an applicable Total Maximum Daily Load (TMDL) as established by the EPA or the TNRCC.

i. Any wastewater having a temperature which will inhibit biological activity in a treatment plant resulting in Interference, but in no case wastewater with a temperature at the introduction into a treatment plant which exceeds 40° Celsius.

j. Any pollutants, including oxygen demanding pollutants (BOD, etc.) released at a flow and/or pollutant concentration which will cause Interference to the system. In no case shall a slug load have a flow rate, or contain concentration or quantities of pollutants that exceed for any time period longer than fifteen (15) minutes more than five (5) times the average daily concentration, quantities, or flow during normal operation.

k. Trucked, drummed, containerized or hauled wastes or pollutants except as specified in the Rules and Regulations No. 13.

l. Any wastewater containing any radioactive wastes or isotopes of such half life or concentration as may exceed limits as permitted by the most current Federal or State regulations.

m. Any pollutants which result in the presence or formation of toxic gases, vapors or fumes within the system in a quantity that may cause acute workers' health and safety problems.

n. Stormwater, surface water, groundwater, roof run-off, subsurface drainage and unpolluted wastewater unless specifically authorized by Wastewater Discharge Permit.

o. Sludges, screenings or other residues from the pretreatment of industrial wastewater, including, but not limited to, the solid or liquid contents of sand, grit or grease traps.

p. Wastewater causing either alone or in conjunction with other sources, the POTW effluent to fail a toxicity or biomonitoring test.

q. Detergents, surfactants, surface-active agents or other substances which may cause foaming in the POTW.

r. Wastewater causing two readings on an explosion hazard meter at the point of discharge into the POTW or at any point in the POTW or more than 50 percent of the Lower Explosive Limit of the meter.

s. Mercury compounds.

Pollutants, substances or wastewater prohibited by this section shall not be processed or stored in such a manner that they could be discharged into the POTW except as allowed by the Wastewater Discharge Permit.

B. LOCAL LIMITS

1. The following pollutant limits are established to protect against pass-through and/or interference. No person shall discharge or cause to be discharged into the wastewater system any pollutant or wastewater in violation of the local limits listed below. These limits are based on either flow-proportional or time-proportional composite samples; or, a grab sample where composite sampling is not possible or practical. The limits apply at the point where the wastewater is discharged to the POTW. All concentrations are for the "total" pollutant.

Pollutant	Concentration	Units
arsenic	0.17	mg/l
cadmium	0.11	mg/l
chromium	1.22	mg/l
copper	2.39	mg/l
cyanide	1.31	mg/l
lead	0.66	mg/l
mercury	0.002	mg/l
molybdenum	0.15	mg/l
nickel	1.71	mg/l
selenium	0.35	mg/l
silver	0.98	mg/l
zinc	5.37	mg/l
Total dissolved solids (TDS)	6140	mg/l

2. No user shall discharge or cause to be discharged into the wastewater system any pollutant or wastewater containing any of the following:

a. Fat, grease, oil or wax of vegetable origin in excess of 100 mg/l unless otherwise allowed by the Wastewater Discharge Permit.

b. Wastewater containing dye, dye waste or any other coloring agent resulting in a wastewater color concentration in excess of 300 ADMI units.

c. The following limits are established for BTEX compounds and are based on grab sampling.

Pollutant	Units	Concentration
Benzene	mg/l	20.0
Toluene	mg/l	17.0
Ethyl benzene	mg/l	16.0
Xylene	mg/l	17.0

3. The PSB reserves the right to amend this Rules and Regulations No. 9 at any time to establish more stringent local limits as necessary to satisfy the purposes as set forth in Section II-A.

C. FEDERAL

1. The categorical pretreatment standards found at 40 C.F.R. Chapter I, Subchapter N, Parts 405 through 471 are hereby incorporated.

a. Where a categorical pretreatment standard is expressed only in terms of either the mass or the concentration of a pollutant in wastewater, the PSB may impose equivalent concentration or mass-based limits in accordance with 40 C.F.R. § 403.6(c).

b. When wastewater subject to a categorical pretreatment standard is mixed with wastewater not regulated by the same standard, the PSB shall impose an alternate limit using the combined wastestream formula in 40 C.F.R. § 403.6(e).

c. A Industrial User may obtain a variance from a categorical pretreatment standard if the Industrial User can prove, pursuant to the procedural and substantive provisions in 40 C.F.R. § 403.13, that factors relating to its discharge are fundamentally different from the factors considered by EPA when developing the categorical pretreatment standard.

d. A Industrial User may obtain a net gross adjustment to a categorical standard in accordance with 40 C.F.R. § 403.15.

2. No Industrial User subject to a Categorical Standard or to a state discharge limitation shall discharge or cause to be discharged into the wastewater system any pollutant or wastewater in violation of that standard or limitation.

3. After the promulgation of a Categorical Standard or state limitation, and upon expiration of any compliance grace period, the Categorical Standard or state limitation, if more stringent than limitations imposed on Industrial Users under this Rules and Regulations No. 9, automatically supersedes and replaces those limitations. Industrial Users which become subject to a Categorical Standard are subject to the reporting requirements at 40 C.F.R. § 403.12.

D. STATE

[This section is reserved.]

E. DILUTION PROHIBITED

Except where expressly authorized to do so, no Industrial User shall ever increase the use of process water, or in any other way attempt to dilute a discharge, as a partial or complete substitute for adequate treatment to achieve compliance with the specific pollutant limitations contained in the Categorical Standards, or in any local limit or standard promulgated by the PSB or the State of Texas.

F. PRETREATMENT OF WASTEWATER

1. Industrial Users shall provide wastewater treatment as necessary to comply with this ordinance and shall achieve compliance with all categorical pretreatment standards, local limits and the prohibitions set out in this Rules and Regulations No. 9 within the time-frame specified by EPA, the State or the PSB, whichever is more stringent. Any facilities necessary for compliance shall be provided, operated and maintained at the Industrial User's expense. At the request of the PSB, detailed plans describing such facilities and operating procedures shall be submitted to the PSB for review and shall be acceptable to the PSB before such facilities are constructed. The review of such plans and operating procedures shall in no way relieve the Industrial User from the responsibility of modifying such facilities as necessary to produce a discharge acceptable to the PSB under the provisions of its Rules and Regulations.

2. Whenever deemed necessary, the PSB may require users to restrict their discharge during peak flow periods, designate certain wastewater be discharged only into specific sewers, relocate and/or consolidate points of discharge, separate sanitary wastestreams from industrial wastestreams and such other conditions as may be necessary to protect the POTW and determine the Industrial User's compliance with the requirements of this Rules and Regulations No. 9.

3. The PSB may require the Industrial User to install and maintain, on their property and at their expense, a suitable storage and flow-control facility to ensure equalization of flow. A wastewater discharge permit may be issued solely for flow equalization.

4. Industrial Users with the potential to discharge flammable substances may be required to install and maintain an approved combustible gas detection device.

5. No Industrial User shall discharge or cause to be discharged into the wastewater system any pollutant or wastewater containing grease, oil, sand or any flammable wastes (including, but not limited to, restaurants, food processing plants, garages, service stations, machine shops and factories), except through a suitable grease, oil, and sand interceptor. No such interceptor shall be required for private living quarters or dwelling units. The Industrial User shall be responsible for the installation, proper operation and maintenance of the interceptor and the lawful disposal of the accumulated waste.

6. Any User discharging wastewater generated in a photo processing process shall be subject to pretreatment requirements. The PSB shall follow the Code of Management Practice (CMP) for Silver Dischargers to determine requirements on a site specific basis. The CMP, finalized in 1995 by the Silver Coalition and the Association of Metropolitan Sewer Association (AMSA) provides recommendations on technology, equipment and management practices for controlling silver discharges from facilities that process photographic materials. Copies of the document can be obtained through the National Association of Photographic Manufacturers (NAPM) at: 550 Mamaroneck Avenue, Suite 307, Harrison, New York 10528-1612. The document is also available at http://www.silvercouncil.org..

7. No User shall bypass their pretreatment facility without prior written authorization of the PSB.

G. COMPLIANCE WITH DISCHARGE PROHIBITIONS

Any facilities required to pretreat wastewater to achieve compliance with this Rules and Regulations No. 9 shall be provided, operated, and maintained at the Industrial User's expense. Industrial Users planning to build or install such facilities after the effective date of this Rules and Regulations No. 9, must submit plans and operation procedures acceptable to the PSB prior to construction or installation of the facilities. The review of such plans and operating procedures will in no way relieve the Industrial User from the responsibility of modifying the facility as necessary to produce an effluent acceptable to the PSB under the provisions of this Rules and Regulations No. 9. Any significant changes in existing pretreatment facilities or methods of operation shall be reported to and be acceptable to the PSB prior to the Industrial User's initiation of the changes.

H. ACCIDENTAL DISCHARGES AND SLUG CONTROL

Each Industrial User shall provide protection from accidental discharge of prohibited materials or other substances regulated by these Rules and Regulations No. 9. At least once every two years, the PSB shall evaluate whether each significant industrial user needs an accidental discharge/slug control plan. The PSB may require any Industrial User to develop, submit for approval and implement such a plan. Facilities to prevent accidental discharge of prohibited materials shall be provided and maintained at the owner or Industrial User's own cost and expense. Review and approval of such plans and operating procedures shall not relieve the Industrial User from the responsibility to modify the Industrial User's facility as necessary to meet the requirements of this Rules and Regulations No. 9. Alternatively, the PSB may develop such a plan for any Industrial User. An accidental discharge/slug control plan shall address, at minimum, the following:

1. A description of discharge practices including non-routine batch discharges.

2. A complete inventory and description of stored chemicals.

3. Procedures to prevent adverse impact from any accidental or slug discharge. Such procedures include, but are not limited to, inspection and maintenance of storage areas, handling and transfer of materials, loading and unloading operations, control of plant site run-off, worker training, building of containment structures or equipment, measures for containing toxic organic pollutants, including solvents and/or measures and equipment necessary for emergency response.

SECTION IV INDUSTRIAL WASTEWATER DISCHARGE PERMITS

A. GENERAL

All SIUs proposing to connect to or to discharge any pollutant or wastewater into the wastewater system shall first obtain a wastewater discharge permit from the PSB. SIUs with an existing permit on the effective date of this Rules and Regulations No. 9 may continue to discharge under the terms of such permit until it expires, or is modified or terminated. The PSB may require other Industrial Users to obtain wastewater discharge permits as necessary to carry out the purposes of this Rules and Regulations No. 9. Any violations of the terms and conditions of a Wastewater Discharge Permit shall be deemed a violation of this ordinance and subjects the wastewater discharger to the sanctions enumerated in this Rules and Regulations No. 9. Obtaining a Wastewater Discharge Permit does not relieve a permittee of its obligation to comply with all federal and state pretreatment standards or requirements or with any other requirements of federal, state and local law.

B. PERMIT APPLICATION

1. To obtain a permit, Industrial Users shall complete and file a permit application on a form prescribed by the PSB at least ninety (90) days prior to the time that they desire to connect to the system or to begin discharging into it. Industrial Users seeking to renew a permit must file a renewal application

at least ninety (90) days prior to the expiration of the existing permit. The filing of a renewal application extends an existing permit until such time as the application for renewal is acted upon.

2. The application may require the following information:

   a. Name, address, and location, (if different from the address);

   b. SIC code number;

   c. Wastewater constituents and characteristics as determined by a reliable analytical laboratory; sampling and analysis shall be performed in accordance with procedures established by the EPA in 40 C.F.R. § 136;

   d. Time and duration of contribution;

   e. Average daily and 30 minute peak wastewater flow rates, including daily, monthly and seasonal variations if any;

   f. Site plans, floor plans, mechanical and plumbing plans showing all sewers, sewer connections, and appurtenances by the size, location and elevation and points of discharge;

   g. Description of activities, facilities and plant processes on the premises including all chemicals and materials which are or could be intentionally or accidentally discharged into the wastewater system;

   h. Where known, the nature and concentration of any pollutants in the discharge which are limited by any local, state, or national Pretreatment Standards, and a statement regarding whether or not the pretreatment standards can be met on a consistent basis and if not, what additional operation and maintenance and/or additional pretreatment is required;

   i. If additional pretreatment and/or operation and maintenance modifications will be required to meet a Pretreatment Standard; the shortest schedule by which the Industrial User could provide such additional pretreatment;

   j. Each product produced by type, amount, process or processes and rate of production;

   k. Type and amount of raw materials processed (average and maximum per day);

   l. Number and type of employees, and hours of operation of plant and proposed or actual hours of operation;

   m. Any other information as may be deemed necessary by the PSB to evaluate the permit application.

3. The application shall include the certification found in 40 C.F.R. § 403.6(a)(2)(ii).

4. After receiving a complete application, the PSB may issue a permit subject to the terms and conditions provided herein. Incomplete or inaccurate applications will not be processed.

5. The PSB will evaluate the data furnished by the User or prospective User and may require additional information. Within thirty (30) days of receipt of a complete application, the PSB will determine whether or not to issue a wastewater discharge permit. The PSB may deny any application.

6. At the discretion of the Pretreatment Manager, the requirement for the Permit Application may be waived for some Industrial Users subject to a permit. In such cases, the Wastewater Discharge Permit shall be issued without an application.

C. PERMIT CONDITIONS

A Wastewater Discharge Permit shall include such conditions as are deemed reasonably necessary by the PSB to accomplish the purpose of these regulations. Wastewater Discharge Permits shall be expressly subject to the PSB Rules and Regulations and all other applicable requirements of federal and state law. Permits shall contain, at minimum, the following information:

1. A statement that indicates the permit duration.

2. A statement that the permit is not transferable without prior notification to the PSB in accordance with the Rules and Regulations.

3. Limits on the wastewater constituents and characteristics.

4. Reporting and record-keeping requirements.

5. A statement of applicable civil and criminal penalties for violation of pretreatment standards or reporting requirements.

6. Limits on average and maximum rate and time of discharge or requirements for flow regulations and equalization.

7. Requirements for installation and maintenance of inspection and sampling facilities.

8. Specifications for monitoring programs which may include sampling locations, frequency of sampling, number, types and standards for tests and testing procedures.

9. Compliance schedule(s) where necessary for installing technology that will allow users to meet applicable pretreatment standards and requirements.

10. Requirements for maintaining and retaining plant records relating to wastewater discharge as specified by the PSB and affording the PSB access thereto.

11. Requirements for notification of the PSB of any new introduction of wastewater constituents or any substantial change in the volume or character of the wastewater constituents being introduced into the wastewater treatment system.

12. Requirements for notification of slug discharges.

13. Requirements for the installation of pretreatment technology, pollution control or construction of appropriate containment devices designed to reduce, eliminate or prevent the introduction of pollutants into the treatment works.

14. Requirements for the development and implementation of spill control plans or other special conditions including management practices necessary to adequately prevent accidental, unanticipated or nonroutine discharges.

15. Requirements for the development and implementation of waste minimization plans to reduce the amount of pollutants discharged to the POTW.

16. Other conditions as deemed appropriate by the PSB to insure compliance with all applicable laws and regulations.

D. PERMIT DURATION

A Wastewater Discharge Permit shall be issued for a specified time period not to exceed five (5) years from the effective date of the permit. A Wastewater Discharge Permit may be issued for a period less than five (5) years at the discretion of the PSB. Each Wastewater Discharge Permit will indicate a specific date upon which it will expire.

E. PERMIT MODIFICATION

A permit may be modified by the PSB, after notice to the permittee and opportunity for a hearing, for any of the following reasons:

1. Upon request of the permittee, provided that discharges under the modified permit would not create a violation of any existing applicable requirement, standard, law, rule or regulation or policy of the PSB.

2. To address material and substantial alterations or additions to the permitted facility or activity which occurred after permit issuance and were not contemplated by PSB at the time of permit issuance and which justify permit conditions that are different than those in the existing permit.

3. To incorporate any properly promulgated new or revised federal, state or local regulation where appropriate.

4. When the PSB receives new information, not available at the time of permit issuance, which justifies permit conditions different than those in the existing permit or which indicates that the discharge poses a threat to the POTW, POTW personnel or the receiving waters.

5. Upon a change in the POTW status that requires either a temporary or permanent reduction or elimination of the authorized discharge.

6. For violation of any terms and/or conditions of the permit.

7. For misrepresentations or failure to fully disclose all relevant facts in the permit application or in any required report.

8. Revision of or a grant of variance from categorical pretreatment standards pursuant to 40 C.F.R. § 403.13.

9. To correct typographical or other errors in the permit.

10. For other just cause as necessary to achieve the purposes of these Rules and Regulations.

F. PERMIT TRANSFER

A wastewater discharge permit is issued to a specific User at a specific facility. A Wastewater Discharge Permit shall not be reassigned or transferred or sold to a new owner, new user, different premises, or a new or changed facility.

G. PERMIT COST

The fees for wastewater discharge permits will be as established by the PSB as set forth in Rules and Regulations No. 6. Fees for permit renewal shall be equivalent to the permit fee. Permit fees are non-refundable.

H. PERMIT APPEAL

The PSB shall provide notice of the issuance of a Wastewater Discharge Permit. The User may petition, in writing, the Pretreatment Manager to reconsider the terms and conditions of a permit within ten (10) days of notice of issuance. Failure to submit a timely petition for review shall be deemed to be a waiver of all administrative appeals. In its notice of appeal, the User must indicate the permit condition objected to, the reasons for the objection and the alternative condition, if any, the User seeks to place in the permit. If the Pretreatment Manager denies the petition or if the Pretreatment Manager fails to act within ten (10) days, the request for reconsideration shall be deemed to be denied. The User may petition, in writing, the PSB to reconsider the terms and conditions of the permit and the Pretreatment Manager's denial within twenty-one (21) days of the notice of issuance of the permit. If the PSB fails to act within sixty-one (61) days from the notice of issuance, a request for reconsideration shall be deemed to be denied. Decisions not to reconsider a permit, not to issue a permit or not to modify a permit by the PSB shall be considered final administrative actions. The effectiveness of the Wastewater Discharge Permit shall not be stayed pending appeal.

I. PERMIT REVOCATION

The PSB may revoke a Wastewater Discharge Permit for good cause including, but not limited to, the following reasons:

1. Failure to notify the PSB of significant changes to the wastewater prior to the changed discharge.

2. Failure to provide prior notification to the PSB of changed conditions pursuant to this Rules and Regulations No. 9.

3. Misrepresentation or failure to fully disclose all relevant facts in the permit application.

4. Falsification of required reports.

5. Tampering with PSB monitoring equipment.

6. Refusing the PSB timely access to the facility premises and records.

7. Failure to meet effluent limitations.

8. Failure to pay recommended penalties.

9. Failure to meet compliance schedule milestones.

10. Failure to provide advanced notice of transfer of User ownership.

11. Violation of any pretreatment standard or requirement or any terms of the Wastewater Discharge Permit or the Rules and Regulations.

SECTION V REPORTING AND MONITORING

A. REQUIRED REPORTS

Industrial Users shall perform the monitoring and submit to the PSB the discharge reports described below. All monitoring reports shall include the certification statement in 40 C.F.R. § 403.6(a)(2)(ii) and shall be signed:

- for a corporation, by a responsible corporate officer as defined in 40 C.F.R. § 403.12(1)(l);
- for a partnership or sole proprietorship, by a general partner or the proprietor; or
- by an authorized representative of the persons described in a) and b) above, as defined in 40 C.F.R. § 403.12(1)(3). Reports shall be deemed submitted on the date postmarked.

1. Baseline Monitoring Reports Within 180 days of the effective date of a Categorical Standard, Industrial Users subject to such Standard and currently discharging to or scheduled to discharge to the wastewater system shall submit to the PSB a report which contains the information listed at 40 C.F.R. § 403.12(b)(1)-(7). New sources and sources that become Industrial Users subsequent to the promulgation of an applicable Categorical Standard, shall be required to submit to the PSB, at least 90 days before commencing their discharge, a report containing the information listed at 40 C.F.R. § 403.12(b)(1)-(5).

2. Compliance Reports Industrial Users subject to any Categorical Standard shall also submit to the PSB the compliance reports required by 40 C.F.R. § 403.12(c)(3), (d) and (e).

3. Notice of Potential Problem Industrial Users shall notify the PSB immediately of any discharge by them that could adversely affect one or more of El Paso's POTWs, including any slug loadings, as defined at 40 C.F.R. § 403.5(b).

4. Notice of Changed Discharge All Industrial Users shall promptly notify the PSB in advance of any substantial change in the volume or character of pollutants in their discharge.

5. Reporting of Violation If any sampling and analysis by an Industrial User of its discharge indicates a violation of the Industrial User's discharge permit, the Industrial User must notify the PSB within 24 hours of becoming aware of the violation. The Industrial User must also repeat the sampling and analysis and submit the results of the repeat analysis within 30 days after becoming aware of the violation. The Industrial User is not required to resample if, (1) The PSB performs sampling at the Industrial User at a frequency of at least once per month, or (2) The PSB performs sampling at the Industrial User between the time when the User performs its initial sampling and the time when the User receives the results of the sampling. This reporting requirement does not apply to BOD and TSS violations.

6. Self Monitoring Report As required in the Wastewater Discharge Permit, users shall collect wastewater samples for self-analysis and shall submit that information along with other information as required by the PSB in a report. At the option of the PSB and upon agreement with the User, the industry self-monitoring may be conducted by the PSB at a cost to be set on a case-by-case basis.

7. Compliance Schedule Reports As required in the Compliance Schedule, users operating under a Compliance Schedule may be required to submit reports necessary to evaluate compliance with the schedule. The Compliance Schedule Reports are due no later than fourteen (14) days following each milestone date in the schedule.

8. Other Reports Industrial Users shall perform such other monitoring and submit such other reports as required by the PSB by permit or otherwise.

B. RECORDKEEPING REQUIREMENTS

1. Any User required to monitor and/or report its discharges by this Rules and Regulations No. 9, or its Wastewater Discharge Permit shall retain and make available for inspection and copying, all records of all information obtained pursuant to any monitoring activities required by the rule and any additional records of information obtained pursuant to monitoring activities undertaken by the User independent of such requirements. Such records shall include the following for all samples taken:

   a. The date, exact place, method, and time of sampling and the names of the person or persons taking the samples;

   b. The dates analyses were performed;

   c. The person who performed the analyses;

   d. The analytical techniques/methods used; and

   e. The results of such analyses.

2. Any User subject to the reporting requirements established in this section shall be required to retain for a minimum of three (3) years any records of monitoring activities and results (whether or not such monitoring activities are required by this section) and shall make such records available for inspection and copying by the PSB or EPA. This period of retention shall be extended during the course of any unresolved litigation regarding the User or when requested by the PSB or EPA.

C. COMPLIANCE MONITORING

Unless otherwise indicated by the PSB, all sampling and analysis required by this Rules and Regulations No. 9, or by permit shall be performed in accordance with the procedures at 40 C.F.R., Part 136.

D. MINIMUM DETECTION LIMITS

Unless otherwise indicated by the PSB, all analysis required for compliance of the Local Limits in Section III shall be performed using the following detection limits. Lower detection limits may be utilized. The detection limits specified are those limits achieved on analysis and not the method detection limit nor the instrument detection limits. Failure to use the listed detection limits shall result in an automatic exceedence and will be subject to enforcement under Section VII herein.

(Chart begins on next page.)

Pollutant	Units	Minimum Detection Limits
aresenic	mg/l	0.01
cadmium	mg/l	0.001
chromium	mg/l	0.10
copper	mg/l	0.10
cyanide	mg/l	0.10
iron	mg/l	0.10
nickel	mg/l	0.0005
selenium	mg/l	0.10
silver	mg/l	0.01
zinc	mg/l	0.01
oil & grease	mg/l	10.00
color	ADMI	100.00

E. MONITORING FACILITIES

1. The PSB may require to be provided and operated, at the User's expense, monitoring facilities to allow inspection, sampling, and flow measurement of any discharge point and/or internal drainage systems located on private property. The monitoring facility should normally be situated on the User's premises, but the PSB may, when such a location would be impractical or cause undue hardship on the User, allow the facility to be constructed in the public street or sidewalk area and located so that it will not be obstructed by landscaping or parked vehicles.

2. There shall be ample room in or near such sampling manhole or facility to allow accurate sampling and preparation of samples for analysis. The facility, sampling, and measuring equipment shall be maintained at all times in a safe and proper operating condition at the expense of the User.

3. Whether constructed on public or private property, the sampling and monitoring facilities shall be provided in accordance with all applicable local construction standards and specifications. Construction of monitoring facilities within the User's property are subject to local Plumbing Code.

F. INSPECTION AND SAMPLING BY THE PSB

The PSB may inspect the facilities of any User and take samples of its discharge at the designated discharge points without advance notice to the User. While the representative of the PSB is at the facility, the User may request and shall be provided a portion of any sample taken. Persons or occupants of premises where wastewater is created or discharged shall allow the PSB or its representative ready access at all reasonable times to all parts of the premises for the purposes of inspection, sampling, records examination, or in the performance of any of their duties. The PSB shall have the right to set up on the User's property such devices as are necessary to conduct sampling inspection, compliance monitoring and/or metering operations. Where a User has security measures

in force which would require proper identification and clearance before entry into their premises, the User shall make necessary arrangements with their security guards so that upon presentation of suitable identification, personnel from the PSB will be permitted to enter, without delay, for the purpose of performing their specific responsibilities.

G. CONFIDENTIAL INFORMATION

User information and data obtained from reports, questionnaires, permit applications, permits, and monitoring programs and from inspections shall be available without restriction unless the User specifically requests and is able to demonstrate to the satisfaction of the PSB that the release of such information would divulge information, processes or methods of production entitled to protection as trade secrets of the User under applicable state law. Any such request must be asserted at the time of submission of the information or data. When requested and demonstrated by the User furnishing a report that such information should be held confidential, the portions of a report which might disclose trade secret(s) shall not be made available for inspection by the public, but shall be made immediately available upon request to governmental agencies for uses related to the NPDES program or pretreatment program and in enforcement proceedings involving the Person or User submitting the report. Wastewater constituents and characteristics shall not be recognized as confidential information.

H. NOTIFICATION OF THE DISCHARGE OF HAZARDOUS WASTE

1. In accordance with federal regulation at 40 C.F.R §403.12(p), any Industrial User who commences the discharge of hazardous waste shall notify the POTW, the EPA Regional Waste Management Division Director and the Texas Natural Resource Conservation Commission, in writing, of any discharge into the POTW of a substance which, if otherwise disposed of, would be a hazardous waste under 40 C.F.R. § 261. Such notification must include the name of the hazardous waste as set forth in 40 C.F.R. § 261, the EPA hazardous waste number, and the type of discharge (continuous, batch or other). If the user discharges more than one hundred (100) kilograms of such waste per calendar month to the POTW, the notification also shall contain the following information to the extent such information is known and readily available to the Industrial User: an identification of the hazardous constituents contained in the wastes, an estimation of the mass and concentration of such constituents in the wastestream discharged during that calendar month and an estimation of the mass of constituents in the wastestream expected to be discharged during the following twelve (12) months. All notifications must take place no later than one hundred and eighty (180) days after the discharge commences. Any notification under this paragraph need be submitted only once for each hazardous waste discharged. However, notifications of changed conditions must be submitted under Section IV-1 of this rule. The notification requirement in this section does not apply to pollutants already reported by users subject to categorical pretreatment standards.

2. Dischargers are exempt from the requirements of Section IV-7-A during a calendar month in which they discharge no more than fifteen (15) kilograms of hazardous wastes unless the wastes are acute hazardous wastes as specified in 40 C.F.R. § 261.30(d) and 261.33(e). Discharge of more than fifteen (15) kilograms of nonacute hazardous wastes in a calendar month, or of any quantity of acute hazardous wastes as specified in 40 C.F.R. § 261.30(d) and 261.33(e) requires a one-time notification. Subsequent months during which the user discharges more than such quantities of any hazardous waste do not require additional notification.

3. In the case of new regulations under Section 3001 or RCRA identifying additional characteristics of hazardous waste or listing any additional substance as a hazardous waste, the Industrial User must notify the PSB, the EPA Regional Waste Management Division Director and the Texas Natural Resource Conservation Commission of the discharge of such substance within ninety (90) days of the effective date of such regulations.

4. In the case of any notification made under Section V-G, the Industrial User shall certify that it has a program in place to reduce the volume and toxicity of hazardous wastes generated to the degree it has determined to be economically practical.

5. This provision does not create a right to discharge any substance not otherwise permitted to be discharged by this ordinance, a permit issued thereunder, or any applicable federal or state law.

SECTION VI STORAGE TANKS

The regulations within this section are applicable to both Underground and Aboveground Storage Tank systems storing hazardous substances and petroleum substances as prescribed by Texas Water Code, Chapter 26, Subchapter I.

A. Owners and operators and their agents, contractors and designees of underground and aboveground storage tanks shall comply with applicable regulations under TNRCC 30 T.A.C. Chapter 334 and 40 C.F.R. Part 261.

B. Owners and operators of underground and aboveground storage tank systems shall report suspected releases to the PSB immediately upon discovery.

C. Discharge of Free Product, or any wastewater containing Free Product, in excess of 100 mg/l to the sanitary sewer system is prohibited in accordance with Section II-1 herein.

D. Discharge of purge water from monitoring wells is prohibited except with prior written authorization of the PSB. Such authorization shall not be unreasonably withheld, and shall be based upon assessment, sample collection and analysis conducted by the owner/operator or his designee. A nonrefundable fee of $250 shall be payable to the PSB to process the request.

E. Discharge of wastewater generated during internal cleaning, repairing, relining, or hydrostatic testing of tanks shall be prohibited without prior written authorization of the PSB. Such authorization shall not be unreasonably withheld, and shall be based upon assessment, sample collection and analysis conducted by the owner/operator or his designee. In addition, the PSB shall consider the affect of the discharge on the wastewater collection system and the feasibility of alternatives to sanitary wastewater collection system discharge. The assessment, sample collection and analysis is the responsibility of the owner or his designee. A non-refundable fee of $250 shall be payable to the PSB to process the request.

F. Wastewater generated during Soil and/or Groundwater Remediation is prohibited for discharge into the wastewater system. Such waste shall be otherwise discharged in accordance with applicable state and federal regulations.

SECTION VII ENFORCEMENT

A. NOTICE OF VIOLATION

1. Whenever the PSB or its designated representative believes that any person or permittee has violated or is violating this Rules and Regulations No. 9 and/or a wastewater permit or order issued hereunder, the PSB or its designated representative may serve (either personally or by registered or certified mail) upon such person or permittee a written notice stating the nature of the alleged violation. The recipient of an alleged violation notice must respond in writing to the PSB or designated representative within fifteen (15) working days from the date of receipt of such notice.

2. Should the recipient of an alleged violation notice fail to respond in writing to the PSB or designated representative, within the initial fifteen (15) working day response period, the recipient person or permittee shall be deemed to have admitted to responsibility for the violation.

3. The person or permittee responding to receipt of an alleged violation notice shall file written response in the most applicable of the following forms:

   a. Should the person or permittee admit his or her responsibility for the alleged violation, the person or permittee shall submit a letter report to the PSB or its designated representative which:

      (i) If the nature of the violation of either the permit or this rule involves a discharge that is prohibited herein, submit a report containing information regarding the time, date, location, cause, source, quantity, quality and concentration of the discharge or disposal and the corrective measures actually taken by the person or permittee to recover or neutralize the discharge, self-reporting notices submitted to any state, federal or other agencies having jurisdiction, and actions to be taken by the person or permittee to prevent any similar recurrent discharges.

      (ii) If the nature of the violation of either the permit or this rule involves an administrative or procedural non-compliance, the letter report shall contain information regarding corrective measures and time schedules the person or permittee has adopted to assure expeditious and continued compliance.

   b. Should the person or permittee deny his or her responsibility for the alleged violation, the person or permittee must submit a letter report to the PSB or designated representative explaining why responsibility is being contested.

B. CONSENT ORDER

The PSB may enter into Consent Orders, assurances of voluntary compliance, or other similar documents establishing an agreement with any user responsible for noncompliance. Such documents will include specific action(s) to be taken by the User to correct the noncompliance within a period of time specified by the document.

C. SHOW CAUSE HEARING

The PSB may order a User which has violated, or continues to violate, any provision of these Rules and Regulations No. 9, a Wastewater Discharge Permit or order issued hereunder, or any other pretreatment standard or requirement, to appear before the PSB and show cause why the proposed enforcement action should not be taken. Notice shall be served on the User specifying the time and place for the meeting, the proposed enforcement action, the reasons for such action and a request that the User show cause why the proposed enforcement action should not be taken. The notice of the meeting shall be served personally or by certified mail return receipt requested at least ten (10) days prior to the hearing. Such notice may be served on any representative of the user. A show cause hearing shall not be a bar against, or prerequisite for, taking any other action against the User.

D. COMPLIANCE ORDER

Whenever the PSB finds that any User has violated or continues to violate any provision of this Rules and Regulations No. 9, or a permit or order issued thereunder, or any other pretreatment standard or requirement, the PSB may issue an order to the User directing that the User come into compliance within a specified period of time. If the User does not come into compliance within the time provided, sewer and/or water service may be discontinued unless adequate treatment facilities, devices, or other related appurtenances be installed and properly operated. Compliance Orders may also contain such other requirements as might be reasonably necessary and appropriate to address the noncompliance, including additional self-monitoring, and the adoption of management practices designed to minimize the amount of pollutants discharged to the wastewater system. A Compliance Order may not extend the deadline for compliance established for a

pretreatment standard or requirement, nor does a Compliance Order relieve the User of liability for any violation, including any continuing violation. Issuance of a Compliance Order is not required before the PSB may take any other enforcement action authorized herein.

E. CEASE AND DESIST ORDER

When the PSB finds that a User had violated, or continues to violate, any provision of these Rules and Regulations No. 9, a Wastewater Discharge Permit or order issued hereunder,or any other pretreatment standard or requirement, or that the User's past violations are likely to recur, the PSB may issue an order to the User directing it to cease and desist all such violations and directing the user to immediately comply with all requirements; and, take such appropriate remedial or preventive action as may be needed to properly address a continuing or threatened violation, including halting operations and/or terminating the discharge. Issuance of a cease and desist order shall not be a bar against, or a prerequisite for, taking any other action against the User.

F. EMERGENCY SUSPENSIONS

1. The PSB may suspend the wastewater treatment and/or water service and/or wastewater permit of a User without prior notice whenever such suspension is necessary in order to stop an actual or threatened discharge presenting or causing an imminent or substantial endangerment to the health or welfare of persons, the wastewater system, or the environment. The PSB may also immediately suspend a User's discharge, after notice and opportunity to respond, that threatens to interfere with the operation of the wastewater system, or which presents or may present an endangerment to the environment.

2. Any User notified of a suspension of its wastewater treatment and/or water service and/or its wastewater permit shall immediately stop or eliminate its discharge. In the event of a User's failure to immediately comply voluntarily with the suspension order, the PSB shall take such steps as deemed necessary, including immediate severance of the sewer connection, to prevent or minimize damage to the wastewater system, receiving streams, or endangerment to any individuals. The PSB may allow the User to recommence its discharge when the endangerment has passed, unless termination proceedings are initiated against the User.

3. Any User notified of a suspension for the reasons in Section VI-F-1 shall submit a detailed written statement describing the causes of the harmful discharge and the measures taken to prevent any future occurrence to the PSB within 15 days of receipt of the notice.

4. Nothing in this section shall be interpreted as requiring a hearing prior to any emergency suspension under this section.

G. TERMINATION OF SERVICE

In addition to the provisions of this rule, any User who violates the following conditions is subject to termination of either water service or wastewater service or both. Such User will be notified of the proposed termination and be offered an opportunity to show cause under Section VI-C of this rule why the proposed action should not be taken. Exercise of this option by the PSB shall not be a bar to, or a prerequisite for, taking any other action against the User.

1. Violation of a Wastewater Discharge Permit condition.

2. Failure to accurately report the wastewater constituents and characteristics of its discharge.

3. Failure to report significant changes in operations or wastewater volume, constituents and characteristics prior to discharge.

4. Refusal of reasonable access to the User's premises for the purpose of inspection, monitoring or sampling.

5. Violation of pretreatment standards.

H. PUBLICATION OF USERS IN SIGNIFICANT NONCOMPLIANCE

The PSB shall publish at least annually in the largest daily newspaper published in El Paso, Texas, a list of all Users which, during the previous twelve (12) months, were in significant noncompliance with applicable pretreatment standards. For purposes of this provision, a significant violation will be as defined in 40 C.F.R. § 403.8(f)(2)(vii).

I. SURCHARGE

Users shall be subject to a surcharge as provided in Rules and Regulations, Number 6, Section V.

J. TERMINATION OF PERMIT

A permit may be terminated by the PSB for the following causes. Users will be notified in advance of the proposed termination of their permit. Users may request a hearing as provided in Section VI-K:

1. Violation of permit conditions.

2. Failure to accurately report the wastewater constituents and characteristics of its discharge.

3. Failure to report significant changes in operations or wastewater constituents and characteristics.

4. Refusal of reasonable access to the User's premises for the purpose of inspection, monitoring, or sampling.

5. A determination that the User's discharge endangers human health or the environment and can only be regulated to acceptable levels by permit termination.

6. Failure to pay required fees, surcharges, or penalties.

K. HEARING BY THE PSB

1. Any User adversely affected by an action taken, or proposed to be taken, pursuant to this Rules and Regulations No. 9, or the terms of a discharge permit, is entitled to a hearing by the PSB upon filing with the PSB a written request within fifteen (15) days of the action, or of receipt of notice thereof, whichever is earlier. This section supersedes the provisions in PSB Rules and Regulations, Number 8, Section II, as they apply to Users of the wastewater system.

2. Filing of a request for a hearing will automatically stay the action, except for action taken pursuant to the emergency suspension authority.

3. The PSB may itself conduct the hearing and take the evidence, or may designate any of its members or any officer or employee of the PSB as the hearing officer. The hearing officer may take any of the following actions:

   a. Issue notices of hearings requesting the attendance and testimony of witnesses and the production of evidence relevant to any matter involved in such hearings.

   b. Take the evidence.

TCEQ Public Water System Plan Review Submittal Form
(Complete and Attach to Submittal Package)

Date: _____
TCEQ PWS Identification No.*: 0710154 CCN No. or Application No.**: P0948
Water System Name: _____
Water System Owner: Lower Valley Water District Type of Entity: Municipal Utility District
Address: 1557 FM 1110 Rd Phone: (915) 791-4480
Responsible Official: Fernando Sanchez Title: Operations Manager
***County (system location: El Paso Subdivision Sec., Phase, Unit, etc. Villa Victoria Subdivision
Mechanism & Source of Financing _____
Engineer: _____ Registration Number: _____
E-mail: _____ Firm Name: _____ Phone: ( ) _____
Firm Address: _____ Fax: ( ) _____

* If no PWS Number exists, the owner must submit a business plan, if required, in accordance with §290.39(f) and (g).
** If a required CCN Number does not exist, an acceptable application to obtain a CCN number must be made before a project submittal can be technically reviewed. In addition, if a submittal is for a project located outside the CCN area, a CCN amendment must be submitted before a project may be reviewed for construction approval. Please refer to 30 TAC Chapter 291 for additional information regarding CCNs.

If this is a new (proposed) system, you must attach the following with this submittal:

- ☐ Attach a list of all water utilities within ½ mile of the proposed service area boundaries
- ☐ Copies of formal applications for service from each of the following:
  - ☐ any municipality if the system is within its ETJ;
  - ☐ any district or other political subdivision whose corporate boundaries are within ½ mile of the proposed service area boundaries
  - ☐ any other water service provider whose certificated service area boundary is within ½ mile of the proposed service area boundaries
- ☐ Documentation that all application requirements including payment of fees were complied with.
- ☐ Copies of written responses from each of the entities listed above.
- ☐ Business plan, if required by 30 TAC 290.39(f) & (g). The business plan financial requirements for non-community water systems must confirm capital availability to construct the system according to TCEQ requirements. This would consist of a balance sheet that shows liability as well as assets, not just a bank confirmation of a deposit account. Alternatively, if the project is being constructed with loan funds, then a loan commitment letter from the lender specific to that project will suffice.
- ☐ Justification for constructing a separate system (unless none of the entities listed above exist)

Type of Project (please check the appropriate boxes). Submit a sealed engineering report that included the number of connections to be served.

- ☐ Distribution System Modifications
- ☐ *** Well completion data on previously approved well
- ☐ Pressure Maintenance Facilities Modifications
- ☐ Disinfection Facilities or Other Modifications
- ☐ Preliminary Engineering Report w/o plans
- ☐ Modifications of Surface Water Treatment Plant
- ☐ Other (Please Explain) _____
- ☐ Storage Capacity Modifications
- ☐ *** Water Well Construction, Proposed
- ☐ Proposed Innovative Process Study
- ☐ *** Ground Water Treatment Plant, New
- ☐ Surface Water Treatment Plant, New
- ☐ Tex. Water Dev. Board Proj. No. _____

***Please refer to *http://www.ntrcc.state.tx.us/permitting/waterperm/pdw/pdw_rad.html* for a list of counties where there is an elevated risk of RADIONUCLIDES in the groundwater. The website also has helpful information regarding the radionuclide testing required in these counties.

IF THIS SUBMITTAL IS A REVISION OF PREVIOUSLY SUBMITTED PLANS, PLEASE ENTER THE ASSIGNED TCEQ LOG NUMBER: _____ . Please call (512) 239-6960 if you have questions regarding this form. Your cooperation will help us provide better service. Additional helpful information and rules are available at our website:

http://www.ntrcc.state.tx.us/permitting/waterperm/ud/planrev.html

I hereby certify that the above information is, to the best of my knowledge, true and correct.

Signed P.E. Seal Here:

_____ _____
Printed Engineer's Name Date

TCEQ Public Water System Plan Review Submittal Form
(Complete and Attach to Submittal Package)

Date: _____
TCEQ PWS Identification No.*: _____CCN No. or Application No.**:_____
Water System Name:_____
Water System Owner:_____Type of Entity:_____
Address:_____Phone:(___)_____
Responsible Official:_____Title:_____
***County (system location) : _____Subdivision Sec., Phase, Unit, etc._____
_____Mechanism & Source of Financing_____
Engineer:_____Registration Number:_____
E-Mail:_____Firm Name:_____Phone:(____)_____
Firm Address:_____ Fax: (_____)_____

***** If no PWS Number exists, the owner must submit a business plan, if required, in accordance with §290.39(f) and (g).
****** If a required CCN number does not exist, an acceptable application to obtain a CCN number must be made before a project submittal can be technically reviewed. In addition, if a submittal is for a project located outside the CCN area, a CCN amendment application must be submitted before a project may be reviewed for construction approval. Please refer to 30 TAC Chapter 291 for additional information regarding CCNs.

If this is a new (proposed) system, you must attach the following with this submittal:

- □ Attach a list of all water utilities within ½ mile of the proposed service area boundaries
- □ Copies of formal applications for service from each of the following
  - □ any municipality if the system is within its ETJ;
  - □ any district or other political subdivision whose corporate boundaries are within ½ mile of the proposed service area boundaries
  - □ any other water service provider whose certificated service area boundary is within ½ mile of the proposed service area boundaries
- □ Documentation that all application requirements including payment of fees were complied with.
- □ Copies of written responses from each of the entities listed above.
- □ Business plan, if required by 30 TAC 290.39(f) & (g). The business plan financial requirements for non-community water systems must confirm capital availability to construct the system according to TCEQ requirements. This would consist of a balance sheet that shows liabilities as well as assets, not just a bank confirmation of a deposit account. Alternatively, if the project is being constructed with loan funds, then a loan commitment letter from the lender specific to that project will suffice.
- □ Justification for constructing a separate system (unless none of the entities listed above exist)

Type of Project (please check the appropriate boxes). Submit a sealed engineering report that includes the number of connections to be served.

- □ Distribution System Modifications
- □ ***Well completion data on previously approved well
- □ Pressure Maintenance Facilities Modifications
- □ Disinfection Facilities or Other Modifications
- □ Preliminary Engineering Report w/o plans
- □ Modification of Surface Water Treatment Plant
- □ Other (Please Explain)_____
  _____
  _____
- □ Storage Capacity Modifications
- □ ***Water Well Construction, Proposed
- □ Proposed Innovative Process Study
- □ ***Ground Water Treatment Plant, New
- □ Surface Water Treatment Plant, New
- □ Tex. Water Dev. Board Proj. No._____

***Please refer to *http://www.tnrcc.state.tx.us/permitting/waterperm/pdw/pdw_rad.html* for a list of counties where there is an elevated risk of RADIONUCLIDES in the groundwater. The website also has helpful information regarding the radionuclide testing required in these counties.

IF THIS SUBMITTAL IS A REVISION OF PREVIOUSLY SUBMITTED PLANS, PLEASE ENTER THE ASSIGNED TCEQ LOG NUMBER:_____. Please call (512) 239-6960 if you have questions regarding this form. Your cooperation will help us provide better service. Additional helpful information and rules are available at our website:

http://www.tnrcc.state.tx.us/permitting/waterperm/ud/planrev.html

I hereby certify that the above information is, to the best of my knowledge, true and correct.

Signed P.E. Seal Here:

_____ _____
Printed Engineer's Name Date

(Date)

Mr. Louis C. Herrin III, P.E.
TCEQ - MC 148
P. O. Box 13087
Austin, Texas 78711-3087

Re: Chapter 317 Summary Transmittal Letter
Permittee: (Insert the name of the permittee exactly as it is written on the wastewater discharge permit associated with the project identified in this letter.)
Permit Number: (Insert the Permit Number of the wastewater facility associated with the project identified in this letter.)
Project Name: (Insert an identifying name for the project.)
County(s): (Insert the name of the county(s) in which the project will be located.)
Grant No.: (If applicable, insert the granting agency initials and a grant number)

Dear Mr. Herrin:

The purpose of this letter is to provide the TCEQ with the information necessary to comply with the requirements of §317.1(a)(3)(D) of the TCEQ's rules entitled, Design Criteria for Sewerage Systems. The necessary information includes:

1. Provide the name and address of the engineering firm.

2. Provide the name, phone number and facsimile number of the design engineer.

3. Provide the name of the entity {or entities} which proposes to own, operate and maintain the project through its design life.

4. If applicable, disclose any variances from Chapter 317 which are a part of the design. Include in this item the technical justification for any variances.

5. If applicable, disclose any innovative or nonconforming technologies which are proposed as part of the project identified in this letter. Include in this item, or as an attachment, the backup testing or other technical information needed to justify the use of the innovative or nonconforming technology. See §317.1(a)(4)(C) for details on innovative and nonconforming technologies.

6. Include one of the following two statements in this item:

    a.) The plans and specifications which describe the project identified in this letter are in substantial compliance with all the requirements of Chapter 317.

    b.) Except as disclosed in item (Insert '4', '5' or '4 and 5' in this spot as pertinent to the project.)

of this letter, the plans and specifications which describe the project identified in this letter are in substantial compliance with all the requirements of Chapter 317. Any deviations from Chapter 317 which are a part of the project are based on the best professional judgement of the professional engineer who prepared the project plans, specifications and final engineering design report for this project.

7. Include a description of the project and its scope. The type of information most useful to the TCEQ is data relating to current and permitted flows and effluent limitations, current and predicted influent flows and organic loads, the purpose of the proposed project and other technical elements of the project.

If you have any questions regarding this project, please contact (Insert name, phone number and facsimile number of a contact person for this project.)

Sincerely,

(Name) (P.E. Seal - Signed and Dated)

xc: (Provide a copy of the summary transmittal letter to the appropriate TCEQ Region Office Water Program manager.)