



CITY OF ALBUQUERQUE  
STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION

April 5, 2011

**UPDATE NUMBER 8**

Update number Eight (8) to the City of Albuquerque (COA) Standard Specifications for Public Works Construction is now available for reference and purchase. Specifications may be purchased in bound book format or in CD ROM format from Albuquerque Reprographics.

The cost of the COA Standard Specification for Public Works Construction General Conditions and Technical Specifications bound book format is \$93.00 plus tax, the cost of the Standard Detail Drawings bound book format is \$87.00 plus tax, the cost of the COA Standard Specification for Public Works Construction General Conditions and Technical Specifications including Detail Drawings in binder format is \$165.00 plus tax and CD ROMS are \$50.00 each plus tax.

The cost for Update Number 8, as a supplement to the COA Standard Specification for Public Works Construction including drawings that have been three hole punched for a standard binder is \$25.00 for each set plus tax and CD ROMS are \$10.00 each plus tax.

Prices are based on the reproduction contract prices that Albuquerque Reprographics has with the City of Albuquerque and are subject to change.

The Standard Specifications for Public Works Construction may also be viewed on the City's Web Page at: <http://www.cabq.gov/planning/publications/standardspecs.html>

See attached memo for more information.



April 5, 2011

*Mayor Richard J. Berry*

**TO:** All Holders of the City of Albuquerque Standard Specifications for Public Works Construction, 2011

**FROM:** Richard Dourte, City Engineer, Planning Department

**SUBJECT: UPDATE NO. 8 – REVISIONS, DELETIONS, AND ADDITIONS**

Attached is a listing of specification sections and/or drawings that have been modified and are hereby made part of the City of Albuquerque's Standard Specifications for PUBLIC Works Construction – 1986 as Update No. 8. The revised text section and drawings should be replaced, deleted, or inserted as indicated. All construction plans and specifications shall incorporate the requirements of Update No. 8 as soon as possible with the following effective dates for full implementation:

1. Plans submitted to DRC for preliminary review shall be in full compliance with Update No. 8 on or after July 1, 2011.
2. Plans submitted to DRC for final review or sign-off shall be in full compliance with Update No. 8 on or after September 1, 2011.
3. Projects with a start of construction date (Work Order or Notice to Proceed Date) on or after November 1, 2011, shall be in full compliance with Update No. 8.

If there are any questions regarding the update of the water/sanitary sewer sections of Update Number 8 of the Standard Specifications please contact Mr. Anthony Montoya, Jr., P.E., Senior Engineer of the ABCWUA at 736-2713 or e-mail him at [almontoya@abcwua.org](mailto:almontoya@abcwua.org). All other questions concerning Update Number 8 should be directed to Mr. Paul Olson, PE, Senior Engineer at the City of Albuquerque Planning Department at (505) 924-3421 or e-mail him at [polson@cabq.gov](mailto:polson@cabq.gov).

In addition to changes from the Albuquerque Bernalillo County Water Utility Authority, Update 8 includes incorporating Amendment #1 to Update 7 and the following changes to Standard details:

Standard Details for Traffic 2533 and 2534 series for Bus Shelter “A” and “B” were removed and index sheet 2500 updated to reflect these removals.

June 28, 2011

Corrections and Changes to Update 8 January 2011 issued April 5, 2011

#### Revisions

The January 2011 Update did not include the revised standard detail drawing 2360. The correct standard detail drawing has a revision date of January 2011.

Standard detail drawing 2400 has been updated and has a revision date of 04/26/04. This standard detail drawing was corrected after the release of Update 7. The revised standard detail drawing is now included.

#### Deletions

The Albuquerque Bernalillo County Water Utility Authority has deleted the following standard detail drawings:

- 2369 Heavyweight Meter Box
- 2391 Landscape Irrigation System
- 2392 Examples of Landscape Irrigation Systems

SECTION 2500

STANDARD DETAILS FOR Traffic

<i>DWG.NO.</i>	TITLE
2501	STANDARD TRANSITION
2502	TYPICAL STREET INERSECTION PLAN
2503	TYPICAL STREET INTESECTION PLAN
2504	CURB RETURN RADIUS TABLE
2505	CHANNELIZED RIGHT TURN FOR INTER. WITH PRINCIPAL ARTERIAL
2510	PLAN CUL-DE-SACS
2511	ISLAND CUL-DE-SACS
2512	HAMMER HEAD CUL-DE-SACS
2528	POLE INSTALLATION FOR PARKING METERS
2529	BICYCLE GATEWAY
2535.1	BUS SHELTER "C" – CUT SECTION, FILL SECTION
2535.2	BUS SHELTER "C" – PLAN & ROOF PLAN (W/SIDEWALK)
2535.3	BUS SHELTER "C" – (W/O SIDEWALK)
2535.4	BUS SHELTER "D" – PLAN & ROOF PLAN (W/SIDEWALK)
2535.5	BUS SHELTER "D" – (W/O SIDEWALK)
2535.6	BUS SHELTER "C" – ELEVATION / SECTION
2535.7	BUS SHELTER "D" – ELEVATION / SECTION
2535.8	BUS SHELTER "C" & "D" DETAILS
2535.9	BUS SHELTER "C" & "D" BENCH
2535.10	BUS SHELTER "C" & "D" TRASH RECEPTACLE
2550	TRAFFIC SIGNAL PULL BOX DETAILS
2551	TRAFFIC SIGNAL MANHOLE DETAILS
2552	TRAFFIC SIGNAL LOOP DETECTOR DETAILS
2555	TRAFFIC SIGNAL CONTROLLER CABINET & PEDESTRIAN FOUNDATION DETAILS
2556	TRAFFIC SIGNAL CABINET FOUNDATION CONVERSION
2557	TRAFFIC SIGNAL SPLICE CABINET GROUND MOUNT (LARGE)
2558	TRAFFIC SIGNAL FOUNDATION DETAILS TYPE II AND TYPE III STANDARDS
2560	TRAFFIC SIGNAL MISCELLANEOUS DETAILS
2561	TRAFFIC SIGNAL MASTARM DETAILS, ALUMINUM
2562A	TRAFFIC SIGNAL MASTARM DETAILS, TYPE II STANDARD
2562B	TRAFFIC SIGNAL MASTARM DETAILS, TYPE II STANDARD
2562C	TRAFFIC SIGNAL MASTARM DETAILS, TYPE III STANDARD
2562D	TRAFFIC SIGNAL TYPE III STANDARD MISC. DETAILS
2565	TRAFFIC SIGNAL SCHOOL BEACON DETAILS (MASTARM)
2566A	TRAFFIC SIGNAL SCHOOL BEACON DETAILS (PEDESTAL)
2566B	TRAFFIC SIGNAL WARNING TRAFFIC BEACON DETAILS
2568	TRAFFIC SIGNAL MACHINE VISION VEHICLE DETECTOR SYSTEM
2569	TRAFFIC SIGNAL OPTICAL DETECTOR INSTALLATION DETAILS
2570	TRAFFIC SIGNAL ELECTRICAL SERVICE DETAILS
2571	TRAFFIC SIGNAL METER PEDESTAL DETAILS FOR SIGNAL
2572	TRAFFIC SIGNAL METER PEDESTAL DETAILS COMBINATION SIGNALS & LIGHTING
2573	STREET LIGHTING CONTROL CABINET SIX CIRCUIT, METERED
2574	STREET LIGHTING CONTROL CABINET SIX CIRCUIT UNMETERED
2580	STREET LIGHTING FOUNDATION & MISCELLANEOUS DETAILS
2581	STREET LIGHTING INSTALLATION & POLE DETAILS

February 10, 2011

To: Richard Dourte, P.E., City Engineer

From: Anthony Montoya , Senior Engineer, ABCWUA

Subject: Update No. 8 – ABCWUA Proposed Revisions, Deletions, and Additions - Summary

The following is a brief summary of the Water Authority's proposed changes to the City of Albuquerque Standard Specifications for Public Works Construction. The section numbers are shown along with a brief description about the proposed changes to the given specification.

**General Conditions, Section 18, Utilities:**

Changes were made to the Water Shut-Off Procedures with regard to the On-Line submittal and the lead time associated for shut-offs on distribution, transmission, and San Juan Chama lines.

**Technical Specifications, Section 121, Plastic Pipe:**

121.4.1 – Addition of pvc color designations for potable water, non-potable water, and sanitary sewer pipe applications;

121.4.2 - Minor correction – replace delectable with detectable;

121.5 - Elimination of PVCO from spec;

121.5.1.8 - Addition of new section which limits PVC to 24" diameter (max);

Replacement of 121.5.2.5.1 with 121.5.2.6 for clarity of pipe discussed;

121.5.3.1.1 - New Section – Prohibits HDPE for public water line use;

121.5.3.2.3 – Minor change for clarity of PE pipe;

121.5.3.2.4 – Change to include authorization by Water Authority for tap on HDPE collector line;

121.5.3.3 – Addition of language to emphasize the non-use of plastic water service lines;

**Technical Specifications, Section 128, Concrete Cylinder Pipe:**

128.1 – Change minimum pipe size from 16" to 24";

**Technical Specifications, Section 129, Ductile Iron Pipe:**

129.3.6 – Addition of polyethylene encasement on DI pipe installation;

129.3.7 – Addition of Bell and Spigot Joint section;

129.4.3 0 - Addition of polyethylene encasement on DI pipe installation;

**Technical Specifications, Section 130, Gray Iron, Ductile Iron, and Steel Fittings:**

130 – Change title of section to include Steel Fittings;

130.2.1 – Add reference to AWWA C208, Standard for Fabricated Steel Water Pipe Fittings;

130.2.1 – Add reference to AWWA C226, Standard for Stainless-steel Fittings for Waterworks Service Sizes ½ In. through 72 In.;

130.6.1 – Thrust restraint blocking is to be used only when necessary rather than routine;

130.6.2 – All restrained joints shall be made by mechanical means;

130.7 – NEW section on Steel Fitting use;

130.8 – Moved Pressure Rating section here;

130.9 – Modified measurement and payment to match that of Section 800 and to include fitting insertion;

Technical Specifications, Section 161, Gray Iron Castings:

161.4 – Removed Water and Sanitary Sewer from this section;

161.5 – NEW SAS and Water Manhole Frame and Cover section;

161.6 - NEW Water Valve, Fire Line, and Vacuum Sewer Valve Frame and Cover section;

Technical Specifications, Section 163 – Ductile Iron Castings:

NEW Section in its entirety to include small water meter covers, and 24" Water and SAS Manhole covers;

Technical Specifications, Section 170, Electronic Marker Devices:

EMD's will now be placed at all SAS manholes, SAS taps on the main and at property line, and at all water service taps. This is in addition to the previous locations specified in original specification.

Technical Specifications, Section 801 – Water Transmission, Collector, and Distribution Lines:

801.2.1 – Delete reference to AWWA C909;

801.2.1 – Add reference to Section 161, Gray Iron Castings;

801.2.1 – Add reference to Section 163, Ductile Iron Castings;

801.3.1.1 – Removal of Made in America requirement for pipe and added the reference to Water Authority Approved Product List;

801.3.2.1.1 – Changes to Pipe Type and Size chart; DI will only be used in 4"-64"; Concrete Cylinder will only be used in 24" and larger; Blue C900 will be used in potable water lines 4" – 12"; Blue C905 will be used in potable water lines 14" – 24"; Purple C900 will be used in non-potable water lines 4" – 12"; Purple C905 will be used in non-potable water lines 14" – 24";

801.3.2.3 - Removal of Made in America requirement for pipe;

801.3.3.2 – Gate valve change from AWWA C509 spec to AWWA C515 spec to allow for a reduced wall valve;

801.3.3.4 – Change from C509 to C515 on parts used in gate valve;

801.3.3.6 - Change from C509 to C515 on parts used in gate valve;

801.3.3.7 – Handwheel diameters specified in vault applications;

801.3.3.10 – Elimination of Water Valve Data Cards and replaced with GPS on As Builts;

801.3.4.2 – Addition of 250B Class for Butterfly valves;

801.3.4.6 – Addition of maximum operating torque (80 lb) on handwheel;

801.3.4.8 - Elimination of Water Valve Data Cards and replaced with GPS on As Builts;

801.3.5 – Valve box material will be 12" polymer coated CMP;

801.3.6 – Valves used must comply with WUA Approved Products List;

801.3.7.1 – Hydrants used must comply with WUA Approved Products List;

801.3.7.5 – Hydrant color is to be Safety Yellow;

801.3.7.8.1 – Delete requirement to, "Attach a Water Utility Division approved anti-theft device to the hydrant";

801.3.7.10 – Revised specification so that hydrants will be fully restrained;

801.3.7.11 – Hydrants will now have an isolation valve installed on branch leg;

801.3.7.12 – Addition of max operating torque on hydrant of 200 ft-lbs;

801.3.7.13 – New specification on hydrant removal procedure;

801.3.7.14 – Requirement for GPS on As Builts for hydrants;

801.3.8 – PRVs to be those on WUA Approved Products List;

801.3.8.4 – Requirement to install a stainless steel plate in PRV vault that states elevation and normal downstream pressure setting;

801.3.8.5 - Elimination of Water Valve Data Cards for PRV and replaced with GPS on As Builts;

801.3.9 – Taps greater than 2/3 line size is no longer allowed; Only long body fully gasketed tapping sleeves shall be allowed.

801.4 – Water Valve Data Card section is eliminated. The section is replaced with the NEW Corrosion Monitoring Station specifications.

801.5 – Elimination of all hydrant data cards;

801.8.1 – Addition of 95% compaction requirement to spec;

801.9.1 – Specified the minimum depths of cover for water lines at finished grade;

801.9.5 – Changes allow deflection at joints for PVC pipe as allowed by manufacturer;

801.9.11 – NEW spec on temporary water mains (shoo-fly);

801.10.3 – Minor changes to include C905 and C605 references and compaction to 95%;

801.12.2 – Valves in runs shall now be mechanically restrained;

801.14.4 – Entire section deleted;

801.15 – Entire section deleted;

801.20.1.3 – Add EMD to valve box rehab work;

801.21.1.3 – Elimination of hydrant and valve data cards;

801.22.3 – Elimination of all reference to reusing or relaying pipe;

801.22.5 - Elimination of all reference to reusing or relaying pipe;

801.22.11.1 – Valve box adjustment will include collar, ring, cover, polymer coated cmp, and EMD;

801.22.15 – Include EMD in ARV items;

801.22.16 – Include EMD, ring and cover to valve box rehab;

801.22.20 – NEW spec on payment for corrosion monitoring station adjustments to finished grade;

#### Technical Specifications, Section 802 – Water Service Lines:

802.3.5.2.1 – Delete section and replace with a reference to the Standard Detail Drawings;

802.3.5.2.2 – Change reference to ASTM A536 (DI Castings);

802.3.5.2.3 – Replace “CITY WATER METER” with “WATER AUTHORITY”;

802.3.5.3.5.7 - Replace “CITY WATER METER” with “WATER AUTHORITY”;

802.3.6 – Add the reference to the WUA Approved Product List rather than specifying details of the corporation stop;

802.3.7 – Added a clarification note that the tailpiece is privately owned infrastructure;

802.3.9.1 – Revised to require a USC approved reduced pressure principal backflow prevention assembly;

802.3.9.2 – Non-potable customers must have a USC RPPBPA;

802.3.9.3 – Fire line services must have a USC RPPBPA;

802.3.9.3.4 – Double check valve may be used on services for specific fire protection systems;

802.7 – NEW specification on service line removal;

802.8.4 – NEW payment specification for service line removal;

#### STANDARD DETAILS

2109 – NEW DI sas manhole frame and covers;

2110 – NEW storm manhole frame and covers;

2460 – Revised MH and Valve regarding: changes to show EMDs; Pavement not on top of collar;

2461 – Collar detail to show EMD;

2301 – Show old line removed rather than abandon in place; Note added regarding EMDs;

2310 – NEW DI water manhole frame and cover;



2315 – Add note requiring 95% compaction;  
2320 – Add note for polyethylene liner; Add note for use of mechanical restraints;  
2326 – Revised to show EMD, 12" polymer coated cmp; 4,000 psi concrete collar, and GPS; Note added regarding GPS coordinate requirement;  
2328 – Revised to show water on outside ring;  
2329 – NEW fire line ring & cover;  
2333 – Add note for restraint on both sides of valve; Add note anchor not needed for insertion that does not cut through the pipe; Note added regarding GPS coordinate requirement;  
2334 – Revised to show EMD, gooseneck with screen, pvc sleeve through manhole, and gravel;  
2335 – NEW ladder detail;  
2340 – EMD added to drawing; Note added regarding GPS coordinate requirement;  
2344 – Revised to show hydrant connection and EMD;  
2350 – Revised to show EMD; Add notes for Schedule 40 fittings; Add note to delete drain pockets when in water table;  
2351 – Revised to show handwheel and operating nut profile;  
2352 - Revised to show handwheel and operating nut profile;  
2353 – Add several general notes (2-5,Z) regarding piping color, bollards, traffic, and drain pockets; addition of a note for EMDs;  
2354 – Add several general notes (2-7) regarding piping color, traffic, bollards, vault parts, elevation plate requirement, and drain pockets;  
2359 – NEW butterfly valve for direct bury installation;  
2360 – NEW butterfly valve for in vault installation;  
2362 – The minimum width between the back of curb and the meter box is reduced to 4";  
2363 – Removal of notes 1, 2, 4, and 5 and add a note regarding the private tailpiece and construction notes U, V, and W;  
2367 – Revised meter lid;  
2368 – Revised to show DI meter plate;  
2370 – The bypass was moved outside of vault and the meter is now on the straight run; Add general notes 4-7 regarding traffic, maximum depth of vault, bypass in parks, and drain pockets;  
2371 - The bypass was moved outside of vault and the meter is now on the straight run; Add general notes 4-7;  
2372 – NEW 6" PRV detail;  
2373 – NEW 8" PRV detail;  
2374 – NEW 10" PRV detail;  
2380 – Add general notes 2-3 regarding corrosion monitoring station requirement and pipe restraint;  
2381 – NEW line relocation detail;  
2387 – Add general note 11 regarding pressure relief devices;  
2394 – Revised to show RPBA inside structure in series with water line; Add notes 1-4 regarding taps, location, meter size, and pressure relief devices;  
2395 – Add general notes 1-4 regarding taps, tees, hydrant meter use, meter permit, and approved hydrants;  
2396 – NEW Corrosion Monitoring Detail – 1;  
2397 – NEW Corrosion Monitoring Detail – 2;  
2398 – NEW Corrosion Monitoring Detail – 3;

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#### 18.1 POLICY ON THE PROXIMITY OF WATER AND SEWER LINES

18.1.1 Whenever possible, it is desirable to lay parallel water and sewer lines at least ten (10) feet apart horizontally, and the waterline should be at higher elevation than the sewer. In cases where it is not practical to maintain a ten (10) foot separation, ENGINEER, after consultation with the Water Authority, may allow deviation on a case by case basis. Such deviation may allow installation of the sewer line closer to the waterline, provided the waterline is in a separate trench or on an undisturbed earth shelf located on one side of the sewer at an elevation such that the bottom of the waterline is at least eighteen (18) inches from the top of the sewer.

18.1.2 When water and sewer lines cross each other, the waterline shall be at least eighteen (18) inches above the sewer. The crossing shall be arranged so that the sewer joints will be equidistant and as far as possible from the waterline joints.

18.1.3 When it is impractical to obtain proper horizontal and vertical separation, the sewer line should be designed and constructed of pressure rated (125 psi) green plastic pipe (C900 or C905), and should be pressure tested similar to a water line to assure water tightness. When pressure rated pipe is required for a sewer crossing, it shall be installed the entire distance between the adjacent manholes.

#### 18.2 EXISTING BUILDING SEWER SERVICES OR WATER SERVICE CONNECTIONS, AND REPLACEMENT OF MAINS.

18.2.1 Where building service line connections to existing sewer mains and water mains are encountered, CONTRACTOR shall ensure that the service line will not be disturbed or damaged. Should any service line connection be broken during the construction of the new line, it shall be replaced by the CONTRACTOR. In the case of a sewer service, the trench shall not be backfilled until the service line is inspected by OWNER'S Plumbing Inspector. In the case of a water service line, the trench shall not be backfilled until the service line is inspected by the Water Authority. No extra compensation will be allowed to the CONTRACTOR for this item. Unless specifically provided otherwise, OWNER assumes no liability for damage to or replacement of building sewer and water service line connections.

18.2.2 When a new sanitary sewer main is required as a replacement for an existing line, the alignment of the new line coincides with the existing line and the grade of the new line is approximately at the same grade as the existing line or lower, then the existing line shall be removed or dealt with as ordered by ENGINEER. The cost of this Work shall be paid for under the appropriate item in the

Bid Proposal. ENGINEER shall determine if it is necessary to pump sewage around the replacement work, or if it is possible to temporarily plug the sewer line during the replacement operation. In the case of by-pass pumping, it will be paid for as indicated in the Bid Proposal.

18.2.3 All work performed on privately owned sewer line and service lines must be inspected by the City of Albuquerque's Code Administration Division. In order that inspection by the Planning Department, Code Administration Division, Plumbing Section can be efficiently handled, with a minimum loss of time to CONTRACTOR, the following shall be noted:

18.2.3.1 Inspection arrangements for a sewer service line shall be made by the CONTRACTOR calling the City of Albuquerque, Code Administration Division, Plumbing Section.

18.2.3.2 Inspection requests called in between the hours of 8:00 a.m. and 12:00 noon will be inspected the same afternoon. Inspection requests called in between the hours of 1:00 p.m. and 5:00 p.m. will be inspected the following morning, except in cases of emergency.

#### 18.3 WATER SYSTEM SHUT-OFF AND TURN-ON PROCEDURES

18.3.1 No one without written permission or direct supervision from the Water Authority Field Division Supervisor may operate any valve or fire hydrant which will cause water to flow within, into or out of the existing system. This includes new waterlines and extensions to the water system which have not been accepted but are connected to the existing water system.

18.3.2 When new waterline tie-ins to the existing water system are required, an electronic request and a street map for the water shut-off or water turn-on shall be submitted to the Water Authority. Request forms are found in the Water Authority Web Page at the following address:  
<http://www.abcwua.org/content/view/471/746>

18.3.2.1 The request for a water shut-off or turn-on for a main designated as a Distribution Line must be submitted at least seven (7) working days before the date of the actual shut-off or turn-on. Request forms received after 8:00 a.m. will be logged in and scheduled on the following working day and the seven (7) working day requirement will commence.

18.3.2.2 The request for a water shut-off or turn-on for a main designated as a Transmission Line, Master Plan Line, Collector, or Well Collector Line must be submitted at least fourteen (14) working days before the date of the actual shut-off or turn-on. Requests received after 8:00 a.m. will be logged in and scheduled on the following working day

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and the fourteen (14) working day requirement will commence.

18.3.2.3 The request for a water shut-off or turn-on for a San Juan Chama designated transmission line or any other water line in the vicinity of San Juan Chama lines will be required to follow the procedures stated in the Water Authority Administrative Instruction No. 9 and must be submitted at least thirty (30) working days before the date of the actual shut-off or turn-on. Requests received after 8:00 a.m. will be logged in and scheduled on the following working day and the thirty (30) working day requirement will commence. CONTRACTOR shall complete the electronic request form, the electronic Request Form for Work Affecting San Juan Chama Transmission Lines, and submit all required design documentation.

18.3.3 - (intentionally left blank)

18.3.4 The reason for the water shut-off or turn-on shall be detailed and descriptive.

18.3.5 Water shut-offs may have to be scheduled at night or on weekends to accommodate water customers and traffic flow.

18.3.6 Water shutoffs involving Transmission, Master Plan, Collector, Well Collector, or San Juan Chama lines may not be permitted during the months of May through September due to the demand on the system. Construction schedules will need to be coordinated with the Water Authority, Plant & Field Divisions when these types of waterlines are impacted. All subsurface work around San Juan Chama transmission lines require special procedures outlined in the Water Authority Administrative Instruction No. 9.

18.3.7 If the water shut-off or turn-on cannot be done on the requested date, the Field Supervisor will notify the CONTRACTOR as soon as possible. The Water Authority shall have the authority to cancel scheduled water shut-offs if the Field Supervisor determines that:

18.3.7.1 CONTRACTOR is not ready to start work and completion of the work will extend beyond the requested time;

18.3.7.2 CONTRACTOR is lacking the necessary equipment, parts, or materials on the job site;

18.3.7.3 Any existing condition giving just cause to show that the scheduled water shut-off will extend beyond the requested time.

18.3.7.4 Field operating conditions have changed which may impact the number of customers or fire hydrants in the shut-off or turn-on request.

#### 18.3.8 EMERGENCY BREAKS:

The Water Authority Field Division shall be notified immediately so that it can perform the shut-off.

#### 18.4 RESPONSIBILITY OF THE CONTRACTOR

18.4.1 CONTRACTOR shall be held responsible for all costs for the repair of any and all damage to the Work or to any utility (which is previously known and disclosed by the utility) as may be caused by their operations. Utilities not shown on the drawings to be relocated or altered shall be protected and maintained by CONTRACTOR. Utilities which are relocated by others in order to avoid interference with structures and which cross the Work shall be maintained in their relocated positions by CONTRACTOR. All costs for such work shall be at CONTRACTOR'S expense without change in the Contract Price.

18.4.2 CONTRACTOR shall never unnecessarily interfere with or interrupt the services of any public or private utility having property within or adjacent to the streets, alleys and easements involved in the Work and shall take all necessary precaution and effort to locate and protect all underground conduit, cables, pipes, waterlines, sewers, structures, gas lines, trees, monuments, power lines, telephone and telegraph lines, traffic control devices and other structures, both below and above ground. CONTRACTOR shall give all public and private utility companies prior written notice, in no event less than forty eight (48) hours, for any work that the CONTRACTOR contemplates, which would interfere in any way whatsoever with the service of any existing public or private utility and Water Authority or City-owned facilities. If such public or private utility does not cooperate for the protection of its services, CONTRACTOR shall notify ENGINEER. Utility lines identified on plans shall be located by CONTRACTOR far enough in advance of construction work in order that the owner of such lines may raise, lower, realign or remove lines and structures, if necessary, and in order that ENGINEER may make any line and grade changes necessary should the existing utility lines conflict with the work under construction, providing such adjustments do not materially affect the Work. In the event an unplanned conflict between an existing, but previously unidentified, utility line and new construction arises, both the owner of such line and the ENGINEER will be notified immediately by CONTRACTOR. CONTRACTOR shall immediately report any damages to public or private property to the owner of the property involved, and to the ENGINEER.

18.4.3 CONTRACTOR shall repair or restore at his own expense any damage to public, Water Authority, City-owned, or private property, for which they are directly or indirectly responsible, to a condition equal to that existing before damage. The CONTRACTOR shall promptly notify

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their insurance carrier of such damage. If CONTRACTOR fails to give such notice to his insurance carrier or refuses to perform such repairs or restoration upon receipt of notice, OWNER may cause such repairs or restoration and deduct the cost thereof from monies due, or which may become due, the CONTRACTOR.

18.4.4 CONTRACTOR shall not remove, realign, or adjust any official City traffic control device including stop signs, warning signs or any other traffic or parking control signs. CONTRACTOR shall give the Construction Coordinator three (3) working days prior notice of any official City traffic control devices that need to be moved. The Construction Coordinator shall take all appropriate actions as soon as practical thereafter.

#### 18.5 LOCATION OF EXISTING UTILITIES

18.5.1 The public and private utility owners shall be responsible to locate their utilities and provide information stating the horizontal alignments of same. If field verification excavations are required, the utility owner will provide same in a timely manner. Utility locations may be obtained by calling the New Mexico One Call System, telephone (811 or 505-260-1990), two (2) working days in advance.

18.5.2 Utilities, which upon exploration are found to interfere with the permanent project work, or if for safety and/or to facilitate construction, it may be necessary to remove exposed lines from the trenching prism, will not be relocated, altered, or reconstructed without the concurrence of the utility owner involved; or ENGINEER may order changes in location, line, or grade of structures being built in order to avoid the utilities. The cost of such changes will be paid for under applicable bid items.

18.5.3 In certain cases where indicated on the drawings, CONTRACTOR shall locate utilities in advance of his construction operations in coordination with the appropriate utility owner. In these cases, CONTRACTOR shall determine the exact locations of utilities, backfill the excavations and construct either temporary or permanent resurfacing over the backfill. The temporary resurfacing shall be constructed when the exploratory excavations are made in an area located within the proposed Project excavations. Permanent resurfacing, when specified, shall be constructed when the exploratory excavations are made in an area located outside the proposed Project excavation and shall be constructed in accordance with the Excavation Ordinance which may require temporary resurfacing or plating. Said permanent resurfacing shall be of the type and thickness specified or as field conditions may otherwise require. In either case, the excavations shall be backfilled by the methods specified and to the relative density specified.

18.5.4 This exploratory excavation work shall be performed as soon as practical, and in any event, a sufficient time in advance of construction to avoid possible delays to CONTRACTOR'S work. All costs for making such exploratory excavations (including the backfilling and the resurfacing as specified herein) shall be at CONTRACTOR'S expense without change in the Contract Price.

#### 18.6 UNKNOWN UTILITIES DISCLOSED DURING THE CONTRACT WORK

18.6.1 In the event that a utility is disclosed subsequent to the award of the Contract, such utility not being indicated on the drawings, or in the event that an existing utility is found to be in a materially different location than shown on the drawings and thus requires additional work on the part of CONTRACTOR for its maintenance, relocation or support, the necessary alteration, relocation, proper support and protection shall be done and paid for as follows:

18.6.1.1 When said utility is found to occupy the space to be occupied by a part of the permanent works to be constructed or when this utility is, in the opinion of ENGINEER, in such close proximity to the new work as to require the relocation or alteration of said utility, CONTRACTOR shall arrange with the utility owner for such relocation or alteration as directed by ENGINEER.

18.6.1.2 When any portion of the utility is in close proximity and more or less parallel to a structure or conduit, CONTRACTOR shall advise owner thereof, and in cooperation with the utility owner, provide and place the necessary support for proper protection to ensure continuous and safe operation of the utility infrastructure. All costs for such work shall be borne by CONTRACTOR.

18.6.2 In the event the CONTRACTOR discovers an unknown line, the CONTRACTOR shall immediately notify the ENGINEER in writing and all public and private utility companies to identify ownership and status. No work shall proceed that shall affect said line until written approval from the ENGINEER is obtained.

#### 18.7 ABANDONED UTILITIES

18.7.1 Unless otherwise specified or directed, CONTRACTOR shall remove all interfering portions of utilities which are shown on the drawings as "abandoned" or "to be abandoned in place" and which interfere with the construction of the Project. All abandoned waterlines shown on the drawings as "abandoned" or "abandoned in place" or found during construction shall be removed or capped at a minimum, unless otherwise specified. All costs involved in said removals shall be included in the prices bid for the various items of Work. All such abandoned utilities

## SECTION 18

### UTILITIES

removed by CONTRACTOR shall be disposed of or recycled.

18.7.2 Where utilities are shown on the drawings as “abandoned” or “to be abandoned in place”, it shall be the CONTRACTOR’S responsibility to contact the utility company involved, within forty eight (48) hours, prior to excavating around such utilities to ascertain that the abandonment of the utility has been completed.

#### 18.8 COORDINATION FOR RELOCATION BY OTHERS

18.8.1 Where removal or relocation of facilities by others is shown on plans or found necessary through exploratory excavations, CONTRACTOR shall coordinate the work with that of the affected owner to minimize the scheduling impact on both parties.

18.8.2 Where parties other than CONTRACTOR are responsible for the relocation of utilities and a delay in CONTRACTOR’S work is caused by the failure on the part of said parties to remove or relocate such utilities in time to prevent such delay, or by any action or lack of action on the part of OWNER, it shall be understood that the CONTRACTOR shall not be entitled, as a result of such delays, to damages or additional payments over and above the Contract Price. If delays in CONTRACTOR’S work are caused by the reasons mentioned herein, CONTRACTOR shall be entitled to an extension of time. The length of such extension of time will be determined by ENGINEER with consideration as to the effect of the delay on the Project as a whole.

18.8.3 In order to minimize delays to the CONTRACTOR caused by the failure of other parties to relocate utilities which interfere with new facilities, CONTRACTOR upon request to ENGINEER may be permitted to temporarily omit the portion of the Work affected by the utility. The portion thus omitted shall be constructed by the CONTRACTOR immediately following the relocation of the utility involved.

## SECTION 121

### PLASTIC PIPE

121.1 GENERAL: Plastic pipe for pressure and non-pressure uses shall be manufactured from polyvinyl chloride (PVC), high-density polyethylene (HDPE) or ultra-high molecular weight materials.

#### 121.2 REFERENCES.

121.2.1 American Society for Testing and Materials (Latest Editions) (ASTM):

D1248 Specification for Polyethylene Plastics Molding and Extrusion Materials

D1598 Test Method for Time-to-Failure of Plastic Pipe Under Constant Internal Pressure

D1599 Test Method for Short-Time Hydraulic Failure Pressure of Plastic Pipe, Tubing and Fittings

D1601 Test Method for Dilute Solution Viscosity of Ethylene Polymers

D1693 Test Method for Environmental Stress-Cracking of Ethylene Plastics

D1784 Specifications for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds

D2239 Specifications for Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter

D2412 Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading

D2657 Heat-Joining Polyolefin Pipe and Fittings

D2737 Specification for Polyethylene (PE) Plastic Tubing

D3034 Specification for type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings

F477 Specification for Elastomeric Seals (Gaskets) for joining Plastic Pipe

F679 Specification for Poly (Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings

F794 Specification for Poly (Vinyl Chloride) (PVC) Large Diameter Ribbed Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter

F894 Specification for Polyethylene (PE) Large Diameter Profile Wall Sewer and Drain Pipe

121.2.2 American Water Works Association (Latest Edition) (AWWA):

C900 AWWA Standards for Polyvinyl Chloride (PVC) Pressure Pipe, 4 in. through 12 in. for Water Distribution

C905 AWWA Standard for Polyvinyl Chloride (PVC) Water Transmission Pipe, Nominal Diameter 14 in. through 48 in.

#### 121.2.3 THIS PUBLICATION:

SECTION 800 WATER TRANSMISSION, COLLECTOR DISTRIBUTION AND SERVICE LINES

SECTION 900 SANITARY AND STORM SEWER FACILITIES

SECTION 1502 SUBMITTALS

#### 121.3 CERTIFICATION

121.3.1 The CONTRACTOR shall submit certification from the manufacturer of the pipe as specified in Section 1502 as to the pipe material and that the pipe meets or exceeds the required testing. Only pipe manufactured in the United States of America will be acceptable.

#### 121.4 GENERAL PLASTIC PIPE REQUIREMENTS

121.4.1 POSITIVE IDENTIFICATION: All PVC pipe shall be coded in accordance with the applicable material standard to eliminate future confusion and prevention accidental damage and service interruption of the facilities. PVC pipe used for potable water mains shall be blue in color. PVC pipe used for non-potable water mains shall be purple in color. PVC pipe used for sanitary sewer collection lines shall be green in color.

121.4.2 LINE LOCATOR: Metallic tape shall be used as a locator for all plastic pipe which is installed less than 10 feet deep. The tape should be installed 2 ft. to 6 ft. below top of ground and centered over the pipe. When feasible, the tape shall be fastened to metallic appurtenances associated with the installation (i.e. valves, fittings, manhole rings, etc.) in an effort to enhance its detectability.

121.4.3 PIPE STORAGE: All types of plastic pipe shall be stored in a manner that the pipe will not be deformed as recommended by the manufacturer. PVC pipe is subject to potential degradation when exposed to prolonged periods of sunlight. Material degradation is generally indicated by

## SECTION 121

### PLASTIC PIPE

a discoloration of the pipe. PVC pipe shall be stored inside a building, under a cover or covered up totally. All discolored pipe shall not be installed and shall be immediately removed from the project.

#### 121.4.4 JOINING SYSTEMS

121.4.4.1 All plastic pipe which is connected to a manhole, junction box, inlet or similar structure shall be installed with an approved manhole connection adapter or water-stop such that each connection is leak-free and that there is no detrimental affect resulting from the material property characteristic differences between the plastic pipe and the structure.

121.4.4.2 BELL AND SPIGOT JOINTS: Pipe with gasket joints shall be manufactured with a socket configuration, which will prevent improper installation of the gasket and will ensure that the gasket remains in place during joining operations. The gasket shall be manufactured from a synthetic elastomer material and shall conform to the requirements of ASTM F 477. The spigot end of each joint of pipe shall be marked circumferentially to indicate the proper home mark. Pipe, which is field-cut, shall be chamfered and the home mark identified in accordance with the applicable criteria.

121.4.4.3 HEAT-WELDED JOINTS: HDPE pipe, which is manufactured without the standard bell and spigot joint configuration shall be joined by a heated fusion process in accordance with ASTM D 2657.

#### 121.5 MATERIALS AND UTILIZATION

##### 121.5.1 Polyvinyl Chloride (PVC) Pressure Pipe:

121.5.1.1 The material in PVC pipe shall be in accordance with ASTM D 1784.

121.5.1.2 Pipe shall be suitable for use in the conveyance of water for human consumption. The pipe shall be marked with two seals of the testing agency that certified the pipe material is suitable for potable water use.

121.5.1.3 PVC pipe shall be approved by the Underwriters Laboratories (UL) and be furnished in cast iron pipe-equivalent outside diameters. Joints shall be push-on flexible elastomeric gasketed.

121.5.1.4 Pressure pipe shall have a minimum working pressure of 150 psi (DR 18) or as specified on the plans or in the Supplemental Technical Specifications.

121.5.1.5 Pipe lengths shall contain one bell-end or couple with an elastomeric gasket. Gasket 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.

121.5.1.6 PVC pressure pipe in sizes 4-inch through 12-inch shall meet the requirements of AWWA C 900.

121.5.1.7 PVC pressure pipe in sizes 14-inch through 24-inch shall meet the requirements of AWWA C 905.

121.5.1.8 PVC pressure pipe shall not be used for public water mains larger than 24-inches.

##### 121.5.2 Polyvinyl Chloride (PVC) Gravity Flow Pipe:

121.5.2.1 The material in PVC pipe shall be in accordance with ASTM D 1784.

121.5.2.2 PVC gravity flow pipe may be used for sanitary sewer applications for sizes 8-inch and greater, except for installation resulting in a depth of cover (to subgrade elevation) less than 3.1 feet or when the Contract documents specifically prohibit its use.

121.5.2.3 Lateral line connections shall be made at manholes or at factory manufactured saddles or tees only, unless specifically authorized by the ENGINEER.

121.5.2.4 PVC gravity flow pipe in sizes 8-inches through 15-inches shall meet the requirements of ASTM D 3034. Only solid wall pipe shall be used. Minimum wall classification shall be SDR 35.

121.5.2.5 PVC gravity flow pipe in sizes 18-inch and larger shall meet the requirements of ASTM F 679 or ASTM F 794. Minimum pipe stiffness shall be 46 psi.

121.5.2.6 Sanitary sewer service line connections to 15-inch and larger pipe diameter will not be permitted, unless authorized by the Water Authority.

##### 121.5.3 Polyethylene (PE) Pipe:

121.5.3.1 The material in PE pipe shall be in accordance with ASTM D 1248.

121.5.3.1.1 Polyethylene (PE) or High Density Polyethylene (HDPE) shall not be used to construct public water lines.

##### 121.5.3.2 High Density Polyethylene (HDPE) Profile Wall Gravity Flow Pipe:

121.5.3.2.1 High-density polyethylene (HDPE), large diameter, profile wall, gravity flow pipe shall meet all general requirements for plastic pipe and shall conform to requirements for plastic pipe and shall conform to

## SECTION 121

### PLASTIC PIPE

requirements in ASTM F 894 for diameters of 30-inch and larger.

121.5.3.2.2 Minimum wall thickness in pipe waterway shall be RSC 63. When using ASTM D 2412 for determining the strength value of pipe, the E' number (E= modulus of soil reaction) shall not exceed 1500 psi. The pipe manufacturer shall provide certification to the CONTRACTOR and ENGINEER that the class of pipe used is adequate for the specific pipe laying conditions, including, but not limited to, depth of bury, soil characteristics and groundwater conditions.

121.5.3.2.3 Sewer service line connections to PE pipe will not be permitted, unless specifically authorized in the plans and/or Supplemental Technical Specifications and/or by the ENGINEER.

121.5.3.2.4 Lateral line connections shall be made at manholes or at factory manufactured tees or saddles only, unless specifically authorized by the Water Authority and the ENGINEER.

121.5.3.3 All water service lines shall be copper per these specifications. Plastic water service lines will not be permitted.

121.6 MEASUREMENT AND PAYMENT:  
Plastic pipe used for both pressure and gravity flow shall be measured and paid for at the contract unit price as specified in Section 800 and 900 and/or as defined in the Bid Proposal.



## SECTION 128

### CONCRETE CYLINDER PIPE

#### 128.1 GENERAL

These specifications cover concrete cylinder pipe intended for use in water supply lines and distribution systems that carry water under pressure. Concrete cylinder pipe may be furnished in pipe diameters of 24 inches and larger for design pressure to a maximum of 400 psi. Unless otherwise shown on the drawings or specified in the Supplementary Specifications, concrete cylinder pipe shall be designed and manufactured for an internal working pressure of 150 psi with allowance for transient pressure in the amount of 50 percent of the indicated working pressure.

#### 128.2 REFERENCES

- 128.2.1 American Water Works Association (Latest Edition) (AWWA)
- C 207 Steel Pipe Flanges for Waterworks Service Sizes 4 in. through 144 in.
- C 208 Dimensions for Fabricated Steel Water Pipe Fittings
- C 303 Reinforced Concrete Pressure Pipe, Steel-Cylinder Type, Pretensioned, for Water and Other Liquids

#### 128.3 DESIGN

128.3.1 The calculation of the cross-sectional area of steel shall be based upon the design procedure stated in AWWA C 303, Appendix A. The design data used in the design of the pipe shall be as stated in the Supplemental Technical Specification or as shown on the plans. The design data shall include but not limited to normal operating pressure, surge pressure, external loading, bedding required, backfilling requirements, estimated weight of the soil to be used for backfilling, modulus of soil reaction, etc. Design calculations shall be submitted for approval prior to fabrication of pipe and fittings.

128.3.2 Use of welded wire fabric in the exterior coating shall conform to the manufacturer's standards; however, use of fabric shall not be included in the total steel area calculations.

#### 128.4 MANUFACTURED PIPE AND FITTINGS

128.4.1 Pipe and fittings shall be manufactured in conformance with AWWA C 303 and shall be manufactured with minimum steel thickness as required in approved design calculations.

#### 128.4.2 JOINTS:

128.4.2.1 Joints shall be flanged where shown on the drawings or as specified herein with steel flanges as specified herein. Unspecified joints shall be of the rubber

gasket type using a bell and spigot design, and shall be in conformance with AWWA C 303.

128.4.2.2 Bells and spigots shall conform to the requirements of AWWA C 303 with the following additions: The spigot ring shall be similar and equal to Carnegie Shape M 3516. Bell and spigot rings shall be designed using their respective internal diameters, with resulting thickness extending a minimum of one inch beyond the limits in the area of the connection between the bell or spigot and the regular cylinder.

128.4.3 Flange connections shall be used at junctures to valves or as may be required on the construction plans. Flanges shall conform to AWWA C 207, Class D.

128.4.4 Specials and Fittings. The ends of pipe or fittings for side street stub-outs or at juncture of valves will be flanged, with flanges conforming to the requirements of AWWA Specifications C 207 designed for a minimum operating pressure of connections to 150 psi.

#### 128.5 DESIGN OF FITTINGS:

The design of tees, wyes, elbows, and bends using crotch plates shall be manufactured in accordance with design criteria established by Ameron Pipe Company and the paper on "Design of Wye Branches for Steel Pipe" by Swanson, Chaption, Wilkenson, King, and Welson and published in June, 1955 issue of "Journal of the American Water Works Association."

#### 128.6 MEASUREMENT AND PAYMENT

The measurement and payment will be as specified in Section 801.

**SECTION 129  
DUCTILE IRON PIPE**

**129.1 GENERAL**

Ductile iron pipe is acceptable for use in the installation of water lines for sizes 4-inches to 64-inches. Ductile iron pipe shall only be used for sanitary sewers where specifically required by the plans or authorized by the ENGINEER. The size and thickness class for ductile iron pipe shall be as specified herein or on the plans.

**129.2 REFERENCES**

**129.2.1 American Society for Testing and Materials (Latest Editions) (ASTM)**

A 674 Practice for Polyethylene Encasement for Ductile Iron Pipe for Water and Other Liquids

A 746 Specifications for Ductile Iron Gravity Sewer Pipe

**129.2.2 American Water Works Association (Latest Editions) (AWWA)**

C 104 American National Standard for Cement Mortar Lining for Ductile Iron Pipe and Fittings for Water

C 105 American National Standard for Polyethylene Encasement for Ductile Iron Piping for Water and Other Liquids

C 111 American National Standard for Rubber Gasket Joints for Ductile Iron and Gray Iron Pressure Pipe and Fittings

C 115 American National Standard for Flanged Ductile Iron Pipe with treaded Flanges

C 150 American National Standard for the Thickness Design for Ductile Iron Pipe

C 151 American National Standard for Ductile Iron Pipe, Centrifugally Cast, for Water or Other Liquids

C 600 Installation of Ductile Iron Water Mains and Their Appurtenances

**129.2.3 This Publication**

Section 130 Gray Iron and Ductile Iron Fittings

Section 801 Installation of Water Transmission, Collector and Distribution Lines

Section 900 Sanitary and Storm Sewer Facilities

129.3.1 The ENGINEER shall determine the required class of ductile iron pipe based on the laying conditions, depth of cover and loading factors in accordance with AWWA C 150 but in no case shall the ductile iron pipe be less than pressure class 150. If a pressure class higher than 150 is required, it will be specified on the plans or in the Supplemental Technical Specifications.

129.3.2 Ductile iron pipe shall be manufactured in accordance with AWWA C 151 and shall be cement mortar lined with a bituminous seal coat in accordance with AWWA C 104.

129.3.3 Ductile iron pipe joints for underground installations shall be rubber-gasketed push-on, or mechanical type in accordance with AWWA C 111.

129.3.4 Where specified on the construction drawings, the ductile iron flanged joint pipe shall meet the requirements in AWWA C 115. Flanged joints shall only be utilized in above

**SECTION 129  
DUCTILE IRON PIPE**

ground installations or within structures, such as: valve pits or vaults.

129.3.5 Ductile iron pipe connections to fittings shall be as specified in Section 130.

129.3.6 Ductile iron pipe shall be installed in accordance with AWWA C 600 and Section 801 and shall be polyethylene encased as per AWWA C 105.

129.3.7 BELL AND SPIGOT JOINTS: Pipe with gasket joints shall be manufactured with a socket configuration, which will prevent improper installation of the gasket and will ensure that the gasket remains in place during joining operations. The gasket shall be manufactured from a synthetic elastomeric material and shall conform to the requirements of ASTM F 477. The spigot end of each joint of pipe shall be marked circumferentially to indicate the proper home mark. Pipe, which is field-cut, shall be chamfered and the home mark identified in accordance with the applicable criteria.

**129.4 DUCTILE IRON SANITARY SEWER PIPE**

129.4.1 Ductile iron pipe, utilized for sanitary sewer installation, shall be asphaltic lined in accordance with ASTM A 746, unless otherwise specified on the plans or in the Supplemental Technical Specifications.

129.4.2 All pipes shall be a minimum of pressure class 150.

129.4.3 Polyethylene encasement shall be installed in accordance with ASTM A 674.

**129.5 MEASUREMENT AND PAYMENT**

129.5.1 Ductile iron pipe with polyethylene encasement for both pressure and gravity flow shall be measured and paid for at the contract unit price as specified in Section 801 and 900 and/or as defined in the Bid Proposal.

## SECTION 130

### GRAY IRON, DUCTILE IRON, AND STEEL FITTINGS

#### 130.1 GENERAL

130.1.1 Fittings required in the installation of ductile iron, polyvinyl chloride and asbestos cement pipes shall be either gray iron or ductile iron, as specified herein.

#### 130.2 REFERENCES

##### 130.2.1 AWWA

C 104	American National Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water
C110	American National Standard for Ductile-Iron and Gray-Iron Fittings for Water
C111	American National Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
C153	American National Standard for Ductile-Iron Compact Fittings for Water Service
C208	American National Standard for Dimensions for Fabricated Steel Water Pipe Fittings
C226	American National Standard for Stainless-Steel Fittings for Waterworks Service Sizes 1/2 In. through 72 In.

#### 130.3 COATINGS

130.3.1 All fittings shall be coated in accordance with AWWA C 110, C 111, and cement-mortar lined, per AWWA C 104.

#### 130.4 MECHANICAL JOINT FITTINGS

130.4.1 Mechanical joint fittings shall be used in all buried installations. The type of fitting shall be as required to install the line in conformance with the grade and alignment shown on the construction drawings or as directed by the ENGINEER.

130.4.2 Mechanical joint fittings shall conform to the requirements of AWWA C 110, C 111, and C 153.

130.4.3 Fittings shall be installed in accordance with the manufacturer's published recommendations. Malleable iron or gray iron bolts, as per AWWA C 110 and C 111, shall be used to complete the connection. Bolts shall be of sufficient length to provide a minimum of three (3) threads

beyond the tightened nut. The bolts shall be tightened evenly such that the distance between the gland and the face of the flange is approximately equal around the circumference of the pipe. All bolts shall be tightened with a torque-measuring wrench and the torque values shall be as follows:

<u>FITTING SIZE</u>	<u>TORQUE RANGE</u>
4" – 24"	79 – 90
30" – 36"	100 – 120
Larger than 36"	120 – 150

#### 130.5 FLANGED JOINT FITTINGS

130.5.1 Flanged end fittings shall only be used where specifically required on the construction drawings or as directed by the ENGINEER.

130.5.2 The bolting material for pipe connection and installation shall be the same as Subsection 130.4.3.

#### 130.6 RESTRAINTS

130.6.1 Thrust restraint blocking shall only be used when adequate mechanical restraint length is not available. When approved by the Water Authority, recommended by the ENGINEER, or shown on the plans, a polyethylene liner, with a minimum thickness of 8 mils, shall be installed between the fitting and any concrete.

130.6.2 All restrained joints shall be by mechanical means unless directed or approved otherwise by the ENGINEER. Prior to the installation, the CONTRACTOR shall submit manufacturer's literature with sufficient data to the ENGINEER for review and approval in writing.

#### 130.7 STEEL FITTINGS

130.7.1 Steel fittings shall only be used when authorized by the ENGINEER and when needed to connect to an existing steel water line. Measurement and payment for steel fittings, when authorized, shall be made at the contract unit price per pound based on weights of an all mechanical joint ends fitting of the type fitting and size used, as specified in AWWA C110. This payment shall include all fabrication and welding required on the fitting.

#### 130.8 PRESSURE RATING

## SECTION 130

### GRAY IRON, DUCTILE IRON, AND STEEL FITTINGS

130.8.1 All fittings shall have a minimum pressure rating of 250 psi.

#### 130.9 MEASUREMENT AND PAYMENT

130.9.1 All cast iron and ductile iron fittings shall be measured and paid for at the contract unit price per pound based on weights of an all mechanical joint ends fitting for the type and size of fitting used as specified in AWWA C110, regardless of the type of ends on the fitting installed. The contract unit price per pound of fittings shall include all gaskets, glands, bolts, and nuts required. No separate payment will be made for these items.

130.9.2 When the CONTRACTOR installs a Water Authority furnished fitting and replaces that fitting in the Water Authority's inventory, the CONTRACTOR shall be paid the full contract unit price of that fitting as outlined above. If the CONTRACTOR does not replace the fitting in the Water Authority's inventory, the payment to the CONTRACTOR will be at the contract unit price of the fitting less the cost of the fitting itself.

130.9.3 Fitting Insertion: The insertion of a fitting into an existing pipe line shall be measured and paid for at the contract unit price per pound based on weights of an all mechanical joint end fitting and if required an all mechanical joint connecting piece (coupling) of the type fitting and size used, as specified in AWWA C110, regardless of the type of ends on the fitting and coupling installed. This payment shall include all compensation for the excavation, cutting and removal of the existing pipe, installation of the fitting and coupling, if required, the re-cutting of the existing pipe or new pipe installed between the fitting and coupling, and backfill and compaction complete in place. In addition to the payment for the fitting insertion, the CONTRACTOR shall be paid for each non-pressurized connection and if pavement, curb and gutter, sidewalk, drive pad, etc., are removed, these items will be paid for as part of the appropriate item.

130.9.4 Restrained joint fittings shall be measured and paid for in the same manner as Subsection 130.9.1.

## SECTION 161

### GRAY IRON CASTINGS

#### 161.1 GENERAL

161.1.1 Gray iron castings shall be as shown on the construction plans or the Standard Detail Drawings, and shall be as specified herein. The castings may include: rockers, rocker plate bearings, bearing plates, manhole frames and covers, water valve frames and covers, railings, railing posts, wheel guards, gratings, etc.

161.1.2 The castings shall be true to patterns in form and dimension and free from pouring faults, sponginess, cracks, blowholes, or other defects in locations affecting their strength and value for the service intended. Castings shall be filleted at angles, and risers shall be sharp and true.

#### 161.2 REFERENCES

161.2.1 American Society for Testing and Materials (Latest Editions) (ASTM)

A-48 Standard Specification for Gray Iron Castings

A-438 Standard Test Method for Transverse Testing of Gray Cast Iron

#### 161.3 TEST SPECIMENS

161.3.1 The number of tension test specimens and their machined dimensions shall be as specified in ASTM A-48.

161.3.2 Depending on the configuration and use of the castings, the ENGINEER may specify that transverse tests of the castings material shall be made in accordance with ASTM A-438. These tests shall be made in addition to the tensile tests.

161.3.3 The manufacturer shall furnish a notarized certificate of compliance which states that the casting material meets or exceeds the requirements for the specified class of material. Test results shall be included with the certificate. The CONTRACTOR shall forward the manufacturer's certificate of compliance and test results to the

ENGINEER for each project on which the casting are installed. The CONTRACTOR shall also furnish the ENGINEER with a copy of the manufacturer's shop drawing at the time the certificate of compliance is submitted.

#### 161.4 STORM DRAIN MANHOLE FRAMES AND COVERS

161.4.1 Castings shall conform to ASTM A-48, Class 30B.

161.4.2 The frame and cover dimensions shall conform to the dimensions shown on the Standard Detail Drawing.

161.4.3 The bearing surfaces of the frames and covers shall be machined or ground to provide a uniform, flat, non-rocking seat for the cover on the frame.

161.4.4 The contact sides of the frame and cover shall be tapered as shown on the Standard Detail Drawing.

161.4.5 Manhole frame shall weigh 145 pounds with a plus or minus tolerance of five percent, and the cover shall weigh 180 pounds with a plus or minus tolerance of five percent.

161.4.6 The words "STORM" and "CITY OF ALBUQUERQUE" shall be cast on the manhole cover to indicate the respective system and the name of the city. The letter size shall be 1 inch in height. The words shall be placed as shown in the Standard Detail Drawing. In addition, the name of the foundry shall be cast on the top of the cover, either in the center or within one of the inner concentric circles.

#### 161.5 SANITARY SEWER AND WATER MANHOLE FRAMES AND COVERS (excluding 24-inch covers)

161.5.1 Castings shall conform to ASTM A-48, Class 30B.

161.5.2 The frame and cover dimensions shall conform to the dimensions shown on the Standard Detail Drawing.

## SECTION 161

### GRAY IRON CASTINGS

161.5.3 The bearing surfaces of the frames and covers shall be machined or ground to provide a uniform, flat, non-rocking seat for the cover on the frame.

161.5.4 The contact sides of the frame and cover shall be tapered as shown on the Standard Detail Drawing.

161.5.5 The weight of the manhole frame and cover shall conform to the weights as shown on the Standard Detail Drawing.

161.5.6 The words "SANITARY" or "WATER" shall be cast on the manhole cover to indicate the respective system. The words shall be placed as shown in the Standard Detail Drawings.

#### 161.6 WATER VALVE, FIRE LINE, AND VACUUM SEWER VALVE FRAME AND COVER

161.6.1 Castings shall conform to ASTM A-48, Class 30B.

161.6.2 The frame and cover dimensions shall conform to the dimensions shown on the Standard Detail Drawing.

161.6.3 The bearing surfaces of the frames and covers shall be machined or ground to provide a uniform, flat, non-rocking seat for the cover on the frame.

161.6.4 The words "WATER", "FIRE", or "SEWER" shall be cast on the ring and cover to indicate the respective system. The letters "USA" and the manufacturer's logo shall be cast on the ring and cover as shown on the Standard Detail Drawing.

#### 161.7 RAILINGS, RAILING POSTS, AND WHEEL GUARDS

161.7.1 Castings shall conform to ASTM A-48, Class 40B.

#### 161.8 ROCKERS, ROCKER PLATE BEARINGS, AND BEARING PLATES FOR BRIDGES

161.8.1 Castings shall conform to ASTM A-48, Class 50B.

161.8.2 Castings shall be machined and finished as specified on the plans. Tool marks on sliding contact surfaces shall run in the direction of plate movement, and in case of rocker plate bearings marks shall be perpendicular to the rocker movement.

#### 161.9 UNCLASSIFIED CASTINGS

161.9.1 All castings not specifically classified, shall conform to the minimum requirements for ASTM A-48, Class 30.

#### 161.10 COATINGS

161.10.1 Manhole frames and covers, and other castings will show bare metal. If specifically required, the castings shall be painted with or dipped in commercial quality asphaltum paint.

#### 161.11 ORIGIN OF MANUFACTURE

161.11.1 To ensure that the specified quality of castings will be guaranteed, only castings manufactured in the United States of America will be acceptable.

#### 161.12 MEASUREMENT AND PAYMENT

161.12.1 Measurement and payment shall be per unit price per defined unit in the bid proposal, or the cost of the castings may be included in major construction item unit costs, such as manhole frame and cover may be included in the cost of the manhole.

## SECTION 163

### DUCTILE IRON CASTINGS

#### 163.1 GENERAL:

Ductile iron castings will be used for water meter covers and lids and 24-inch water and 24-inch sanitary sewer manhole covers.

#### 163.2 REFERENCES

163.2.1 American Society for Testing and Materials (Latest Editions) (ASTM)

A-536 Specifications for Ductile Iron Castings

163.2.2 American Association of State Highway and Transportation Officials

M 306 Specification for Drainage, Sewer, Utility, and Related Castings

#### 163.3 MATERIALS

163.3.1 The casting shall be true to pattern in form and dimension and shall be free from pouring faults, cracks, blowholes, or other defects in locations affecting the unit's strength and value of service.

163.3.2 Unless otherwise approved by the ENGINEER, the units shall be cast in sand molds, using ductile iron, meeting the chemical and tensile strength requirements, as specified in ASTM A536, Grade 70-50-05.

163.3.3 The surfaces requiring grinding or machining, shall be noted on the drawings.

#### 163.4 TESTING

163.4.1 Separately cast test bars shall be tested and conform to specified tensile requirements including tensile strength, yield strength, and elongation as per ASTM A536.

163.4.2 Castings shall pass proof load testing as specified in AASHTO Std. M 306 for heavy duty, H-20, traffic loads.

163.4.3 The manufacturer shall furnish a certificate of compliance which states that the casting material meets or exceeds the requirements for the specified material. Test results shall be included with the certificate. The CONTRACTOR shall forward the manufacturer's certificate of compliance and test results to the ENGINEER for each project on which the castings are installed. The CONTRACTOR shall also furnish the ENGINEER with a copy of the manufacturer's shop drawing at the time the certificate of compliance is submitted.

#### 163.5 METER COVER AND LID

163.5.1 The meter cover and lid dimensions shall conform to the dimensions shown on the Standard Detail Drawing.

163.5.2 The bearing surface of the lid and cover shall be machined or ground to provide a uniform, flat, non-rocking seat for the lid on the cover.

163.5.3 The words "WATER AUTHORITY" shall be cast on the lid.

#### 163.6 24-INCH MANHOLE COVERS

163.6.1 The cover dimensions shall conform to the dimensions shown on the Standard Detail Drawing.

163.6.2 The bearing surfaces of the frames and covers shall be machined or ground to provide a uniform, flat, non-rocking seat for the cover on the frame.

163.6.3 The contact sides of the frame and cover shall be tapered as shown on the Standard Detail Drawing.

163.6.4 The weight of the manhole frame and cover shall conform to the weights as shown on the Standard Detail Drawing.

163.6.5 The words "SANITARY" or "WATER" shall be cast on the manhole cover to indicate the respective system. The name of the foundry shall be cast on the cover. The words "ALBUQUERQUE BERNALILLO COUNTY WATER UTILITY AUTHORITY" shall be cast on the 24" covers. The words shall be placed as shown in the Standard Detail Drawings.

#### 163.7 COATINGS

163.7.1 Manhole covers and water meter covers and lids will show bare metal. If specifically required, the castings shall be painted with or dipped in commercial quality asphaltum paint or other approved bituminous seal coat.

#### 163.8 ORIGIN OF MANUFACTURE

163.8.1 To ensure that the specified quality of castings will be guaranteed, only castings manufactured in the United States of America will be acceptable.

#### 163.9 MEASUREMENT AND PAYMENT

163.9.1 Measurement and payment shall be per unit price per defined unit in the bid proposal, or the cost of the castings may be included in major construction item unit cost such as meter box rehabilitation, installation, or relocation.



SECTION 170  
ELECTRONIC MARKER DEVICES

- 170.1 GENERAL: Electronic location markers shall consist of devices having a passive inductive device capable of reflecting a specifically designated impulse frequency, unique to the utility being installed. Devices shall be color-coded in accordance with the American Public Works Association's Utility Location and Coordinating Council Standards. Electronic Marker Devices (EMDs) shall be from a listed manufacturer on the current Water Authority Approved Product List
- 170.2 REFERENCES
- 170.3 INSTALLATION: Marker devices shall be installed approximately 6-inches over the point to be located, and a minimum of 6-inches from any metal object. However, depth of burial shall not be less than 2-1/2-feet nor more than 6-feet. Devices shall be hand backfilled to 1-foot above the device to prevent movement or damage.
- 170.4 PLACEMENT: Electronic Marker Devices shall be installed at the following locations:
- 170.4.1 SANITARY SEWER
- 170.4.1.1 At all manholes, one foot upstream of the manhole over the centerline of the main line.
- 170.4.1.2 At temporary dead ends of lines.
- 170.4.1.3 At the property line for all service laterals, including service stubs from vacuum pits.
- 170.4.1.4 At the centerline of the gravity main line over all taps, risers, or wyes.
- 170.4.1.5 At all plugged tees.
- 170.4.1.6 At upper bend on vacuum sewer lifts.
- 170.4.1.7 At wye for branch line connection to vacuum sewer main.
- 170.4.1.8 At valves on vacuum sewer mains, one foot north or west of the valve over the line.
- 170.4.1.9 On Sanitary Sewer Force Mains:
- 170.4.1.9.1 At valves, one foot north or west of the valve over the main line.
- 170.4.1.9.2 At bends, 22 1/2-degrees and larger.
- 170.4.1.9.3 At capped or plugged ends.
- 170.4.1.9.4 At tees over the main line.
- 170.4.1.9.5 For single services, over the main line at the service tap.
- 170.4.2 WATER LINES:
- 170.4.2.1 At valves, one foot north or west of the valve over the main line.
- 170.4.2.2 At flanged outlets on concrete cylinder pipes.
- 170.4.2.3 At bends, 22 1/2-degrees and larger.
- 170.4.2.4 At capped or plugged ends.
- 170.4.2.5 At tees over the main line.
- 170.4.2.6 For single services, over the main line at the service tap.
- 170.4.2.7 For double services, over the main line halfway between the service taps.
- 170.5 CERTIFICATION
- 170.5.1 The CONTRACTOR shall certify in writing that the Electronic Marker Device is in place, prior to paving over any of the above locations. Electronic Marker Devices that are found to be missing shall be installed at the CONTRACTOR's expense.
- 170.6 MEASUREMENT AND PAYMENT: No separate measurement or payment will be made for Electronic Marker Devices.

## SECTION 800

### WATER TRANSMISSION, COLLECTOR, DISTRIBUTION AND SERVICE LINES

#### 800.1 GENERAL:

This section is related to linear water facilities which apply to the conveyance of water from the well site to reservoir, from pumping station to reservoir, and from reservoir to user.

#### 800.2 CONTENTS

<u>Section No.</u>	<u>Title</u>
801	Installation of Water Transmission, Collector, and Distribution Lines
802	Installation of Water Service Lines

## SECTION 801

### INSTALLATION OF WATER TRANSMISSION, COLLECTOR, AND DISTRIBUTION LINES

#### 801.1 GENERAL:

The water facilities and materials, specified herein, are associated with water transmission, collector and distribution lines.

#### 801.2 REFERENCES:

##### 801.2.1 American Water Works Association (Latest Edition) (AWWA):

- C110 American National Standard for Ductile-Iron and Gray-Iron Fittings, 3-inch through 48-inch, for Water and Other Liquids
- C203 Coal-Tar Protective Coatings and Linings for Steel Water Pipelines -- Enamel and Tape-Hot-Applied
- C206 Field Welding of Steel Water Pipe
- C207 Steel Pipe Flanges for Waterworks Service-Size 4-inch through 144-inch
- C502 Dry Barrel Fire Hydrants
- C504 Rubber-Seated Butterfly Valves
- C509 Resilient-Seated Gate Valves for Water and Sewerage Systems
- C515 Reduced-Wall, Resilient-Seat Gate Valve
- C600 Installation of Ductile-Iron Water Mains and Their Appurtenances
- C604 Installation of Steel Water Pipe -- 4-inch (100 mm) and Larger
- C605 Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water
- C651 Disinfection Water Mains
- C900 Polyvinyl Chloride (PVC) Pressure Pipe, 4-inch through 12-inch, for Water Distribution
- C905 Polyvinyl Chloride (PVC) Water Transmission Pipe Nominal Diameter 14-inch through 36-inch
- M9 Concrete Pressure Pipe
- M23 PVC Pipe-Design and Installation

##### 801.2.2 This Publication:

- Section 18 Utilities
- Section 121 Plastic Pipe
- Section 127 Steel Water Pipe
- Section 128 Concrete Cylinder Pipe
- Section 129 Ductile Iron Pipe
- Section 130 Gray Iron, Ductile Iron, and Steel Fittings
- Section 161 Gray Iron Castings
- Section 163 Ductile Iron Castings
- Section 170 Electronic Markers
- Section 340 Portland Cement Concrete Curbs, Gutters, Walks, Driveways, Alley Intersections, slope paving, and Median Paving
- Section 343 Removal and Disposal of Existing Pavement, Curbs, Gutters, Sidewalks & Driveways
- Section 701 Trenching, Excavation and Backfill
- Section 1502 Submittals

##### 801.2.3 American Association of State Highway and Transportation Officials (AASHTO)

- M 245 Standard Specification for Corrugated Steel Pipe, Polymer Precoated for Sewers and Drains
- M 246 Standard Specification for Steel Sheet, Metallic-Coated and Polymer-Precoated, for Corrugated Steel Pipe

##### 801.2.4 American Society for Testing and Materials (ASTM)

- A 742 Standard Specification for Steel Sheet, Metallic Coated and Polymer Precoated for Corrugated Steel Pipe
- A 762 Standard Specification for Corrugated Steel Pipe, Polymer Precoated for Sewers and Drains

## SECTION 801

### INSTALLATION OF WATER TRANSMISSION, COLLECTOR, AND DISTRIBUTION LINES

#### 801.3 MATERIALS

##### 801.3.1 GENERAL

801.3.1.1 The CONTRACTOR shall submit certification from the manufacturer of the pipe as specified in Section 1502 as to the pipe material and that the pipe meets or exceeds the required testing. Only pipe listed on the Water Authority Approved Product List shall be accepted unless otherwise approved in writing by the Water Authority Field Division Manager.

801.3.1.2 Main line pipe and fittings shall be as specified in the Reference Section in this publication as listed above or as specified in the Supplemental Technical Specifications and/or as authorized by the ENGINEER.

##### 801.3.2 PIPE

801.3.2.1 Limitations of pipe materials versus pipe sizes will be as follows, unless otherwise specified on the plans or Supplemental Technical Specifications:

###### 801.3.2.1.1

<u>PIPE TYPE</u>	<u>SIZES</u>
Ductile Iron	4-inch to 64-inch
Concrete Cylinder	24-inch and larger
Plastic (Blue - PVC – C900)	4-inch to 12-inch
Plastic (Blue - PVC – C905)	14-inch to 24-inch
Plastic (Purple- PVC–C900)	4-inch to 12-inch
Plastic (Purple – PVC – C905)	14-inch to 24-inch

801.3.2.2 The type of pipe used shall be approved by the ENGINEER. Steel pipe shall be used only where specified on the drawings. Unless otherwise approved by the ENGINEER, all pipe installed shall be identical from valve to valve.

##### 801.3.3 GATE VALVES:

801.3.3.1 Gate valves shall only be used for pipe sizes of 12-inches and smaller, unless otherwise noted on the plans or in the Supplemental Technical Specifications.

801.3.3.2 All gate valves shall be resilient seat valves and shall conform to AWWA C515. The valve shall be a non-rising stem type with inside screw and “O” ring seals. The valve shall have a standard hub which opens counter-clockwise. Type valve ends shall be mechanical joints, unless otherwise specified on the plans. “O” ring retainer shall be secured with nuts and bolts.

801.3.3.3 The resilient seat shall be mechanically retained or bonded on the valve gate (wedge disc).

801.3.3.4 All brass or bronze parts used on gate valves shall comply with AWWA C515.

801.3.3.5 The outside of the valve body shall be painted with a corrosion-resistant coating. The inside shall be protected with corrosion resistant coating, approved for potable water.

801.3.3.6 The valve stem shall comply with AWWA C515. The material for the valve stem shall be brass or bronze, and shall have a minimum yield strength of 20,000-psi and minimum tensile strength of 60,000 psi.

801.3.3.7 Gate valves shall have a 2-inch square operating hub nut. Gate valves in vaults with valve covers at ground level shall have a handwheel with the 2-inch nut welded to the center. For a 4-inch, 6-inch, 8-inch, 10-inch, and 12-inch valve, the minimum outside diameter of the handwheel will be 10-inch, 12-inch, 14-inch, 16-inch, and 16-inch respectively. Handwheel diameters shall not be less than those stated in AWWA C509, Table 5.

801.3.3.8 Maximum input torque to open and/or close the valve shall be 200 foot-pounds for a 4-inch valve and 300 foot-pounds for 6-inch through 12-inch under a working pressure of 200 psi.

801.3.3.9 No project shall be accepted by the OWNER until all valves are operational and accessible.

801.3.3.10 Before the work will be accepted, water valve GPS coordinates shall be provided on the Record Drawings. GPS coordinates obtained by a Professional Surveyor licensed in the state of New Mexico shall be taken at the valve operating nut. Use the NAD 1983 NM STATE PLANE CENTRAL ZONE for x and y coordinates and NAVD 1988 for z coordinate.

##### 801.3.4 RUBBER SEATED BUTTERFLY VALVES:

801.3.4.1 Butterfly valves shall be used for sizes of 14 inches and larger, and shall comply with AWWA C504.

801.3.4.2 Only short body, Class 150B or 250B valves are acceptable. Wafer type valves are not acceptable. Valve ends may be either mechanical joint or flanged.

801.3.4.3 The rubber seat shall be field replaceable on valve sizes 24 inches and larger. The rubber seat may be mechanically retained or bonded on the disk or valve body.

801.3.4.4 Butterfly valves shall have a 3-inch square operating hub nut. Butterfly valves in vaults with valve covers at ground level shall have a hand wheel with the 3-inch nut welded to the center.

801.3.4.5 The valve shaft and disk shall be installed horizontally. The valve disc shall pivot and rotate on the horizontal axis.

801.3.4.6 The maximum input torque to open and/or close the valve shall not exceed 150 ft-lb on the wrench

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### INSTALLATION OF WATER TRANSMISSION, COLLECTOR, AND DISTRIBUTION LINES

nut and 80 lb on the handwheel under a minimum working pressure of 150 psi. The butterfly operator shall be compatible with the pressure. Manual actuators shall be provided from the same manufacturer as the valve. Maximum operating torques shall be in accordance with AWWA C504.

801.3.4.7 No project shall be accepted by the OWNER until all valves are operational and accessible.

801.3.4.8 Before the work will be accepted, water valve GPS coordinates shall be provided on the Record Drawings. GPS coordinates obtained by a Professional Surveyor licensed in the state of New Mexico shall be taken at the valve operating nut. Use the NAD 1983 NM STATE PLANE CENTRAL ZONE for x and y coordinates and NAVD 1988 for z coordinate.

#### 801.3.5 VALVE BOXES:

Valve boxes shall consist of polymer coated steel pipe (CMP). The CMP pipe shall be polymer coated and conform to AASTO M 246 or ASTM A 742. Pipe galvanized material shall have a minimum coating thickness of 3 mils. Acceptable coating material is Trenchcoat Protective Film (Dow) or approved equal. Valve box shall be cut to accommodate the required depth. No joints shall be allowed in boxes less than 10 feet in depth. The pipe shall be manufactured in accordance with the applicable requirements of AASTO M 245 or ASTM A 762. Pipe material shall have a 12 gauge minimum thickness and be 12 inches in diameter to accommodate the cover and lid specified herein. The pipe shall be centered and placed true to vertical around the axis of the operating nut. Valve covers and lids for re-use water shall be as shown in Standard Drawings and shall be shown on project construction plans.

#### 801.3.6 COMBINATION AIR AND VACUUM VALVES:

Air and vacuum valves shall be the type and size shown on the plans. Only combination air and vacuum valves listed on the Water Authority Approved Product List shall be used.

#### 801.3.7 FIRE HYDRANTS

801.3.7.1 Hydrants shall be limited to those on the Water Authority Approved Product List.

801.3.7.2 Fire hydrants and their extensions shall be in accordance with AWWA C502, traffic type. Fire hydrants shall have one (1) 5¼-inch diameter valve opening; one (1) 6-inch mechanical joint inlet connection; two (2) 2½-inch hose nozzle connections; and one (1) 4½-inch steamer nozzle with National Standard Fire Hose Coupling Screw Threads. Fire hydrants shall have a bronze or cast iron pentagon operating nut, be designed for 150 psi working pressure service, and have a normal bury of 4 to 4½ feet unless field conditions require a deeper bury, in which case

extensions will be used so as to bring the bottom of the break-off flange 2 to 8 inches above the top of finish grade.

801.3.7.3 The pipe fittings and fire hydrants starting at the street main and ending at the fire hydrant itself shall be lying in a line perpendicular to the street's centerline or radially on a curvilinear installation, unless otherwise approved in writing by the Water Authority. Fire hydrants shall have no more than ½-inch variation from a vertical line between the breakaway flange and the top of the fire hydrant.

801.3.7.4 Hydrants shall be dry barrel, post-type with compression main valve closing with pressure. They shall have a field lubrication capability. Hydrants shall have a bronze seat ring threaded into a bronze drain ring or bronze or cast iron bushing.

801.3.7.5 Exterior of hydrant, below the ground line, shall be coated with asphalt varnish, and the exterior painted from the top to a point one foot below the ground level flange, consisting of one coat rust inhibitive primer and one coat "safety yellow" enamel. The bonnet shall then be painted with a reflectorized paint using a color as close to "safety yellow" as possible.

801.3.7.6 The bottom plate of the main valve shall be epoxy coated. The shoe of the fire hydrant shall have a 6-inch mechanical joint connection and the inside shall be epoxy coated to prevent corrosion. The nozzle shall be threaded in place and retained by stainless steel locks. Hydrant body shall be threaded to receive the threaded nozzle. Nozzle shall be secured by a stainless steel locking device.

801.3.7.7 Fire hydrant shall contain two drain outlets. The drain outlets shall be constructed of bronze. Hydrant shall be provided with a pentagon operating nut to open counter clockwise and shall have an anti-friction washer between the hold-down nut and the operating nut.

801.3.7.8 To prevent loss of brass operating nuts due to theft or vandalism, the following shall be included in or on the fire hydrant:

801.3.7.8.1 The bonnet must be removed in order to remove the operating nut; or

801.3.7.8.2 Use a cast iron or bronze operating nut.

801.3.7.9 Fire hydrants shall be installed at locations as shown on construction plans and in accordance with Standard Detail Drawings.

801.3.7.10 Fire hydrants shall be fully restrained in accordance with Section 130.

801.3.7.11 All fire hydrant legs shall include an isolation valve.

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### INSTALLATION OF WATER TRANSMISSION, COLLECTOR, AND DISTRIBUTION LINES

801.3.7.12 Hydrants shall be functional and capable of being opened or closed without difficulty following application of an operating torque of 200-foot-pounds at the operating nut.

801.3.7.13 Removal of existing fire hydrants – Where noted in the construction plans, existing fire hydrants and appurtenances shall be removed and salvaged. The pipe from the main to the fire hydrant shall be removed back to the main and the tee capped per 801.12. The CONTRACTOR shall note this on the record drawings.

801.3.7.14 Before the work will be accepted, fire hydrant GPS coordinates shall be provided on the Record Drawings. GPS coordinates obtained by a Professional Surveyor licensed in the state of New Mexico shall be taken at the valve flange. Use the NAD 1983 NM STATE PLANE CENTRAL ZONE for x and y coordinates and NAVD 1988 for z coordinate.

801.3.8 PRESSURE REDUCING VALVE (PRV): Pressure reducing valve shall be limited to those on the Water Authority Approved Product List. Submittals for approval shall be made to the ENGINEER and approval must be received before installation. The following items are required in the PRV:

801.3.8.1 Materials:

801.3.8.1.1 Main valve

801.3.8.2 Pilot Control System:

801.3.8.2.1 Adjustment from 15 psi to 75 psi.

801.3.8.2.2 Shut-off lever on all pilot control system lines.

801.3.8.2.3 Inlet flow strainer.

801.3.8.2.4 Closing speed control.

801.3.8.2.5 Opening speed control.

801.3.8.2.6 Flow stabilizer.

801.3.8.2.7 Tubing shall be copper.

801.3.8.3 Sizing shall be approved by the Water Authority. Installation shall be as per the construction plans. The Water Authority shall adjust final settings on PRV.

801.3.8.4 PRV operating criteria of elevation and normal downstream pressure setting shall be engraved on a stainless steel plate and mounted inside the vault. Numerical values shall be verified and approved by the Water Authority prior to installation of plate.

801.3.8.5 Before the work will be accepted, PRV GPS coordinates shall be provided on the Record Drawings. GPS coordinates obtained by a Professional Surveyor licensed in the state of New Mexico shall be taken at the PRV. Use the NAD 1983 NM STATE PLANE CENTRAL ZONE for x and y coordinates and NAVD 1988 for z coordinate.

#### 801.3.9 TAPPING SLEEVES:

(For other than Concrete Cylinder Pipe) Only approved, long body, fully-gasketed tapping sleeves shall be allowed. They shall be ROMAC SST Series, or JCM 432 Series, or approved equal. During installation of the tapping sleeve, the pipe shall be fully supported to support the weight of the tapping sleeve and tapping machine. Taps greater than 2/3 line size will not be allowed unless otherwise approved in writing by the Water Authority.

801.3.9.1 Tapping sleeves of heavy welded steel bodies shall meet the following requirements:

801.3.9.1.1 Epoxy Coated

801.3.9.1.2 Bolts and nuts to be stainless steel and shall be Grade 8 minimum

801.3.9.1.3 Gaskets to be Buna-N rubber

801.3.9.1.4 Flange to be flat face steel and comply with AWWA C-207

801.3.9.1.5 Class D-ANSI 150 lbs. drilling

801.3.9.1.6 Designed to sustain an operating pressure of 150 psi

801.3.9.1.7 May be used on all water mains, 4-inch and larger

801.3.9.2 Tapping sleeves of cast iron bodies shall meet the following requirements:

801.3.9.2.1 Mechanical joint type with a working pressure of 200 psi

801.3.9.2.2 Outlet flange to be Class 125, ANSI B16.1

801.3.9.2.3 Sleeves to include side and end gaskets of Buna-N rubber

801.3.9.2.4 Eight high strength steel bolts and nuts to secure the halves of the sleeve to the pipe

801.3.9.2.5 May be used on all mains 4-inch and larger

## SECTION 801

### INSTALLATION OF WATER TRANSMISSION, COLLECTOR, AND DISTRIBUTION LINES

801.3.9.3 Tapping sleeves of short sleeve cast iron shall meet the following requirements:

801.3.9.3.1 Working pressure of 150-psi

801.3.9.3.2 Outlet flange to be Class 125, ANSI B16.1

801.3.9.3.3 Outlet half to have an enclosed gasket in a groove for a pressure seal

801.3.9.3.4 Four high strength steel bolts to secure halves of tapping sleeve to pipe

801.3.9.3.5 May be used on all water mains, 4-inch and larger

#### 801.4 CORROSION MONITORING STATIONS

801.4.1 When corrosion monitoring stations are encountered in the field or on the construction plans, the CONTRACTOR shall protect the station from damage.

801.4.2 The ENGINEER shall provide a design to the CONTRACTOR that will include relocations, if needed, adjustment to grade, and a testing plan to comply with the National Association of Corrosion Engineers (NACE) requirements.

801.4.3 The CONTRACTOR shall provide all materials, equipment, labor and supervision necessary for the completion of the installation, relocation, or adjustment, and testing. The CONTRACTOR shall employ a Corrosion Construction Supervisor, with experience in the installation of similar type systems, to supervise the corrosion monitoring facilities installation, relocation, or adjustment. The Corrosion Construction Supervisor shall be under the direct supervision of a licensed professional Corrosion Engineer or a NACE certified Cathodic Protection Specialist. The Corrosion Construction Supervisor shall instruct the CONTRACTOR on site during the initial installation and shall revisit the site as required.

801.4.4 All construction projects within the vicinity of corrosion monitoring stations will coordinate with the Water Authority to ensure the integrity and functionality is preserved.

#### 801.6 WATER LINE CONNECTIONS

##### 801.6.1 GENERAL:

All new water line tie-ins to the existing water system shall be directly inspected and approved by the ENGINEER. This includes non-pressurized or pressurized connections that will result in extension of the existing system.

#### 801.7 LOCATIONS OF WATER MAINS AND SEWER LINES

801.7.1 Unless otherwise authorized by the ENGINEER, parallel water and sewer lines shall be installed at least 10-feet apart horizontally, and the water line shall be at a higher elevation than the sewer. Separate trenches will be required in all cases (this shall be effective even though one line has been installed prior to the other), and the water line shall be at least 18-inches above the sewer; when water and sewer lines cross each other, the water line shall be at least 18-inches above the sewer; otherwise the sewer shall be of pressure class pipe extending between manholes, or concrete encased for 10-feet on each side of the water line as shown in the Standard Detail Drawings. The crossings shall be arranged so that the sewer joints will be equidistant and as far as possible from the water main joints.

801.7.2 Water mains shall not be constructed under walkways, sidewalks, curbs and gutters, drivepads, or similar concrete structures by tunneling underneath them. Trenchless technologies may be allowed with prior approval by the Water Authority. The CONTRACTOR may cut concrete structures or remove and replace the section of the concrete structure to the nearest full expansion joint or edge.

#### 801.8 TRENCHING AND BACKFILLING

801.8.1 All trenching, bedding, and backfilling activities shall conform to Section 701. Compaction shall be no less than 95% of maximum density as defined by ASTM D 1557 modified proctor.

#### 801.9 GENERAL INSTALLATION ITEMS

801.9.1 The minimum cover over distribution lines shall be 3 feet; and 4 feet of cover over transmission and well collector lines at finished grade.

801.9.2 Pipe and accessories shall be new and unused and shall be handled in such a manner as to insure delivery to the trench in sound, undamaged condition. Particular care shall be taken not to injure the pipe coating. No other pipe or material of any kind shall be placed inside of a pipe or fitting after the factory coating has been applied.

801.9.3 The interior of the pipe shall be thoroughly cleaned of foreign matter before being lowered into the trench and shall be kept clean during operations by plugging or other approved methods. When work is not in progress, open ends of pipes and fittings shall be securely closed so that no other substances will enter the pipes or fittings. Any section of the pipe found to be defective before or after laying shall be replaced with sound pipe without additional expense to the OWNER.

801.9.4 All nuts and bolts utilized in underground pipe connections shall be stainless steel, high strength cast iron or high grade, high strength steel. The full length of each section of pipe shall rest solidly upon the bed, with recesses excavated to accommodate bells and joints. Any pipe that

## SECTION 801

### INSTALLATION OF WATER TRANSMISSION, COLLECTOR, AND DISTRIBUTION LINES

has the grade or joint disturbed after laying shall be taken up and re-laid. Pipes shall not be laid in water or when trench or weather conditions are unsuitable for the work except by as authorized by the ENGINEER. All unconnected ends of pipes shall have a valve, plug, or cap installed on it.

801.9.5 Pipe shall be laid to line and/or grade shown on the plans or as staked in the field. Changes in horizontal or vertical alignment of the pipe at a joint shall not exceed the manufacturer's recommended deflection for the type and size pipe being laid. When the change required is more than the recommended deflection, a fitting or several short joints of pipe shall be used.

801.9.6 When new pipe is to be connected to an existing pipe or when crossing an existing pipe line, the CONTRACTOR shall excavate the existing lines well in advance of the laying of the new pipe line to enable the ENGINEER to verify their elevation and placement and to make any changes in grade and/or alignment of the new pipe line that may be required.

801.9.7 On all push-on-joints (e.g., bell and spigot, fluid-tite, and ring-tite) the rubber gasket shall be removed, cleaned, the groove cleaned, the gasket replaced, and the bell or plain end cleaned before jointing. The gasket and the bell or plain end of the pipe to be jointed shall both be lubricated with a suitable soft vegetable soap compound to facilitate jointing. Care shall be taken to insure that neither the bell or collar, or the pipe being jointed is damaged as it is being pushed securely into place.

801.9.8 Flanged and mechanical joints shall be made with machine bolts and nuts of the proper size only. All components of these types of joints shall be cleaned before jointing. Only one (1) gasket will be permitted in a flange joint. In a mechanical joint, the plain end pipe shall be fully seated before the gasket and gland is slipped up to the bell. Nuts on both types of joints shall be tightened by alternating nuts 180-degrees apart. The CONTRACTOR shall be responsible for assuring that proper torque is achieved and shall have a torque wrench available for verification by the ENGINEER.

801.9.9 When laying pipe, a metalized detectable warning tape shall be installed a minimum of 1-foot above the top of pipe and 2 to 6 feet below the final surface. The tape shall be detectable with a standard metal pipe locator. The color of tape shall be safety precaution blue and will be inscribed at 10-foot intervals with the words, "CAUTION BURIED WATER LINE BELOW." Tape shall be 2 inches wide. The tape shall be constructed of material that is impervious to alkalis, acids, chemical reagents, and solvents found in the soils.

801.9.10 When laying pipe, Electronic Marker Devices (EMD's) shall be installed in accordance with Section 170.

#### 801.9.11 TEMPORARY WATER MAIN

801.9.11.1 The CONTRACTOR may install a temporary water main (shoo-fly), if approved by the Water Authority, to provide a water service during replacement of the existing water main in a street or alley if authorized by the Water Authority. The shoo-fly shall be installed at locations as agreed with the Water Authority. The temporary water main size shall be determined by the ENGINEER and designed for traffic and above ground use. Access to all driveways shall be maintained. Cost shall be considered incidental to the work.

#### 801.10 SPECIFIC PIPE LAYING REQUIREMENTS

801.10.1 Ductile iron pipe shall be installed in accordance with AWWA C600 and as herein specified.

801.10.2 Steel pipe shall be installed in accordance with AWWA C604, AWWA C206 for welded joint and as herein specified. All field-welded joints shall have one coat of coal tar enamel of 3/32-inch thickness.

801.10.3 Plastic pressure pipe shall be installed in accordance with AWWA M23, C900, C905, C605 and/or manufacturer's printed recommendations, whichever is applicable. Trenching, excavation and backfill is specified in Section 701. Compaction shall be no less than 95% of maximum density as defined by ASTM D 1557 modified proctor. A reference mark (a distinct circumferential line) is placed on the pipe's spigot by the manufacturer to indicate the correct depth of the spigot penetration into the pipe's gasket joint. If the pipe is seated too deep or too shallow, the pipe may buckle or separate due to thermal expansion/contraction, therefore particular attention shall be exercised when jointing pipe. The reference mark must be showing and not farther than 1/2-inch from the leading edge of the bell. The CONTRACTOR shall verify that the manufacturer's reference mark is correct per manufacturer's literature.

801.10.4 All concrete cylinder pipe shall have two small bond wires of low resistance, or other approved method, welded across the joint to make the joint electrically continuous. Where rigid joints are specified, they shall be provided as specified herein. The outside joint recess shall be completely filled with a rich low shrinkage cement grout. The concrete surface in contact with the joint mortar shall be moistened with water just prior to pouring the joint recess. The mortar shall be poured into the joint recess against a water proof paper or cloth diaper laid around and lapping the outside field joint. The diaper shall completely and snugly enclose the joint recess, being held in place by metal box strapping or wire. The mortar shall be poured into an opening slightly to one side on the top of the pipe and rodded by a flexible wire rod onto place until it appears on the opposite side completely. After the joint recess has been filled with mortar, adjoining pipe section shall not be disturbed. After the joint has been made, the concrete lining surfaces of the joint shall be moistened and the interior recess tightly jointed and troweled flush and



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smooth with the inside pipe surface. Grout for painting the interior joints shall be of a stiff consistency and shall have low shrinkage characteristics. In sizes of pipe smaller than 24 inches, the mortar shall be buttered all around the shoulder inside the bell before the spigot is entered. A backing-up tool, such as an inflated rubber ball wrapped with burlap, shall be pulled through the joint to compact the mortar, completely fill the inside annular space and wipe off the excess mortar. Each joint will be inspected by the ENGINEER for proper and complete closure prior to final acceptance. Flanges shall be protected by "cocoon" type protection coating of coal tar and felt in accordance with AWWA C203. When moving individual pipe section, the pipe shall be lifted using two web or belt type slings which support the pipe between the third and outside quarter points.

801.10.5 All fittings and valves shall be installed as per the type of joint as stated herein and/or as shown on the plans.

801.10.6 All couplings, clamps, sleeves, etc shall be installed as per the manufacturer's printed recommendations and as approved by the ENGINEER. The CONTRACTOR shall properly restrain all appurtenances as necessary.

801.10.7 All water lines installed as part of a re-use system or other non-potable use shall be purple in color or shall be encased in purple PVC wrap.

801.11 CUTTING: The cutting of any type of pipe shall be done as per the manufacturer's printed recommendations, as approved by the ENGINEER. Care shall be taken in cutting any pipe that has an internal and/or external lining or coating.

#### 801.12 BLOCKING AND RESTRAINED JOINTS

801.12.1 All restrained joints shall be by mechanical means unless directed or approved otherwise by the ENGINEER.

801.12.2 All tees and bends shall be restrained by mechanical means. Valves in runs shall be mechanically restrained. Butterfly valves shall be flanged. Where rigid joints are called for on concrete cylinder pipe, the joints shall be flanged or field welded bell and spigot joints in accordance with the manufacturer's recommendation.

801.12.3 All caps and plugs on dead end lines shall be mechanically restrained when feasible. Blocking may also be required when adequate restrain length is not available.

801.12.4 Where restrained joints on ductile iron pipe or PVC pipe are called for on the plan, the mechanical restraining system employed shall conform to the recommendations of the pipe manufacturer.

#### 801.13 RESTRAINING JOINTS

#### FOR CONCRETE CYLINDER PIPE

801.13.1 Restrained joints in concrete cylinder pipe for thrust restraint shall be produced by continuous welding the pipe joints.

#### 801.14 CONNECTIONS TO EXISTING CONCRETE CYLINDER PIPE

801.14.1 OBJECTIVE: The intent of this Subsection is to establish procedural and design criteria for making connections to existing concrete cylinder pipe for water distribution line extensions, and will be applicable to 4-inch and larger size connections.

801.14.2 NEW WATER LINES: Non-factory taps are prohibited.

#### 801.14.3 EXISTING WATER LINES

801.14.3.1 New connections to existing concrete cylinder pipe must be approved in writing by the Water Authority Field Division Manager. Hot taps and service connections will not be allowed. The requester shall provide the following information:

801.14.3.1.1 Justification for the connection

801.14.3.1.2 City Project name and number

801.14.3.1.3 Date connection to be performed  
(Minimum 30-day notice)

801.14.3.1.4 Name of the CONTRACTOR who will be installing the connection

801.14.3.1.5 Scheduling of connections is subject to the moratorium requirements of the Water Authority

801.14.3.2 The CONTRACTOR shall coordinate the work with the Water Authority Field Division before commencing work. The Water Authority Field Division shall inspect and approve the entire installation of the connection prior to backfilling and returning to service.

#### 801.16 HYDROSTATIC TESTS:

801.16.1 The CONTRACTOR shall be required to perform hydrostatic tests in all water mains, laterals, dead ends, and service lines in accordance with AWWA C600. The test shall be conducted in the presence of the ENGINEER, or his authorized representative. The testing of the lines shall be done without being connected to existing lines. The CONTRACTOR shall provide all temporary plugs required. Water used for disinfecting may be used for hydrostatic testing. Leakage through connections to the existing system, leaks in the existing lines, or leaking existing valves under the test pressure will invalidate the test. The lines shall be tested at 150-pounds, or 1.5 times the normal working pressure of the line,

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whichever is greater, for not less than two hours. All taps, gauges, and necessary equipment shall be provided by the CONTRACTOR as approved by the ENGINEER, however, the ENGINEER may utilize gauges provided by himself if he so elects. Each section of the new line between valves shall be tested to demonstrate that each valve will hold the test pressure. No installed pipe shall be accepted if the leakage is greater than that determined by page 801-12 Hydrostatic Test sheet calculations. If the total leakage is less than the allowable, the line can be accepted. All visible leaks shall be repaired regardless of the amount of leakage and the test reconducted.

**801.16.2** The CONTRACTOR shall submit a testing plan to the ENGINEER for approval. In cases where a new main is being connected to an existing main without the installation of a new valve, the end of the new main shall be temporarily capped and restrained and a hydrostatic test performed. Hydrostatic tests should not be made such that an existing valve or existing main is included in the test section. Test Sheet on page 801-12 is the standard form which must be completed at the time of the test, signed by the ENGINEER and delivered to the Water Authority prior to acceptance of the Project.

#### **801.17 DISINFECTING, FLUSHING, AND BACTERIA TESTING OF WATER LINES:**

**801.17.1** New water lines shall be installed in such a manner as to not require cleaning by flushing. This shall require capping stockpiled line, capping lines at night and any other time work is not in progress, visual inspection of interior of lines, and cleaning as necessary prior to placing in the trench. Every effort shall be made to prevent the entry of dirt and debris into pipelines under construction.

**801.17.1.1** Mains shall be disinfected in accordance with AWWA C651 with chlorine liquid solution, which shall be added by an approved method at one end of the lines as water is drawn through the lines and service connections. The chlorine solution shall remain in the line for at least 24 hours. The lines shall then be flushed until the chlorine residual is equal to the normal residual in the existing system or at 0.5 parts per million for un-chlorinated water. Dry chlorine shall not be used for disinfection of water lines. The flushed water shall be disposed of by the CONTRACTOR appropriately. Should results of the bacteriological analysis be unsatisfactory, the disinfection procedure shall be repeated.

**801.17.1.2** The CONTRACTOR shall be granted three free volumes of water for testing, disinfecting, and flushing the new installation. All water used for testing, disinfecting, and flushing shall be metered. If additional water is needed for these purposes, the water shall be paid for by the CONTRACTOR at the current water rates. An approved backflow prevention system shall be used when withdrawing water from any waterlines and hydrants. Unmetered connection to the water system shall not be

used for providing water for disinfecting, testing, or flushing.

**801.17.1.3** Water Authority or the ENGINEER will collect the water sample to test the water in the existing lines at the point of delivery for assurance of clean and potable water. The water in the existing lines will be used for testing and flushing.

#### **801.18 INTERFERENCE WITH SERVICE AND SCHEDULE OR WORK**

**801.18.1** The CONTRACTOR shall obtain the permission of the ENGINEER before making any connections with existing mains. The required operation of existing valves will be performed by the Water Authority as per Section 18.

**801.18.2** Work shall be started after authorization from the Water Authority and the ENGINEER and shall be completed in a prompt efficient manner in coordination and cooperation with other utilities concerned.

**801.18.3** The CONTRACTOR shall be required to arrange his construction to maintain continuous service to water users, from existing facilities, to the fullest extent possible. CONTRACTOR shall, at all times, withhold construction work where any conflicts in the service requirements occur.

#### **801.19 NOTIFICATION OF COMPLETION:**

**801.19.1** The CONTRACTOR shall notify the ENGINEER, in writing, when the CONTRACTOR has completed construction of a water line. This notification should be submitted immediately upon completion; the water line shall not be placed in service by the Water Authority before the sewer service and the paving, if applicable, are in place and until the Water Authority has received and accepted all adequate documentation submittals per 801.21. Water Authority inspection shall consider, on a case by case basis, exceptions for fire protection purposes.

#### **801.20 VALVE BOX REHABILITATION**

**801.20.1** The rehabilitation of existing valve boxes as shown on the plans or as authorized by the ENGINEER shall include the following:

**801.20.1.1** Removing and disposing the existing valve box, concrete collar, ring, and cover and installing the new type box, concrete collar, ring, and cover.

**801.20.1.2** Installation of a new concrete collar is required in paved and unpaved areas. Main line pipe size and direction of the line shall be scribed on the collar.

**801.20.1.3** Install a new electronic marker device.

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801.20.1.4 Removal, disposal, and replacement of the pavement.

801.20.1.5 Excavation, backfill, and compaction.

801.20.1.6 All materials, labor, and equipment necessary to do the work.

801.20.2 The work under this item shall be constructed per the Standard Detail Drawings

#### 801.21 DOCUMENTATION SUBMITTALS

801.21.1 At the time of the final inspection, the following documentation will be submitted to the ENGINEER and to the Water Authority:

801.21.1.1 Hydrostatic test data of the new water line system

801.21.1.2 Microbiological test reports which were taken at representative locations along the system.

801.21.1.3 All valves at that time shall be in the open position, unless otherwise authorized by the ENGINEER and Water Authority.

801.21.1.4 A marked-up set of construction drawings reflecting as-built conditions. This does not supplant the requirements for record or as-built drawings.

#### 801.22 MEASUREMENT AND PAYMENT

##### 801.22.1 PIPE:

Payment for all sizes and types of pipe shall be made on the basis of measurement per linear foot, including the length of fittings, valves, etc. The contract unit price of pipe shall include all jointing and coupling materials necessary for its installation and connections to other sections of pipe, except for fittings, valves or other appurtenances. The cost of hydrostatic testing, flushing and disinfecting of new water lines shall be included in the contract unit price for the item in place. Pipe locator tape for pipe shall be included in the contract unit price of the pipe. Joint restraint shall be paid for separately.

##### 801.22.2 DEPTH OF TRENCH:

801.22.2.1 The contract unit price for pipe and appurtenances in all cases shall include the trenching, installation, and compacted backfilling for trench cuts as specified in Section 701.

801.22.2.2 Payment for additional excavation deeper than the specified limits shall be made on the contract unit price per vertical foot per linear foot, and shall include trenching, installation of pipe and appurtenances, and compacted backfilling in the deeper trench.

##### 801.22.3 REMOVAL AND DISPOSAL OF PIPE

801.22.3.1 The payment for removal shall be made on a unit price per linear foot; there shall be no additional cost to the OWNER for disposal.

801.22.3.2 The payments for removal and disposal shall include trenching and compacted backfilling.

##### 801.22.4 CAST IRON AND DUCTILE IRON FITTINGS:

801.22.4.1 All cast iron and ductile iron fittings shall be measured and paid for at the contract unit price per pound based on weights of an all mechanical joint ends fitting for the type and size of fitting used as specified in AWWA C110, regardless of the type of ends on the fitting installed. The contract unit price per pound of fittings shall include all gaskets, glands, bolts, and nuts required. No separate payment will be made for these items.

801.22.4.2 When the CONTRACTOR installs a Water Authority-furnished fitting and replaces that fitting in the Water Authority's inventory, the CONTRACTOR shall be paid the full contract unit price of that fitting as outlined above. If the CONTRACTOR does not replace the fitting in the Water Authority's inventory, the payment to the CONTRACTOR will be at the contract unit price of the fitting less the cost of the fitting itself.

801.22.4.3 Fitting Insertion: The insertion of a fitting into an existing pipe line shall be measured and paid for at the contract unit price per pound based on weights of an all mechanical joint end fitting and if required on all mechanical joint connecting piece (coupling) of the type fitting and size used, as specified in AWWA C110, regardless of the type of ends on the fitting and coupling installed. This payment shall include all compensation for the excavation, cutting and removal of the existing pipe, installation of the fitting and coupling, if required, the re-cutting of the existing pipe or new pipe installed between the fitting and coupling, and backfill and compaction complete in place. In addition to the payment for the fitting insertion, the CONTRACTOR shall be paid for each non-pressurized connection and if pavement, curb and gutter, sidewalk, drive pad, etc., are removed, these items will be paid for as part of the appropriate item.

##### 801.22.5 REMOVAL AND DISPOSAL OF PIPE AND APPURTENANCES:

801.22.5.1 The payment for removal and disposal shall include trenching and compacted backfilling.

##### 801.22.6 CONCRETE CYLINDER FITTINGS:

Concrete cylinder pipe fittings, such as flanged outlets, bends, reducers, etc., shall be considered as incidental to the contract unit price for installation of the pipe, as shown on the construction plans.

##### 801.22.7 COUPLINGS:

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The measurement for steel or cast iron couplings shall include payment for all gaskets, bolts, and incidental materials as may be needed for its complete installation. Payment shall be made on the contract unit price per each size of coupling required.

#### 801.22.8 STEEL FITTINGS:

Steel fittings shall only be used when authorized by the ENGINEER and when needed to connect to an existing steel water line. Measurement and payment for steel fittings, when authorized, shall be made at the contract unit price per pound based on weights of an all mechanical joint ends fitting of the type fitting and size used, as specified in AWWA C110. This payment shall include all fabrication and welding required on the fitting.

#### 801.22.9 VALVE AND VALVE BOXES:

801.22.9.1 Valves shall be measured and paid for at the contract unit price per each size of valve. The contract unit price for valves 24-inch and larger shall include the bypass valve, fittings and piping, complete in place.

801.22.9.2 Valve Boxes shall be measured and paid for at the contract unit price per each per type of valve box. Payment shall include the polymer coated corrugated metal pipe, new ring, cover, new concrete pad, and new EMD complete in place.

#### 801.22.10 FIRE HYDRANTS

801.22.10.1 Fire Hydrants shall be measured and paid for at the contract unit price per each per depth of bury. Payment shall include excavation, gravel drain pocket, mechanical restraining system, backfilling, and compaction complete in place.

801.22.10.2 Measurement and payment for removal of existing fire hydrant shall be per each and shall include excavation and salvage of the existing fire hydrant, valve and pipe back to the water main, capping the tee, backfilling and compaction as required for the location of the fire hydrant and appurtenances. Removal and replacement of existing paving, curb, gutter, and sidewalk will be covered under those bid items.

#### 801.22.11 VALVE BOX ADJUSTMENTS:

801.22.11.1 Valve box adjustment using the adjustment collar and insert shall be measured and paid for per each complete in place including the concrete pad and EMD. If existing ring and cover do not match current approved standards, a new ring and cover that does comply with the Standard Specifications shall be installed and the cost shall be considered incidental to the valve box adjustment.

801.22.11.2 When the adjustment height required on a valve box exceeds the height of the adjustment collar or the valve box has been previously adjusted, the valve box shall

be rehabilitated. Measurement and payment shall be made as specified under Valve Box Rehabilitation.

#### 801.22.12 WATER LINE CONNECTIONS:

##### 801.22.12.1 Non-pressurized Connections:

Non-pressurized connections shall be measured and paid for at the contract unit price per each for any size or type of pipe, complete in place, which shall include any extra excavation required, shut-off coordination, the removal of any caps or plugs or the cutting of the existing pipe any number of times required to make the connection, drainage plan (if required), pumping or handling of the water, backfilling and compaction. Fittings shall be measured and paid for per pound as specified herein, including all types of couplings.

##### 801.22.12.2 Pressurized Connections:

Pressurized connections shall be measured and paid for at the contract unit price per each per location shown on the plans, complete in place, which shall include excavation, the cleaning or removal of existing pipe coatings and coverings, hydrostatic testing, the tapping, any grouting required, backfilling and compaction. The installation of the tapping sleeve and gate valve is to be paid under separate item or as indicated on the plans.

##### 801.22.12.3 Connection to Steel Water Lines:

All connections to existing steel water lines shall be made by using a transition coupling. The measurement and payment for this type of connection shall be made per pound of fitting for a Mechanical-Joint Connecting Piece of the size used based on the weights specified in AWWA C110.

#### 801.22.13 THRUST RESTRAINTS:

##### 801.22.13.1 CONCRETE BLOCKING:

When concrete blocking is used, as authorized by the ENGINEER, the blocking shall be measured and paid for at the contract unit price per cubic yard placed to the neat lines shown on the plans or per the Standard Detail Drawings.

##### 801.22.13.2 RESTRAINING JOINTS FOR CONCRETE CYLINDER PIPE:

Measurement and payment for this item shall be at the contract unit price per linear inch of circumferential welded, complete in place, including protective coating of the weld.

##### 801.22.13.3 MECHANICALLY RESTRAINED JOINTS:

Mechanically restrained joint assemblies shall be measured and paid for at the contract unit price per each assembly per size of the pipe per each type (pipe to pipe, pipe to mechanical joint, pipe to fitting, etc.) complete in place.

##### 801.22.13.4 VALVE ANCHORAGE:

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No separate measurement nor payment shall be made for valve anchorage as per Standard Detail Drawing. The cost of this work shall be included with the cost of the valve.

**801.22.14 PRESSURE REDUCING VALVE (PRV):**  
Measurement and payment for furnishing and installing a PRV shall be made at the contract unit price per each per size, complete in place as shown on the plans or in the Standard Detail Drawings. The payment shall include all labor, gauges, equipment and material required for the excavation, the PRV, all by-pass piping, fittings and valves both inside and outside the structure, the structure, backfilling and compaction.

**801.22.15 AIR RELEASE VALVE (ARV):**  
Measurement and payment for furnishing and installing an ARV shall be made at the contract unit price per each per size of ARV, complete in place as shown on the plans or in the Standard Detail Drawings. The payment shall include all labor, equipment and materials required for the excavation, ARV, piping, fittings, gate valve, structure, backfilling, compaction, EMD, valve box, and concrete collar.

**801.22.16 VALVE BOX REHABILITATION:**  
Valve box rehabilitation shall be measured and paid for at the contract unit price per each, complete in place which shall include the removal of the existing valve box, excavation, the new valve box installed, EMD, backfilling, compaction and the installation of the concrete collar. If existing ring and cover do not match current approved standards, a new ring and cover that does comply with the Standard Specifications shall be installed and the cost shall be considered incidental to the valve box rehabilitation.

**801.22.17 CONCRETE STRUCTURES:**  
The removal and replacement of concrete structures such as sidewalks, drive pads, wheelchair ramps, and curb and gutters, as required for the installation of water lines shall be measured and paid for as specified in Section 340 and 343.

**801.22.18 BEDDING MATERIAL:**  
No separate measurement nor payment shall be made for bedding material required when shown on the plans or when required due to the type of pipe supplied by the CONTRACTOR. The cost of the bedding material shall be included in the unit price of the pipe. If bedding material is not required by the conditions above, but is required due to the conditions encountered during construction, then the bedding material shall be measured and paid for as specified in Section 701.

**801.22.19 SURPLUS MATERIALS:**  
No separate measure nor payment will be made for the removal and disposal of surplus material generated by the pipe, bedding material or the use of lean fill.

**801.22.20 CORROSION MONITORING  
STATION ADJUSTMENTS TO FINISHED GRADE**

**801.22.20.1 Corrosion monitoring station**  
adjustments to grade shall be measured and paid per each complete in place including electrical connections or extensions needed, pea gravel, concrete collar, and traffic rated box and cover to comply with current standard detail drawings.

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AND DISTRIBUTION LINES

Test No.: \_\_\_\_\_ HYDROSTATIC TEST

PROJECT NAME: \_\_\_\_\_ DATE: \_\_\_\_\_

PROJECT NUMBER: \_\_\_\_\_ CONTRACTOR: \_\_\_\_\_

LOCATION: \_\_\_\_\_

PIPE MATERIAL: \_\_\_\_\_ DIP \_\_\_\_\_ PVC \_\_\_\_\_ CCP \_\_\_\_\_ Fabricated Steel

Test: Length (S) = \_\_\_\_\_ ft.

Size (D) = \_\_\_\_\_ inches

Pressure (P) = \_\_\_\_\_ psi - gauge (average test pressure during the hydrostatic test)

Leakage Allowed ( $L_{ALL}$ ) - \_\_\_\_\_ gal / hr ( $L_{ALL} = SD \sqrt{P} / 133,200$  per AWWA C600-99)

Basis: Only resilient seated gate valves and/or rubber seated butterfly valves are used. No metal seated valves are allowed.

Total Leakage Allowed for 2 hour Test Period:  $L_{ALL} * 2 \text{ hours} =$  \_\_\_\_\_ gallons

Actual Amount of Water ADDED to maintain 150 psi  $\pm$  5 psi for 2 hours = \_\_\_\_\_ gallons

If actual amount of water added is LESS THAN total leakage allowed, test PASSED

If actual amount of water added is GREATER THAN total leakage allowed, test FAILED

\_\_\_\_\_ Test Passed \_\_\_\_\_ Test Failed

Contractor \_\_\_\_\_ Date \_\_\_\_\_

Inspector \_\_\_\_\_ Date \_\_\_\_\_

Project Manager \_\_\_\_\_ Date \_\_\_\_\_

COMMENTS: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Note: See Section 801.16 for the Specification for test procedure.

## SECTION 802

### INSTALLATION OF WATER SERVICE LINES

#### 802.1 GENERAL:

This section pertains to the water service line which extends from the distribution line to the water meter.

#### 802.2 REFERENCES

- |         |  |
|---------|--|
| 802.2.1 | American Society for Testing and Materials (Latest Editions) (ASTM)  |
| A-536   | Specifications for Ductile Iron Castings                             |
| B-62    | Specifications for Composition Bronze or Ounce Metal Castings        |
| B-88    | Specification for Seamless Copper Water Tube                         |
| D-2000  | Classification System for Rubber Products in Automotive Applications |
| 802.2.2 | American Water Works Association (Latest Editions) (AWWA)            |
| 802.2.3 | This publication:<br><br>Section 163 Ductile Iron Castings           |
| C-800   | Underground Service Line Valves and Fittings                         |

#### 802.3 MATERIALS

##### 802.3.1 SERVICE LINE FITTINGS:

All service line fittings shall be in full compliance with the latest version of AWWA Standard C800, except as modified herein. Fittings shall be of the type required for the type of service line being installed. All stops shall be of the round, full opening type with no restriction in the opening less than the nominal size. Fittings incorporating a threaded plastic gripper and "O" ring seal may be utilized in lieu of the flared configuration. All service pipe and fittings shall be designed to sustain an operating pressure of 150-psi.

**802.3.2 COPPER SERVICE PIPE:** The ¾-inch to 2-inch copper service pipe shall conform to ASTM B 88 and shall be Type K, unless otherwise specified. Copper tubing shall be bent with approved tube benders without any kinks or sharp bends. Cutting of tubing will be performed with cutters designed for that purpose. Couplings used to join two pieces of tubing together shall not be installed anywhere on the service line between the water meter and the water main.

##### 802.3.3 TAPPING SADDLES:

**802.3.3.1** Service saddle bodies shall be of cast iron, ductile iron, or bronze. The type of saddle used must be listed on the current Water Authority Approved Products List. Straps, nuts, bolts, and washers shall be of stainless steel or bronze. Gaskets shall be vulcanized elastomeric rubber or synthetic rubber compound.

**802.3.3.2** The saddles shall be tapped for the type of thread being used on the corporation stop.

**802.3.3.3** Tapping saddles for PVC C900 pipe shall have bronze straps and shall be installed as per the manufacturer's printed recommendations.

##### 802.3.4 METERS:

Meters are furnished and installed by the Water Authority for new service installations. For replacement and relocation work, the existing meters shall be reinstalled by the CONTRACTOR.

##### 802.3.5 METER

###### 802.3.5.1 METER BOXES FOR ¾-INCH TO 1-INCH METERS:

**802.3.5.1.1** Meter boxes with two meters shall be centered on adjacent property lines.

**802.3.5.1.2** The meter box is to be part of an underground enclosure for water meters and shall have a ductile iron cover plate and lid.

**802.3.5.1.3** Meter box shall be cast in one piece to form a hollow rectangle and new material or recycled materials shall be used in its manufacture.

**802.3.5.1.4** The box material shall have the following minimum mechanical properties at variable ambient temperatures of -20°F to 120°F, compressive strength equal to 10,000 psi, tensile strength equal to 1,500 psi and flexural strength equal to 7,500 psi.

**802.3.5.1.5** Meter boxes to be installed shall have no visual cracking, crazing, checking, blistering, surface pitting, or deformation.

**802.3.5.1.6** The finished meter box shall have the following physical properties:

**802.3.5.1.6.1** Maximum wall deflection shall not exceed 1/8 inch at any one point when subject to earth pressures or forces created during backfilling.

**802.3.5.1.6.2** Material used for making the box shall be non-biodegradable when buried and/or exposed to water. Life expectancy of the box shall be at least 20 years.

**802.3.5.1.6.3** Overall weight of the box component shall not exceed 80 pounds.

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### INSTALLATION OF WATER SERVICE LINES

802.3.5.1.6.4 Inside dimensions of the box shall conform to the current Standard Detail Drawings. This meter box is for one and two meter installations.

802.3.5.1.6.5 Inside and outside surfaces of the walls shall be reasonably smooth and free of burrs.

802.3.5.1.6.6 All materials used for box construction shall be approved for use in the domestic water supply system.

#### 802.3.5.2 METER BOX COVER AND LID:

802.3.5.2.1 The size, dimensions, and details of the meter box cover and lid are as shown in the Standard Detail Drawings.

802.3.5.2.2 The casting shall conform to ASTM A536. The castings shall be true to pattern in form and dimensions and be free from pouring faults, sponginess, cracks, blowholes, or other defects. Castings shall be filleted boldly at angles and arises shall be sharp and true. Edges shall be rounded or chamfered. The castings shall be thoroughly cleaned and the parting lines, grates, and risers ground flush. The lid shall seat firmly in the cover without rocking. The lid top surface shall be flush with the top surface of the cover. The lid shall be easily removed from the cover.

802.3.5.2.3 The cover and lid shall have, integrated in the casting top, a corrugated design to provide a non-slip surface. The lid shall have, integrated in the top of the casting, the words "WATER AUTHORITY".

#### 802.3.5.3 METER BOX FOR 1 1/2-INCH AND 2-INCH METERS:

802.3.5.3.1 The meter box is to be part of an underground enclosure for water meters.

802.3.5.3.2 The meter box and cover with lid shall be selected from those on the Water Authority Approved Product List.

802.3.5.3.3 The material used for manufacturing the box, cover and lid shall be new or recycled materials and shall have the following minimum mechanical properties at ambient temperatures from -20°F to 120°F: Compressive Strength = 11,000 psi., Tensile Strength = 1,700 psi., and Flexural Strength = 7,500 psi.

802.3.5.3.4 Meter boxes to be installed shall have no visual cracking, crazing, checking, blistering, surface pitting, or deformation.

802.3.5.3.5 The finished meter box shall have the following physical properties:

802.3.5.3.5.1 Box, cover, and lid shall be rated for a load capacity of 1,000 lbs. over a 4-inch by 4-inch (4" x 4") area.

802.3.5.3.5.2 The overall weight of the box, cover, lid, and extension shall not exceed 80 lbs.

802.3.5.3.5.3 Maximum wall deflection shall not exceed 1/8 inch at any one point when subjected to earth pressures or forces created during backfilling.

802.3.5.3.5.4 The material used for making the box shall be non-biodegradable when buried underground and exposed to water.

802.3.5.3.5.5 The minimum dimensions of the box, cover, and lid shall conform to the current Standard Detail Drawings.

802.3.5.3.5.6 The walls inside and outside of the box shall be reasonably smooth and free of burrs.

802.3.5.3.5.7 The cover of the meter box shall have a non-skid surface and have "WATER AUTHORITY" inscribed on the top. The cover shall be secured to the box by bolts.

802.3.5.3.5.8 All materials used for constructing the box, cover, and lid, shall be approved for use in domestic water supply systems.

#### 802.3.5.4 LOCATIONS OF METER BOXES:

Meter boxes shall be located within the right-of-way as shown on the Standard Detail Drawings or within easements as approved by the Water Authority.

#### 802.3.6 CORPORATION STOP:

The corporation stop shall be AWWA thread inlet by compression-type outlet or Pack Joint to fit 3/4-inch, 1-inch, 1.5-inch, and 2-inch copper tubing, as allowed on the Water Authority Approved Product List.

#### 802.3.7 TAILPIECE:

The service shall be placed in the meter box with a copper tubing tailpiece for 3/4-inch to 2-inch services, protruding from the standard concrete pad into the owner's property with a Pack Joint capped fitting to which the plumber can connect. Maintenance of the tailpiece is the responsibility of the customer.

#### 802.3.8 COPPERSETTERS:

Coppersettors shall have pipe connections for Type K Copper Tubing. The coppersetter shall be an assembly of brass and copper tubing with a bottom bar, shall have a bronze ball valve on the inlet side of the meter, and shall be furnished with coupling gaskets. The coppersetters shall be selected from the Water Authority Approved Product List. Coppersetters shall have temporary threaded plugs in the meter connections and shall be furnished free of



## SECTION 802

### INSTALLATION OF WATER SERVICE LINES

excess grease. A stabilizer bar of 12-inches by ½-inch galvanized pipe shall be inserted in the yoke assembly as shown on the Standard Detail Drawings. A coppersetter with dual check valve shall be installed as per the Cross Connection Control section.

#### 802.3.9 CROSS CONNECTION CONTROL:

802.3.9.1 Approved dual check valves shall be installed on all services within pressure zones 0-W, 1-W, and 1-E. Water customers having private wells located within water pressure zones other than zones 0-W, 1-W, and 1-E, that connect to the municipal water system shall: a) agree to permanently abandon the use of private wells by plugging the wells in accordance with the State Engineer's procedures prior to connecting to the municipal water system; or b) agree to completely sever the private well from the premise's existing plumbing system and install a USC approved reduced pressure principal backflow prevention assembly at the water meter.

802.3.9.2 All customers connected to a non-potable water system and the public water system shall install a USC approved reduced pressure principal backflow prevention assembly approved by the Water Authority at the potable service connection.

802.3.9.3 All fire line services to fire protection systems shall be equipped with a USC approved reduced pressure principal backflow prevention assembly approved by the Water Authority and Fire Marshal having jurisdiction at each service connection.

802.3.9.3.4 A USC approved double check valve assembly approved by the Water Authority and Fire Marshal having jurisdiction may be installed instead of a reduced pressure backflow prevention assembly provided the fire protection system contains ANSI/NSF Standard 60 or 61 water piping throughout the entire fire protection system, the fire sprinkler drain discharges into atmosphere, and there are no reservoirs, fire department connections, connections from auxiliary water supplies, antifreeze nor other additives.

#### 802.4 SERVICE LINE INSTALLATIONS

##### 802.4.1 NEW ¾-INCH TO 2-INCH SERVICE LINES:

802.4.1.1 New service lines shall be completed in accordance with Standard Detail Drawings and shall include the following:

802.4.1.1.1 Furnish and install tapping saddle, EMD, corporation stop, tubing, coppersetter, meter box, cover, lid, tailpiece, and concrete collar, complete in place, including excavation, backfill, and flushing.

802.4.1.2 Meters shall not be installed as part of this work. However, construction of the meter box and placement of the yoke shall be such that at a later date, the meter may be installed properly and easily.

802.4.1.3 The CONTRACTOR shall be responsible for proper vertical and horizontal location of the box over the meter yoke.

##### 802.4.2 REPLACEMENT OF ¾-INCH TO 2-INCH SERVICE LINES:

802.4.2.1 Replacement service lines are essentially new services installed in conjunction with the replacement of the water main. Unless otherwise specified in the Contract Documents, all existing services shall be replaced with new material between the water main and the meter yoke.

802.4.2.2 Replacement service line work does not include any relocation or rehabilitation of the meter. The work shall consist of the following:

802.4.2.2.1 Furnish and install tapping saddle, EMD, corporation stop, coppersetter and tubing, complete in place, including flushing.

802.4.2.2.2 Re-connection to the meter.

802.4.2.2.3 All necessary excavation, backfill, including sidewalk, curb, gutter, pavement removal and replacement.

##### 802.4.3 ¾-INCH TO 2-INCH METER RELOCATION

802.4.3.1 A meter relocation is the relocation of an existing meter to a position closer to the water main. The meter relocation item is to be used when the service line is not replaced.

802.4.3.2 A new meter box and cover shall be furnished and installed.

802.4.3.3 A coppersetter shall be used in the reinstallation of the meter, for services sized ¾-inch thru 2-inch, and shall be of a height to properly position the meter vertically within the box, as shown in the Standard Detail Drawings.

802.4.3.4 When moving the meter further from the water main, refer to section 802.4.1. The existing line shall be abandoned and the corporation stop shall be closed.

802.4.3.5 When determined by the Water Authority, the existing meter shall be replaced by the CONTRACTOR with a meter furnished by the Water Authority. Any 1¼ -inch meters found in the field shall be replaced with 1-inch meters by the Water Authority.

## SECTION 802

### INSTALLATION OF WATER SERVICE LINES

802.4.3.6 The work and materials shall include the coppersetter, connector pieces, excavation, tubing, backfill, removal and replacement of meter, installation of new meter box, and concrete pad. The work shall also include all necessary disconnections, and connections of the house and meter box service lines, complete restoration of the affected site (including landscaping) and adjustment of the meter to the level shown in the Standard Detail Drawings.

802.5 Meter boxes shall not be located or relocated in driveways or driveways unless authorized by the ENGINEER.

#### 802.6 ¾-INCH TO 2-INCH METER REHABILITATION AND REPLACEMENT

##### 802.6.1 ¾-INCH TO 2-INCH METER REHABILITATION:

802.6.1.1 Meter rehabilitation is applicable where the meter box deficiency exists. Deficiencies include obsolete, broken above or below grade, improperly sized, or existing location does not allow access to the meter, curb stop, or connector pieces (does not meet new installation standards). When any of these conditions exist, the meter box and meter installation shall be rehabilitated, as authorized by the ENGINEER.

802.6.1.2 The work and materials shall include:

802.6.1.2.1 Furnish and install a new coppersetter, meter box, cover and lid, and concrete pad.

802.6.1.2.2 Furnish and install any reconnection pieces necessary for a complete service restoration.

802.6.1.2.3 Flushing out of the service line.

802.6.1.2.4 Site restoration (including any necessary landscaping) and cleanup.

##### 802.6.2 ¾-INCH THRU 2-INCH METER REPLACEMENT:

Meters to be replaced under "Service Line Replacement" and "Meter Relocation" work shall be performed in accordance with the following procedure:

802.6.2.1 All existing meters involved with "Service Line Replacement" and "Meter Relocation" work shall be replaced by the CONTRACTOR with a meter provided by the Water Authority.

802.6.2.2 The replacement meter shall be requested, in writing by the CONTRACTOR, to the Water Authority, with documentation of address and meter size for each meter to be replaced, project name and number, and CONTRACTOR'S name.

802.6.2.3 The request shall be received at least seven days prior to issuance of meters.

802.6.2.4 A meter replacement worksheet must be filled out by the CONTRACTOR and submitted to the Water Authority which will include the date of installation, address of service, old meter brand, old meter serial number, old meter size, old meter reading, new meter brand, serial number, size, and reading.

802.6.2.5 The CONTRACTOR shall handle all meters so as not to damage them and shall be responsible for the meters from the time of receipt to turn in. Stolen or lost meters shall be replaced at the CONTRACTOR'S expense.

#### 802.7 SERVICE LINE REMOVAL

802.7.1 When an existing service line is to be decommissioned, the CONTRACTOR shall remove and dispose the meter box and service line back to the main where the corporation stop will be turned to the closed position and buried.

#### 802.8 MEASUREMENT AND PAYMENT

##### 802.8.1 METERED SERVICE LINE INSTALLATIONS:

For ¾-inch through 2-inch, new service line, service line replacements and transfer, meter relocation, meter replacement, and meter rehabilitation shall be measured and paid for as a completed unit of installation in accordance with the applicable items contained in the Bid Proposal, which payment shall include all materials, labor and equipment required to install, flush and place into service the applicable item.

##### 802.8.2 SERVICE LINES:

Unless otherwise authorized in the Contract Documents or by the ENGINEER, service line materials and fittings shall be considered incidental to the applicable pay item established in the Bid Proposal.

##### 802.8.3 PAVEMENT REMOVAL AND REPLACEMENT:

Unless otherwise authorized in the Contract Documents or by the ENGINEER, pavement removal and replacement shall be considered incidental to the applicable pay item established in the Bid Proposal.

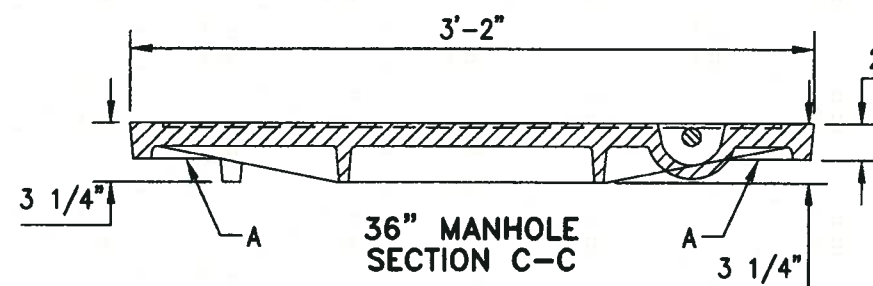
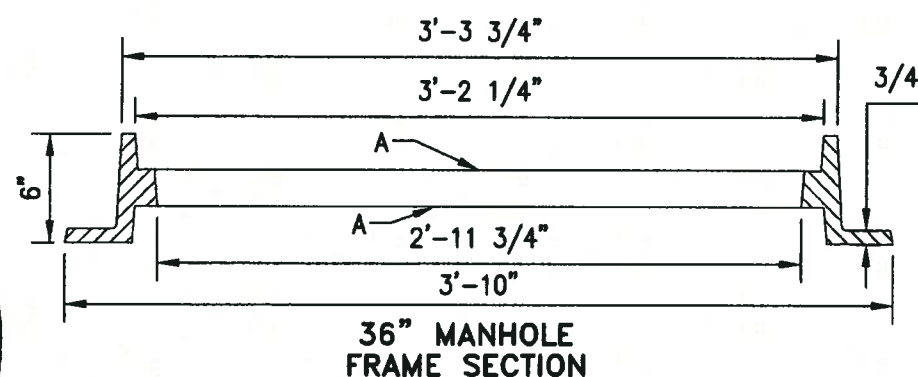
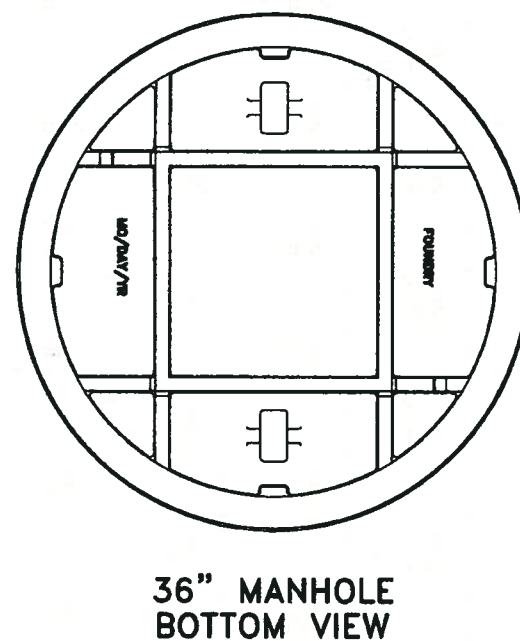
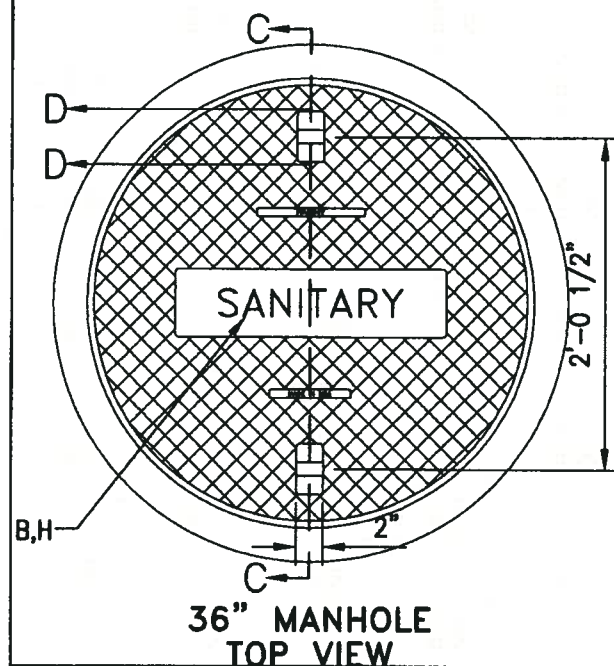
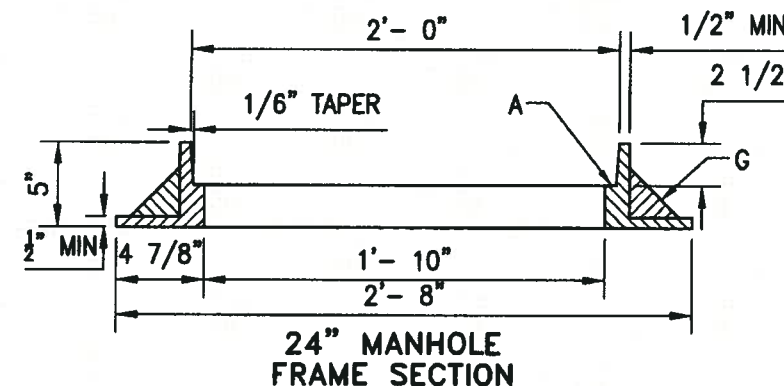
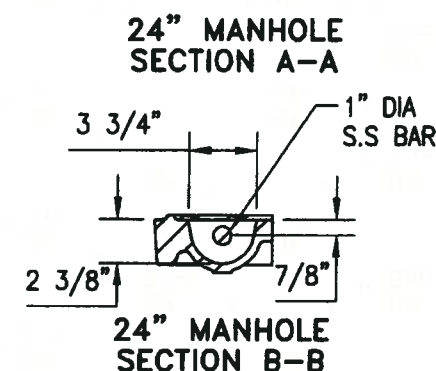
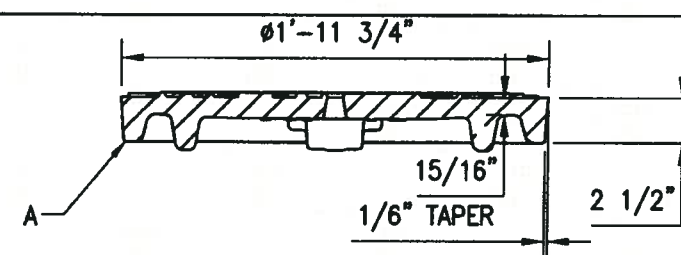
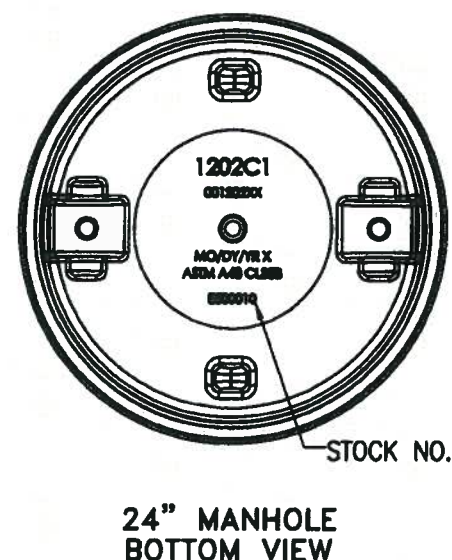
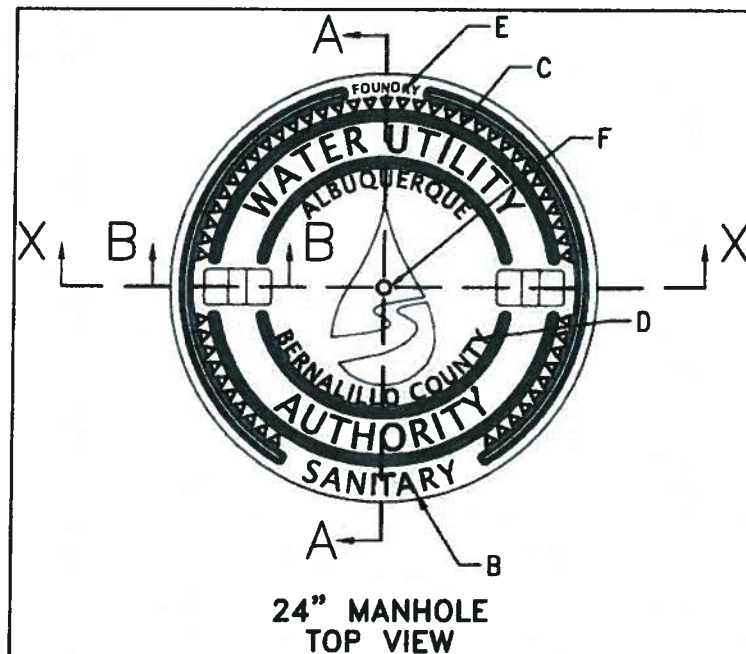
##### 802.8.4 SERVICE LINE REMOVAL

802.8.4.1 Service line removals shall be measured and paid for at the contract unit price per each, which shall include removal of the existing meter box, removal of the existing service line, and closing the corporation stop. Removal and replacement of any subgrade or asphalt is considered incidental to the removal.

SECTION 2100

STANDARD DETAILS FOR SEWER

<i>DWG. NO.</i>	<i>TITLE</i>
2101	MANHOLE TYPE "C"
2102	MANHOLE TYPE "E"
2107	CONCRETE MANHOLE COVER TYPE "C"
2109	SEWER MANHOLE FRAME AND COVERS
2110	STORM MANHOLE FRAME AND COVERS
2111	MANHOLE ADJUSTMENT RING
2116	VERTICAL DROP AT MANHOLE
2118	SERVICE LINE CONNECTIONS AT MANHOLE
2125	SERVICE LINE DETAILES
2134	SEWER SERVICE REPLACEMENT DETAIL
2135	RISER DETAILES RIGID PIPE MAIN
2136	RISER DETAILES FLEXIBLE PIPE MAIN
2140	ENCASEMENT DETAILES
2145	SEWER LINE DEAD-END MARKER
2150	SAMPLING AND METERING MH, 6'x 8' RECTANGULAR
2151	SAMPLING AND METERING MANHOLE, 8' DIAMETER
2160	SANITARY SEWER AIR RELEASE VALVE DETAIL
2162	VACUUM SEWER STANDARDS - STANDARD DETAILES
2163	VACUUM SEWER STANDARDS VALVE AND PIT INSTALLATION WITH LIFT IN VACUUM SERVICE LATERAL
2164	VACUUM SEWER STANDARDS TYPICAL VACUUM BRANCH LINE CONNECTION
2165	VACUUM SEWER STANDARDS 3" VALVE AND PIT INSTALLATION WITH INTERNAL BREATHER
2167	VACUUM SEWER STANDARDS SINGLE BUFFER TANK, 30 GAL PER MINUTE MAX. FLOW
2168	VACUUM SEWER STANDARDS DUAL BUFFER TANK 60 GALLON PER MINUTE MAX. FLOW
2169	VACUUM SEWER STANDARDS VACUUM DIVISION VALVE - STEM NUT AND SOCKET DETAIL
2170	VACUUM SEWER STANDARDS VACUUM DIVISION VALVE - VALVE BOX
2171	VACUUM SEWER STANDARDS VACUUM VALVE PIT-TYPE "A"
2172	VACUUM SEWER STANDARDS VACUUM VALVE PIT-TYPE "B"
2173	VACUUM SEWER STANDARDS BLOCKING AND SEEPAGE COLLAR DETAILES
2174	VACUUM SEWER STANDARDS SERVICE WYE ON EXISTING VACUUM MAIN
2180	VACUUM SEWER STANDARDS CASING DETAIL FOR BORE AND JACK



### 24" GENERAL NOTES:

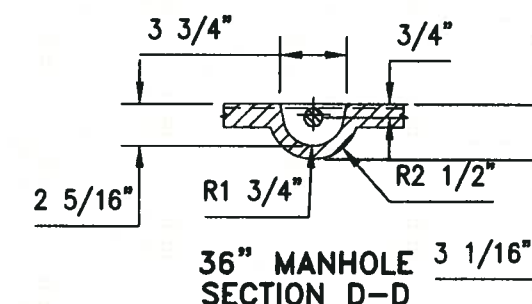
1. STANDARD 24" CAST IRON M.H. FRAME AND DUCTILE IRON COVER. WEIGHTS: COVER = 127 LBS., FRAME = 150 LBS. TOTAL = 277 LBS. (TOLERANCE =  $\pm 5\%$ )
2. REFERENCE SPEC. SECTION 130.
3. ONLY PRODUCTS CAST IN THE USA WILL BE ACCEPTABLE.

### 36" GENERAL NOTES:

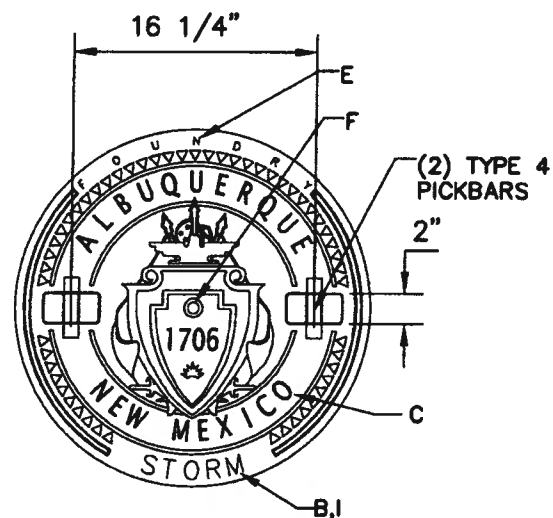
1. STANDARD 36" CAST IRON M.H. FRAME AND COVER. WEIGHTS: COVER = 355 LBS., FRAME = 315 LBS. TOTAL = 670 LBS. (TOLERANCE =  $\pm 5\%$ )
2. REFERENCE SPEC. SECTION 130.
3. ONLY PRODUCTS CAST IN THE USA WILL BE ACCEPTABLE.

### CONSTRUCTION NOTES:

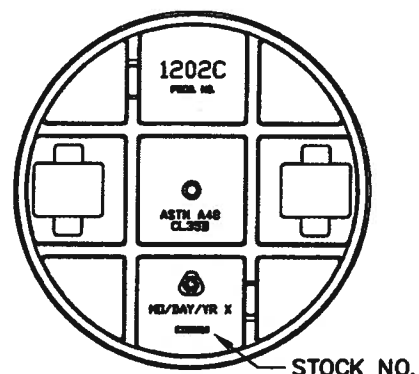
- A. MACHINED OR GROUND BEARING SURFACES.
- B. "SANITARY" CAST ON COVER TO IDENTIFY SANITARY SEWER.
- C. LETTER SIZE TO BE  $1 \frac{1}{4}"$  IN HEIGHT RAISED LETTERING.
- D. LETTER SIZE TO BE  $3/4"$  IN HEIGHT RAISED LETTERING.
- E. LETTER SIZE TO BE  $3/8"$  MIN. IN HEIGHT RAISED LETTERING.
- F.  $3/4"$  DIA VENT HOLE REQUIRED.
- G. GUSSETS OPTIONAL IF REQUIRED BY MANUFACTURER.
- H.  $2"$  LETTERS (RECESSED FLUSH).



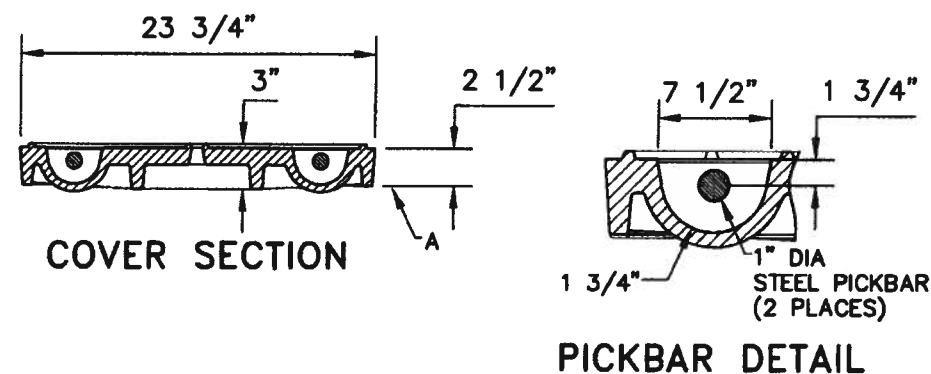
REVISIONS	WATER AUTHORITY
	SEWER MANHOLE FRAME AND COVERS
	DWG. 2109 JANUARY 2011



24" MANHOLE  
TOP VIEW

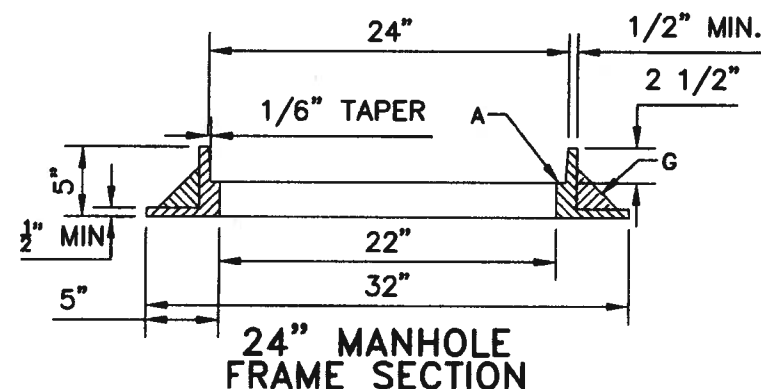


24" MANHOLE  
BOTTOM VIEW



COVER SECTION

PICKBAR DETAIL



24" MANHOLE  
FRAME SECTION

### 24" GENERAL NOTES:

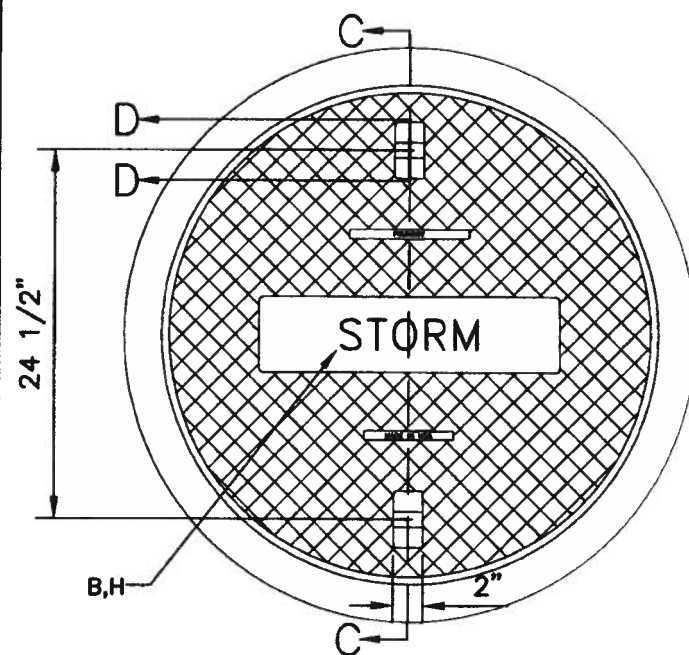
1. STANDARD 24" CAST IRON M.H. FRAME AND COVER.  
WEIGHTS: COVER = 180 LBS., FRAME = 145 LBS.  
TOTAL = 325 LBS. (TOLERANCE =  $\pm 5\%$ )
2. REFERENCE SPEC. SECTION 130.
3. ONLY PRODUCTS CAST IN THE USA WILL BE ACCEPTABLE.

### 36" GENERAL NOTES:

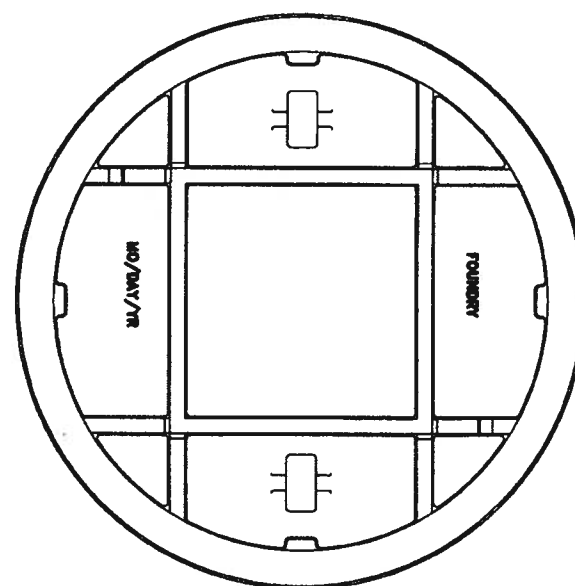
1. STANDARD 36" CAST IRON M.H. FRAME AND COVER.  
WEIGHTS: COVER = 355 LBS., FRAME = 315 LBS.  
TOTAL = 670 LBS. (TOLERANCE =  $\pm 5\%$ )
2. REFERENCE SPEC. SECTION 130.
3. ONLY PRODUCTS CAST IN THE USA WILL BE ACCEPTABLE.

### CONSTRUCTION NOTES:

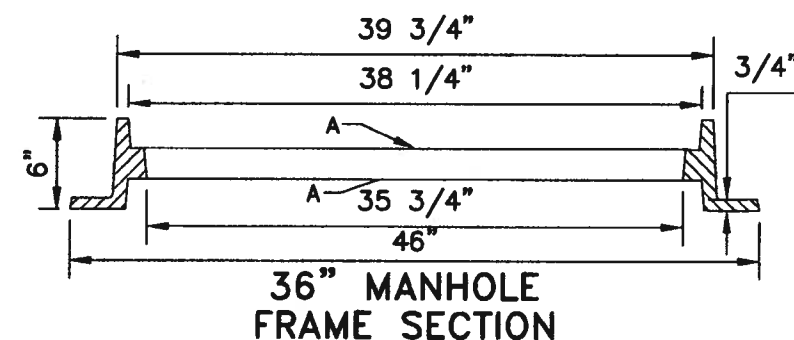
- A. MACHINED OR GROUND BEARING SURFACES.
- B. "STORM" CAST ON COVER TO IDENTIFY STORM DRAINAGE.
- C. LETTER SIZE TO BE 1 1/4" IN HEIGHT RAISED LETTERING.
- D. LETTER SIZE TO BE 3/4" IN HEIGHT RAISED LETTERING.
- E. LETTER SIZE TO BE 3/8" MIN. IN HEIGHT RAISED LETTERING.
- F. 3/4" DIA VENT HOLE REQUIRED.
- G. GUSSETS OPTIONAL IF REQUIRED BY MANUFACTURER.
- H. 2" LETTERS (RECESSED FLUSH).
- I. LETTER SIZE TO BE 1" IN HEIGHT RAISED LETTERING.



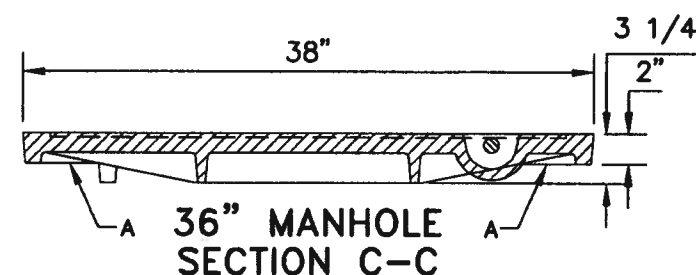
36" MANHOLE  
TOP VIEW



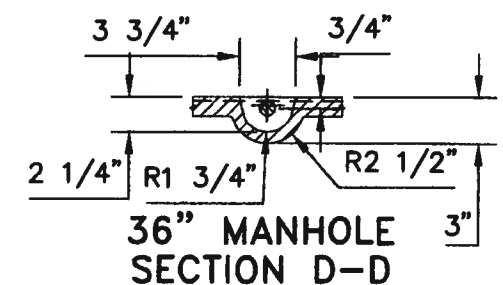
36" MANHOLE  
BOTTOM VIEW



36" MANHOLE  
FRAME SECTION



36" MANHOLE  
SECTION C-C



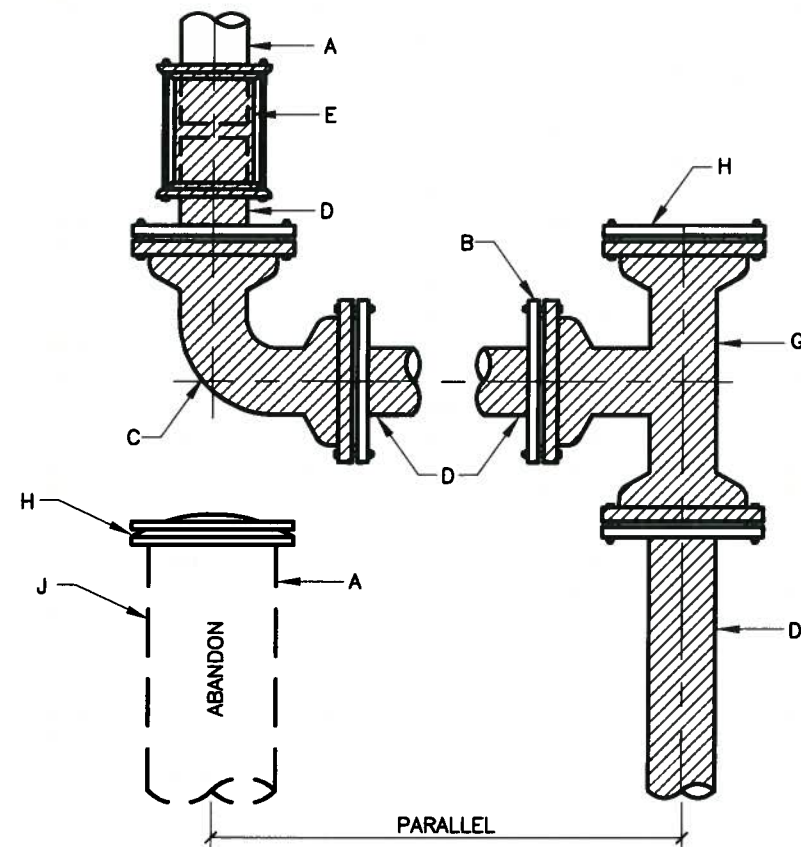
36" MANHOLE  
SECTION D-D

REVISIONS	CITY OF ALBUQUERQUE
	STORM
	MANHOLE FRAME AND COVERS
	DWG. 2110 JANUARY 2011

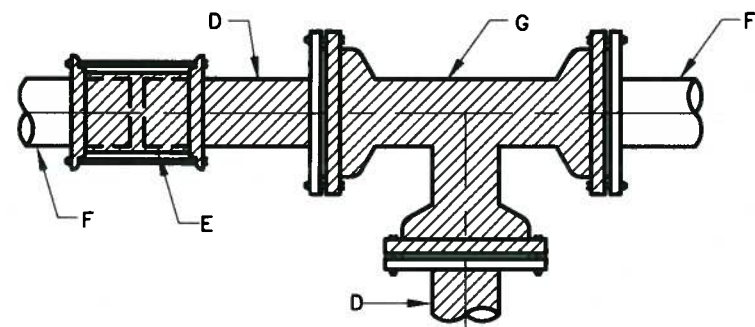
## SECTION 2300

### STANDARD DETAILS FOR WATER

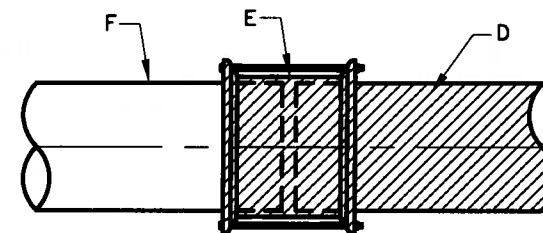
<i>DWG. NO.</i>	<i>TITLE</i>
2301	WATERLINE CONNECTION DETAILS
2305	CONCRETE CYLINDER PIPE RIGID JOINT DETAIL
2310	WATER MANHOLE FRAME AND COVERS
2315	PIPE TRENCH TERMINOLOGY
2320	CONCRETE BLOCKING DESIGN
2326	WATER VALVE BOX
2328	RING & COVER FOR VALVE BOX
2329	FIRE LINE RING AND COVER FOR VALVE BOX
2333	WATER VALVE ANCHORAGE
2334	LARGE DIAMETER VALVE VAULT
2335	LADDER DETAIL
2340	FIRE HYDRANT INSTALLATION
2344	AIR RELEASE FIRE HYDRANT CONNECTION
2347	DETAILS ON TYPICAL FIRE HYDRANT LOCATIONS
2350	AIR / VACUUM RELEASE VALVE
2351	CONC. CYL. BUTTERFLY VALVE IN VAULT INSTALLATION
2352	DUCTILE IRON BUTTERFLY VALVE IN VAULT INSTALLATION DETAILS
2353	SURGE RELIEF VALVE STATION
2354	STANDARD PRV STATION, NO METER
2355	STANDARD PRV STATION WITH PROPELLER METER
2356	STANDARD PRV STATION WITH POWER/TELEMETRY
2357	STANDARD PRV STATION STRUCTURAL DETAILS
2358	THRUST TIE DETAILS
2359	DUCTILE IRON BUTTERFLY VALVE DIRECT BURY INSTALLATION DETAILS
2360	DUCTILE IRON BUTTERFLY VALVE IN VAULT INSTALLATION
2361	TYPICAL METER BOX INSTALLATIONS
2362	¾" – 1" METER SERVICE LINE INSTALLATION
2363	1 ½" – 2" METERED SERVICE LINE INSTALLATION
2366	METER BOX FOR ¾" AND 1" METERS
2367	METER BOX COVER AND LID FOR 1½" - 2" METERS
2368	METER BOX COVER AND LID FOR ¾" & 1" METERS
2370	LARGE DIAMETER METER VAULT FOR 3" – 6" SERVICE
2371	LARGE DIAMETER METER VAULT FOR 8" – 12" SERVICE
2372	6" PRV ASSEMBLY DETAILS
2373	8" PRV ASSEMBLY DETAILS
2374	10" PRV ASSEMBLY DETAILS
2375	STANDARD PRV STATION STRUCTURAL DETAILS
2380	BORING INSTALLATION
2381	TYPICAL LINE RELOCATION
2385	REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION ASSEMBLY (RPBA)
2386	DOUBLE CHECK VALVE ASSEMBLY (DCVA)
2387	DOUBLE CHECK – DETECTOR CHECK ASSEMBLY (DCDA)
2388	LANDSCAPE PRESSURE VACUUM BREAKER (PVB)
2389	ENCLOSURES
2390	INSTALLATION FOR CONTINUOUS SERVICE
2394	RESIDENTIAL WATER PRIVATE FIRE PROTECTION SYSTEMS
2395	APPROVED METHODS FOR FILLING TANKS
2396	CORROSION MONITORING DETAILS – 1
2397	CORROSION MONITORING DETAILS – 2
2398	CORROSION MONITORING DETAILS – 3



**REPLACEMENT OF STEEL LINES 4"-12"**  
**CONNECTION DETAILS**



**TEE INSERTION D.I., P.V.C. OR A.C. PIPE**



**TRANSITION COUPLING**  
**FROM D.I., P.V.C., OR A.C.**  
**TO D.I. OR P.V.C.**

**GENERAL NOTES:**

- 1 ALL NEW PIPE AND FITTINGS SHALL BE PROVIDED WITH THRUST CONTROL.
- 2 THRUST CONTROL SHALL BE BY RESTRAINED JOINTS ONLY UNLESS DIRECTED OTHERWISE BY ENGINEER.
- 3 EMD'S ARE REQUIRED AT VALVES, TEES, FLANGED OUTLETS (ON CONCRETE CYLINDER PIPES), AND CAPPED OR PLUGGED ENDS. SEE SPECIFICATION SECTION 170 FOR LOCATIONS.

**CONSTRUCTION NOTES:**

- A EXISTING STEEL PIPE.
- B REDUCE AT TEE, IF EXISTING LINE IS SMALLER THAN NEW LINE.
- C M.J., C.I. ELBOW WITH JOINT RESTRAINT.
- D NEW D.I. OR P.V.C., WITH VALVE AS DIRECTED.
- E RESTRAINED TRANSITION COUPLING FOR A.C. RESTRAINED SOLID SLEEVE FOR D.I., C.I. AND PVC.
- F EXISTING D.I., C.I., P.V.C., OR A.C.. IF A.C., USE ADAPTER APPROVED BY ENGINEER OR AS APPROVED ON THE CURRENT WATER AUTHORITY APPROVED PRODUCTS LIST.
- G M.J. D.I. TEE WITH JOINT RESTRAINT.
- H M.J., C.I. PLUG OR CAP WITH JOINT RESTRAINT.
- J REMOVE AT LEAST 10' OF PIPE TO BE ABANDONED AND CAP OR PLUG.

REVISIONS	WATER AUTHORITY
	WATER WATERLINE CONNECTION DETAILS
	DWG. 2301 JANUARY 2011

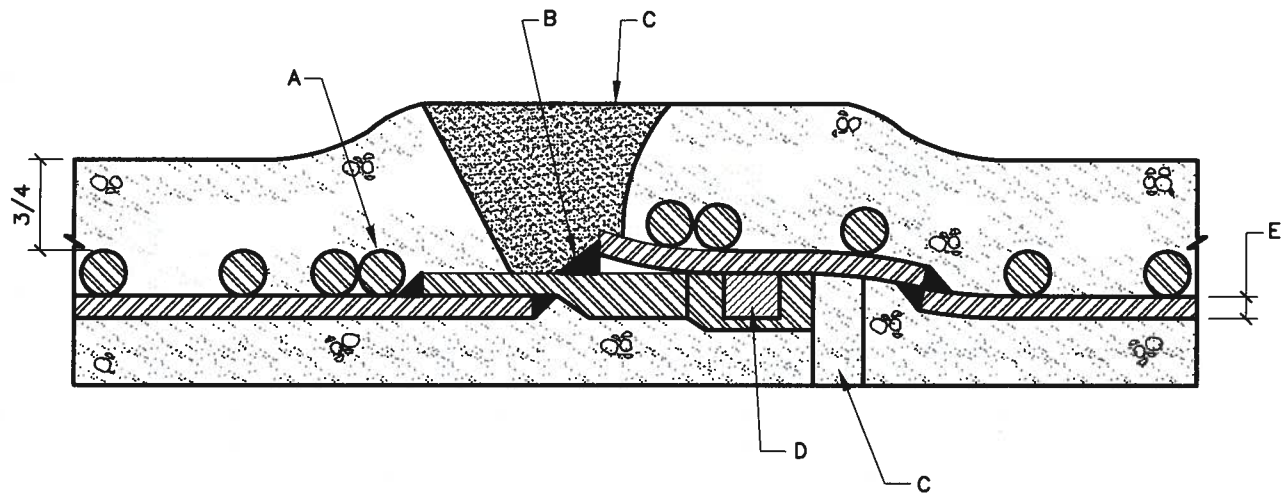


**GENERAL NOTES:**

- 1 SEE PLAN AND PROFILE SHEETS FOR LENGTH IN FEET OF RIGID PIPE ON EITHER SIDE OF BEND.
- 2 CARE MUST BE EXERCISED NOT TO OVERHEAT RUBBER GASKET WHEN WELDING.

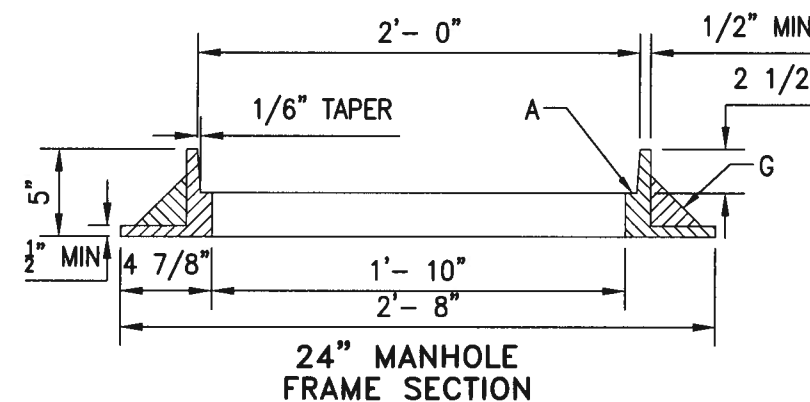
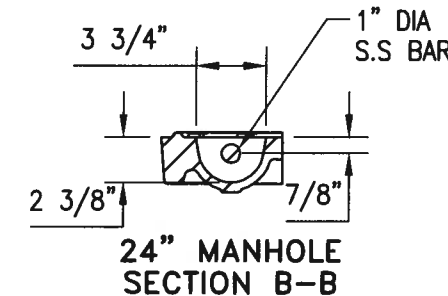
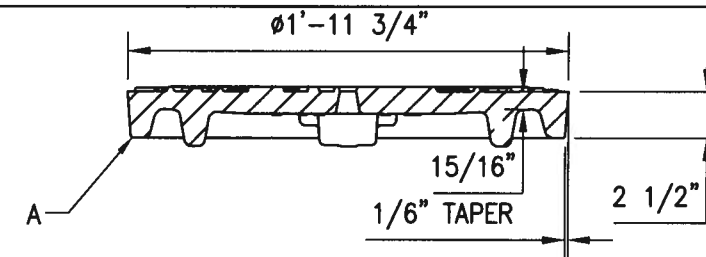
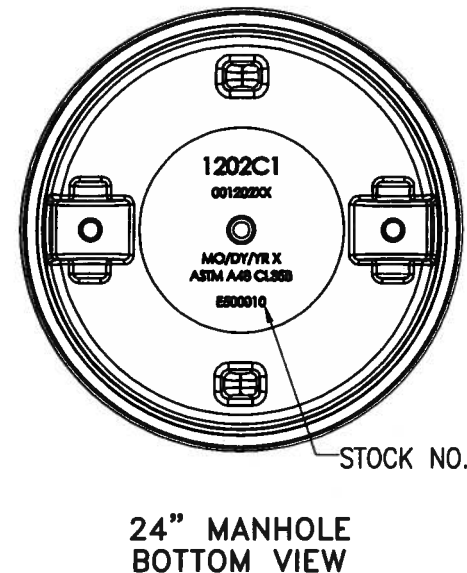
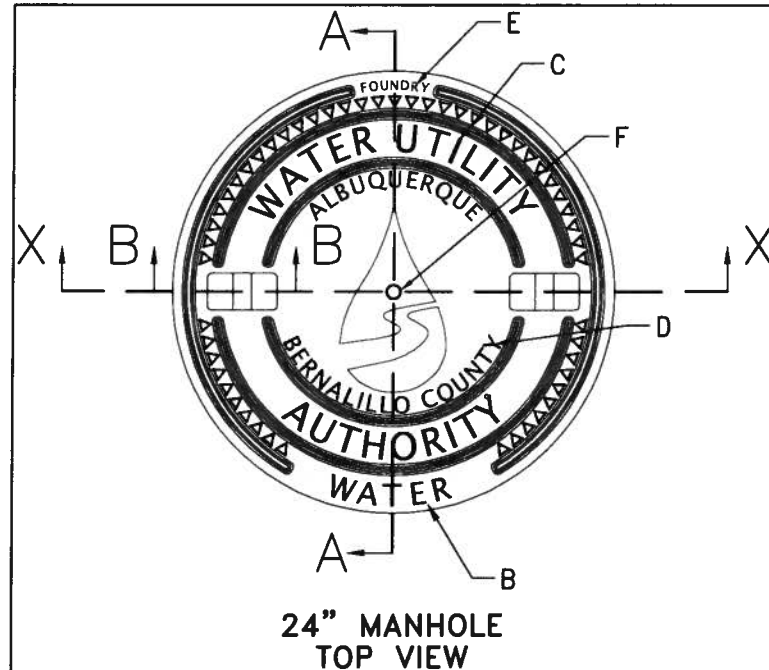
**CONSTRUCTION NOTES:**

- A COMPLETE COIL PARALLEL TO END OF PIPE.
- B FIELD WELD, CONTINUOUS.
- C FIELD-APPLIED CEMENT MORTAR COATING.
- D RUBBER GASKET.
- E STEEL CYLINDER PORTION OF PIPE.



REVISIONS	WATER AUTHORITY
	WATER CONCRETE CYLINDER PIPE RIGID JOINT DETAIL
	DWG. 2305 JANUARY 2011





### 24" GENERAL NOTES:

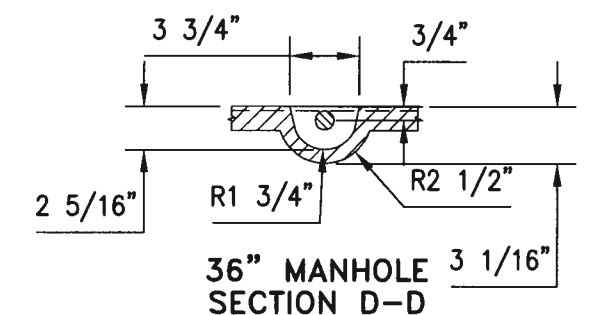
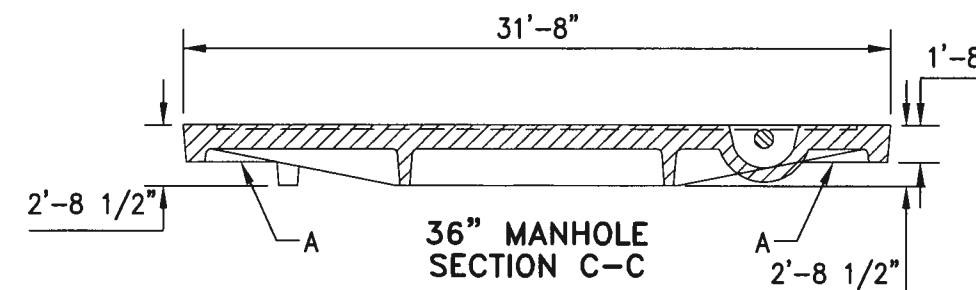
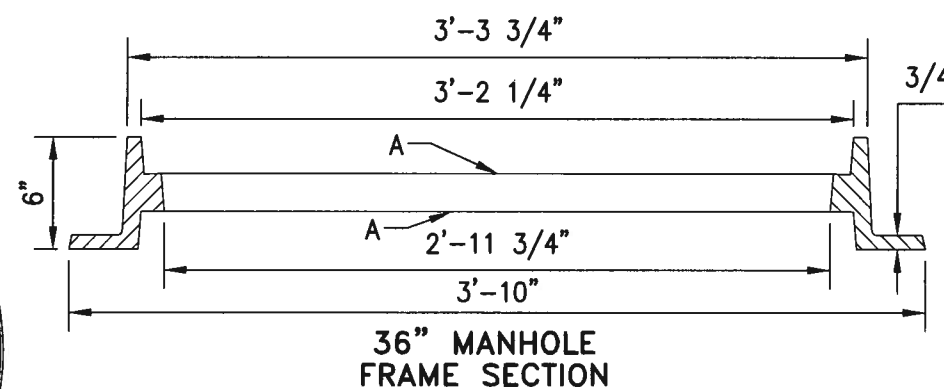
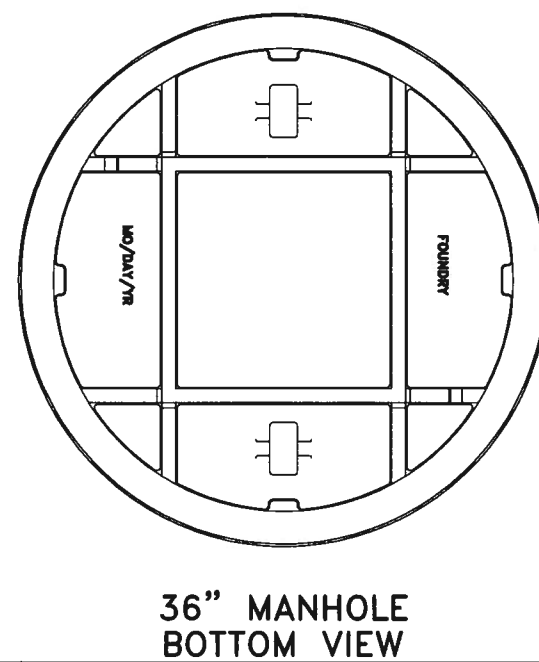
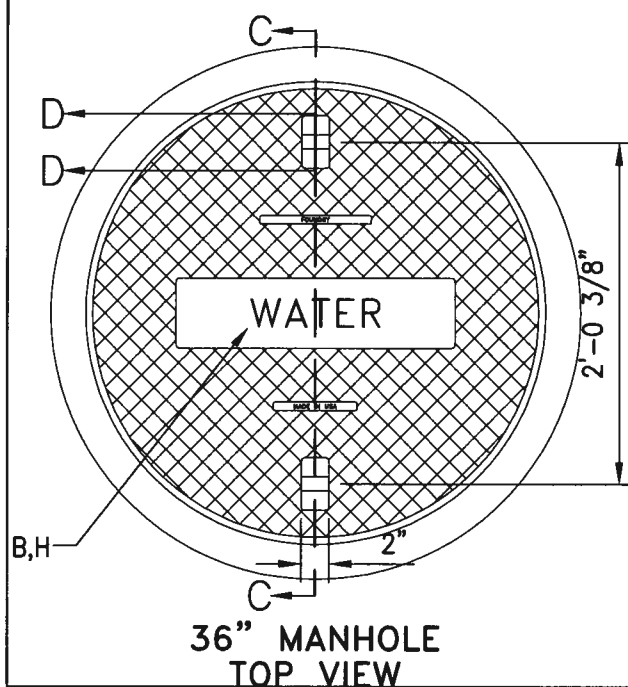
1. STANDARD 24" CAST IRON M.H. FRAME AND DUCTILE IRON COVER. WEIGHTS: COVER = 127 LBS., FRAME = 150 LBS. TOTAL = 277 LBS. (TOLERANCE =  $\pm 5\%$ )
2. REFERENCE SPEC. SECTION 130.
3. ONLY PRODUCTS CAST IN THE USA WILL BE ACCEPTABLE.

### 36" GENERAL NOTES:

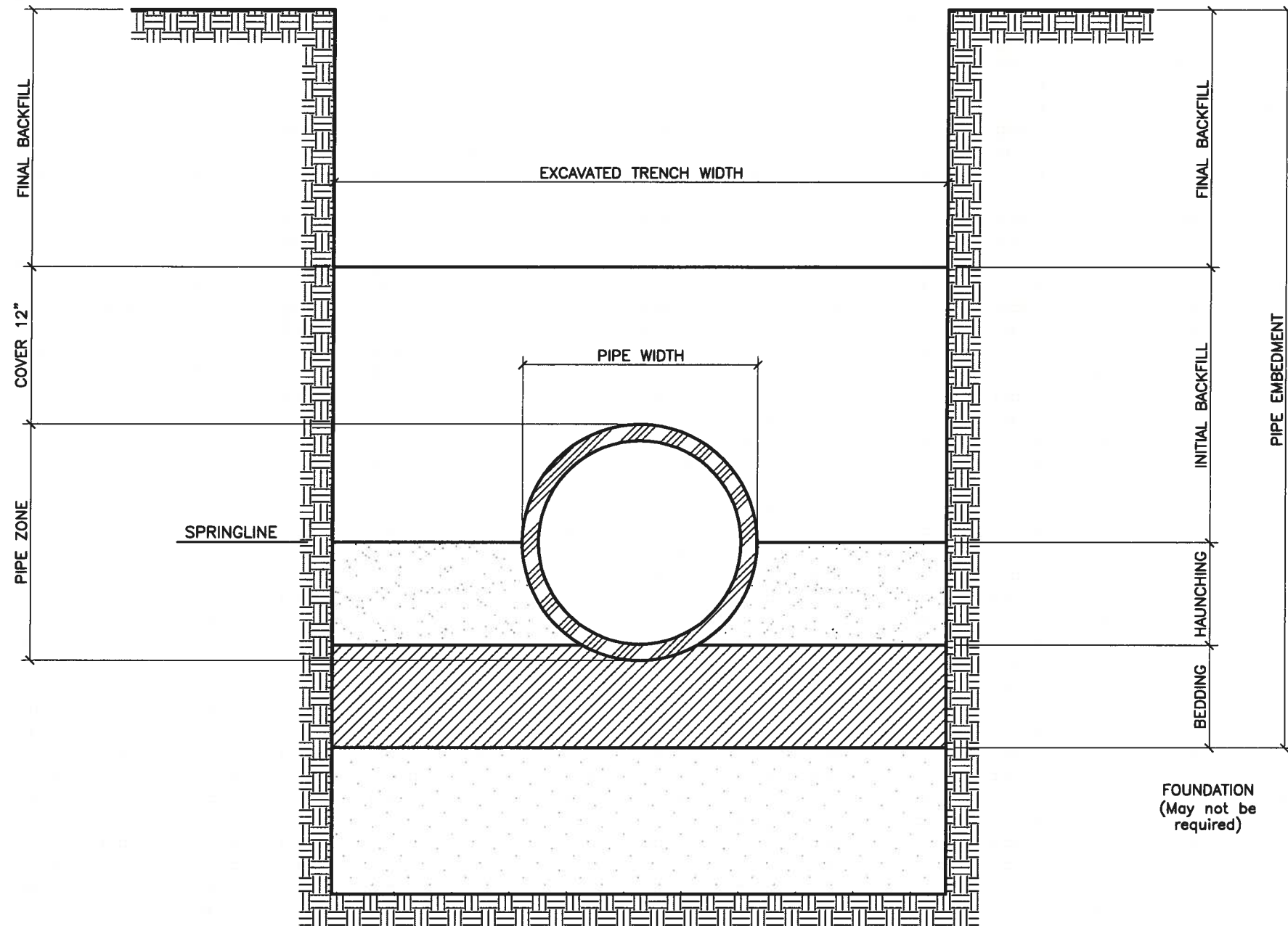
1. STANDARD 36" CAST IRON M.H. FRAME AND COVER. WEIGHTS: COVER = 355 LBS., FRAME = 315 LBS. TOTAL = 670 LBS. (TOLERANCE =  $\pm 5\%$ )
2. REFERENCE SPEC. SECTION 130.
3. ONLY PRODUCTS CAST IN THE USA WILL BE ACCEPTABLE.

### CONSTRUCTION NOTES:

- A. MACHINED OR GROUND BEARING SURFACES.
- B. "WATER" CAST ON COVER TO IDENTIFY WATERLINE.
- C. LETTER SIZE TO BE  $1 \frac{1}{4}"$  IN HEIGHT RAISED LETTERING.
- D. LETTER SIZE TO BE  $\frac{3}{4}"$  IN HEIGHT RAISED LETTERING.
- E. LETTER SIZE TO BE  $\frac{3}{8}" \text{ MIN.}$  IN HEIGHT RAISED LETTERING.
- F.  $\frac{3}{4}" \text{ DIA VENT HOLE REQUIRED.}$
- G. GUSSETS OPTIONAL IF REQUIRED BY MANUFACTURER.
- H. 2" LETTERS (RECESSED FLUSH).



REVISIONS	WATER AUTHORITY
	WATER MANHOLE FRAME AND COVERS
	DWG. 2310 JANUARY 2011

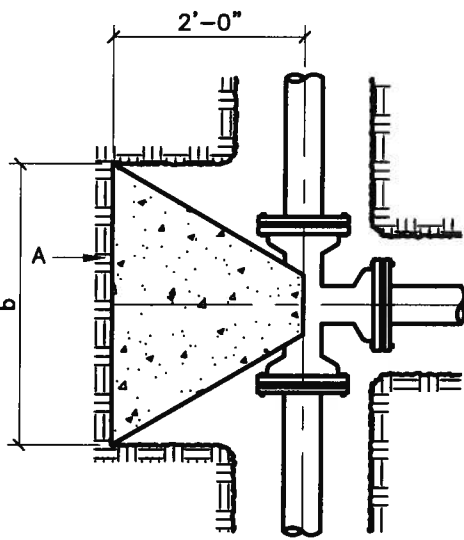


**TRENCH CROSS-SECTION**  
**SHOWING TERMINOLOGY**

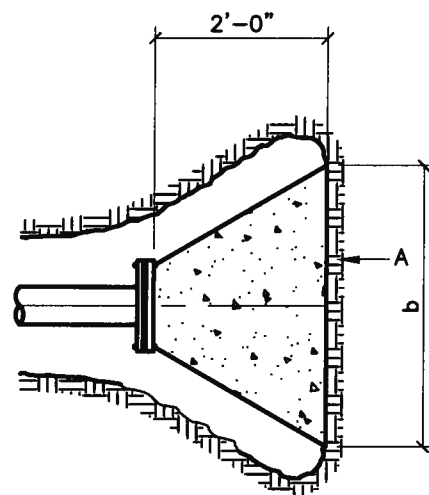
**GENERAL NOTES:**

- 1 MECHANICAL TAMPERS SHALL NOT BE USED IN THE INITIAL BACKFILL REGION FOR FLEXIBLE PIPE. WHEN FLEXIBLE PIPE IS USED, CONTRACTOR SHALL, PRIOR TO THE START OF CONSTRUCTION, PROVIDE THE PROPOSED COMPACTION METHOD IN THE INITIAL BACKFILL REGION TO THE WATER AUTHORITY FOR APPROVAL.
- 2 MINIMUM CLASS "C" BEDDING WILL BE USED.
- 3 ALL COMPACTION WILL BE TO 95% OF THE STANDARD PROCTOR.

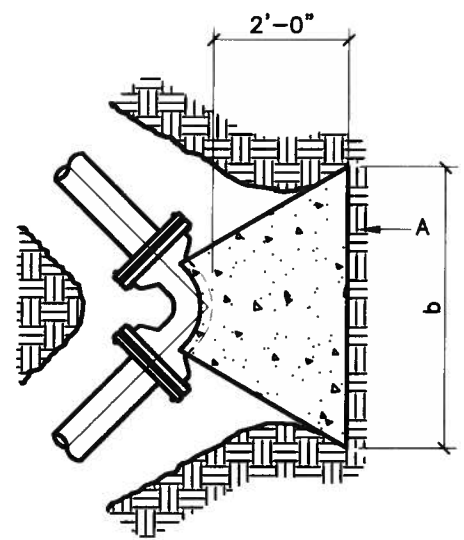
REVISIONS	WATER AUTHORITY
	WATER PIPE TRENCH TERMINOLOGY
	DWG. 2315 JANUARY 2011



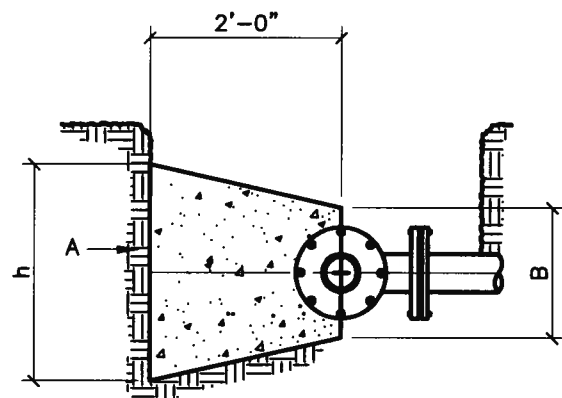
PLAN



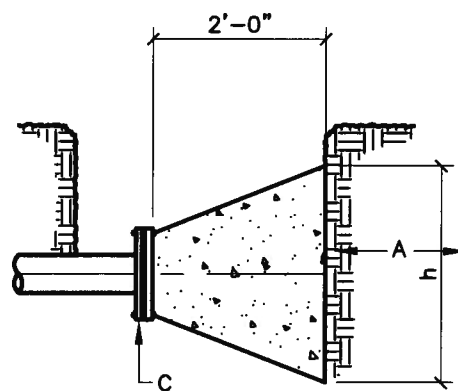
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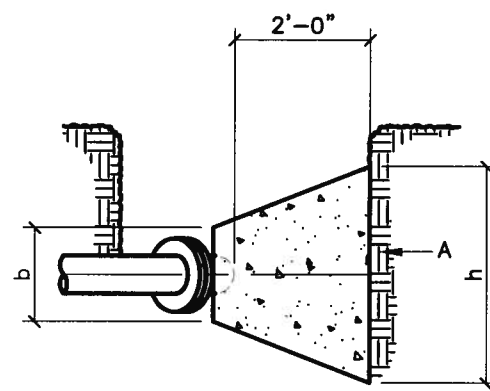
PLAN



ELEVATION  
CONCRETE BLOCKING  
FOR TEE



ELEVATION  
CONCRETE BLOCKING  
FOR PLUG OR CAP



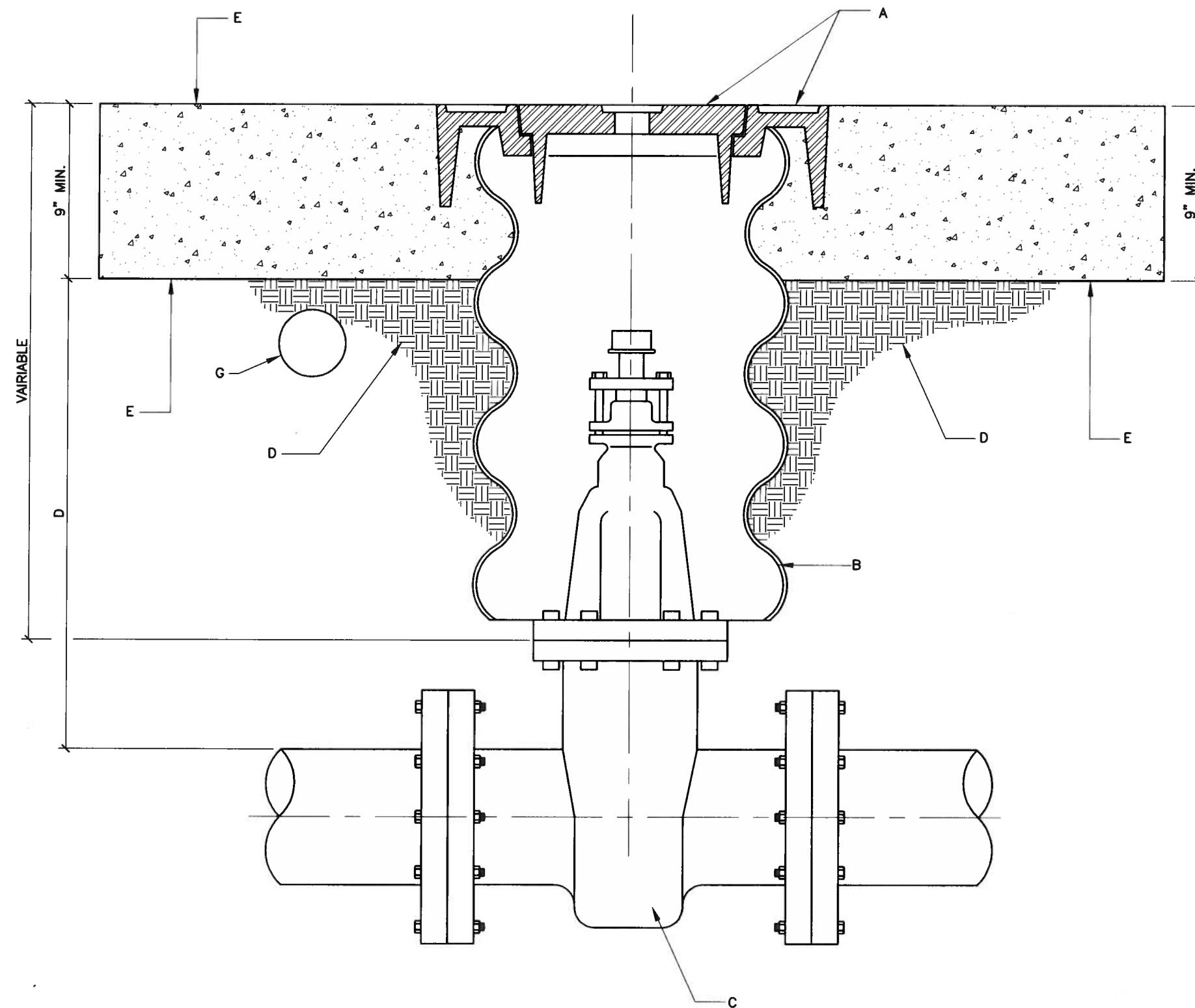
ELEVATION  
CONCRETE BLOCKING  
FOR ELBOW

- GENERAL NOTES:**
- 1 ALL THRUST CONTROL BY RESTRAINED JOINTS ONLY UNLESS DIRECTED BY ENGINEER, AND FOR "SPECIAL" SITUATIONS SPECIFIED BY THE WATER AUTHORITY.
  - 2 PIPE SIZE GREATER THAN 14" REQUIRES DESIGN BY ENGINEER TO BE SUBMITTED TO THE WATER AUTHORITY FOR APPROVAL.
  - 3 CONCRETE BLOCKING PER SEC. 101 EXTERIOR CONCRETE,  $f'_c=3000$  psi @ 28 DAYS.

PIPE SIZE	ELBOW ANGLE	ELBOW (b) DIM.	ELBOW (h) DIM.	TEE OR PLUG (b) DIM.	TEE OR PLUG (h) DIM.
4"				2'	1'
4"	90° 45°	2'	2'		
4"	22 1/2° 11 1/4°	2'	2'		
6"				2'	2'
6"	90° 45°	2'	2'		
6"	22 1/2° 11 1/4°	2'	2'		
8"				3'	3'
8"	90°	3'	3'		
8"	45°	2'	2'		
8"	22 1/2° 11 1/4°	2'	2'		
10"				3'	3'
10"	90°	3'-6"	3'-6"		
10"	45°	3'	3'		
10"	22 1/2° 11 1/4°	2'	2'		
12"				3'-6"	3'-6"
12"	90°	4'	4'		
12"	45°	3'-6"	3'-6"		
12"	22 1/2° 11 1/4°	2'	2'		
14"				4'	4'
14"	90°	5'	5'		
14"	45°	3'-6"	3'-6"		
14"	22 1/2° 11 1/4°	3'	3'		

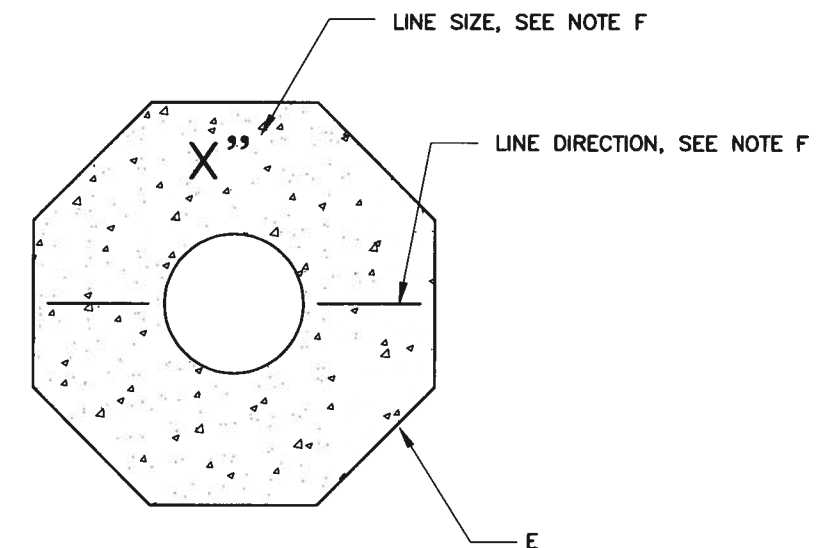
- CONSTRUCTION NOTES:**
- A UNDISTURBED EARTH.
  - B O.D. OF PIPE + 8".
  - C O.D. OF CAP OR PLUG, MIN. 12"x12".
  - D ONLY FOR EXCEPTIONAL SITUATIONS, USE OF MECHANICAL RESTRAINTS TAKES PRECEDENCE.

REVISIONS	WATER AUTHORITY
	WATER CONCRETE BLOCKING DESIGN
	DWG. 2320 JANUARY 2011



# **GENERAL NOTES:**

- A VALVE BOX RING AND COVER PER C.O.A. STD. DWG. 2328.
- B 12" DIAMETER POLYMER COATED STEEL PIPE CMP.
- C NEW OR EXISTING VALVE.
- D COMPACTED BACKFILL. SOIL OR BASE COURSE MATERIAL (95% COMPACTION). SEE SECTION 701.
- E CONCRETE COLLAR PER COA STANDARD DRAWING 2461.  $f'_c = 4000$  psi.
- F TOP OF CONCRETE COLLAR SHALL BE STAMPED WITH LINE SIZE AND DIRECTION. MINIMUM LETTER SIZE SHALL BE 3" IN HEIGHT. INSTALL FIRE LINE RING AND COVER ON FIRE LINES PER COA STANDARD DRAWING 2329.
- G ELECTRONIC MARKER DEVICE (EMD), SEE COA STANDARD SPECIFICATION SECTION 170.

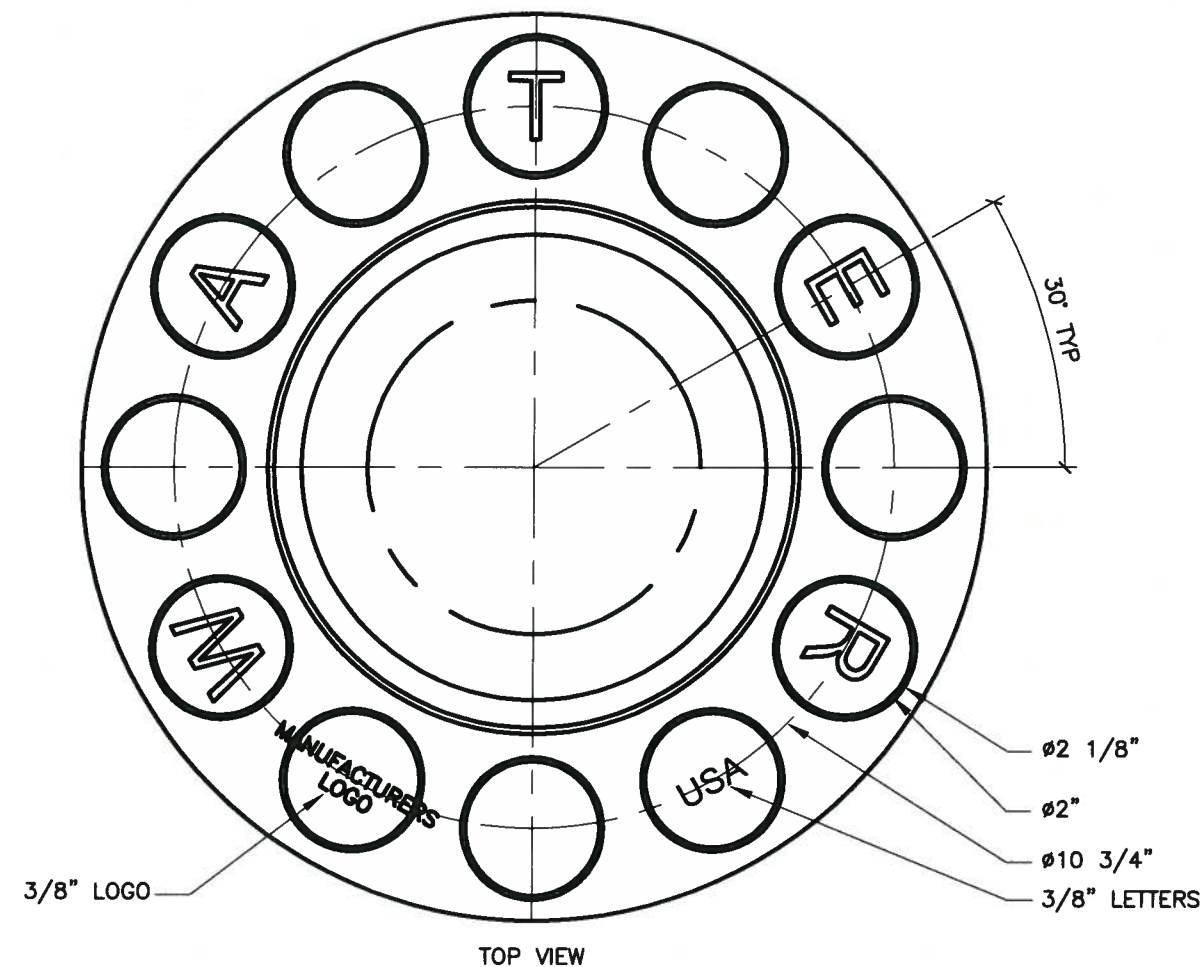


## **LABEL REQUIREMENTS**

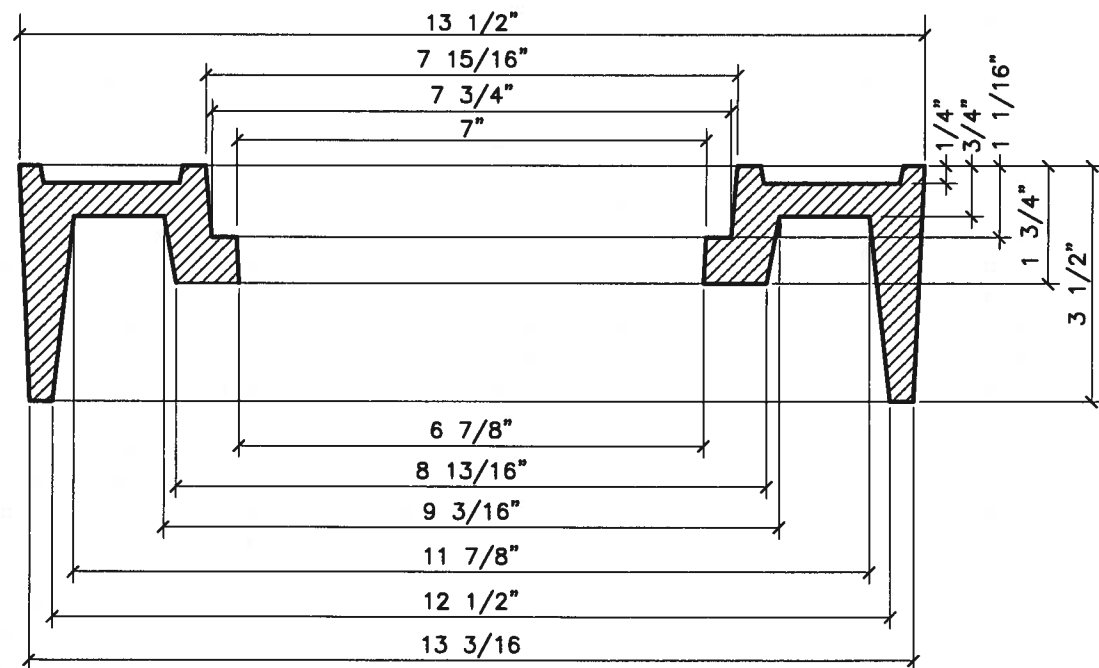
### **GENERAL NOTES:**

1. BEFORE THE WORK WILL BE ACCEPTED, WATER VALVE GPS COORDINATES SHALL BE PROVIDED ON THE RECORD DRAWINGS. GPS COORDINATES OBTAINED BY A PROFESSIONAL SURVEYOR LICENSED IN THE STATE OF NEW MEXICO SHALL BE TAKEN AT THE VALVE OPERATING NUT. USE THE NAD 1983 NM STATE PLANE CENTRAL ZONE FOR X AND Y COORDINATES AND NAVD 1988 FOR Z COORDINATE.

REVISIONS	WATER AUTHORITY
	WATER
	VALVE BOX
	DWG. 2326 JANUARY 2011

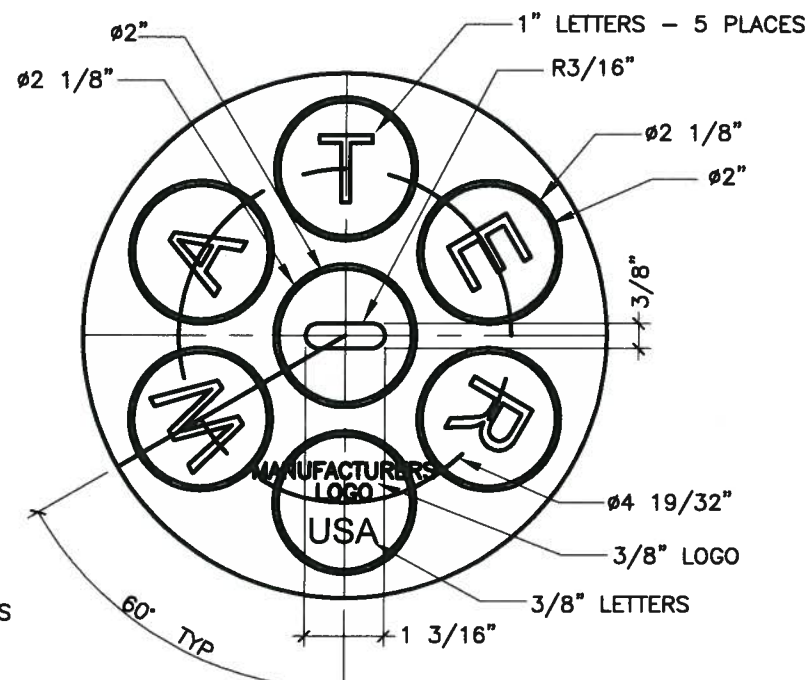


TOP VIEW

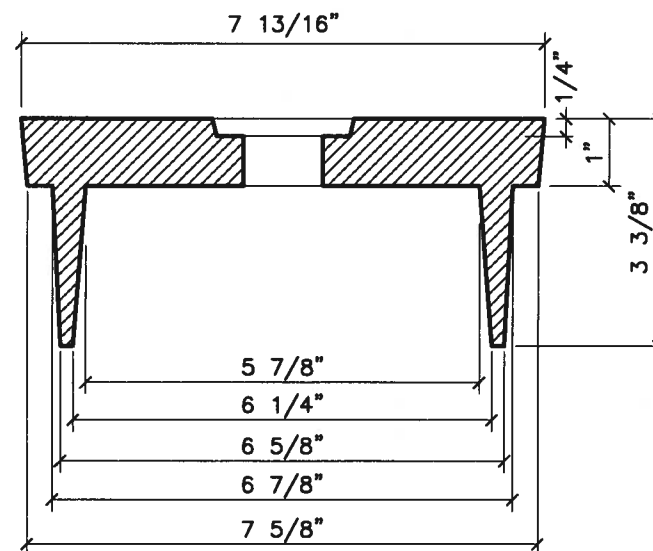


SECTION

VALVE BOX RING



TOP VIEW



SECTION

VALVE BOX COVER

#### GENERAL NOTES - RING

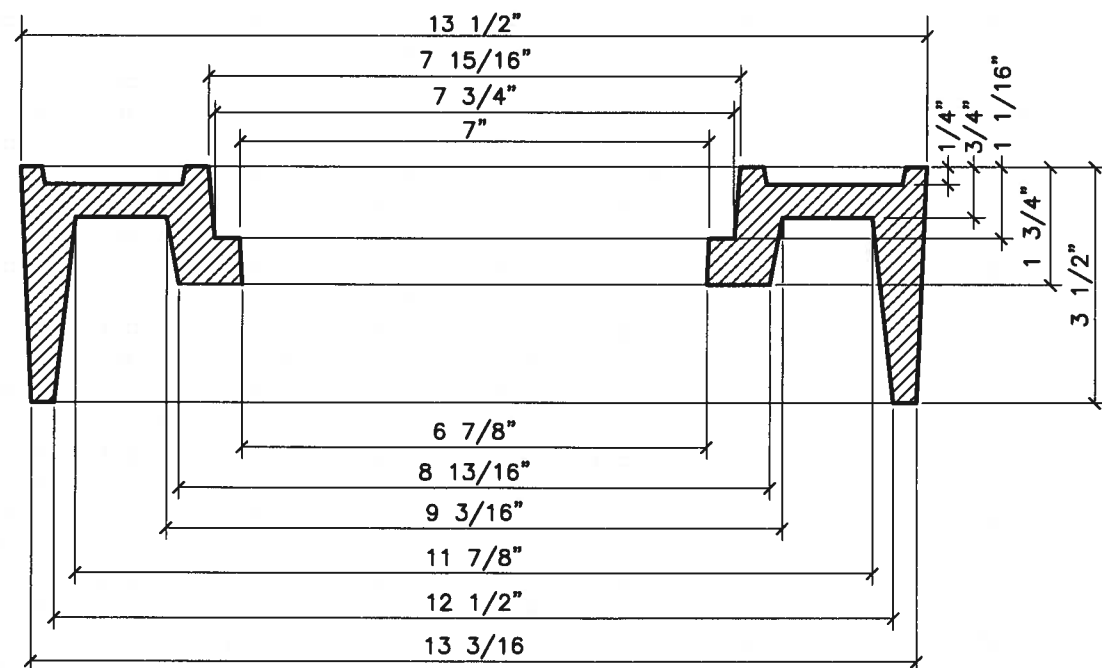
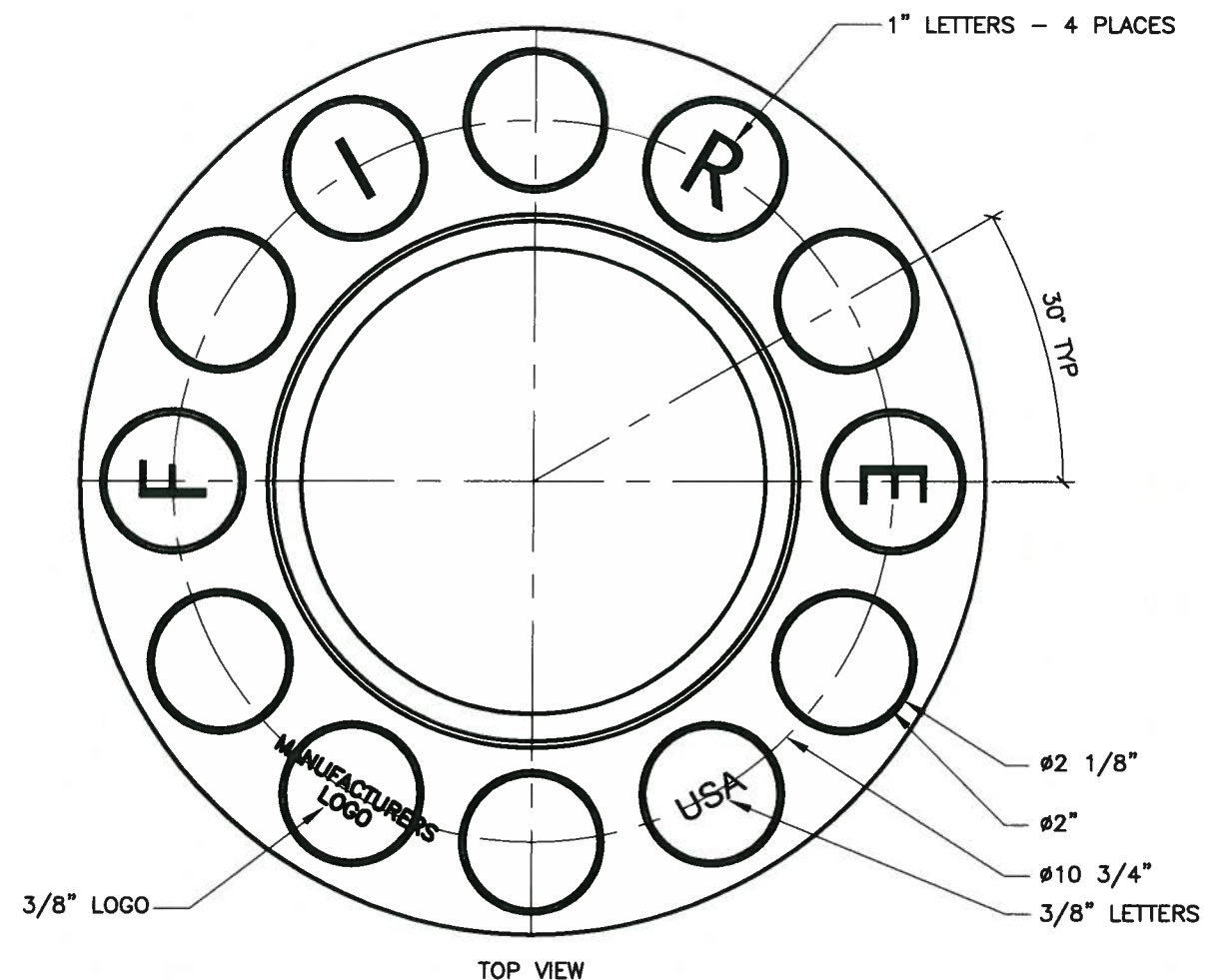
- 1 ALBUQUERQUE VALVE BOX RING DESIGNED TO ACCEPT AN ALBUQUERQUE VALVE BOX COVER.
- 2 THE CASTING NUMBER, MANUFACTURER'S LOGO, DATE OF MANUFACTURE AND "USA" SHALL BE CAST IN A CONSPICUOUS LOCATION ON BOTH THE RING AND THE COVER.
- 3 FILLETS SHALL BE 1/4"R UNLESS OTHERWISE SPECIFIED.
- 4 A DRAFT ANGLE OF 3°-5° SHALL BE APPLIED UNLESS OTHERWISE SPECIFIED.
- 5 FINISH: REMOVE EXCESS IRON AND FINS.
- 6 THIS DETAIL DOES NOT APPLY FOR VALVE BOX RING AND COVER TO BE USED ON REUSE OR NON-POTABLE WATER SYSTEMS.
- 7 SEE STANDARD DRAWING 2329 FOR FIRE LINE RING AND COVER.
- 8 ONLY PRODUCTS CAST IN THE USA WILL BE ACCEPTABLE.

#### GENERAL NOTES - COVER

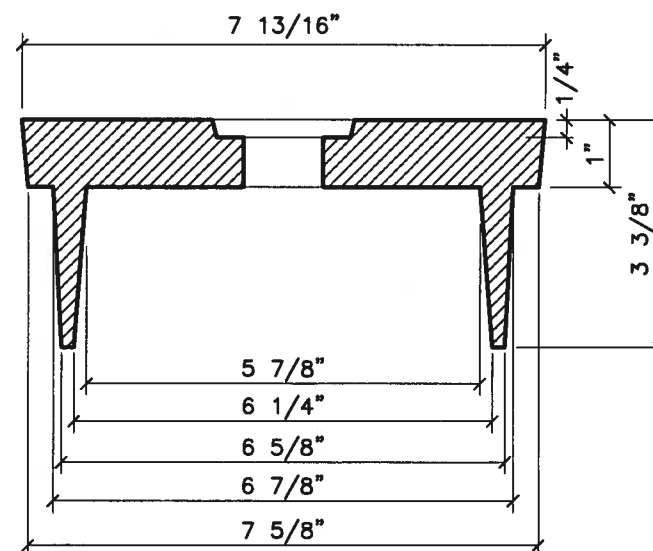
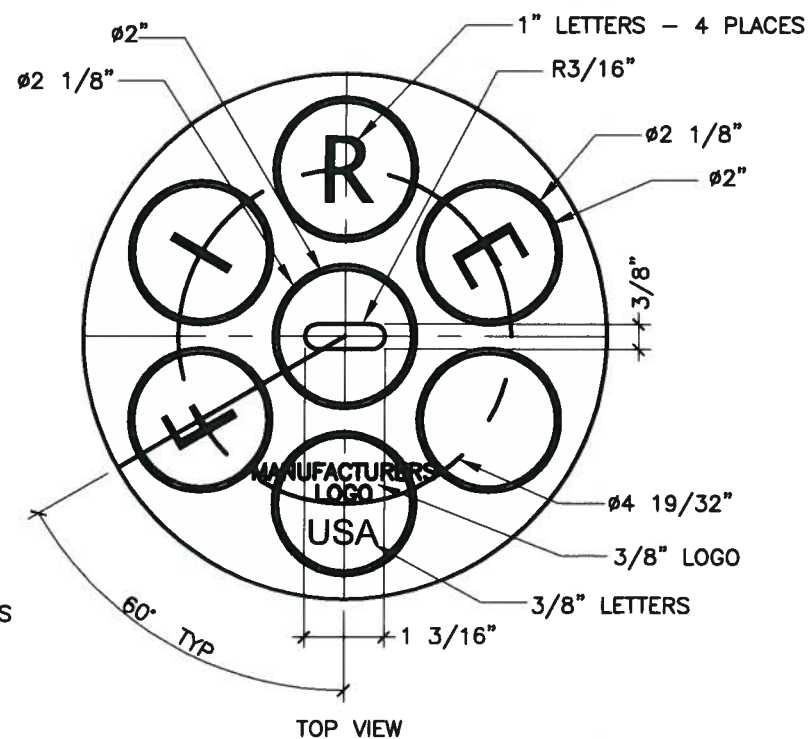
- 1 ALBUQUERQUE VALVE BOX COVER DESIGNED TO FIT INTO AN ALBUQUERQUE VALVE BOX RING.
- 2 THE CASTING NUMBER, MANUFACTURER'S LOGO, DATE OF MANUFACTURE AND "USA" SHALL BE CAST IN A CONSPICUOUS LOCATION ON BOTH THE RING AND THE COVER.
- 3 FILLETS SHALL BE 1/4"R UNLESS OTHERWISE SPECIFIED.
- 4 A DRAFT ANGLE OF 3°-5° SHALL BE APPLIED UNLESS OTHERWISE SPECIFIED.
- 5 FINISH: REMOVE EXCESS IRON AND FINS.
- 6 ONLY PRODUCTS CAST IN THE USA WILL BE ACCEPTABLE.

REVISIONS	WATER AUTHORITY
	WATER RING AND COVER FOR VALVE BOX
	DWG. 2328 JANUARY 2011





VALVE BOX RING



VALVE BOX COVER

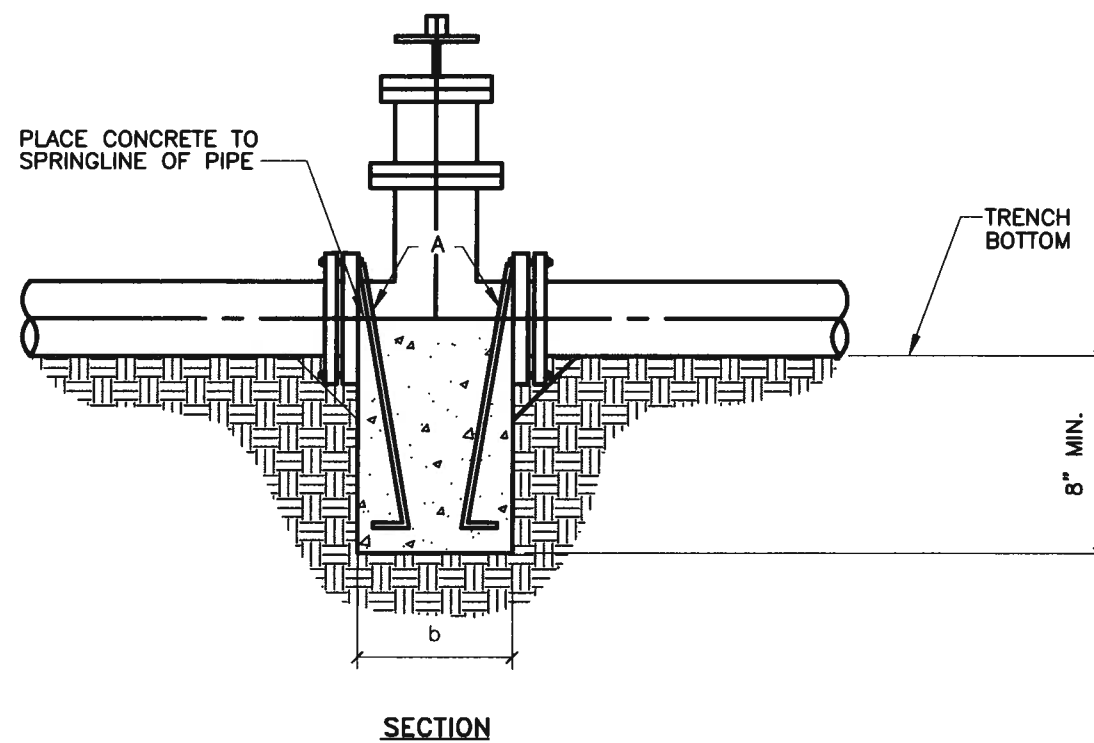
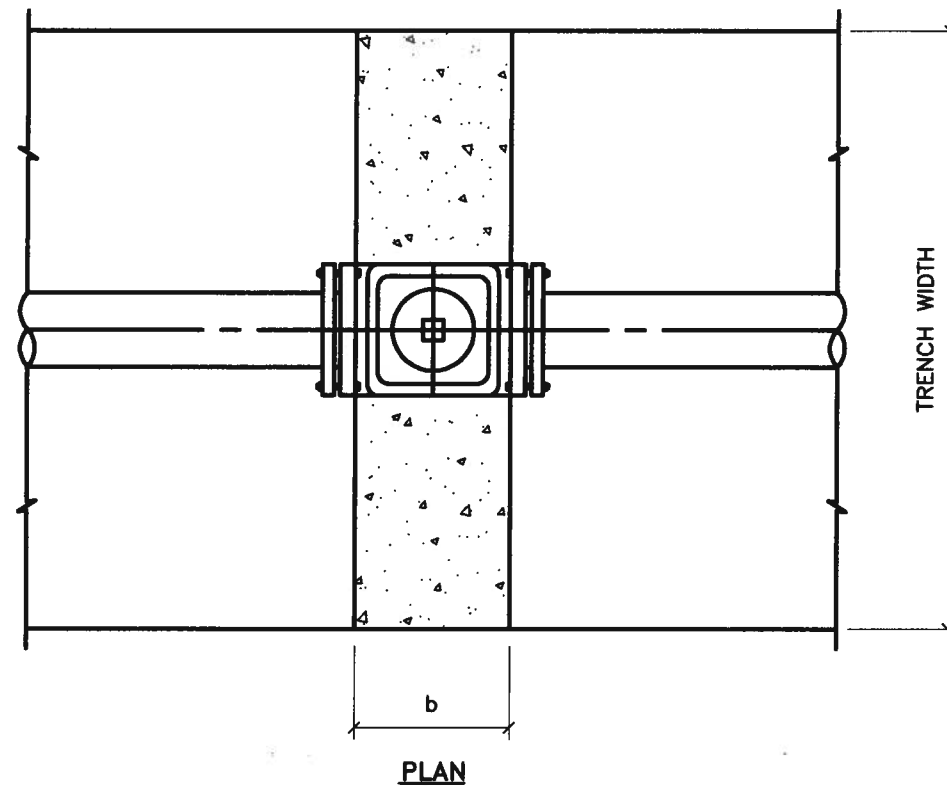
### GENERAL NOTES - RING

- 1 ALBUQUERQUE FIRE VALVE BOX RING DESIGNED TO ACCEPT AN ALBUQUERQUE VALVE BOX COVER.
- 2 THE CASTING NUMBER, MANUFACTURER'S LOGO, DATE OF MANUFACTURE AND "USA" SHALL BE CAST IN A CONSPICUOUS LOCATION ON BOTH THE RING AND THE COVER.
- 3 FILLETS SHALL BE 1/4"R UNLESS OTHERWISE SPECIFIED.
- 4 A DRAFT ANGLE OF 3°-5° SHALL BE APPLIED UNLESS OTHERWISE SPECIFIED.
- 5 FINISH: REMOVE EXCESS IRON AND FINS.
- 6 THIS DETAIL DOES NOT APPLY FOR VALVE BOX RING AND COVER TO BE USED ON REUSE OR NON-POTABLE WATER SYSTEMS.
- 7 SEE STANDARD DRAWING 2328 FOR WATER LINE RING AND COVER.
- 8 ONLY PRODUCTS CAST IN THE USA WILL BE ACCEPTABLE.

### GENERAL NOTES - COVER

- 1 ALBUQUERQUE VALVE BOX COVER DESIGNED TO FIT INTO AN ALBUQUERQUE VALVE BOX RING.
- 2 THE CASTING NUMBER, MANUFACTURER'S LOGO, DATE OF MANUFACTURE AND "USA" SHALL BE CAST IN A CONSPICUOUS LOCATION ON BOTH THE RING AND THE COVER.
- 3 FILLETS SHALL BE 1/4"R UNLESS OTHERWISE SPECIFIED.
- 4 A DRAFT ANGLE OF 3°-5° SHALL BE APPLIED UNLESS OTHERWISE SPECIFIED.
- 5 FINISH: REMOVE EXCESS IRON AND FINS.
- 6 ONLY PRODUCTS CAST IN THE USA WILL BE ACCEPTABLE.

REVISIONS	WATER AUTHORITY
	FIRE LINE RING AND COVER FOR VALVE BOX
	DWG. 2329 JANUARY 2011



#### GENERAL NOTES:

- 1 THE ENGINEER SHALL PROVIDE DESIGN FOR ALL VALVES GREATER THAN 12" AND BUTTERFLY VALVES.
- 2 ALL THRUST CONTROL BY RESTRAINED JOINTS ONLY UNLESS OTHERWISE DIRECTED BY ENGINEER.
- 3 USE FOR VALVE INSERTION INTO EXISTING LINES ONLY.
- 4 CONCRETE USED FOR VALVE ANCHORAGE PER SEC. 101 HYDRAULIC STRUCTURAL CONCRETE,  $f'_c=3000$  psi @ 28 DAYS.
- 5 ALL JOINTS ARE TO BE MECHANICALLY RESTRAINED. THE MINIMUM RESTRAINED JOINT LENGTH SHALL BE 5 FEET ON EITHER SIDE OF THE VALVE.
- 6 NOT NEEDED FOR E-Z VALVE OR OTHER VALVE INSERTION THAT DOES NOT CUT THROUGH THE ENTIRE SECTION OF PIPE.
- 7 BEFORE THE WORK WILL BE ACCEPTED, WATER VALVE GPS COORDINATES SHALL BE PROVIDED ON THE RECORD DRAWINGS. GPS COORDINATES OBTAINED BY A PROFESSIONAL SURVEYOR LICENSED IN THE STATE OF NEW MEXICO SHALL BE TAKEN AT THE VALVE OPERATING NUT. USE THE NAD 1983 NM STATE PLANE CENTRAL ZONE FOR X AND Y COORDINATES AND NAVD 1988 FOR Z COORDINATE.

#### CONSTRUCTION NOTES:

- A TWO NO. 4 BARS FOR VALVE STRAPS WITH 3" HOOKS. HOOKS TO BE EMBEDDED BELOW BOTTOM OF PIPE. BARS TO BE COATED WITH BITUMINOUS MATERIAL TO PREVENT CORROSION.

PIPE SIZE	DIM. b
6"	8"
8"	9"
10"	10"
12"	10"

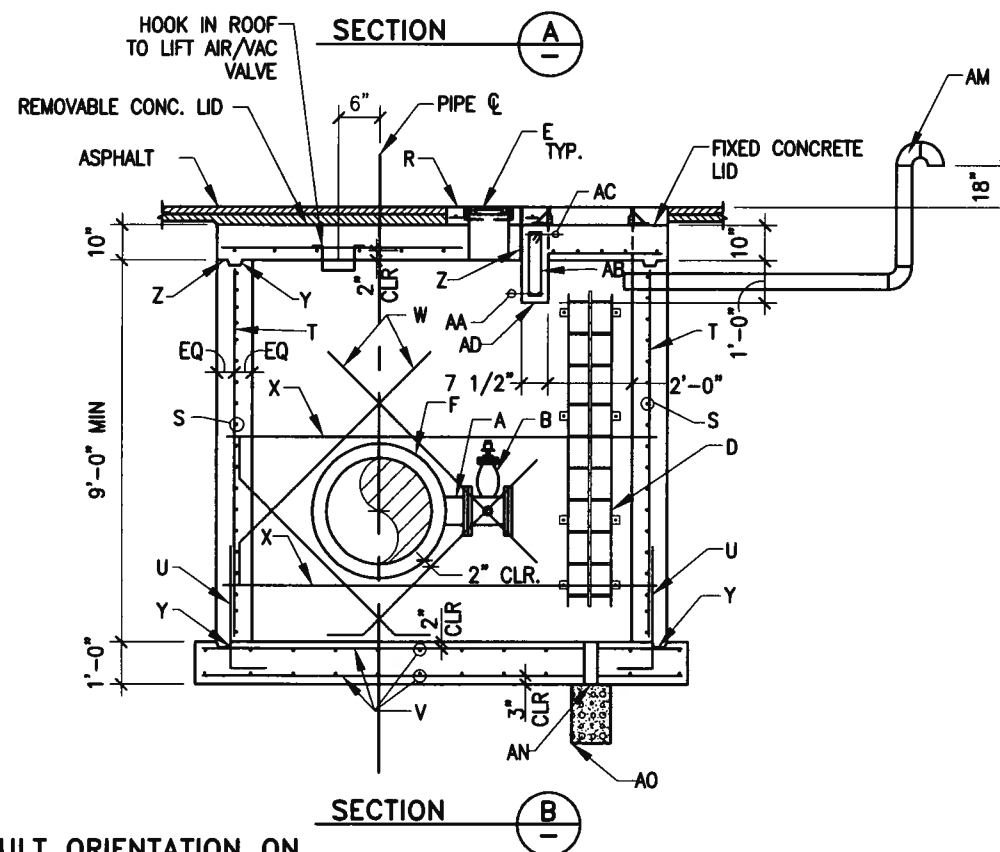
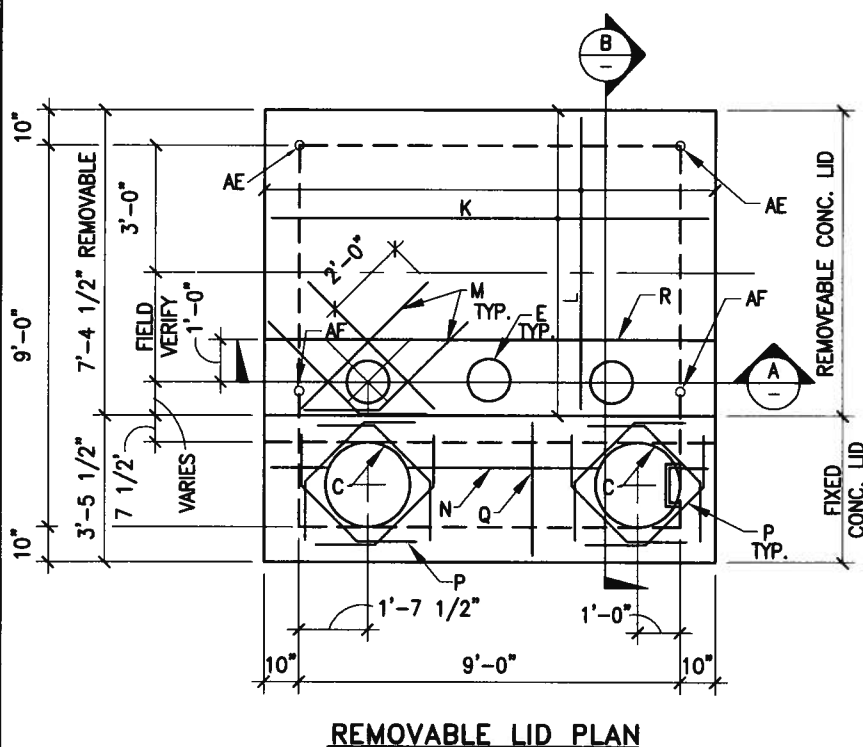
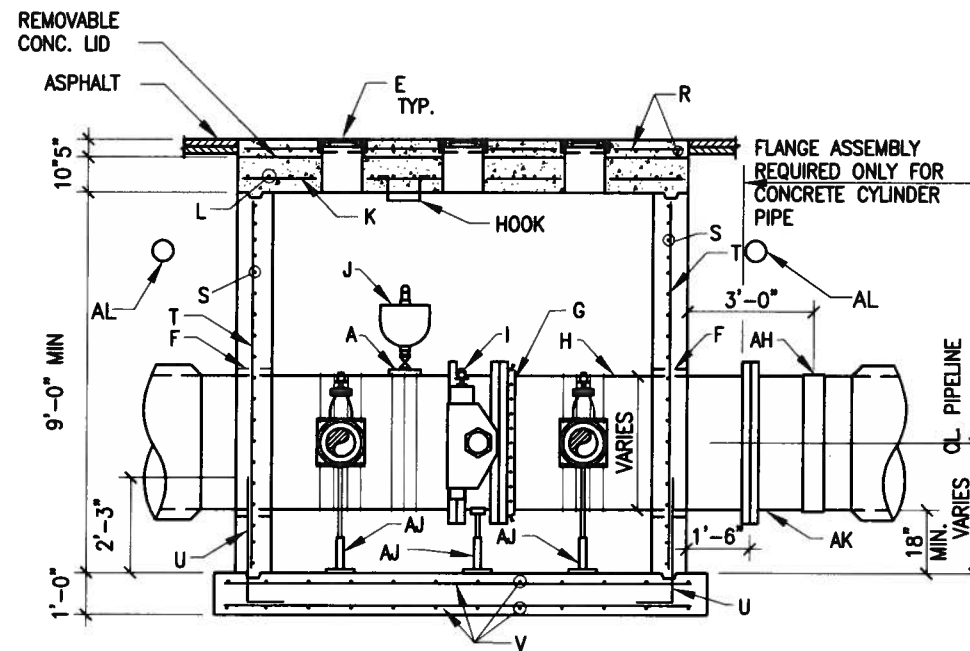
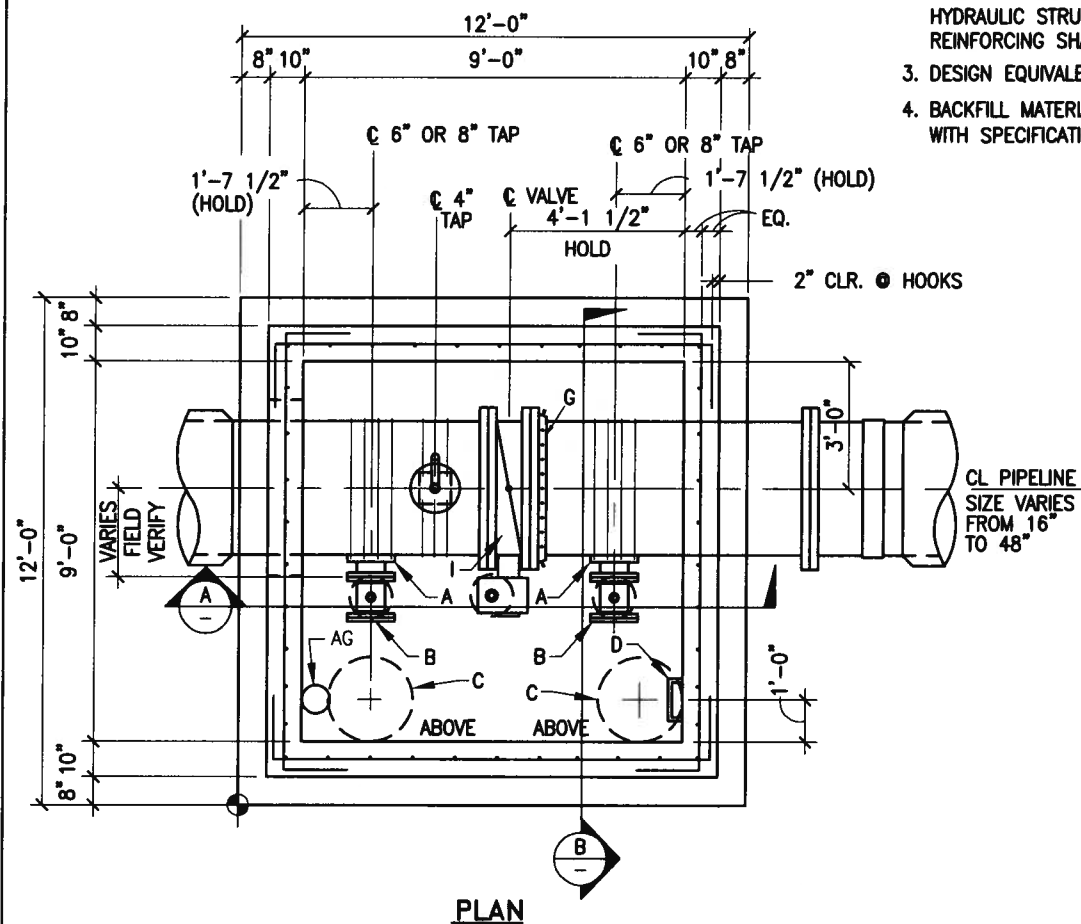
REVISIONS	WATER AUTHORITY
	<b>WATER</b> <b>WATER VALVE</b> <b>INSERTION ANCHORAGE</b> DWG. 2333      JANUARY 2011

# **GENERAL NOTES:**

1. VALVE VAULT SHALL NOT BE USED IN GROUND WATER CONDITIONS OR IN CLAY SOILS.
2. CONCRETE SHALL MEET SPECIFICATION SEC. 510 AND SEC. 101 HYDRAULIC STRUCTURAL CONCRETE,  $f'_c = 3000$  psi. REINFORCING SHALL BE GRADE 60.
3. DESIGN EQUIVALENT FLUID PRESSURE = 91.2 pcf,  $K = .5$
4. BACKFILL MATERIAL SHALL BE CLASS II OR III IN ACCORDANCE WITH SPECIFICATION SEC. 501.
5. PIPE DIAMETER VARIES FROM 16" DIA. TO 48" DIA.
6. PIPELINE CENTERLINE IN THE HORIZONTAL PLANE IS FIXED. ASSOCIATED VALVE BOXES ADJUST IN LOCATION DUE TO PIPE SIZE FIELD VERIFY THESE MEASUREMENTS.
7. PIPELINE VERTICAL CENTERLINE IS ADJUSTABLE WITH THE MINIMUM OF 18" BELOW PIPELINE AS THE ONLY LIMIT.
8. HOLD CENTERLINE OF TAP LOCATIONS AND CENTER OF BUTTERFLY VALVE.
9. DO NOT CONSTRUCT DRAIN POCKETS WHEN CONSTRUCTING IN SHALLOW GROUNDWATER CONDITIONS. ENGINEER SHALL PROVIDE A WATERPROOF MANHOLE OR VAULT DESIGN FOR APPROVAL BY THE WATER AUTHORITY PRIOR TO INSTALLATION.

## **CONSTRUCTION NOTES:**

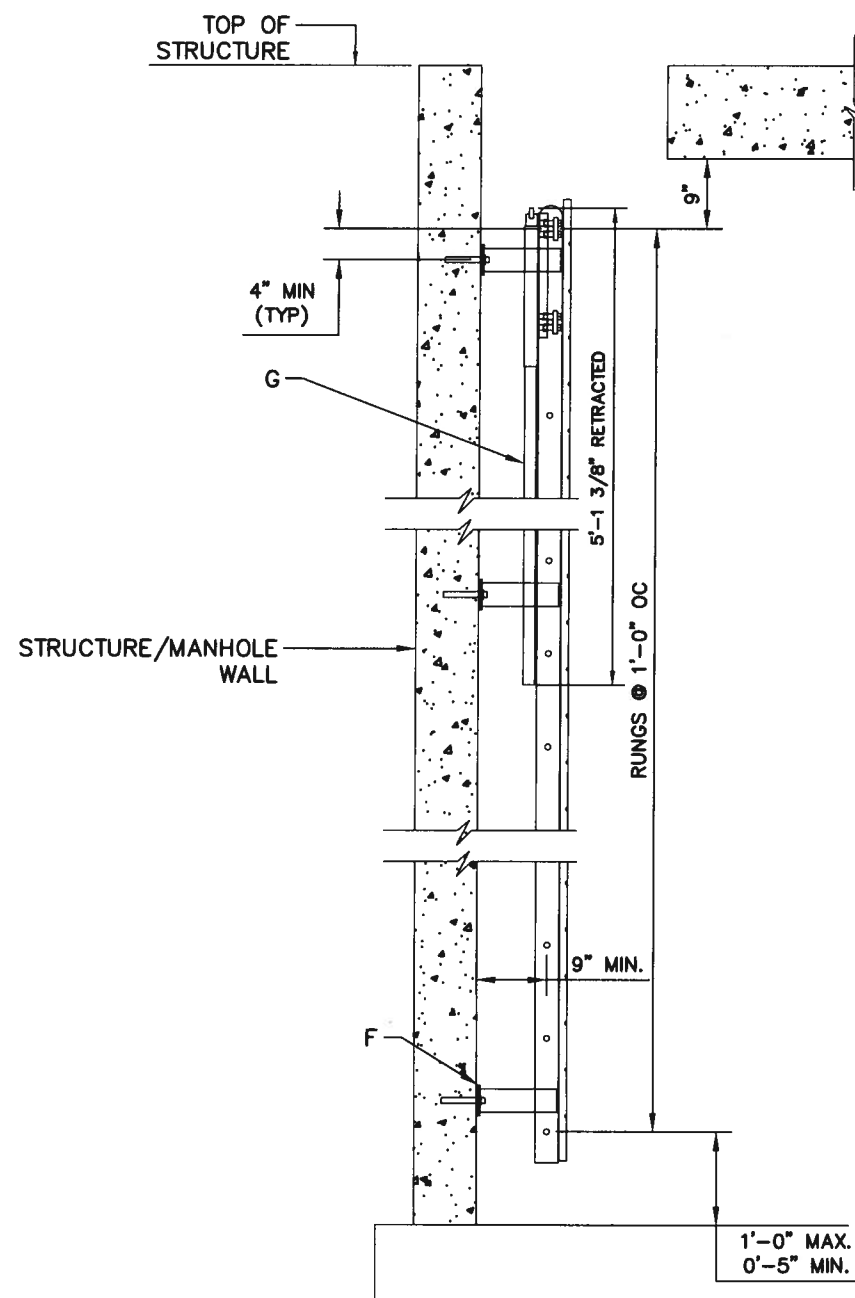
- A TAPPING SADDLE (D.I.P. OR C.C.P.) OR FLANGED OUTLETS (C.C.P.).
- B 6" GATE VALVE WITH BLIND FLANGE (16" TO 30").  
8" GATE VALVE WITH BLIND FLANGE (36" TO 48").
- C 3'-0" DIA. MANHOLE FRAME & COVER PER STANDARD DRAWING 2310.
- D LADDER TO BE INSTALLED PER STD DRAWING 2335.
- E VALVE BOX, RING & COVER PER DWG. 2328.
- F LINK SEAL OR EQUAL.
- G "MEGA-FLANGE" ADAPTER, EBAA OR EQUAL.
- H DUCTILE IRON PIPE (FLXPE).
- I AWWA C504 BUTTERFLY VALVE (FL) PER 801.3.4, SEE STD. DWG. 2360.
- J COMBINATION AIR AND VACUUM VALVE W/ ISOLATION VALVE. SIZE SHOWN IN CONSTRUCTION PLANS.
- K #8 @ 7 1/2" O.C.x10'-4". ADD BAR EACH SIDE OF OPENING.
- L #6 @ 6" O.C.x7'-0 1/2". ADD BAR EACH SIDE OF OPENING.
- M 4-#5 DIAGONALS AT EACH OPENING.
- N #5 @ 12" O.C.x10'-4". FIELD CUT AT OPENINGS.
- P #5 DIAGONALSx6'-0". BEND AS REQUIRED.
- Q #5 @ 12" O.C.x3'-1 1/2". FIELD CUT AT OPENINGS.
- R 5" CONCRETE TOPPING SLAB WITH #4@6" O.C. EACH WAY. SPREAD BARS AT OPENINGS.
- S #5 @ 6" O.C. HORIZ.x10'-4" WITH 10" HOOKS EACH END.
- T #4 @ 12" O.C. VERT. x 8'-10".
- U #5 FOOTING DOWELS @ 6" O.C. WITH 10" HOOK.
- V #6 @ 6" O.C.x11'-8" EACH WAY TOP & BOTTOM.
- W 2-#5 DIAGONALSx7'-0". BEND AS REQUIRED. (8 TOTAL EACH WALL)
- X 2-#6x10'-4" TOP & BOT. OF PIPE. PLACE OUTSIDE OF DIAGONALS.
- Y 2x4 KEY TYPICAL.
- Z 30# FELT MASTIC
- AA 2-#9x10'-4"
- AB #4 TIES @ 5 1/2" O.C. 1st TIE 1 3/4" FROM FACE OF WALL.
- AC 2-#5x10'-4"
- AD BLOCK OUT WALL FOR BEAM.
- AE COIL INSERT WITH 8000# CAPACITY EACH. PROVIDE GREASED BOLT AND ASPHALT OVER CONNECTION. PROVIDE SINGLE SWIVEL LIFT PLATES. WIRE TIE TO BOTTOM LADDER RUNG.
- AF PROVIDE COIL INSERT "AE" ABOVE IN 10" SLAB. PROVIDE PVC POCKET THROUGH 5" TOPPING SLAB. INSERT BOLT & FILL WITH ASPHALT.
- AG 8"Ø HOLE WITH GRAVEL FILL. PROVIDE 1/2" C.Y. GRAVEL FILL BELOW FOUNDATION.
- AH BUTT STRAP TYP.
- AJ ADJUSTABLE PIPE SUPPORT.
- AK STEEL PIPE (FLXPE). COAT ALL EXPOSED STEEL SURFACES WITH AN APPROVED PRODUCT OR AS APPROVED ON THE CURRENT WATER AUTHORITY PRODUCTS LIST
- AL ELECTRONIC MARKER DEVICE (EMD) SEE COA STD SPEC SECTION 170.
- AM 6" STEEL PIPE W/GOOSENECK AND INSECT SCREEN
- AN 8" DIA. SCHEDULE 40 PVC PIPE SLEEVE THROUGH MANHOLE BASE.
- AO 3'x3'x3' DEEP 1" CLEAN GRAVEL. ASTM C33, NO. 57 GRAVEL.



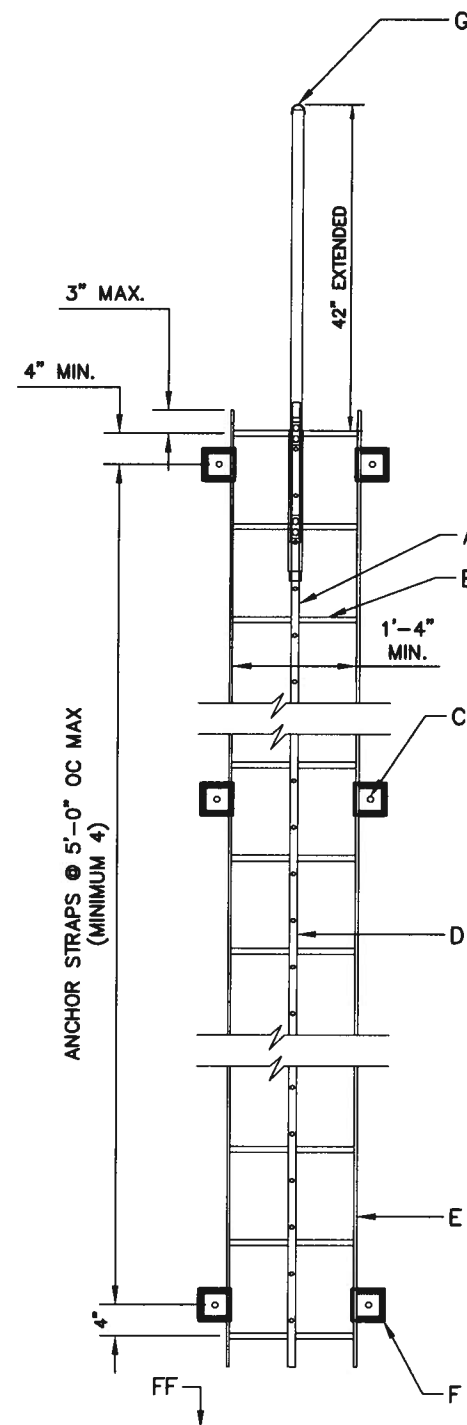
VAULT ORIENTATION ON CONSTRUCTION DRAWINGS

REVISIONS	WATER AUTHORITY
	WATER LARGE DIAMETER VALVE VAULT
	DWG. 2334 JANUARY 2011





SIDE VIEW



ELEVATION

LADDER DETAIL

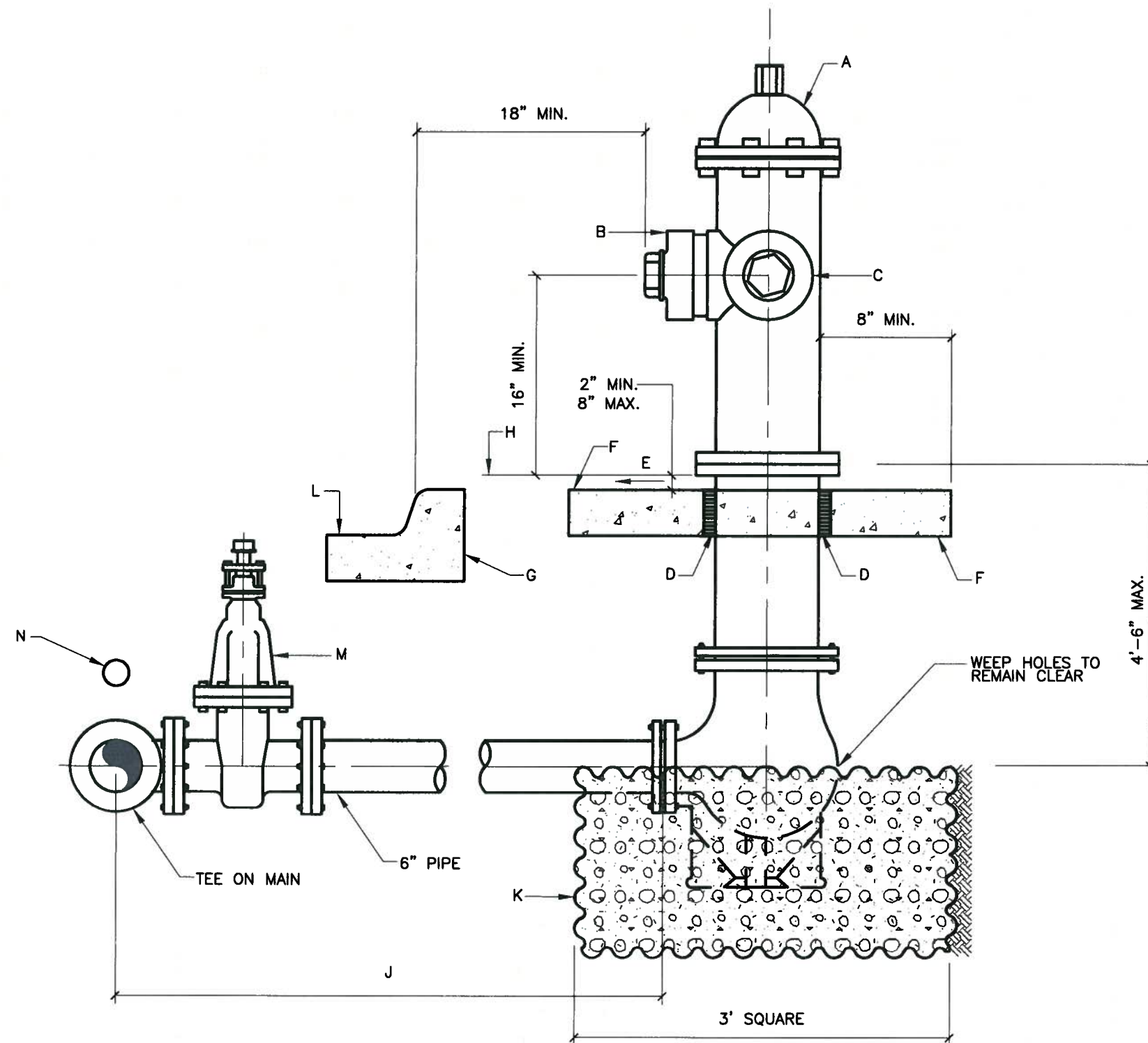
GENERAL NOTES:

1. LADDER AND SUPPORTS SHALL BE ALUMINUM.
2. DIMENSIONS SHOWN ARE MINIMUMS. CONTRACTOR SHALL COORDINATE DESIGN AND DIMENSIONS OF THE LADDER AND SUPPORTS WITH THE MANUFACTURER.

CONSTRUCTION NOTES:

- A. SAF-T-CLIMB WITH REMOVABLE EXTENSION KIT AND STORAGE MOUNTING BRACKET.
- B. 3/4" Ø SMOOTH BAR WITH ADDED TRACTION RUNGS @ 12" OC PLUG WELD TO SIDE BARS (TYP)
- C. 3" X 3/8" FLAT WALL STRAP
- D. STAINLESS STEEL RAILOCK RAIL OR EQUAL WITH EXTENSION ON ALL LADDERS.
- E. 3" X 3/8" SIDEBARS ROUND ALL CORNERS SMOOTH 1/8" RADIUS
- F. CHLOROPRENE PADS.
- G. BILCO LADDER UP.

REVISIONS	WATER AUTHORITY
	WATER
	LADDER DETAIL
	DWG. 2335
	JANUARY 2011



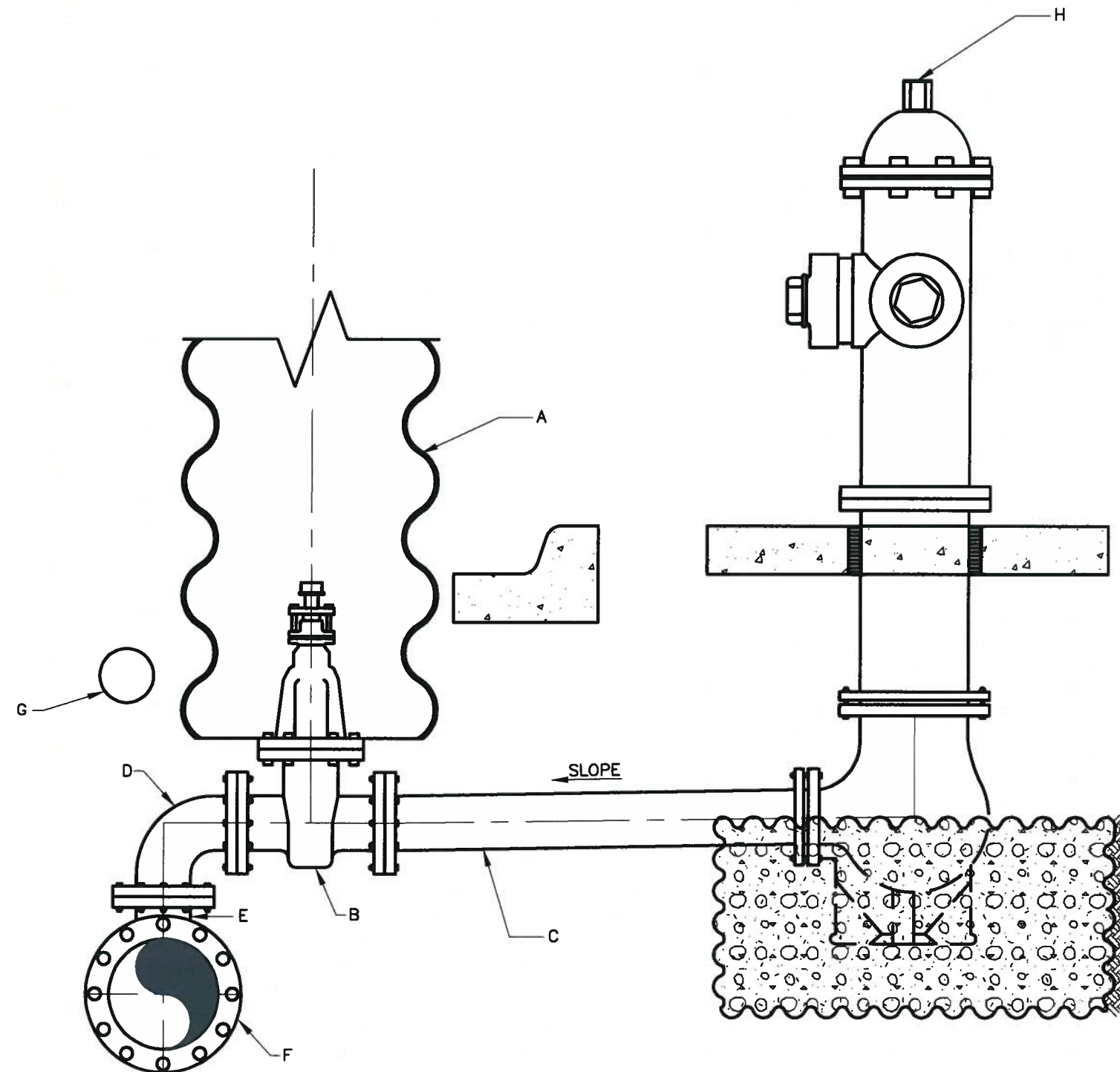
#### GENERAL NOTES:

- 1 NO OBSTRUCTIONS WILL BE PERMITTED WITHIN 3'-0" OF FIRE HYDRANT.
- 2 HYDRANT LEG SHALL BE VALVED.
- 3 CONTRACTOR SHALL BE RESPONSIBLE FOR SETTING TOP FLANGE OF FIRE HYDRANT TO THE CONTROLLED ELEVATION LINE.
- 4 FOR FIRE HYDRANT LOCATIONS, SEE DWG. 2347.
- 5 WHEN NEW OR EXISTING SIDEWALK ABUTS CURB, RECONSTRUCT SIDEWALK PER DWG. 2430, 2431.
- 6 PUMPER NOZZLE TO BE SET FACING THE TRAVELED WAY, UNLESS OTHERWISE NOTED ON PLANS.
- 7 HYDRANTS INSTALLED IN SIDEWALK AREAS SHALL MAINTAIN A MIN. 36-INCH CLEAR PEDESTRIAN PATH PER ADA STANDARD.
- 8 BEFORE THE WORK WILL BE ACCEPTED, FIRE HYDRANT GPS COORDINATES SHALL BE PROVIDED ON THE RECORD DRAWINGS. GPS COORDINATES OBTAINED BY A PROFESSIONAL SURVEYOR LICENSED IN THE STATE OF NEW MEXICO SHALL BE TAKEN AT THE FLANGE. USE THE NAD 1983 NM STATE PLANE CENTRAL ZONE FOR X AND Y COORDINATES AND NAVD 1988 FOR Z COORDINATE.

#### CONSTRUCTION NOTES:

- A FIRE HYDRANT PER SPECIFICATIONS.
- B PUMPER NOZZLE 4 1/2".
- C HOSE NOZZLE 2 1/2".
- D 1/2" EXPANSION JOINT MATERIAL.
- E MATCH SIDEWALK SLOPE OR SLOPE 1/4" PER FOOT.
- F 3'x3'x6" CONCRETE SQUARE PAD, TO BE CONSTRUCTED AROUND FIRE HYDRANT'S CENTER LINE WHEN NOT LOCATED WITHIN SIDEWALK OR CONCRETE AREA. CONCRETE PER SEC. 101 EXTERIOR CONCRETE, f'c=3000 psi @ 28 DAYS.
- G BACK OF CURB.
- H CONTROLLED ELEVATION LINE, LEVEL IN ALL DIRECTIONS.
- J USE OF RESTRAINED JOINTS IS MANDATORY. ALL FIRE HYDRANT LEG PIPING AND FITTINGS INCLUDING TEE ON MAIN SHALL BE RESTRAINED JOINT.
- K GRAVEL DRAIN POCKET. USE FILTER FABRIC TO COVER AROUND GRAVEL DRAIN POCKET. ASTM C33, NO.57 GRAVEL.
- L CURB AND GUTTER. WHERE NO CURB AND GUTTER EXIST, BOLLARDS ARE REQUIRED.
- M FIRE HYDRANT ISOLATION VALVE.
- N ELECTRONIC MARKER DEVICE (EMD), SEE COA STANDARD SPECIFICATION SECTION 170.

REVISIONS	WATER AUTHORITY
	WATER FIRE HYDRANT INSTALLATION
	DWG. 2340 JANUARY 2011



**GENERAL NOTES:**

1 INSTALL AS REQUIRED BY CONSTRUCTION PLANS.

**CONSTRUCTION NOTES:**

A VALVE BOX PER STD. DWG. 2326.

B GATE VALVE FL.- FL.

C WATER LINE TO AIR RELEASE IN SIDEWALK.

D DUCTILE IRON 90° BEND.

E FLANGED OUTLET OR MECHANICAL JOINT TEE.

F WATER MAIN.

G ELECTRONIC MARKER DEVICE (EMD), SEE COA STANDARD SPECIFICATION SECTION 170.

H FIRE HYDRANT PER STD. DWG. 2340.

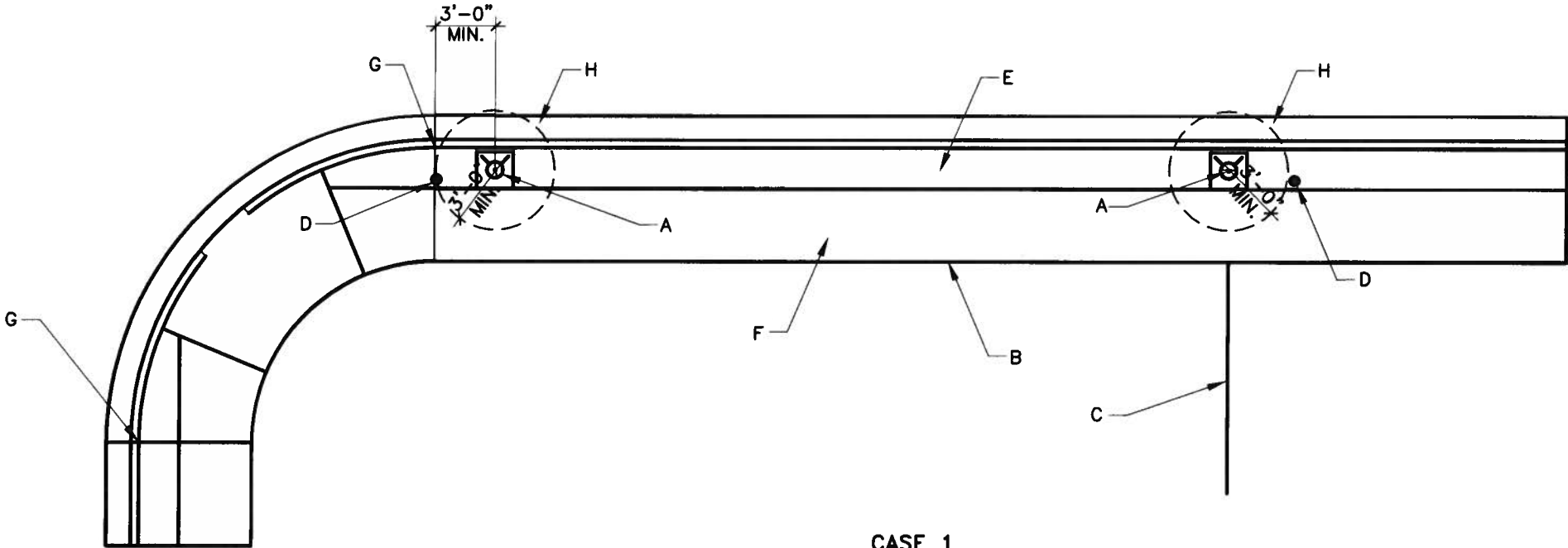
REVISIONS	WATER AUTHORITY
	WATER AIR RELEASE FIRE HYDRANT CONNECTION
	DWG. 2344 JANUARY 2011

GENERAL NOTES:

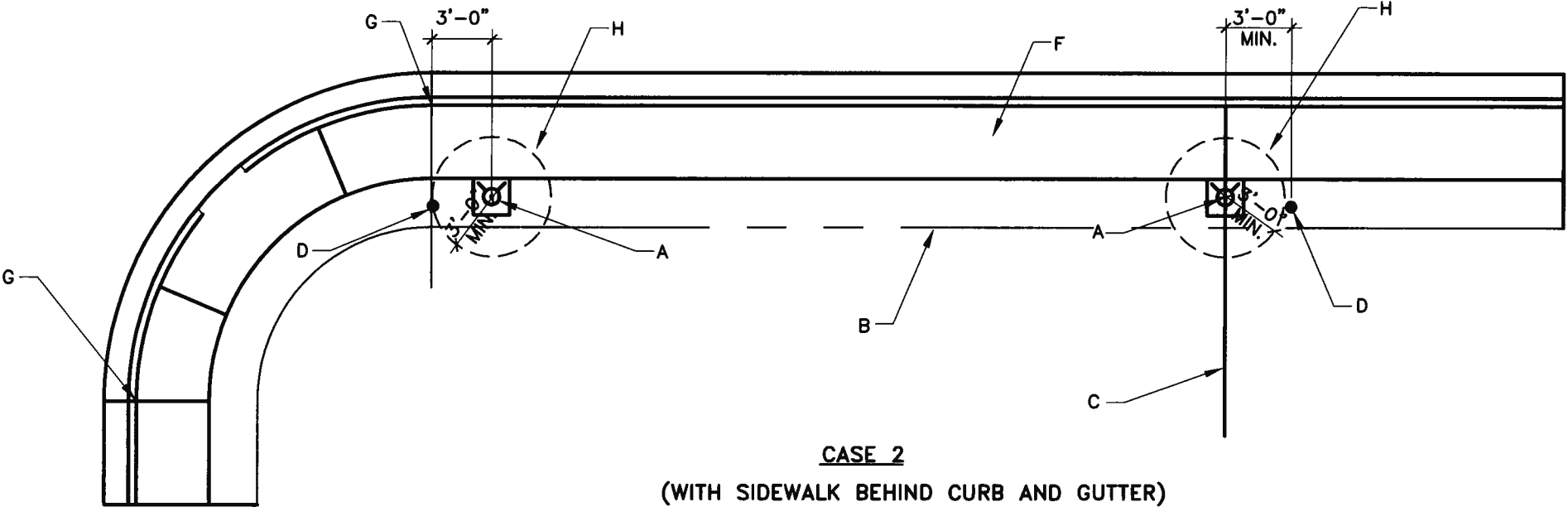
- 1 FIRE HYDRANTS ARE NOT TO BE LOCATED WITHIN THE CURB RETURN AREA. FIRE HYDRANTS LOCATED IN THE MID BLOCK LENGTH SHALL BE CENTERED ON ADJOINING PROPERTY LINES UNLESS OTHERWISE SPECIFIED.
- 2 A MINIMUM CLEARANCE OF 3' SHALL BE PROVIDED BETWEEN FIRE HYDRANT AND ANY PERMANENT OBSTRUCTION (UTILITY POLE, LIGHT STANDARD, TRAFFIC SIGNAL, ETC.).
- 3 FOR FIRE HYDRANT INSTALLATION DETAILS SEE DWG. 2340.

CONSTRUCTION NOTES:

- A FIRE HYDRANT
- B RIGHT-OF-WAY OR EASEMENT LINE
- C PROPERTY LINE
- D PERMANENT OBSTRUCTION
- E PARKWAY
- F SIDEWALK
- G PC OR PT OF CURB RETURN
- H MAINTAIN A MINIMUM CLEARANCE OF 3' RADIUS FROM CENTER OF HYDRANT TO ANY AND ALL OBSTRUCTIONS.

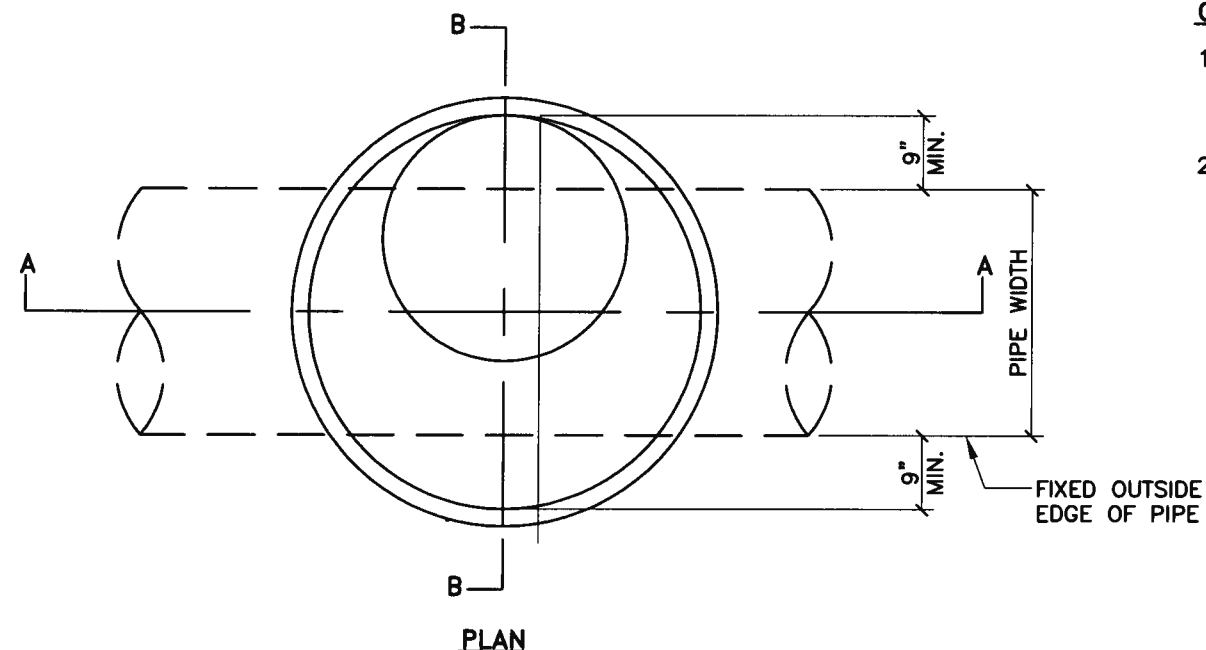


CASE 1  
(WITH PARKWAY BEHIND CURB AND GUTTER)



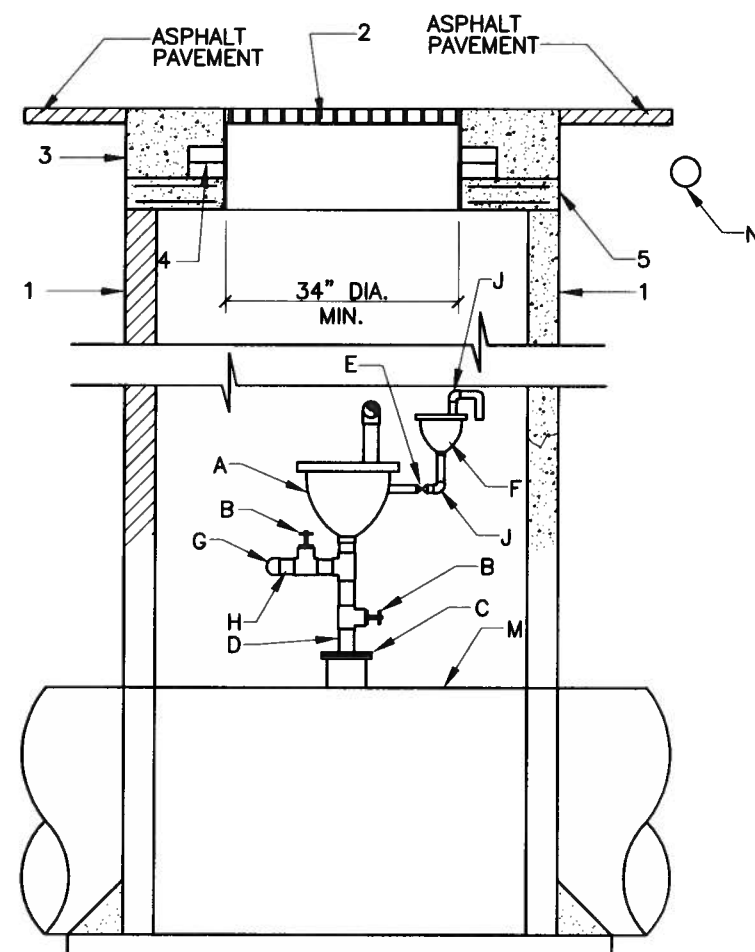
CASE 2  
(WITH SIDEWALK BEHIND CURB AND GUTTER)

REVISIONS	WATER AUTHORITY
	WATER DETAILS ON TYPICAL FIRE HYDRANT LOCATIONS
	DWG. 2347 JANUARY 2011

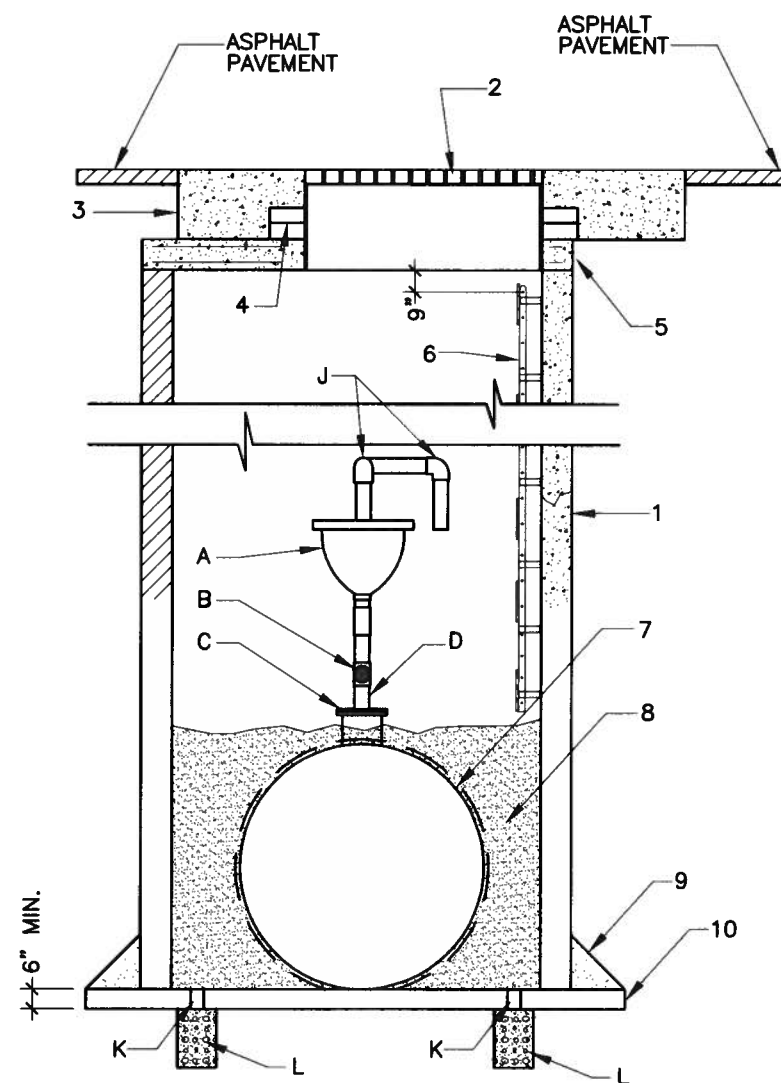


#### GENERAL NOTES

- 1G. ALL PIPING AND FITTINGS SHALL BE SCH. 40 THREADED STAINLESS STEEL. SIZE IS DETERMINED BY SPECIFIC AIR/VACUUM RELEASE VALVE TO BE INSTALLED.
- 2G. DO NOT CONSTRUCT DRAIN POCKETS WHEN CONSTRUCTING IN SHALLOW GROUNDWATER CONDITIONS. ENGINEER SHALL PROVIDE A WATERPROOF MANHOLE OR VAULT DESIGN FOR APPROVAL BY THE WATER AUTHORITY PRIOR TO INSTALLATION.



**SECTION A-A**



**SECTION B-B**

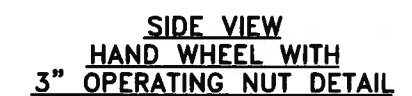
#### MATERIALS LIST

- A COMBINATION AIR AND VACUUM RELEASE VALVE, SIZE AS SHOWN ON PLAN.
- B GATE VALVE, SAME SIZE AS COMBINATION AIR AND VACUUM RELEASE VALVE INLET.
- C MINIMUM 6" FLANGE NOZZLE OR FLANGE TAPPING SADDLE. PROVIDE BLIND FLANGE TAPPED FOR THREADED NIPPLE WHERE AIR/VAC VALVE IS SHOWN TO BE LESS THAN 6".
- D STAINLESS STEEL NIPPLE.
- E 1" BALL VALVE.
- F 1" AIR RELEASE VALVE.
- G THREADED CAP.
- H THREADED NIPPLE FOR VENT AND HOSE CONNECTION.
- J 90° ELBOW.
- K 4" DIA. SCHEDULE 40 PVC PIPE SLEEVE THROUGH MANHOLE BASE.
- L 12"x12"x18" DEEP 1" CLEAN GRAVEL. ASTM C33, NO. 57 GRAVEL.
- M WATER MAIN.
- N ELECTRONIC MARKER DEVICE (EMD) SEE STANDARD SPECIFICATION SECTION 170.

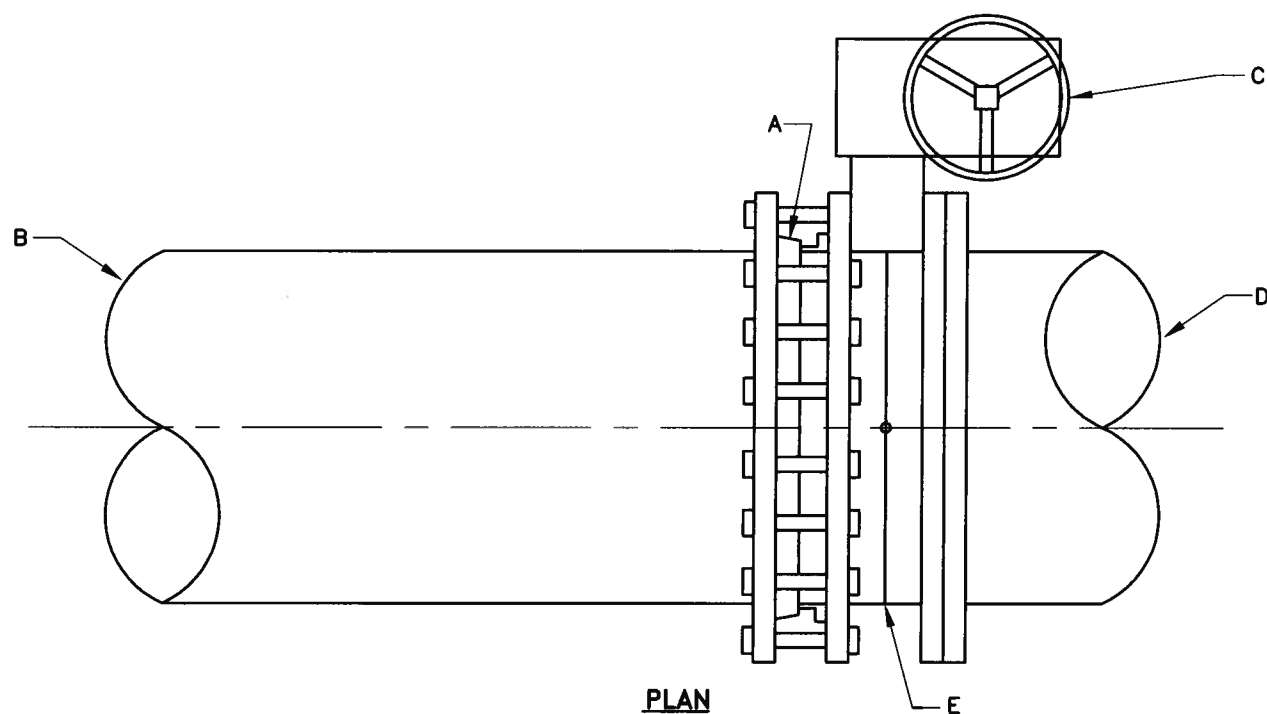
#### CONSTRUCTION NOTES:

- 1 MANHOLE MAY BE CONSTRUCTED OF CONCRETE BLOCK, GR, MS BRICK, POURED CONCRETE, OR PRECAST REINFORCED CONCRETE. IF BLOCK OR BRICK, PLASTER INSIDE AND OUT WITH 1/2" MORTAR. SEE DWG 2101.
- 2 USE 36" MH FRAME AND COVER. COVER MARKED "WATER", PER STANDARD DRAWING 2310.
- 3 CONCRETE COLLAR PER C.O.A. STD. DWG. 2461 + "ARV" STAMP.
- 4 USE ADJUSTMENT RINGS OR MAX. 2 COURSES GR MS BRICK FOR ADJUSTMENT OF MH FRAME TO PAVEMENT GRADE.
- 5 PRECAST CONCRETE COVER. SEE DWG 2107, EXCEPT OPENING SHALL BE 34" DIAMETER MINIMUM.
- 6 LADDER TO BE INSTALLED FOR 4' AND DEEPER MANHOLES PER STD DRAWING 2335.
- 7 CUT MANHOLE TO PROVIDE A 4" CLEARANCE AROUND WATER MAIN AND FILL ANNULAR SPACE WITH NON-SHRINK GROUT OR WATER AUTHORITY APPROVED EQUAL.
- 8 1" CLEAN GRAVEL TO TOP OF MAIN.
- 9 6" GROUT FILLET AROUND BASE.
- 10 CONCRETE BASE USING #4 BARS AT 12" OC EACH WAY.

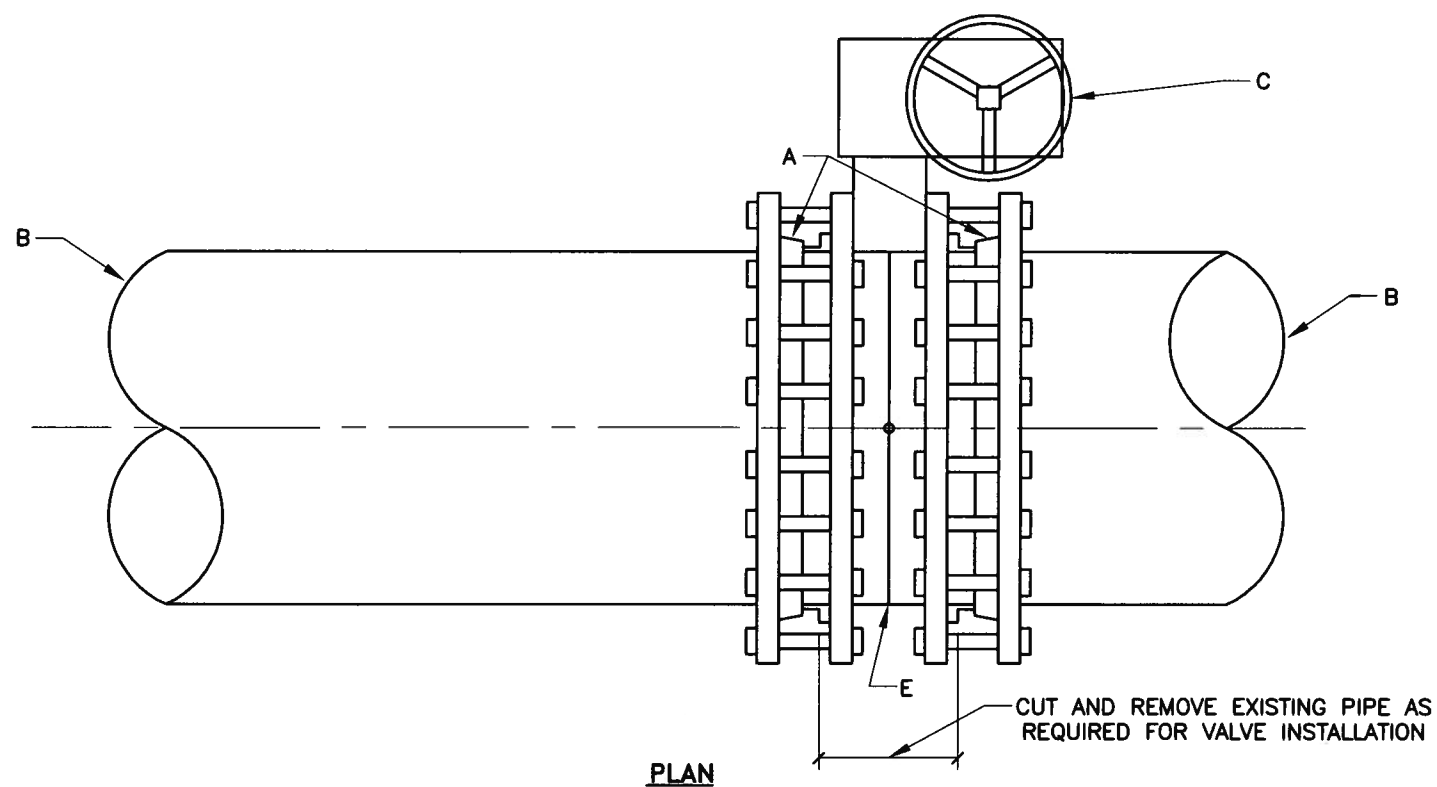
REVISIONS	WATER AUTHORITY
	WATER AIR/VACUUM RELEASE VALVE
	DWG. 2350 JANUARY 2011



REVISIONS	WATER AUTHORITY
	WATER CONC CYL BUTTERFLY VALVE IN VAULT INSTALLATION
	DWG. 2351 JANUARY 2011



**BUTTERFLY VALVE INSTALLATION DETAIL IN NEW D.I. PIPELINE**



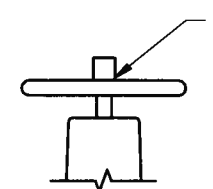
**BUTTERFLY VALVE INSTALLATION DETAIL IN EXISTING D.I. PIPELINE**

**CONSTRUCTION NOTES:**

1 THIS DETAIL IS TO BE USED FOR NEW OR EXISTING DUCTILE IRON PIPE ONLY. WHERE EXISTING PIPE IS OF CAST IRON MATERIALS, VALVE INSTALLATION DETAILS SHALL BE SUBMITTED TO AND APPROVED BY THE WATER AUTHORITY.

**CONSTRUCTION NOTES:**

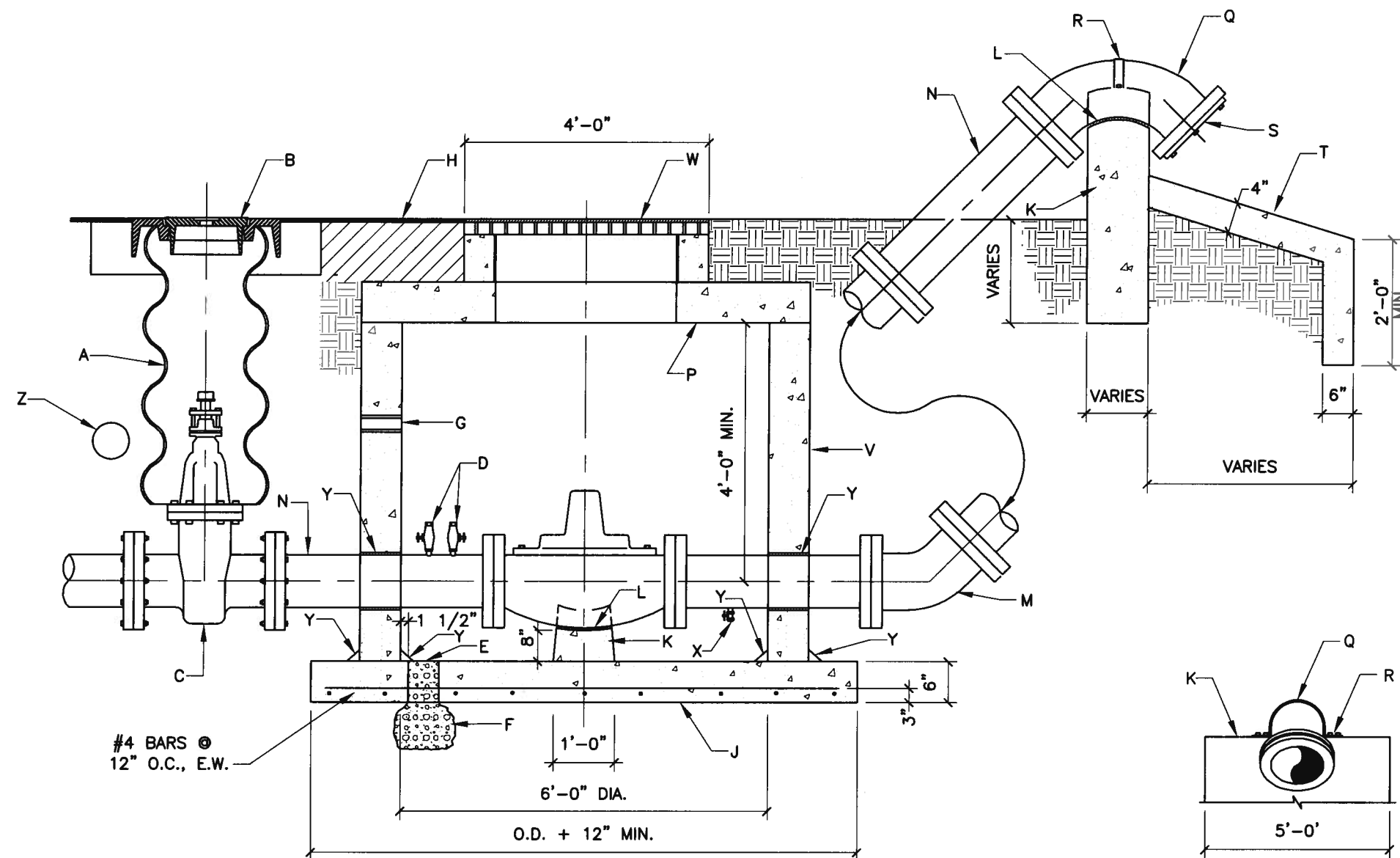
- A MEGA FLANGE – FLANGE ADAPTER, SERIES 2100 AS MANUFACTURED BY EBAA IRON SALE, OR APPROVED EQUAL.
- B MAIN PIPELINE (D.I.) WITH PLAIN END.
- C HAND WHEEL WITH 3" SQUARE OPERATING NUT AS SPECIFIED BY THE ENGINEER. SEE HAND WHEEL DETAIL FOR SIDE VIEW.
- D MAIN PIPELINE (D.I.) WITH FLANGED END.
- E BUTTERFLY VALVE (FLGxFLG), SIZE AS SHOWN ON DRAWINGS.
- F WELD 3" OPERATING NUT TO HAND WHEEL.



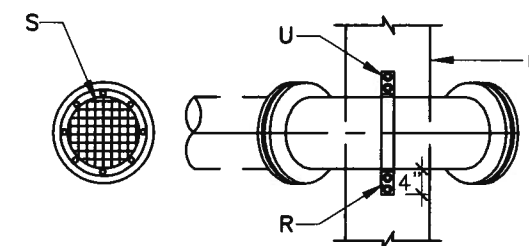
**SIDE VIEW  
HAND WHEEL WITH  
3" OPERATING NUT DETAIL**

**IN VAULT INSTALLATION**

REVISIONS	WATER AUTHORITY
	WATER
	DUCTILE IRON BUTTERFLY VALVE IN VAULT INSTALLATION DETAILS
	DWG. 2352 JANUARY 2011



**ELEVATION  
TYPICAL**



**PIPE OUTLET**

**FRONT VIEW**

**PLAN VIEW**

**ANCHOR DETAILS**

**GENERAL NOTES:**

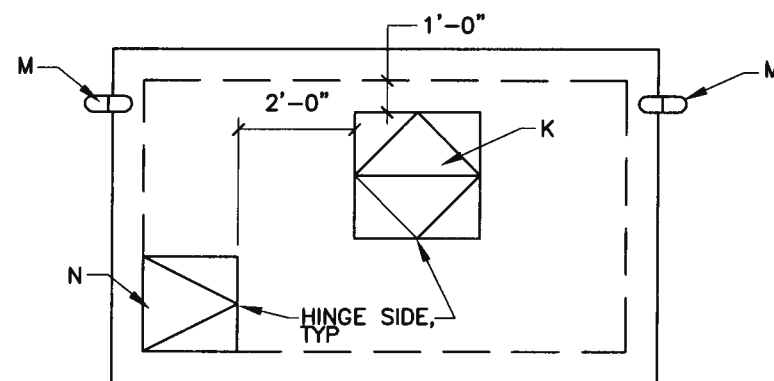
- 1 SIZE, ELECTRIC AND MECHANICAL APPURTENANCES AND OUTLET DISCHARGE POINT AS REQUIRED BY THE WATER AUTHORITY.
- 2 ALL ABOVE SURFACE PIPING SHALL BE PAINTED SAFETY YELLOW.
- 3 BOLLARDS WILL BE REQUIRED WHEN REQUIRED BY THE ENGINEER OR THE WATER AUTHORITY.
- 4 NOT TO BE USED IN TRAFFIC AREAS.
- 5 DO NOT CONSTRUCT DRAIN POCKETS WHEN CONSTRUCTING IN SHALLOW GROUNDWATER CONDITIONS. ENGINEER SHALL PROVIDE A WATERPROOF MANHOLE OR VAULT DESIGN FOR APPROVAL BY THE WATER AUTHORITY PRIOR TO INSTALLATION.

**CONSTRUCTION NOTES:**

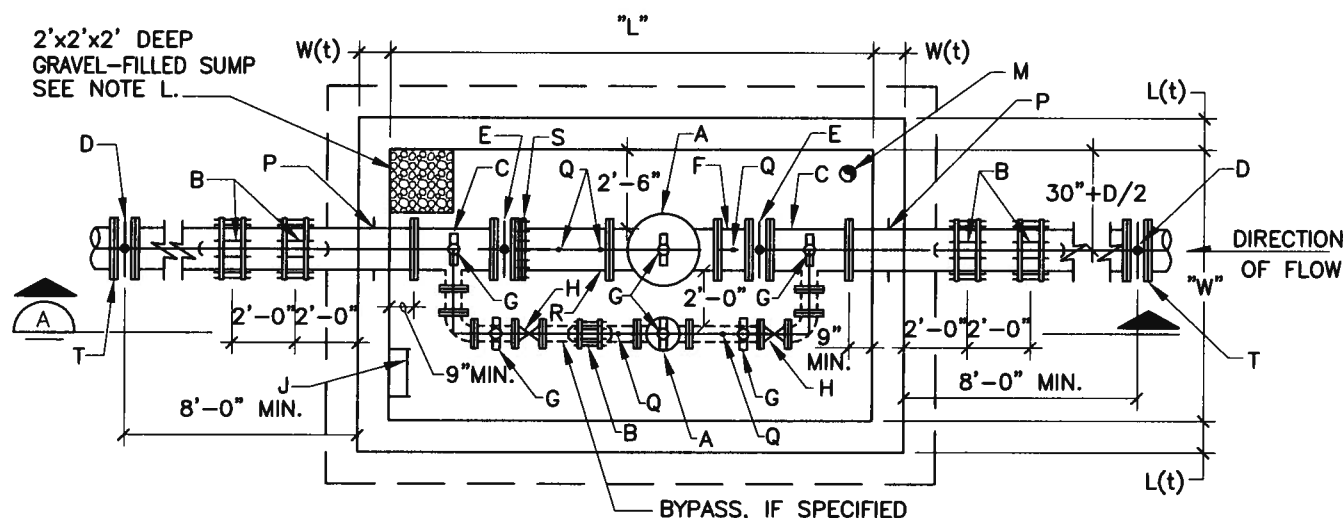
- A VALVE BOX PER C.O.A. STD. DWG. 2326.
- B VALVE BOX RING AND COVER PER C.O.A. STD. DWG. 2328.
- C GATE VALVE (FL. - FL.).
- D 1/2" CONNECTIONS WITH PETCOCK FOR PRESSURE MEASURING DEVICES.
- E 6" DIAMETER FLOOR DRAIN HOLE THROUGH SLAB.
- F 1/2 CU. YD. COARSE GRAVEL, ASTM C33, NO. 57 GRAVEL.
- G 2" SLEEVE FOR CONDUIT.
- H PAVEMENT.
- J REINFORCED CONCRETE SLAB, SLOPE TO DRAIN. CONCRETE PER SEC. 101, HYDRAULIC STRUCTURAL CONCRETE,  $f'_c=3000$  psi @ 28 DAYS.
- K REINFORCED CONCRETE PEDESTAL. CONCRETE PER SEC. 101, EXTERIOR CONCRETE,  $f'_c=3000$  psi @ 28 DAYS.
- L 30 LB. FELT BETWEEN FITTING OR VALVE AND PEDESTAL.
- M C.I./D.I. 45° ELL. (FL. - FL.).
- N C.I./D.I. PIPE (FL. - FL.).
- P PRECAST CONCRETE COVER, SEE DWG. 2107, EXCEPT OPENING SHALL BE 34" DIAMETER MINIMUM.
- Q C.I./D.I. 90° ELL. (FL. - FL.).
- R ANCHOR STRAPS 3/8"x2".
- S COVER OPENING WITH 1/2" HARDWARE CLOTH, SECURE TO END OF ELL WITH 6- 3/8"x2" BOLTS, NUTS, AND WASHERS.
- T CONCRETE SPLASH PAD TO BE DESIGNED FOR EACH SITE, WITH WELDED WIRE FABRIC REINFORCEMENT. CONCRETE PER SEC. 101, EXTERIOR CONCRETE,  $f'_c=3000$  psi @ 28 DAYS.
- U 4- 5/8"x10" ANCHOR BOLTS.
- V 6'-0" DIA. TYPE "C" MANHOLE, PER C.O.A. STD. DWG. 2101.
- W 4'x4' BILCO DOOR AS APPROVED BY THE ENGINEER OR THE WATER AUTHORITY.
- X 1" TAP AND VALVE FOR DRAIN.
- Y NON-SHRINK GROUT.
- Z ELECTRONIC MARKER DEVICE (EMD), SEE COA STANDARD SPECIFICATION SECTION 170.

REVISIONS	WATER AUTHORITY
	WATER SURGE RELIEF VALVE STATION
	DWG. 2353 JANUARY 2011

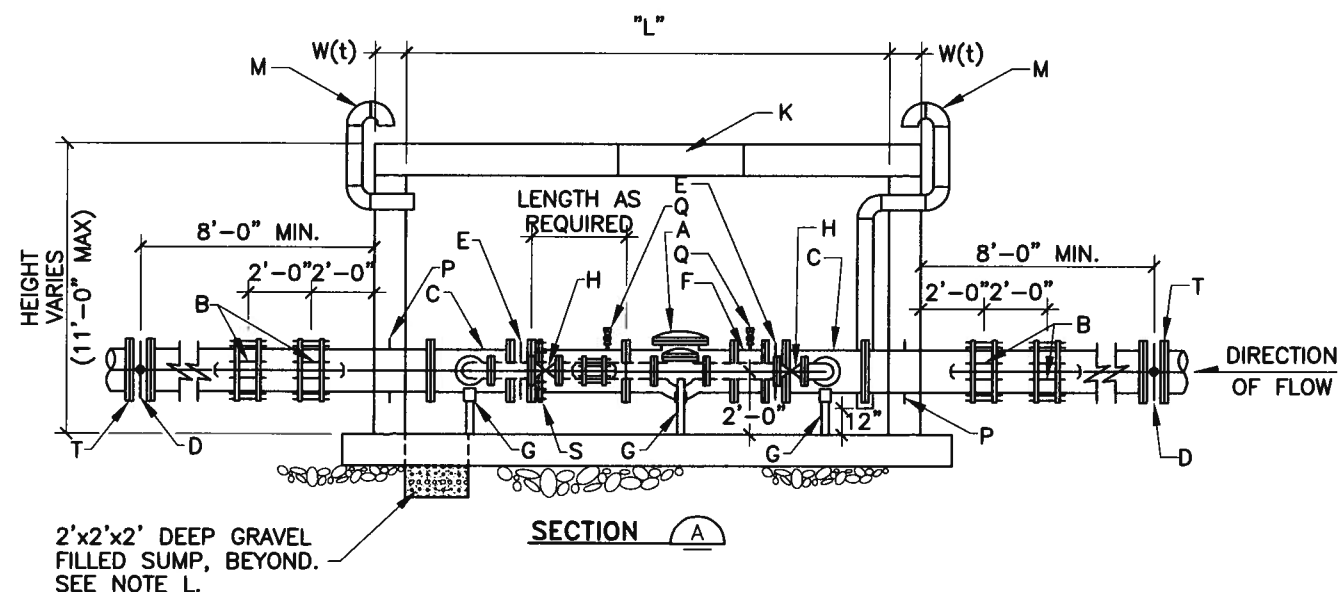




TOP PLAN



INTERIOR PLAN



SECTION

# GENERAL NOTES:

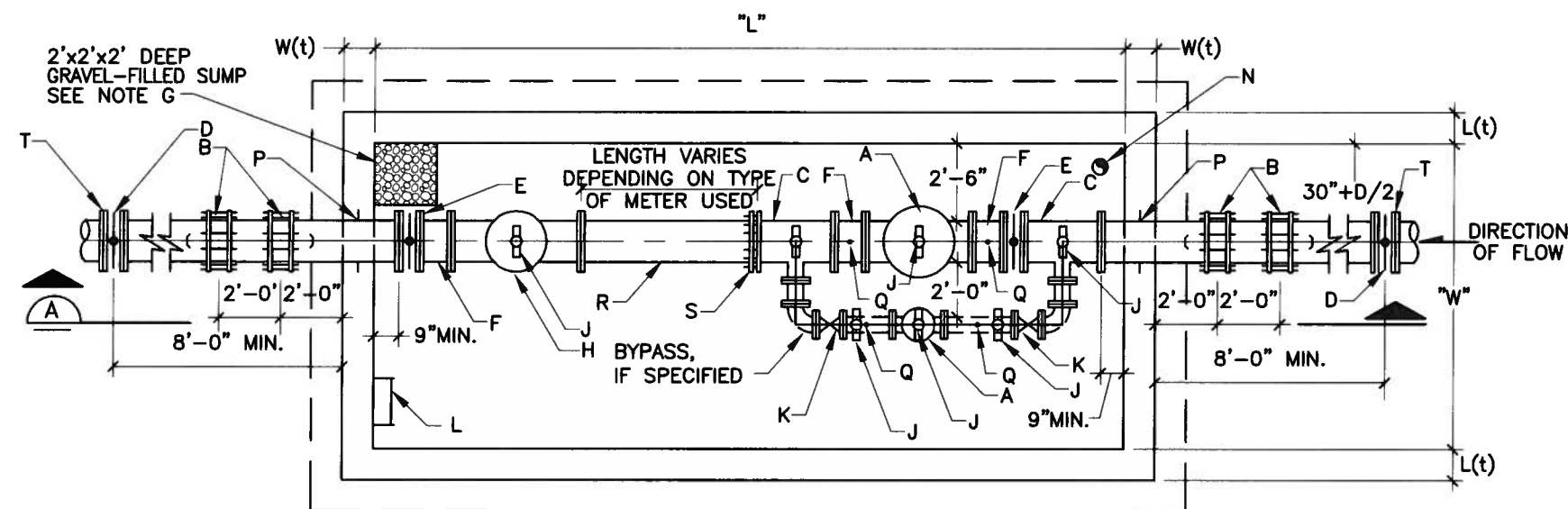
- FOR STRUCTURAL DETAILS, VAULT DIMENSIONS AND REINFORCING SEE STANDARD PRV STATION STRUCTURAL DETAILS DWG. 2357.
- ALL EXTERIOR PIPING SHALL BE PAINTED SAFETY YELLOW.
- BOLLARDS WILL BE REQUIRED WHEN REQUIRED BY THE ENGINEER OR THE WATER AUTHORITY.
- IN NON-TRAFFIC AREAS, THE TOP ELEVATION OF THE VAULT WILL BE 12" ABOVE FINISHED GRADE WITH BOLLARDS PAINTED SAFETY YELLOW AT EACH CORNER.
- ALL PARTS WITHIN THE VAULT MUST COINCIDE WITH THE CURRENT WATER AUTHORITY APPROVED PRODUCTS LIST.
- A PLATE SHALL BE INSTALLED ON THE VAULT WALL THAT SHOWS THE ELEVATION.
- DO NOT CONSTRUCT DRAIN POCKETS WHEN CONSTRUCTING IN SHALLOW GROUNDWATER CONDITIONS. ENGINEER SHALL PROVIDE A WATERPROOF MANHOLE OR VAULT DESIGN FOR APPROVAL BY THE WATER AUTHORITY PRIOR TO INSTALLATION.

## CONSTRUCTION NOTES:

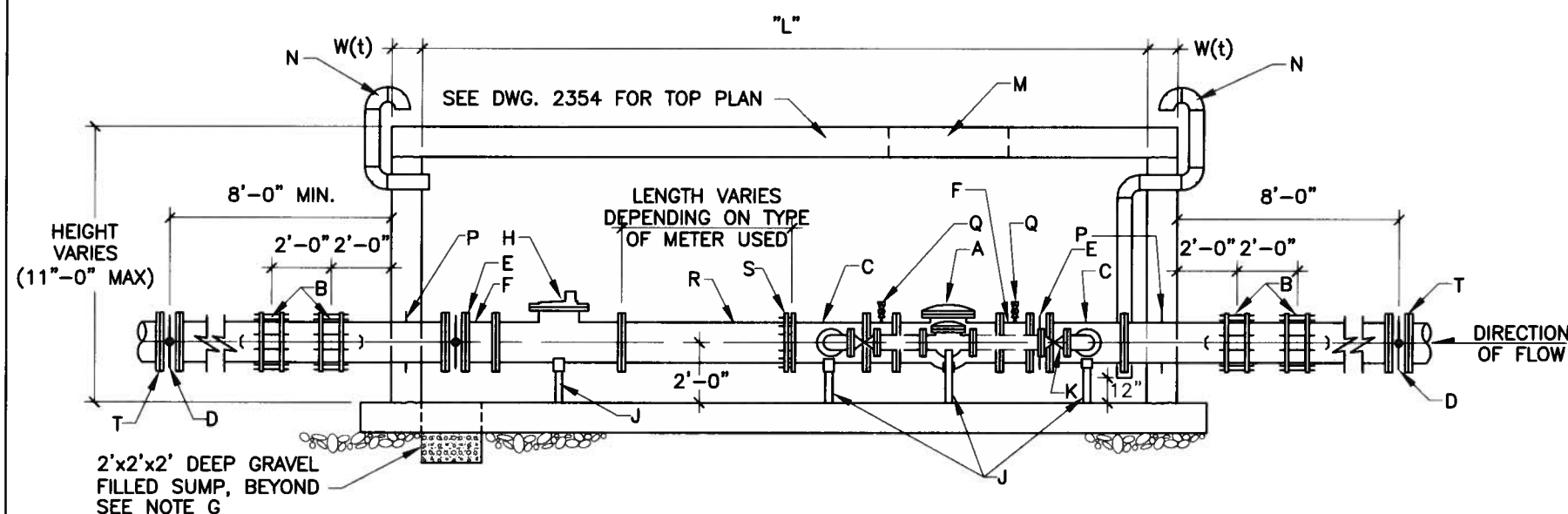
- PRV LOCATION, FINAL DESIGN AND LAYOUT SHALL BE APPROVED BY THE WATER AUTHORITY TO CONFORM WITH SPECIFIC SYSTEM AND SITE REQUIREMENTS.
- PRV STATION ACCESS OPENING COVERS SHOWN ON THIS STANDARD DETAIL ARE SUITABLE FOR LOCATIONS NOT EXPOSED TO CONTINUOUS HIGH DENSITY TRAFFIC. IF PRV STATION MUST BE LOCATED IN AREAS OF CONTINUOUS HIGH DENSITY TRAFFIC THE ACCESS OPENING COVERS SHALL BE SPECIFICALLY DESIGNED TO WITHSTAND THE CONDITIONS AND LOADINGS TO BE ENCOUNTERED.
- ALUMINUM FLOOR DOORS AND FRAME FOR LOCATIONS SUBJECT TO INTERMITTENT AND LIGHT DENSITY TRAFFIC SHALL BE DESIGNED TO WITHSTAND A LIVE LOAD OF THE AASHTO H-20 DESIGNATION AND SHALL BE FLUSH WITH TOP OF VAULT.
- ALUMINUM FLOOR DOORS AND FRAMES FOR LOCATIONS OUT OF ROADWAYS AND NOT SUBJECT TO TRAFFIC LOADINGS SHALL BE DESIGNED TO WITHSTAND A LIVE LOAD OF 300 POUNDS PER SQUARE FOOT AND SHALL EXTEND 3-INCHES MINIMUM ABOVE TOP OF VAULT.
- 6-INCH VENT PIPING SHALL BE ROUTED SUCH THAT THE ABOVE GROUND GOOSENECK AND INSECT SCREEN ARE LOCATED OUT OF VEHICULAR OR PEDESTRIAN TRAFFIC AREAS.

- A PRESSURE REDUCING VALVE, AS SPECIFIED
- B FLEXIBLE COUPLING WITH THRUST TIES, SEE THRUST TIE DETAIL ON DWG. 2358
- C FLANGED TEE, REQUIRED ONLY IF BYPASS SPECIFIED
- D BURIED BUTTERFLY VALVE (GATE VALVE FOR SIZE < 14")
- E BUTTERFLY VALVE WITH HAND WHEEL OPERATOR (GATE VALVE FOR SIZE < 14"), REQUIRED ONLY WHEN BYPASS IS SPECIFIED.
- F FLANGED SPOOL, LENGTH = 1'-0"
- G ADJUSTABLE PIPE SADDLE SUPPORT, GRINNELL FIG. 264, ELCEN FIG. 50 OR EQUAL, TYPICAL
- H GATE VALVE WITH HAND WHEEL OPERATOR, REQUIRED ONLY IF BYPASS SPECIFIED
- J LADDER PER COA STANDARD DRAWING 2335.
- K ALUMINUM FLOOR DOOR WITH RECESSED HASP COVERED BY A HINGED LID FLUSH WITH TOP SURFACE. DOOR SIZE SHALL BE 4'x4' DOUBLE LEAF (WITHOUT BYPASS) AND 4'x6' DOUBLE LEAF (WITH BYPASS). HARDWARE AND HINGES SHALL BE 304 STAINLESS STEEL. BILCO TYPE JD, OR EQUAL.
- L GRAVEL PER ASTM C33, NO. 57 GRAVEL.
- M 6" STEEL PIPE W/GOOSENECK AND INSECT SCREEN
- N 3'-0" SQ ALUMINUM FLOOR DOOR WITH RECESSED HASP COVERED BY A HINGED LID FLUSH WITH TOP SURFACE. HARDWARE AND HINGES SHALL BE 304 STAINLESS STEEL. BILCO TYPE J, OR EQUAL.
- P WALL PIPE, CENTERED IN WALL, WITH NON-SHRINK GROUT OR WATER AUTHORITY APPROVED EQUAL.
- Q 1/2" PIPE TAP WITH 1/2" BALL VALVE AND CAP
- R D.I. SPOOL FLG. x P.E.
- S MEGA FLANGE - FLANGE ADAPTER, AS MANUFACTURED BY EBAA IRON SALES, OR APPROVED EQUAL.
- T INSULATING FLANGE KIT.

REVISIONS	WATER AUTHORITY
	WATER STANDARD PRV STATION NO METER
	DWG. 2354 JANUARY 2011



INTERIOR PLAN



SECTION A-A

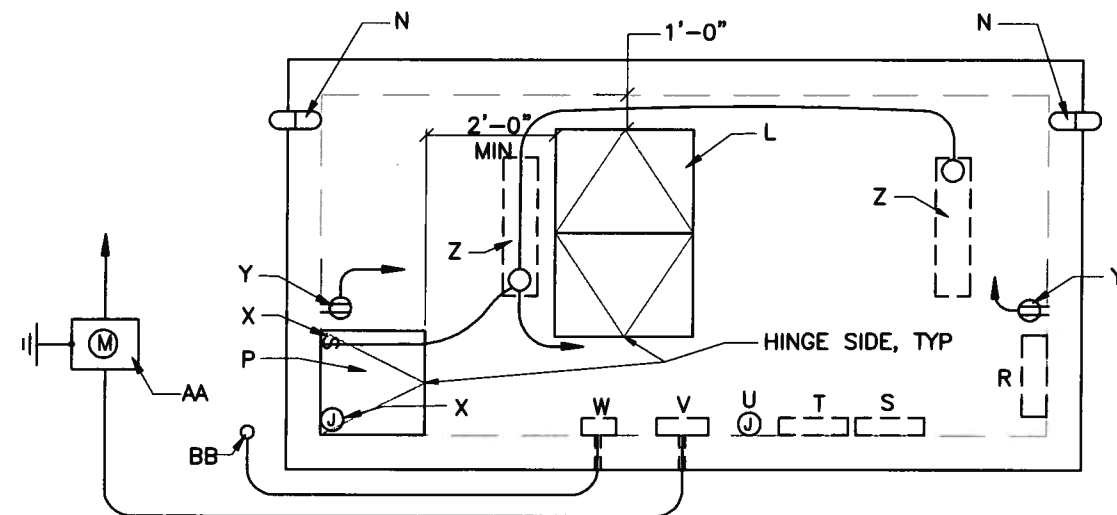
# GENERAL NOTES:

1. FOR STRUCTURAL DETAILS, VAULT DIMENSIONS AND REINFORCING SEE STANDARD PRV STATION STRUCTURAL DETAILS DWG. 2357
2. SEE STANDARD PRV STATION, NO METER, DWG. 2354 FOR ADDITIONAL CONSTRUCTION NOTES.
3. IN NON-TRAFFIC AREAS, THE TOP ELEVATION OF THE VAULT WILL BE 12" ABOVE FINISHED GRADE WITH BOLLARDS PAINTED SAFETY YELLOW AT EACH CORNER.
4. ALL PARTS WITHIN THE VAULT MUST COINCIDE WITH THE CURRENT WATER AUTHORITY APPROVED PRODUCTS LIST.
5. A PLATE SHALL BE INSTALLED ON THE VAULT WALL THAT SHOWS THE ELEVATION.
6. DO NOT CONSTRUCT DRAIN POCKETS WHEN CONSTRUCTING IN SHALLOW GROUNDWATER CONDITIONS. ENGINEER SHALL PROVIDE A WATERPROOF MANHOLE OR VAULT DESIGN FOR APPROVAL BY THE WATER AUTHORITY PRIOR TO INSTALLATION.

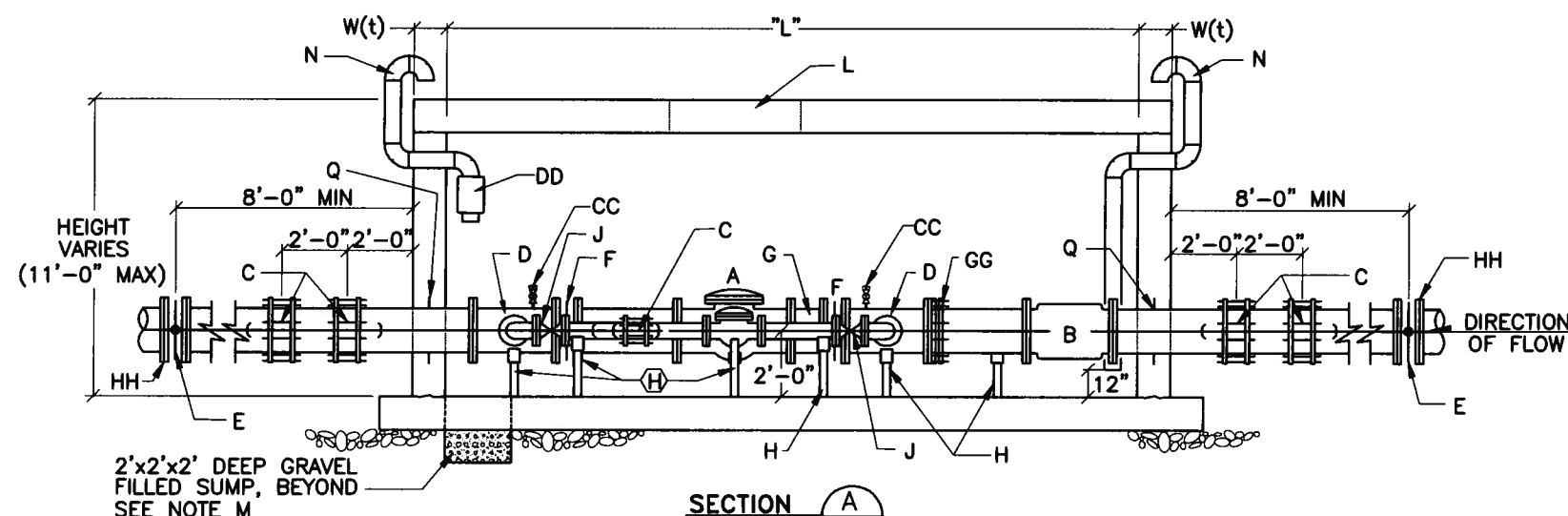
## CONSTRUCTION NOTES:

- A PRESSURE REDUCING VALVE, AS SPECIFIED
- B FLEXIBLE COUPLING WITH THRUST TIES, SEE THRUST TIE DETAIL ON DWG 2358.
- C FLANGED TEE, REQUIRED ONLY IF BYPASS SPECIFIED
- D BURIED BUTTERFLY VALVE (GATE VALVE FOR SIZE < 14")
- E BUTTERFLY VALVE WITH HAND WHEEL OPERATOR (GATE VALVE FOR SIZE < 14"), REQUIRED ONLY WHEN BYPASS SPECIFIED
- F FLANGED SPOOL, LENGTH = 1'-0"
- G ASTM C33, NO. 57 GRAVEL.
- H PROPELLER TYPE FLOW METER, SPARLING MODEL PDS-102 OR EQUAL, COMPLETE WITH TUBE, SADDLE AND STRAIGHTENING VANES.
- J ADJUSTABLE PIPE SADDLE SUPPORT, GRINNEL FIG. 264, ELCEN FIG. 50, OR EQUAL.
- K GATE VALVE WITH HAND WHEEL OPERATOR, REQUIRED ONLY IF BYPASS SPECIFIED
- L LADDER PER COA STANDARD DRAWING 2335.
- M ALUMINUM FLOOR DOOR WITH RECESSED HASP COVERED BY A HINGED LID FLUSH WITH TOP SURFACE. DOOR SIZE SHALL BE 4'x4' DOUBLE LEAF (WITHOUT BYPASS) AND 4'x6' DOUBLE LEAF (WITH BYPASS). HARDWARE AND HINGES SHALL BE 304 STAINLESS STEEL. BILCO TYPE JD, OR EQUAL.
- N 6" STEEL PIPE W/GOOSENECK AND INSECT SCREEN
- P WALL PIPE WITH THRUST COLLAR, CENTER IN WALL
- Q 1/2" PIPE TAP WITH 1/2" BALL VALVE AND CAP
- R D.I. SPOOL FLG. x P.E.
- S MEGA FLANGE - FLANGE ADAPTOR, AS MANUFACTURED BY EBAA IRON SALES, OR APPROVED EQUAL.
- T INSULATING FLANGE KIT.

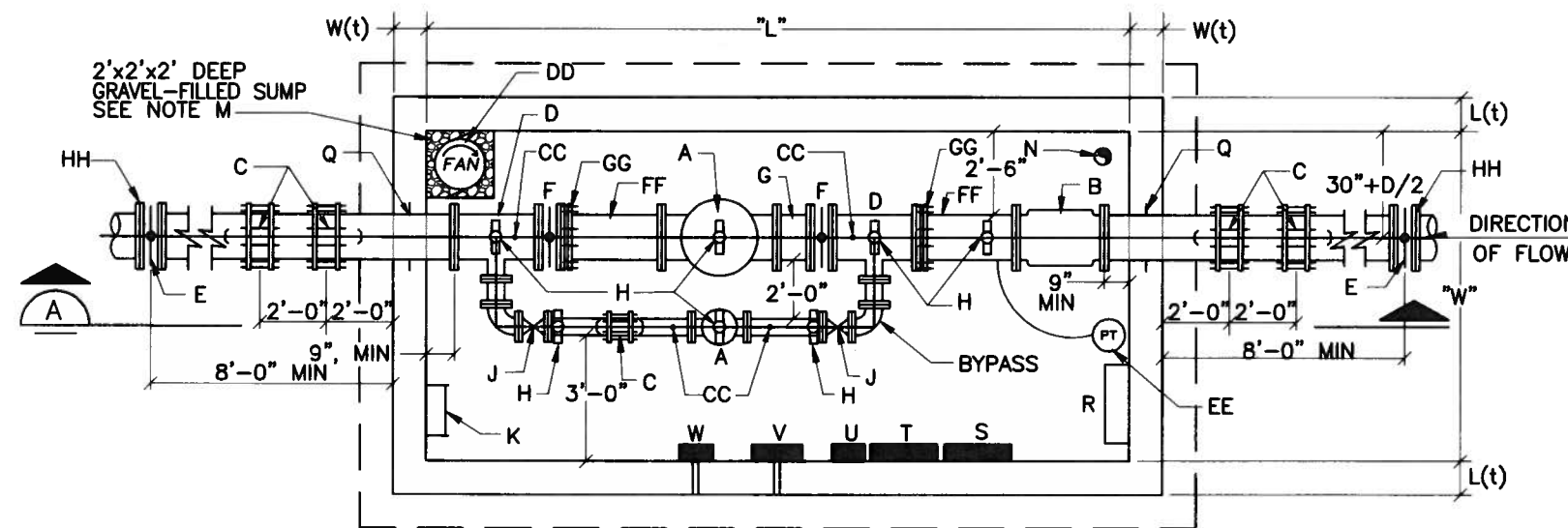
REVISIONS	WATER AUTHORITY
	WATER STANDARD PRV STATION WITH PROPELLER METER
	DWG. 2355 JANUARY 2011



TOP PLAN



SECTION (A)



INTERIOR PLAN

# GENERAL NOTES:

1. FOR STRUCTURAL DETAILS, VAULT DIMENSIONS AND REINFORCING SEE STANDARD PRV STATION STRUCTURAL DETAILS DWG. 2357.
2. SEE STANDARD PRV STATION NO METER, DWG. 2354 FOR ADDITIONAL CONSTRUCTION NOTES.
3. IN NON-TRAFFIC AREAS, THE TOP ELEVATION OF THE VAULT WILL BE 12" ABOVE FINISHED GRADE WITH BOLLARDS PAINTED SAFETY YELLOW AT EACH CORNER.
4. ALL PARTS WITHIN THE VAULT MUST COINCIDE WITH THE CURRENT WATER AUTHORITY APPROVED PRODUCTS LIST.
5. A PLATE SHALL BE INSTALLED ON THE VAULT WALL THAT SHOWS THE ELEVATION.
5. DO NOT CONSTRUCT DRAIN POCKETS WHEN CONSTRUCTING IN SHALLOW GROUNDWATER CONDITIONS. ENGINEER SHALL PROVIDE A WATERPROOF MANHOLE OR VAULT DESIGN FOR APPROVAL BY THE WATER AUTHORITY PRIOR TO INSTALLATION.

## CONSTRUCTION NOTES:

- A PRESSURE REDUCING VALVE, AS SPECIFIED
- B MAGNETIC FLOW METER, KROHNE M940/960, OR AS APPROVED BY THE WATER AUTHORITY, COMPLETE WITH SIGNAL CONVERTER
- C FLEXIBLE COUPLING WITH THRUST TIES, SEE THRUST TIE DETAIL ON DWG. 2358.
- D FLANGED TEE
- E BURIED BUTTERFLY VALVE (GATE VALVE FOR SIZE < 14")
- F BUTTERFLY VALVE (GATE VALVE FOR SIZE < 14")
- G FLANGED SPOOL, LENGTH = 1'-0"
- H ADJUSTABLE PIPE SADDLE SUPPORT, GRINNELL FIG. 264, ELCEN FIG. 50 OR EQUAL
- J GATE VALVE
- K LADDER PER COA STANDARD DRAWING 2335.
- L ALUMINUM FLOOR DOOR WITH RECESSED HASP COVERED BY A HINGED LID FLUSH WITH TOP SURFACE. DOOR SIZE SHALL BE 4'x6' DOUBLE LEAF. HARDWARE AND HINGES SHALL BE TYPE 304 STAINLESS STEEL. BILCO TYPE JD OR EQUAL.
- M GRAVEL PER ASTM C33, NO. 57 GRAVEL.
- N 6" STEEL PIPE W/GOOSENECK AND INSECT SCREEN
- P 3'-0" SQ ALUMINUM FLOOR DOOR WITH RECESSED HASP COVERED BY A HINGED LID FLUSH WITH TOP SURFACE. HARDWARE AND HINGES SHALL BE TYPE 304 STAINLESS STEEL. BILCO TYPE J OR EQUAL.
- Q WALL PIPE WITH THRUST COLLAR, CENTER IN WALL
- R RCP CABINET FURNISHED BY THE WATER AUTHORITY
- S POWER SUPPLY AND TERMINAL CABINET
- T FLOW INDICATING TRANSMITTER
- U WEATHERPROOF JUNCTION BOX FOR CONNECTION OF VAULT FLOOD LEVEL ELEMENT
- V 100 AMP, 120/240 VOLT, SINGLE PHASE THREE WIRE CIRCUIT BREAKER PANEL
- W RADIO AND TELEMETRY EQUIPMENT FURNISHED BY THE WATER AUTHORITY
- X WEATHERPROOF JUNCTION BOXES FOR CONNECTION TO TWO POLE MICROSWITCH FOR INTRUSION ALARM AND FOR CONNECTION TO DPDT MICROSWITCH TO ENERGIZE LIGHTS AND EXHAUST FAN WHEN ACCESS DOOR IS OPENED
- Y WEATHERPROOF, GFI DUPLEX RECEPTACLE 24" ABOVE FINISH FLOOR
- Z 2-LAMP STRIP FLUORESCENT ENCLOSED SURFACE MOUNTED LIGHT FIXTURE
- AA PEDESTAL TYPE 100 AMP, 120/240 VOLT, SINGLE PHASE METER AND MAIN CIRCUIT BREAKER. INSTALL ON 16"x16"x6" CONCRETE PAD PER PNM DWG #DS-19-84.0
- BB TELEMETRY SYSTEM MAST AND ANTENNA LOCATION TO BE DETERMINED BY THE WATER AUTHORITY
- CC 1/2" PIPE TAP WITH 1/2" BALL VALVE AND CAP
- DD INLINE EXHAUST FAN W/SWITCH AND ACCESS DOOR CONTROLS
- EE PRESSURE TRANSDUCER, HONEYWELL MODEL STG 644-EIG-0000-DM. PROVIDE 1/2" PIPE TAP, 1/2" BALL VALVE AND TUBING TO CONNECT TRANSDUCER TO PIPE BARREL
- FF D.I. SPOOL FLG. x P.E.
- GG MEGA FLANGE - FLANGE ADAPTER, AS MANUFACTURED BY EBAA IRON SALES, OR APPROVED EQUAL.
- HH INSULATING FLANGE KIT.

REVISIONS	WATER AUTHORITY
	<b>WATER</b>
	<b>STANDARD PRV STATION</b>
	<b>WITH POWER/TELEMETRY</b>
	DWG. 2356 JANUARY 2011

# PRV VAULT DIMENSION AND REINFORCING SCHEDULE

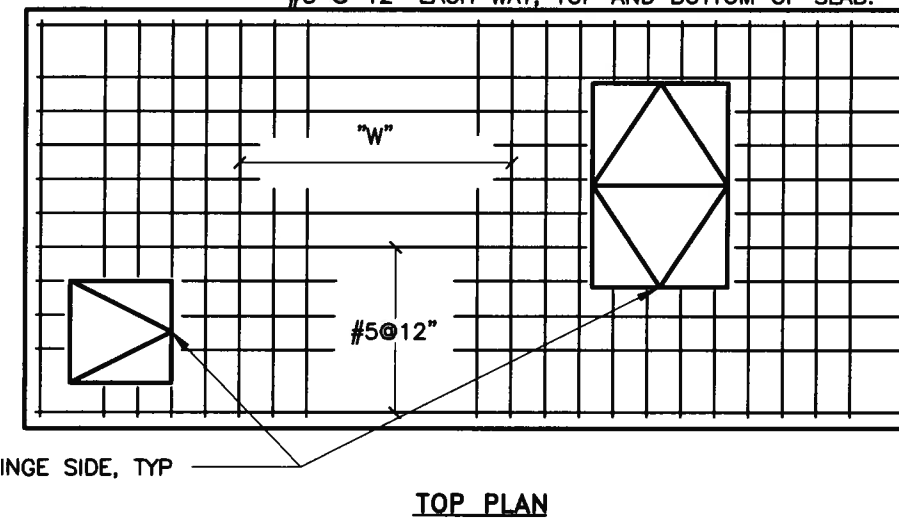
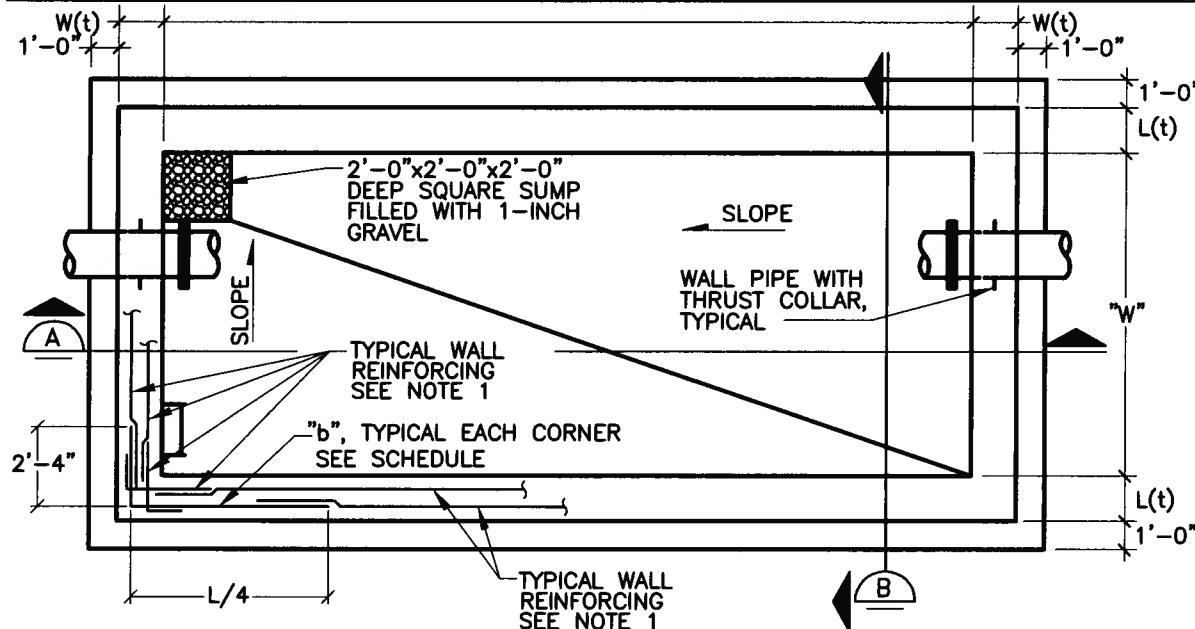
STANDARD PRV VAULT DIMENSIONS														WALL REINFORCING								
PIPE SIZE		STANDARD PRV NO METER, NO BYPASS		STANDARD PRV NO METER, W/BYPASS		WITH PROPELLER METER AND NO BYPASS		WITH PROPELLER METER AND BYPASS		WITH MAGNETIC FLOW METER AND BYPASS		WALL THICKNESS		TOP THICKNESS		WITHOUT BYPASS			WITH BYPASS			
NO	METER, NO BYPASS	NO	METER, W/BYPASS	NO	METER, W/BYPASS	NO	METER, W/BYPASS	NO	METER, W/BYPASS	NO	METER, W/BYPASS	L(t)	W(t)	T(t)	NONTRAFFIC	"L"	"W"	b	"L"	"W"	b	
(IN)	"L"	"W"	"L"	"W"	"L"	"W"	"L"	"W"	"L"	"W"	"L"	"W"	L(t)	W(t)	T(t)	NONTRAFFIC	a	a	b	a	a	b
6	10'-6"	5'-6"	11'-8"	8'-0"	10'-6"	5'-6"	14'-6"	8'-0"	15'-8"	8'-6"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	0'-8"	#6 @ 12"	TYPICAL	TYPICAL	#5 @ 6"	TYPICAL	#6 @ 12"
8	10'-6"	5'-8"	12'-0"	8'-2"	10'-6"	5'-8"	15'-4"	8'-2"	16'-2"	8'-8"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	0'-8"	#6 @ 12"	TYPICAL	TYPICAL	#5 @ 6"	TYPICAL	#6 @ 12"
10	10'-6"	5'-10"	13'-0"	8'-4"	11'-4"	5'-10"	17'-4"	8'-4"	17'-4"	8'-10"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	0'-8"	#6 @ 12"	#6 @ 12"	TYPICAL	#5 @ 6"	#6 @ 12"	#6 @ 12"
12	10'-6"	6'-0"	13'-8"	8'-6"	12'-8"	6'-0"	19'-0"	8'-6"	18'-4"	9'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	0'-8"	#6 @ 12"	#6 @ 12"	TYPICAL	#5 @ 6"	#6 @ 12"	#6 @ 12"
14	10'-6"	6'-2"	14'-9"	8'-8"	14'-3"	6'-2"	21'-6"	8'-8"	20'-2"	9'-2"	1'-0"	1'-2"	1'-0"	1'-2"	1'-0"	0'-8"	#5 @ 6"	#5 @ 6"	#6 @ 12"	#5 @ 6"	#5 @ 6"	#6 @ 12"
16	10'-6"	6'-4"	15'-4"	8'-10"	16'-6"	6'-4"	24'-2"	8'-10"	21'-0"	9'-4"	1'-0"	1'-2"	1'-0"	1'-2"	1'-0"	0'-8"	#5 @ 6"	#5 @ 6"	#6 @ 12"	#5 @ 6"	#5 @ 6"	#6 @ 12"

**DIMENSIONAL NOTES:**  
 "L" = VAULT LENGTH  
 "W" = VAULT WIDTH  
 L(t) = WALL THICKNESS(LENGTH)  
 W(t) = WALL THICKNESS(WIDTH)  
 T(t) = TOP SLAB THICKNESS

**WALL REINFORCING NOTES:**  
 1. "a" BAR DESIGNATION REPRESENTS WALL DOWELS PROTRUDING VERTICALLY FROM BASE SLAB ALONG LENGTHWISE DIMENSION "L" OR WIDTH DIMENSION "W".  
 2. "b" BAR DESIGNATION REPRESENTS ADDITIONAL HORIZONTAL WALL CORNER REINFORCING.

**GENERAL NOTES:**  
 1. TYPICAL WALL REINFORCING SHALL BE #5 @ 12" O.C., EACH WAY, EACH FACE UNLESS SHOWN OTHERWISE ON THE SCHEDULE. PROVIDE BARS AS INDICATED ON THE SCHEDULE AND LAP W/ #5 @ 12" FOR REMAINDER OF WALL HT. OR LENGTH.  
 2. TYPICAL BASE SLAB REINFORCING SHALL BE #5 @ 12" EACH WAY, TOP AND BOTTOM OF SLAB.

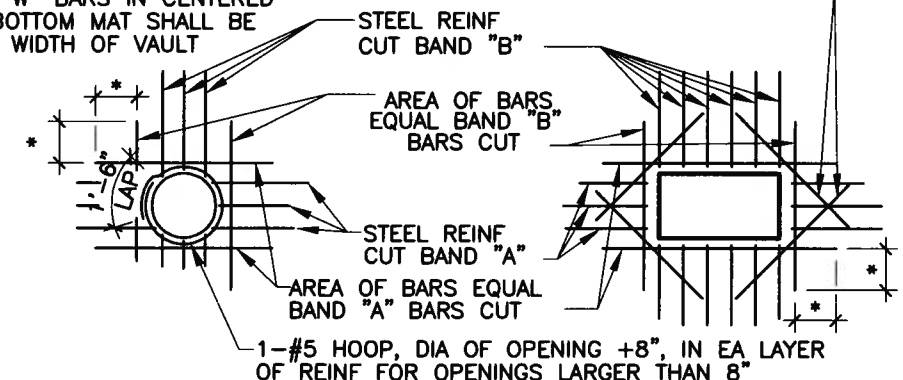
- CONCRETE SHALL BE IN ACCORDANCE WITH STD SPEC SEC. 510 AND SEC. 101 FOR HYDRAULIC CONCRETE  $f'_c=3000$  psi @ 28 DAYS. ALL REINFORCING STEEL SHALL BE GRADE 60.
- IF THE DEPTH OF VAULT EXCEEDS THE 11'-0" MAX. DEPTH SHOWN, THE ENGINEER SHALL DESIGN THE REINFORCEMENT, WALL & FLOOR THICKNESS TO SUIT THE SPECIFIC CONDITIONS. ALL STRUCTURAL MODIFICATIONS SHALL BE DESIGNED AND STAMPED BY A LICENSED NEW MEXICO PROFESSIONAL ENGINEER.
- DO NOT CONSTRUCT DRAIN POCKETS WHEN CONSTRUCTING IN SHALLOW GROUNDWATER CONDITIONS. ENGINEER SHALL PROVIDE A WATERPROOF MANHOLE OR VAULT DESIGN FOR APPROVAL BY THE WATER AUTHORITY PRIOR TO INSTALLATION.



VAULT DIMENSION	VAULT TOP REINFORCING	
	T(t)=0'-8" CENTERED MAT	T(t)=1'-0" BOTTOM MAT
"W"	"W"	"W"
≤ 6'-0"	#5 @ 12"	#5 @ 12"
> 6'-0" ≤ 7'-0"	#5 @ 12"	#6 @ 12"
> 7'-0" ≤ 9'-0"	#6 @ 12"	#7 @ 12"
> 9'-0" ≤ 10'-0"	#7 @ 12"	#7 @ 12"

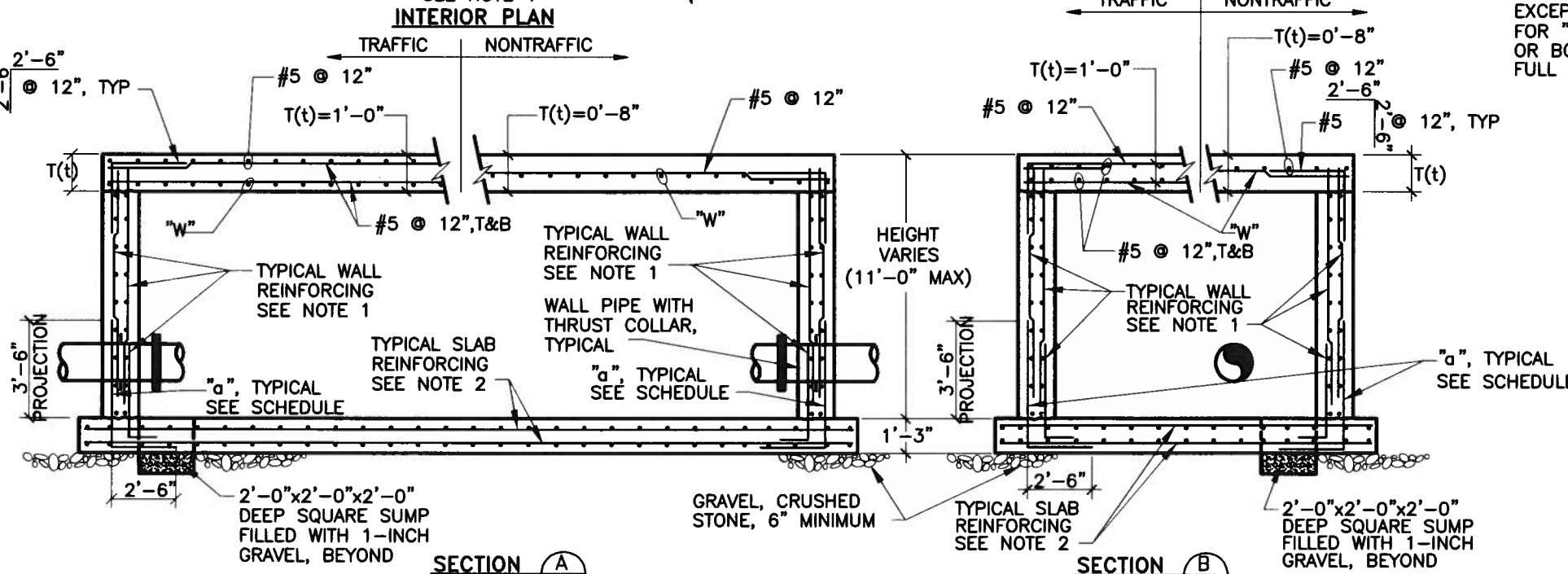
\* #5=2'-6", #6=3'-0", #7=3'-6"  
 EXCEPT REPLACEMENT BARS FOR "W" BARS IN CENTERED OR BOTTOM MAT SHALL BE FULL WIDTH OF VAULT

ADD 1-#5x4'-0" DIAG AT EA COR FOR EA LAYER OF REINF



## OPENING NOTES:

- TYPICAL FOR ALL OPENINGS IN CONCRETE WALLS AND SLABS.
- DO NOT WELD REINFORCEMENT TO PIPE SLEEVES AND INSERTS.



REVISIONS	WATER AUTHORITY
	WATER
	STANDARD PRV STATION
	STRUCTURAL DETAILS
	DWG. 2357
	JANUARY 2011

*SEE NOTES TIE ROD SCHEDULE			
TEST PRESSURE		150 PSI	
PIPE DIA. (IN.)	MINIMUM PIPE WALL THICKNESS (IN.)*	TIE RODS	
		DIA. (IN.)	NO. REQ'D
6	3/16	5/8	2
8	3/16	5/8	2
10	3/16	5/8	2
12	3/16	5/8	2
14	3/16	3/4	2
16	3/16	7/8	2

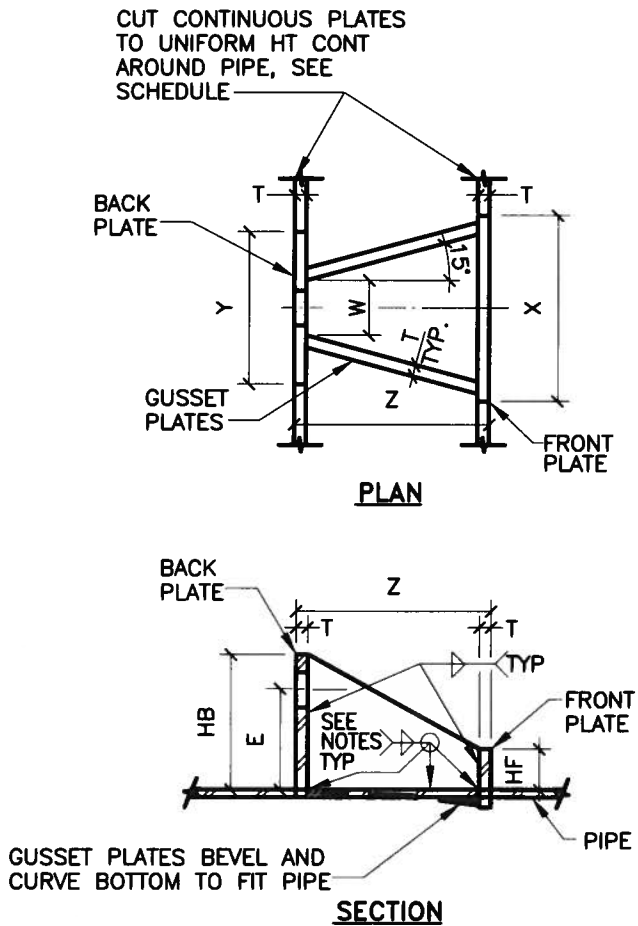
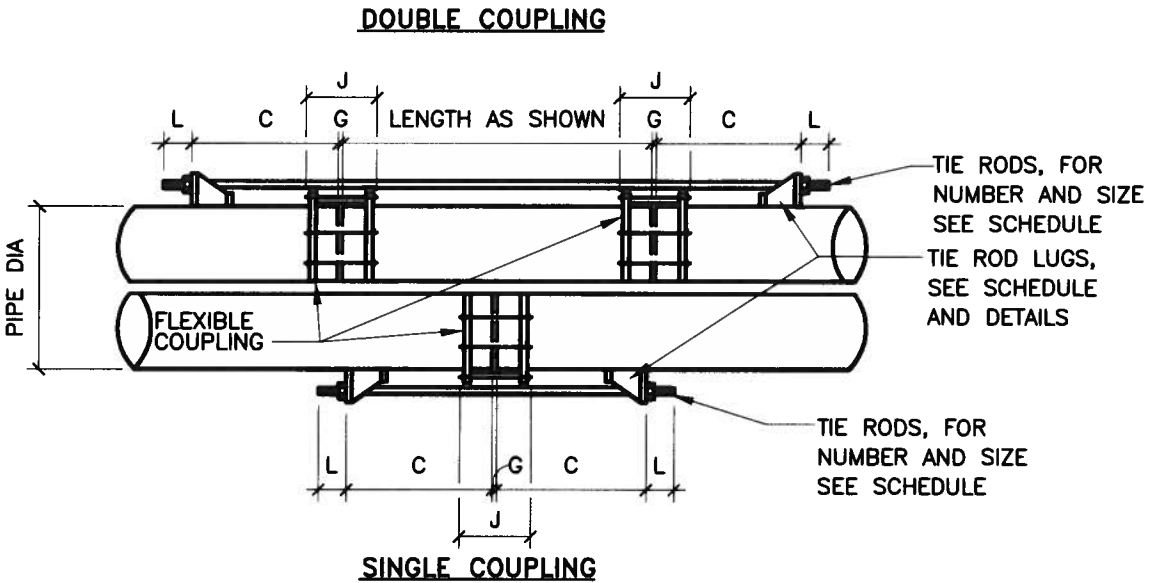
NOTES:

- THE CONTRACTOR SHALL DETERMINE THE LENGTH "J" (COUPLING BOLT LENGTH) FROM MANUFACTURER'S CATALOGS USING THE SPECIFIED MIDDLE RING LENGTH.
- "G" = MANUFACTURER'S RECOMMENDED SPACE BETWEEN ENDS OF PIPE.
- "C" = J+Z+1 INCH, (ROUND THIS VALUE UP TO NEXT EVEN INCH), MINIMUM. (FOR Z DIMENSIONS, SEE LUG SCHEDULE.)
- TIE ROD LENGTH = 2L+2C+G.

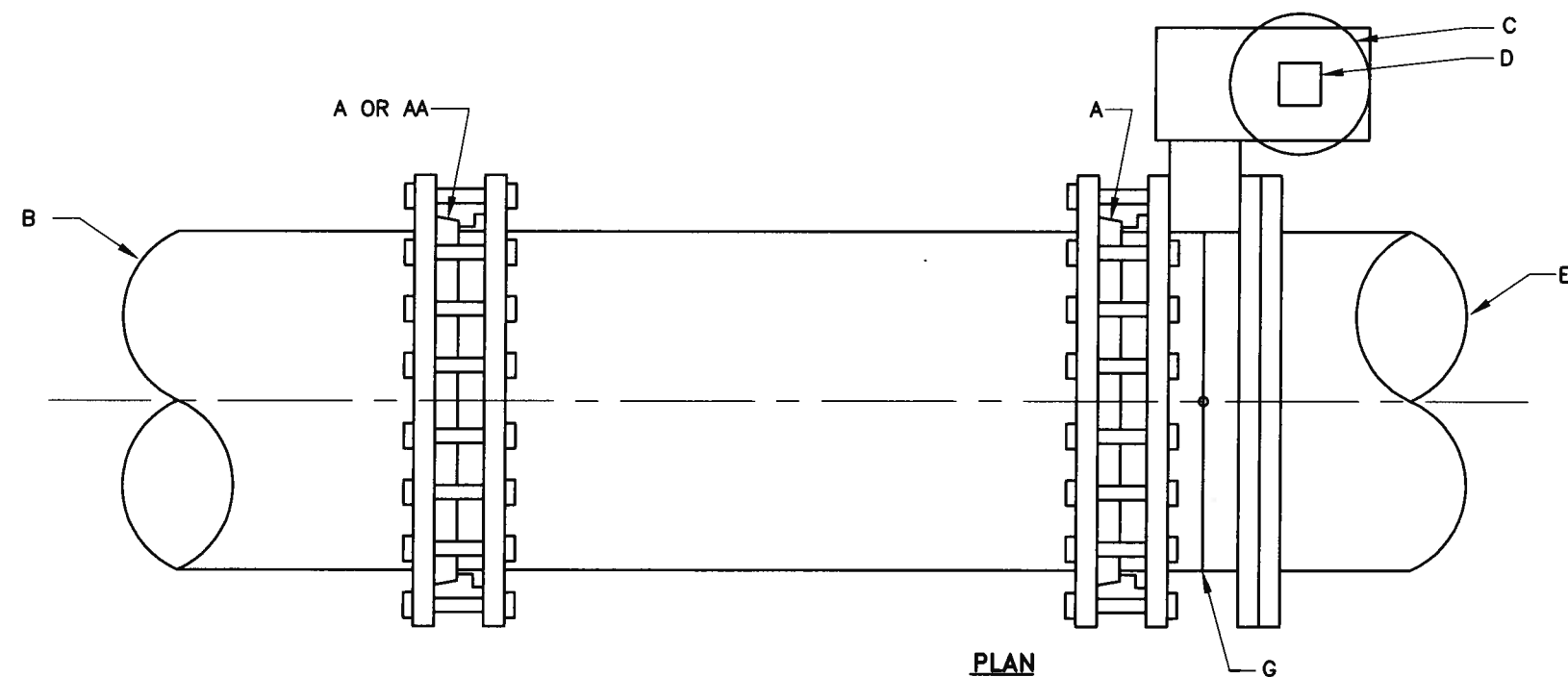
LUG SCHEDULE									
STUD DIA	T	W	X	Y	Z	HB	E	HF	L
5/8	3/8	1-3/8	4-1/16	4-1/2	3-3/8	3-7/8	3	1-3/4	3
3/4	3/8	1-1/2	5	4-1/2	5	4-1/8	3-1/8	1-3/4	3
7/8	1/2	1-5/8	5-1/2	4-1/2	5-1/8	4-1/4	3-1/8	1-3/4	4

NOTES:

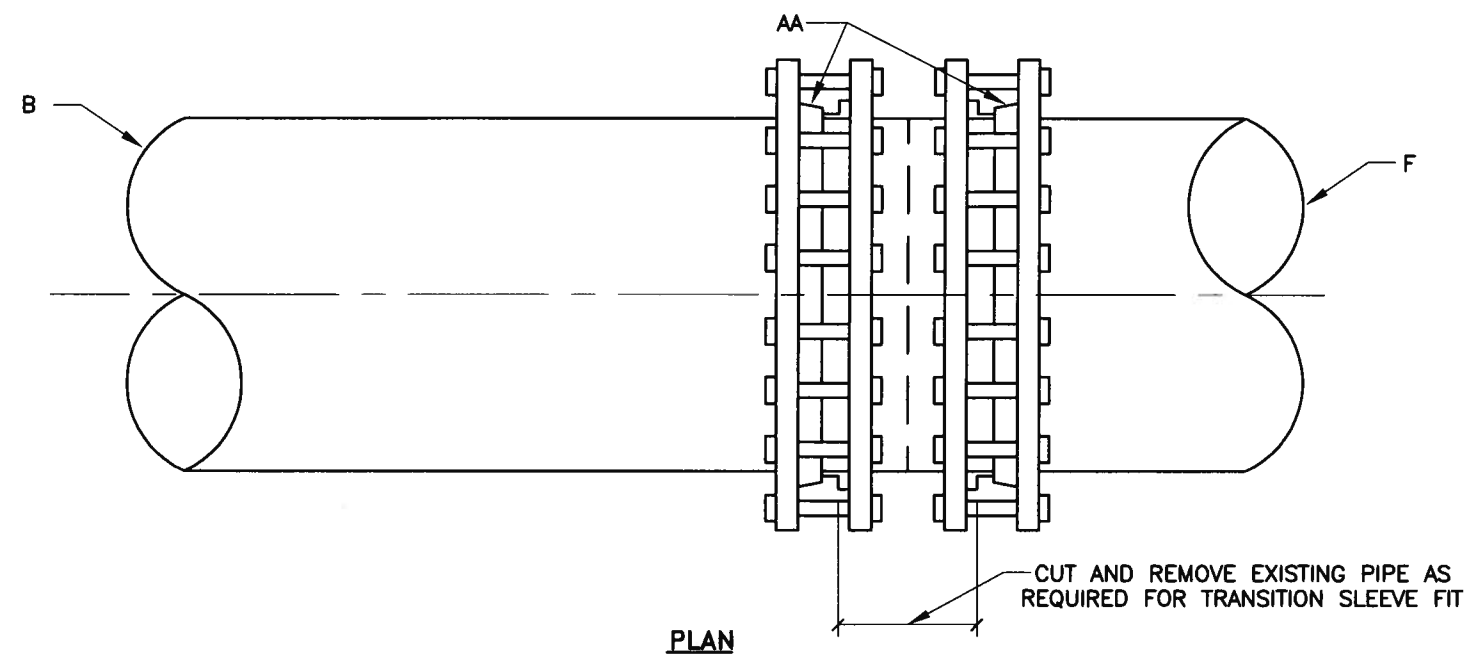
- LUG SCHEDULE DIMENSIONS IN INCHES.
- TIE RODS SHALL CONFORM TO ASTM A193 GRADE B7.
- NUTS SHALL CONFORM TO ASTM A194 GRADE 2H.
- PLATE SHALL CONFORM TO ASTM A283 GRADE D.
- TIE ROD NUTS SHALL BE TIGHTENED GRADUALLY AND EQUALLY IN STAGES TO PREVENT UNEVEN ALIGNMENT AND TO ALLOW EQUAL STRESS ON ALL TIE RODS UNDER PRESSURE. TIGHTEN UNTIL SNUG. THREADS SHALL PROTRUDE FROM NUTS. PEEN THREADS AFTER TIGHTENING NUTS.
- TIE ROD LUGS SHALL BE SPACED EQUALLY AROUND PIPE.
- FILLET WELDS SHALL MEET THE MINIMUM REQUIREMENTS OF THE AISC SPECIFICATION EXCEPT AS FOLLOWS: FILLET WELDS SHALL BE 1/4-INCH MINIMUM EXCEPT WHEN WELDING 3/16-INCH PLATE WHERE THEY SHALL BE 3/16-INCH.
- TIE RODS SHALL NOT BE ATTACHED TO A PIPE WHEN THE WALL THICKNESS IS LESS THAN THE MINIMUM SHOWN ON THE TIE ROD SCHEDULE.
- FOR ALL BURIED ASSEMBLIES, COAT WITH AN ENGINEER APPROVED PRODUCT OR AS APPROVED ON THE CURRENT WATER AUTHORITY APPROVED PRODUCTS LIST.



REVISIONS	WATER AUTHORITY
	WATER
	THRUST TIE DETAIL
	DWG. 2358 JANUARY 2011



**BUTTERFLY VALVE INSTALLATION DETAIL IN NEW D.I. PIPELINE**



**INSTALLATION DETAIL FOR TRANSITION BETWEEN DIFFERENT PIPE MATERIALS**

**CONSTRUCTION NOTES:**

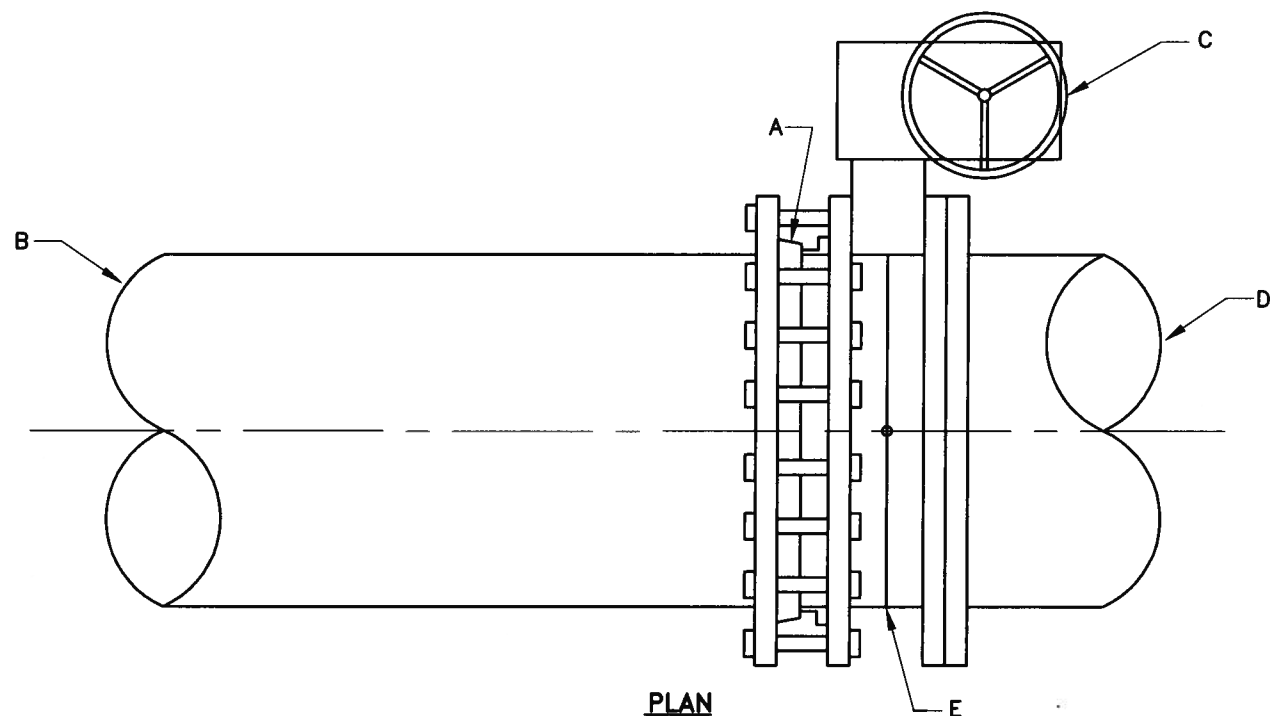
1 THIS DETAIL IS TO BE USED FOR NEW OR EXISTING DUCTILE IRON PIPE ONLY. WHERE EXISTING PIPE IS OF CAST IRON MATERIALS, VALVE INSTALLATION DETAILS SHALL BE SUBMITTED TO AND APPROVED BY THE WATER AUTHORITY.

**CONSTRUCTION NOTES:**

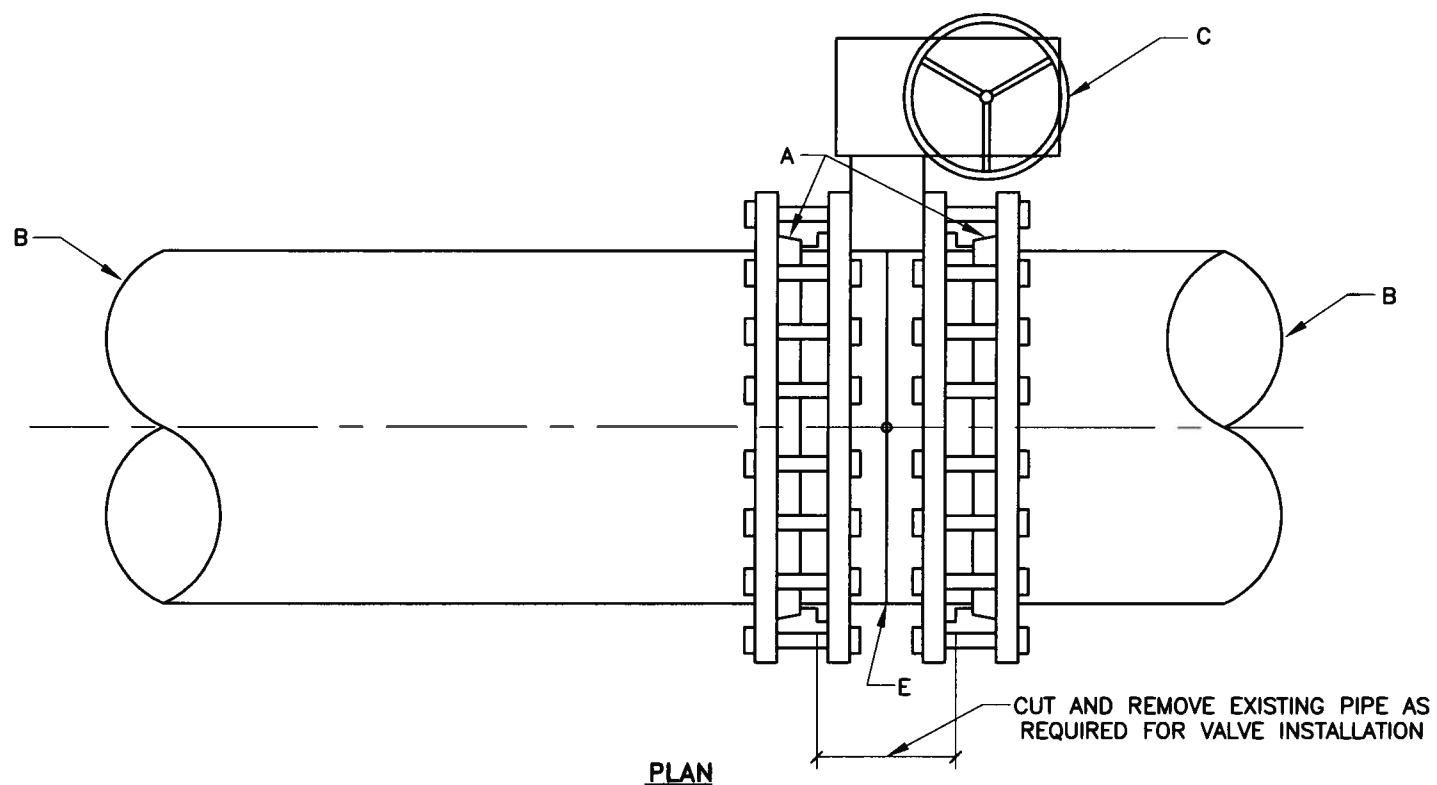
- A ADAPTER, SERIES 2100 AS MANUFACTURED BY EBAA IRON SALE, OR APPROVED EQUAL.
- AA TRANSITION SLEEVE ADAPTER, SERIES 2100 AS MANUFACTURED BY EBAA IRONSALE, OR APPROVED EQUAL.
- B MAIN PIPELINE (D.I.) WITH PLAIN END.
- C VALVE BOX AND COVER PER C.O.A. STD. DWG 2328.
- D 3" SQUARE OPERATING NUT.
- E MAIN PIPELINE (D.I.) WITH FLANGED END.
- F MAIN PIPELINE (OTHER) WITH PLAIN END.
- G BUTTERFLY VALVE (FLGxFLG), SIZE AS SHOWN ON DRAWINGS.

**DIRECT BURY INSTALLATION**

REVISIONS	WATER AUTHORITY
	WATER DUCTILE IRON BUTTERFLY VALVE DIRECT BURY INSTALLATION DETAILS
	DWG. 2359 JANUARY 2011



**BUTTERFLY VALVE INSTALLATION DETAIL IN NEW D.I. PIPELINE**



**BUTTERFLY VALVE INSTALLATION DETAIL IN EXISTING D.I. PIPELINE**

**CONSTRUCTION NOTES:**

1 THIS DETAIL IS TO BE USED FOR NEW OR EXISTING DUCTILE IRON PIPE ONLY. WHERE EXISTING PIPE IS OF CAST IRON MATERIALS, VALVE INSTALLATION DETAILS SHALL BE SUBMITTED TO AND APPROVED BY THE WATER AUTHORITY.

2 SEE STANDARD DRAWING 2334 FOR VALVE VAULT DETAILS.

**CONSTRUCTION NOTES:**

A MEGA FLANGE – FLANGE ADAPTER, SERIES 2100 AS MANUFACTURED BY EBAA IRON SALE, OR APPROVED EQUAL.

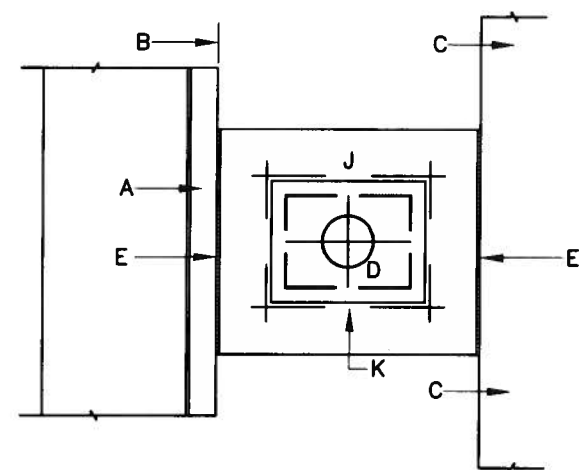
B MAIN PIPELINE (D.I.) WITH PLAIN END.

C HAND WHEEL.

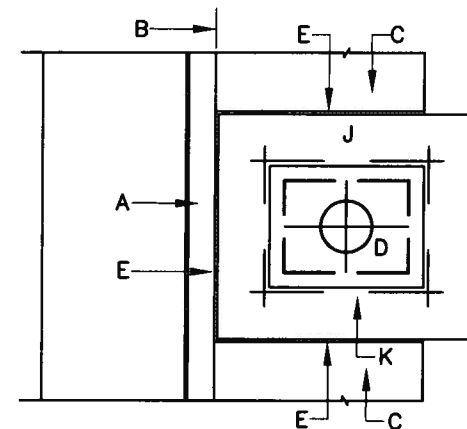
D MAIN PIPELINE (D.I.) WITH FLANGED END.

E BUTTERFLY VALVE (FLGxFLG), SIZE AS SHOWN ON DRAWINGS.

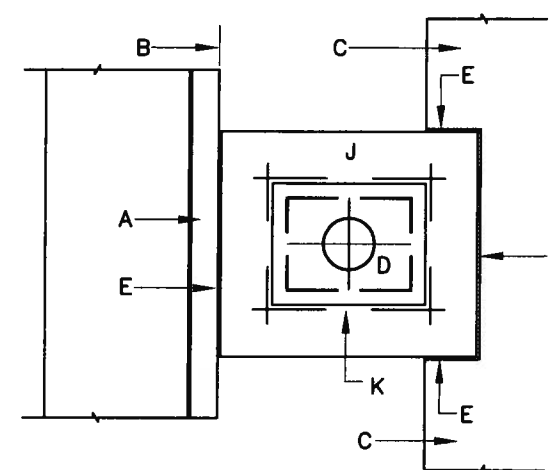
IN VAULT INSTALLATION	
REVISIONS	WATER AUTHORITY
	<b>WATER</b> <b>DUCTILE IRON BUTTERFLY VALVE</b> <b>IN VAULT INSTALLATION</b> DWG. 2360      JANUARY 2011



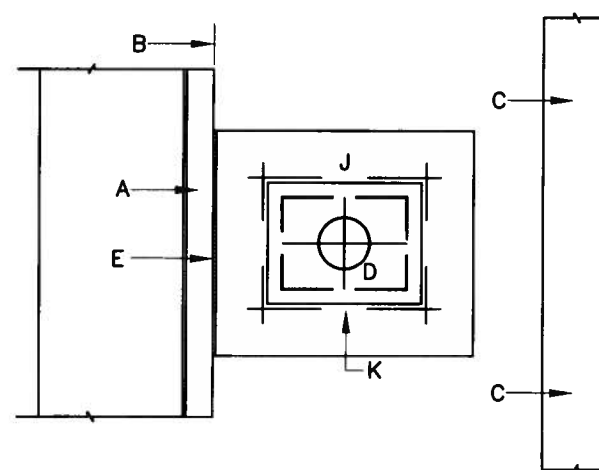
**CASE 1**  
(IN PARKWAY)



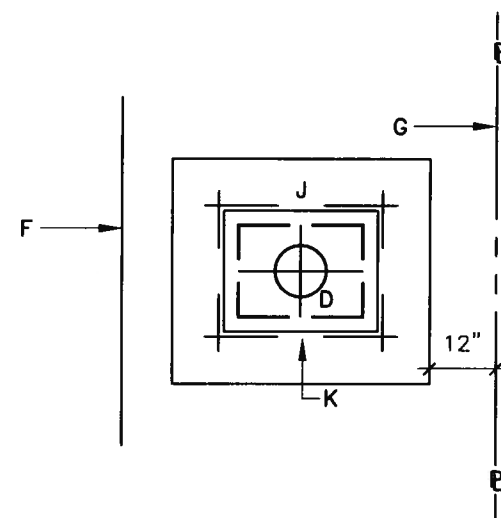
**CASE 2**  
(IN SIDEWALK)



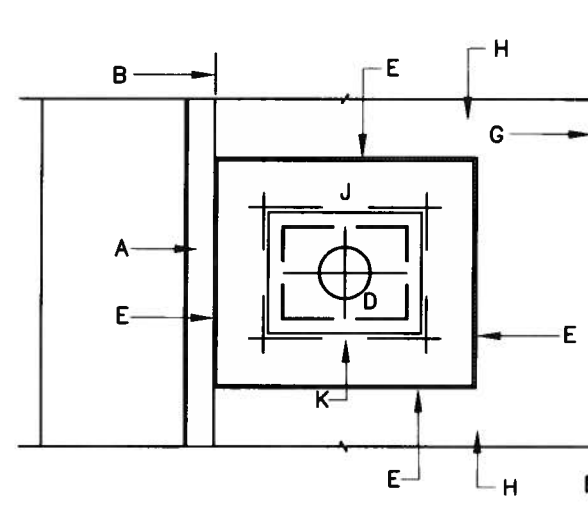
**CASE 3**  
(IN NARROW PARKWAY)



**CASE 4**  
(IN WIDE PARKWAY)



**CASE 5**  
(NO CURB AND GUTTER OR SIDEWALK)



**CASE 6**  
(IN DRIVEPAD)

**TYPICAL INSTALLATIONS 3/4" - 1" METERS**

**GENERAL NOTES:**

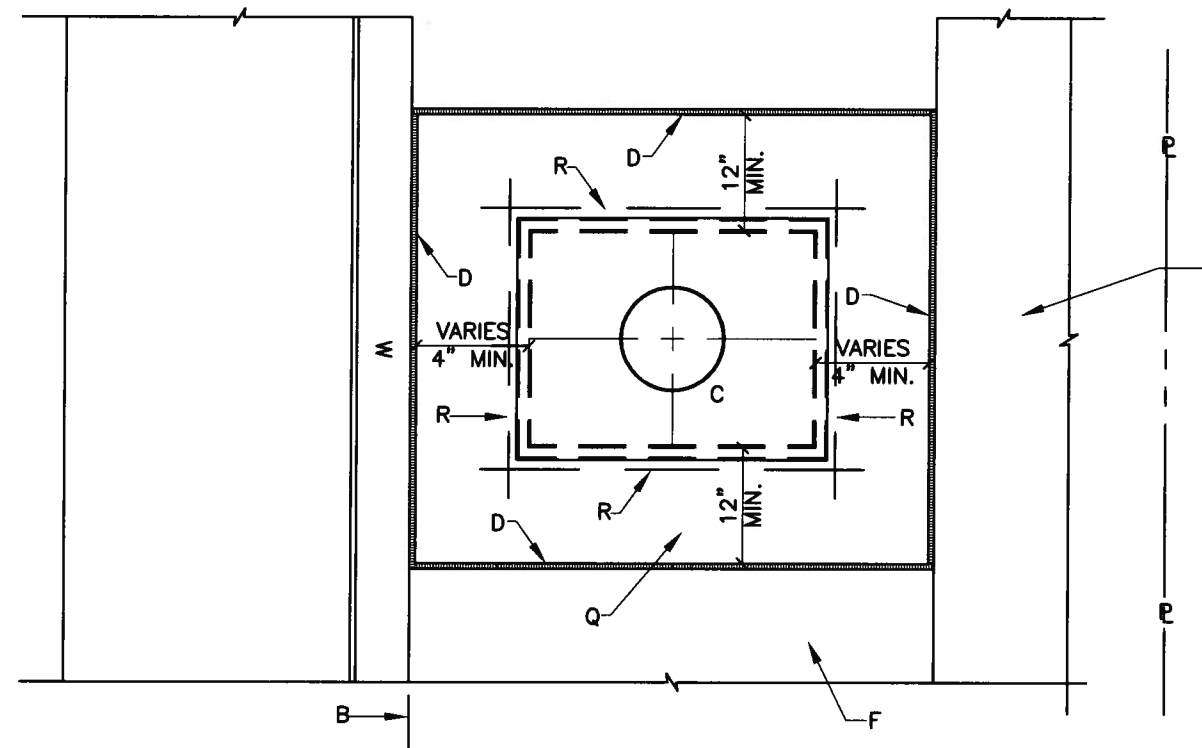
- 1 FOR CONSTRUCTION AND DIMENSIONS OF WATER METER BOX AND CONCRETE PAD, SEE STD. DWG. 2362, 2363 & 2368.
- 2 BECAUSE OF LIMITED SPACE, METER BOXES MAY BE ROTATED 90°. CONNECTIONS TO BE MADE PER WATER AUTHORITY APPROVAL.
- 3 DOUBLE METER BOXES SHALL BE CENTERED ON ADJOINING PROPERTY LINES.

**CONSTRUCTION NOTES:**

- A CURB.
- B BACK OF CURB.
- C SIDEWALK.
- D METER BOX COVER, SEE STD. DWG. 2368.
- E 1/2" EXPANSION JOINT.
- F EDGE OF UNCURBED STREET OR GRADED STREET.
- G PROPERTY LINE.
- H DRIVEPAD.
- J CONCRETE PAD SEE DWG. 2362
- K #4 REBAR CONTINUOUS ALL AROUND METER BOX.

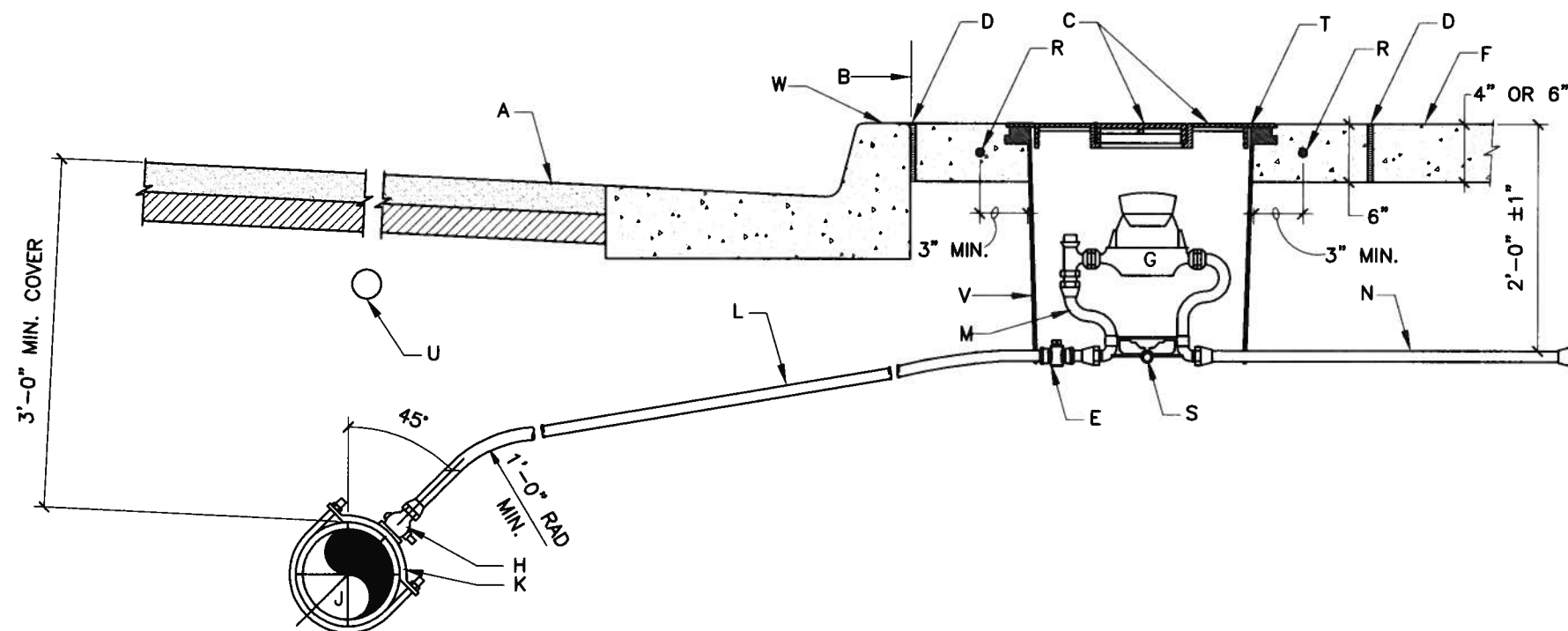
REVISIONS	WATER AUTHORITY
	WATER TYPICAL METER BOX INSTALLATIONS
	DWG. 2361 JANUARY 2011





PLAN

SEE DWG. 2361 FOR TYPICAL INSTALLATIONS



SECTION

SERVICE LINE FOR 3/4" - 1" METER

**GENERAL NOTES:**

- 1 THE METER SHALL BE SET UTILIZING A COPPER-SETTER. COPPER-SETTER HEIGHT 10" FOR 1" METER. 7" FOR 3/4" METER.
- 2 THE VALVE AND METER REGISTER SHALL BE LOCATED UNDER THE LID OPENING. WHERE TWO METERS ARE TO BE INSTALLED IN A SINGLE METER BOX, THE METER REGISTERS SHALL BE WITHIN READING RANGE OF THE LID OPENING.
- 3 METER BOX LOCATION SHALL CONFORM TO DWG. 2361.
- 4 WHEN CONTRACTOR DOES NOT INSTALL METER, CONTRACTOR SHALL PROVIDE REMOVABLE PLUGS FOR END OF COPPER-SETTER.
- 5 EXISTING CONCRETE SHALL BE SAWCUT.
- 6 CROSS CONNECTION CONTROL. SEE STANDARD SPECIFICATION SECTION 802.3.9
- 7 THE (PRIVATE) TAILPIECE IS TO BE INSTALLED BY THE CONTRACTOR AND IS TO BE OWNED AND MAINTAINED BY THE CUSTOMER PER WATER AUTHORITY ORDINANCE.

**CONSTRUCTION NOTES:**

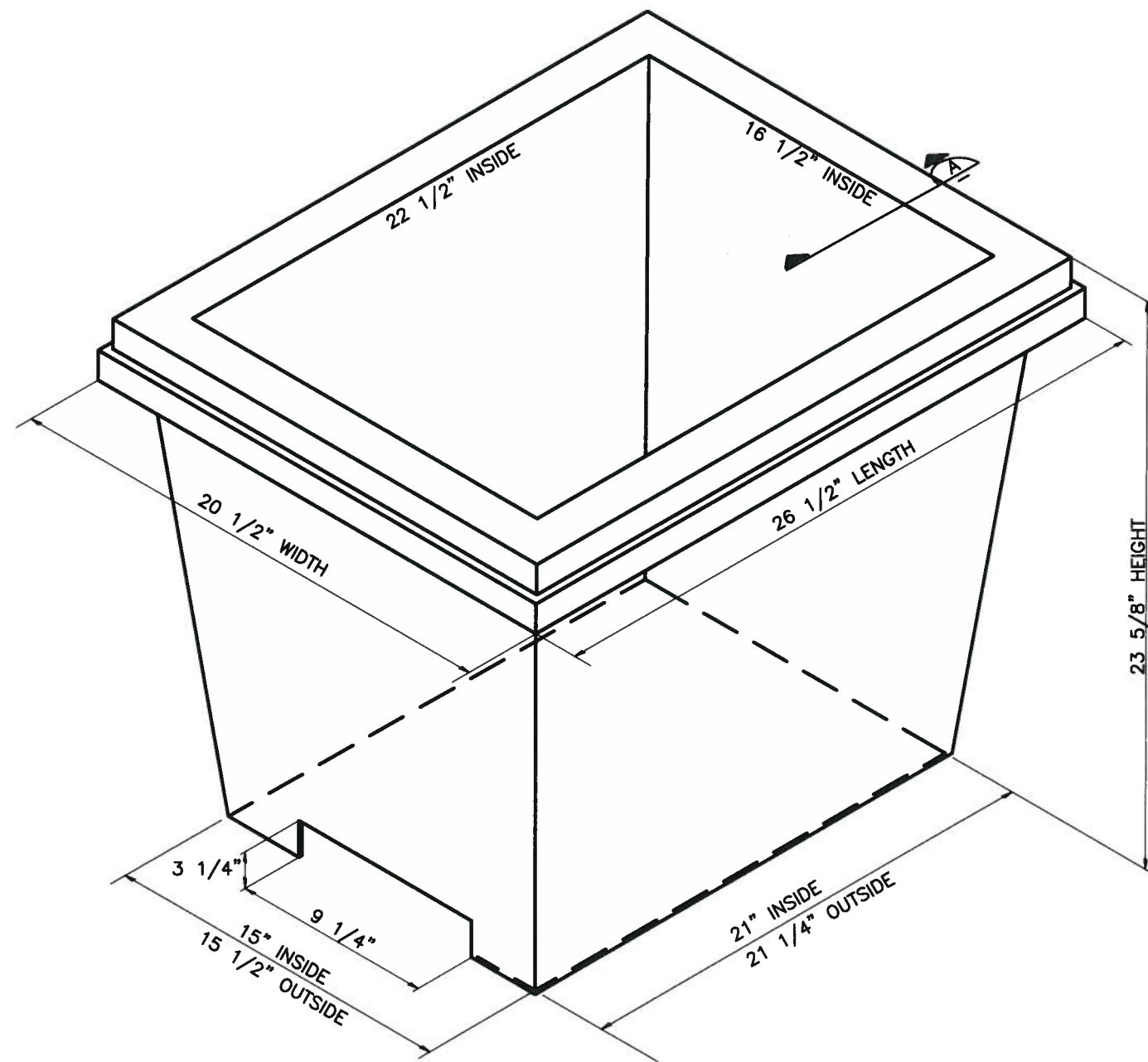
- A STREET SURFACE.
- B BACK OF CURB.
- C METER BOX COVER AND LID. SEE DWG. 2368 OR 2369.
- D 1/2" EXPANSION JOINT.
- E CURB STOP, LOCATE INSIDE METER BOX.
- F SIDEWALK OR DRIVEPAD.
- G METER. TOP OF METER SHALL BE 12"-18" BELOW COVER.
- H CORP STOP.
- J MAIN WATER LINE.
- K TAPPING SADDLE.
- L COPPER SERVICE LINE.
- M COPPER SETTER. PROVIDE WITH DUAL CHECK VALVE IN PRESSURE ZONES OW, 1W, 1E, AND FOR PRIVATE WELLS. SEE SPECIFICATION SECTION 802.3.9 FOR PRIVATE WELL PROVISIONS.
- N TAILPIECE 3' LONG, APPROVED COPPER TUBING WITH A CLEAN CUT AT END WITH A TEMPORARY PLUG. DUAL CHECK VALVE SHALL BE INSTALLED IN WATER ZONES OW, 1W, 1E AND FOR PRIVATE WELLS. SEE SPECIFICATION SECTION 802.3.9 FOR PRIVATE WELL PROVISIONS.
- Q CONCRETE PAD REQUIRED IN ALL AREAS PER SEC. 101 EXTERIOR CONCRETE, f'c=3000 psi @ 28 DAYS.
- R #4 REBAR CONTINUOUS ALL AROUND METER BOX.
- S STABILIZER BAR. USE FOR SINGLE METER ONLY. 12" LONG x 1/2" DIA. GALV. STEEL PIPE.
- T METER BOX LID SHALL BE FLUSH WITH SURROUNDING SIDEWALK.
- U ELECTRONIC MARKER DEVICE (EMD) SEE STANDARD SPECIFICATION SECTION 170.

V METER BOX PER STANDARD DRAWING 2366.

W "W" STAMP ON CURB WHERE SERVICE LINE CROSSES.

REVISIONS	WATER AUTHORITY
	<b>WATER</b> <b>3/4" - 1" METER SERVICE</b> <b>LINE INSTALLATION</b> DWG. 2362 JANUARY 2011





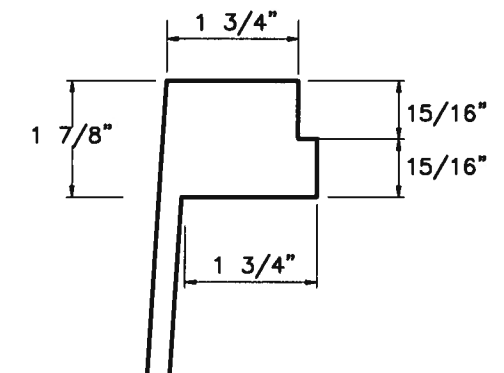
**BOX**  
N.T.S.

**GENERAL NOTES:**

- 1 METER BOX LOCATION TO CONFORM TO DWG. 2361.
- 2 CONSTRUCTION OF METER BOX TO CONFORM TO SECTION 802 FOR WATER METER BOX, 3/4" AND 1" METERS.
- 3 SEE DWG 2368 FOR METER BOX COVER AND LID.

**CONSTRUCTION NOTES:**

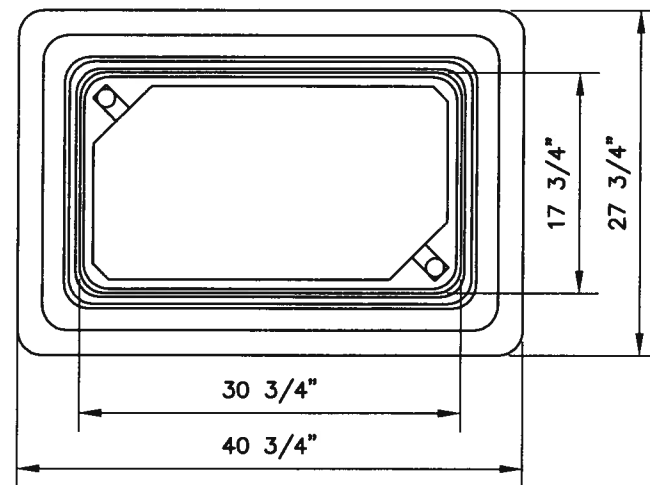
- A PIPE HOLE, 1 AT EACH END, 9 1/4" WIDE BY 3 1/4" HIGH.



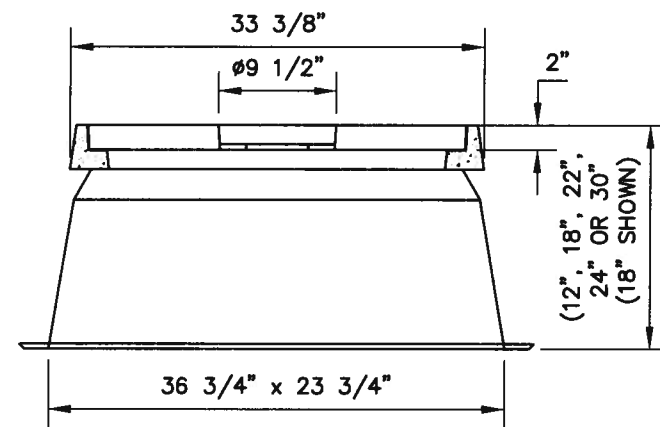
**SECTION**  
N.T.S. **A**

\*METER BOX FOR ONE OR TWO METER INSTALLATIONS

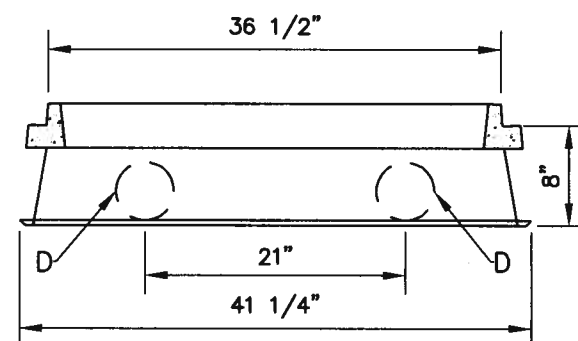
REVISIONS	WATER AUTHORITY
	<b>WATER METER BOX FOR 3/4" AND 1" METERS</b> DWG. 2366 JANUARY 2011



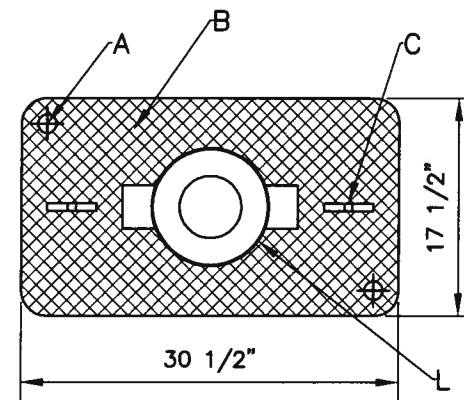
**TOP VIEW**



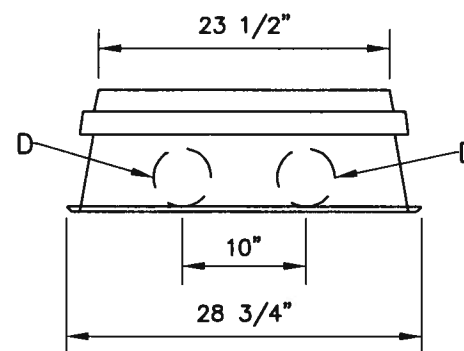
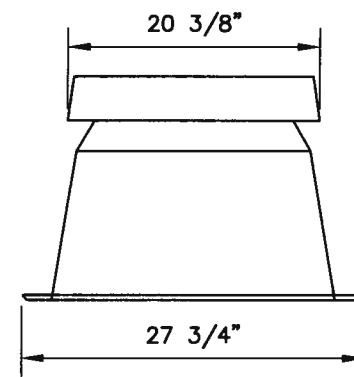
**BOX & COVER SECTION**



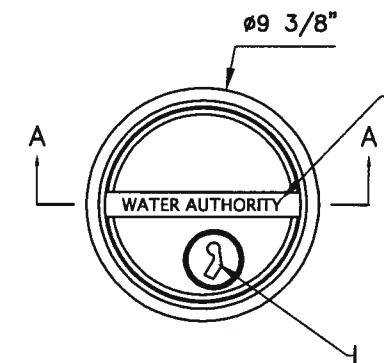
**EXTENSION SECTION**



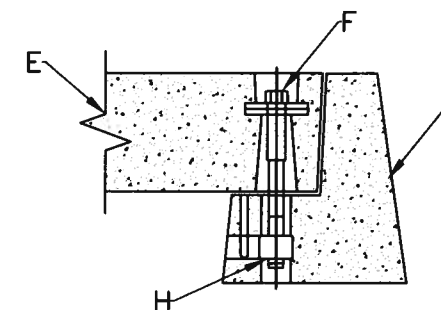
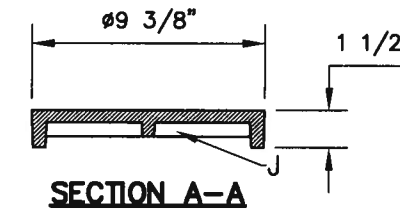
**COVER**



**END VIEWS**



**METER LID**



**COVER BOLTDOWN OPTION**

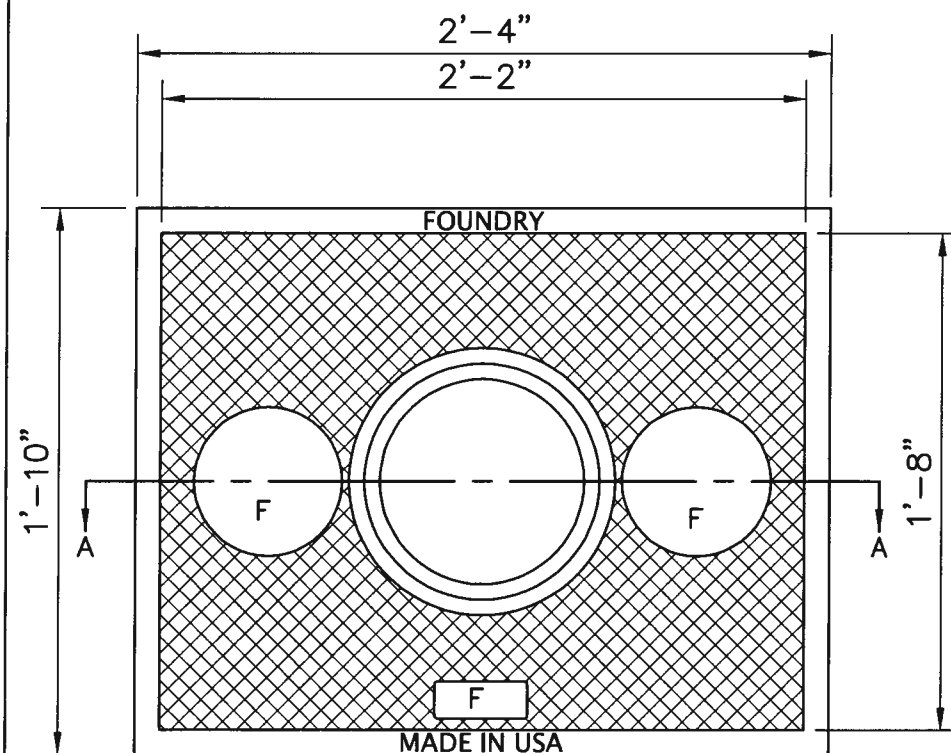
**GENERAL NOTES:**

1. MATERIAL: FIBERGLASS REINFORCED POLYMER CONCRETE AND FIBERGLASS REINFORCED POLYMER.
2. STANDARD COLOR: CONCRETE GRAY (OPTIONAL COLLARS ARE AVAILABLE FOR COVER AND COLLAR).
3. FLARED WALL BOXES ARE NESTABLE.
4. OPTIONAL CAST IRON READER LIDS ARE AVAILABLE.

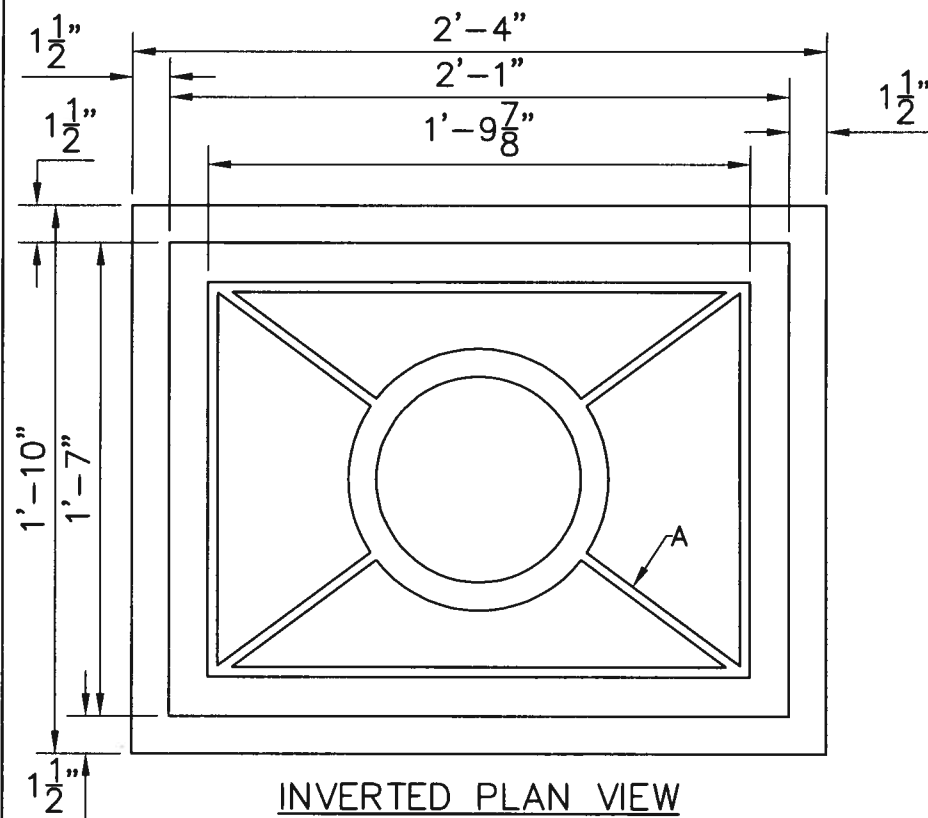
**CONSTRUCTION NOTES:**

- A. COVER BOLTDOWN OPTION
- B. SKID RESISTANT SURFACE
- C. 5/8" x 4" LIFTING SLOTS
- D. OPTIONAL KNOCKOUTS OR TERMINATORS
- E. COVER
- F. STAINLESS STEEL CAPTIVE BOLT
- G. BOX
- H. SELF-CENTERING CORROSION RESISTANT NUT
- I. METER LID KEYHOLE
- J. 1/2" THICK RIB
- K. 1/2" RAISED LETTERING (FLUSH)
- L. LID

REVISIONS	WATER AUTHORITY
	WATER METER BOX COVER & LID FOR 1-1/2" - 2" METERS
	DWG. 2367 JANUARY 2011



PLAN VIEW  
BOX COVER FOR 3/4" - 1" METERS



INVERTED PLAN VIEW  
BOX COVER FOR 3/4" - 1" METERS

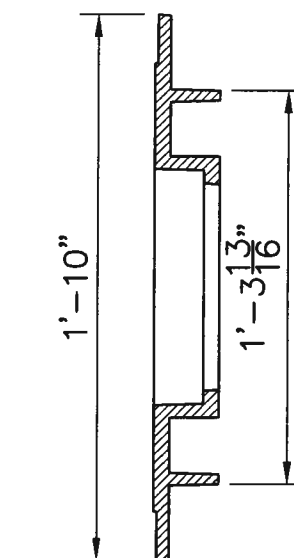
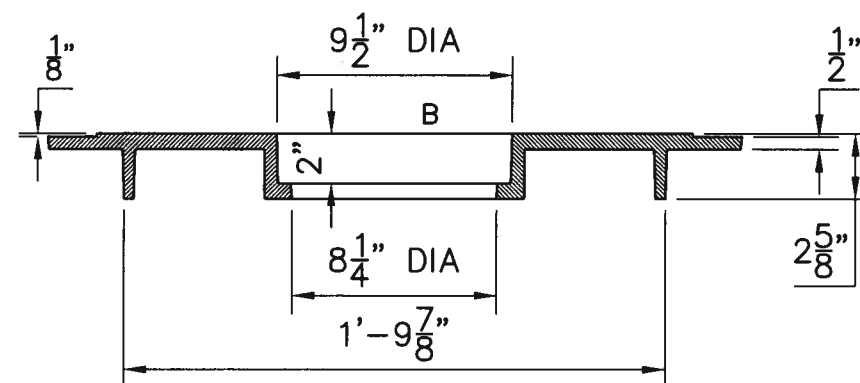
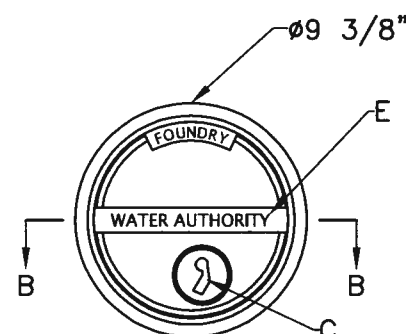


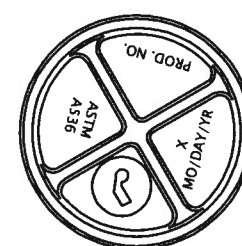
PLATE SECTION



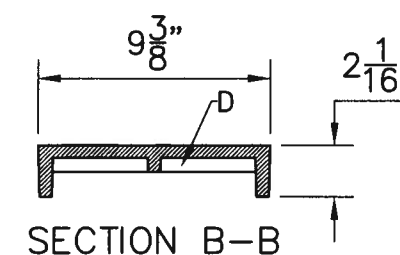
SECTION A-A



PLAN VIEW  
WATER  
METER LID



BOTTOM VIEW



SECTION B-B

# **GENERAL NOTES:**

1 TO BE USED IN SIDEWALKS, MOUNTABLE CURB OR IN UNPAVED AREAS.

## **COVER**

2 MATERIAL - DUCTILE IRON.

3 ROUND ALL EDGES.

4 TOP TO BE ASPHALT PAINTED.

5 TOP OF COVER SHALL HAVE AN INTEGRATED CORRUGATED DESIGN TO PREVENT SLIPPING.

## **LID**

6 MATERIAL - DUCTILE IRON.

7 ROUND ALL EDGES.

8 TOP TO BE ASPHALT PAINTED.

9 TOP OF LID SHALL HAVE INTEGRATED CORRUGATED DESIGN TO PREVENT SLIPPING.

10 TOP OF COVER SHALL HAVE INTEGRATED WORDS "WATER AUTHORITY".

11 LID SHALL NOT ROCK ON COVER AND SHALL BE EASILY OPENED.

12 THE TOP SURFACE OF THE LID SHALL BE FLUSH WITH TOP OF COVER.

## **CONSTRUCTION NOTES:**

A 3/8"x2 3/8" RIB (TYPICAL).

B LID OPENING.

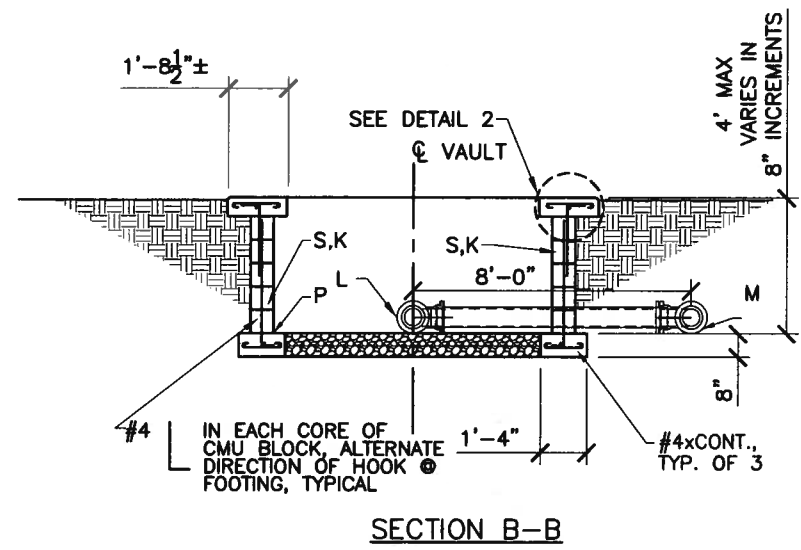
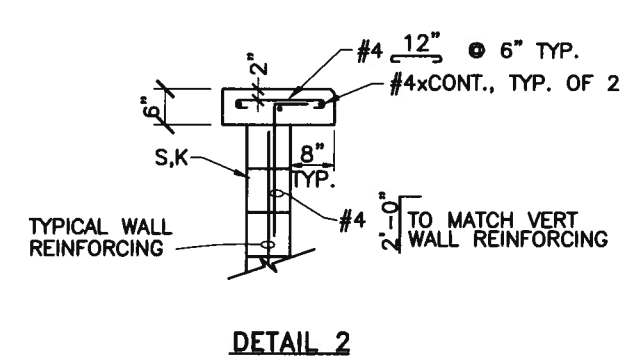
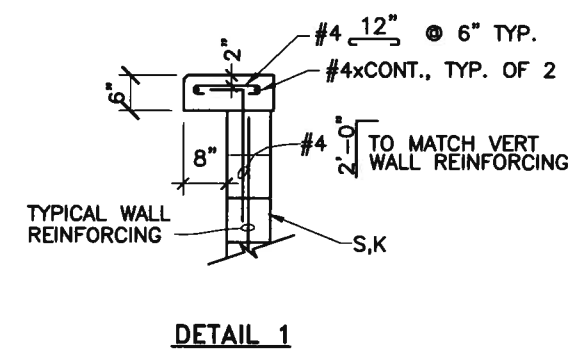
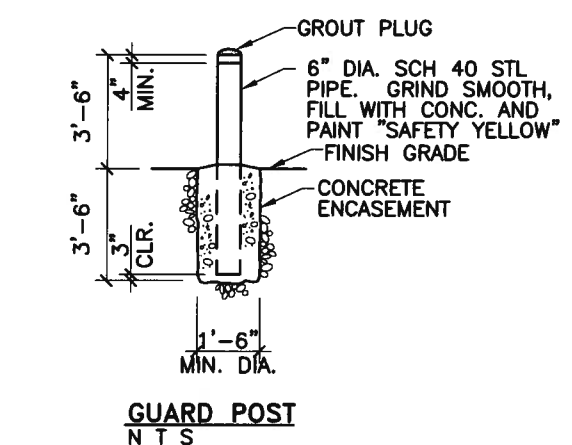
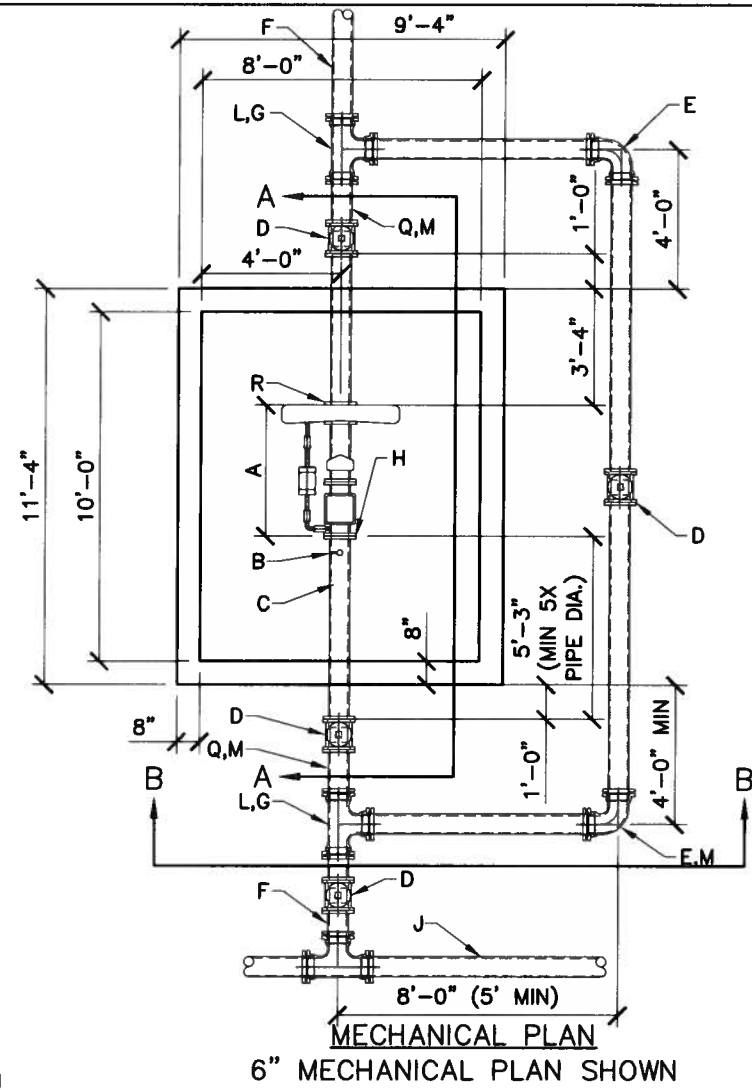
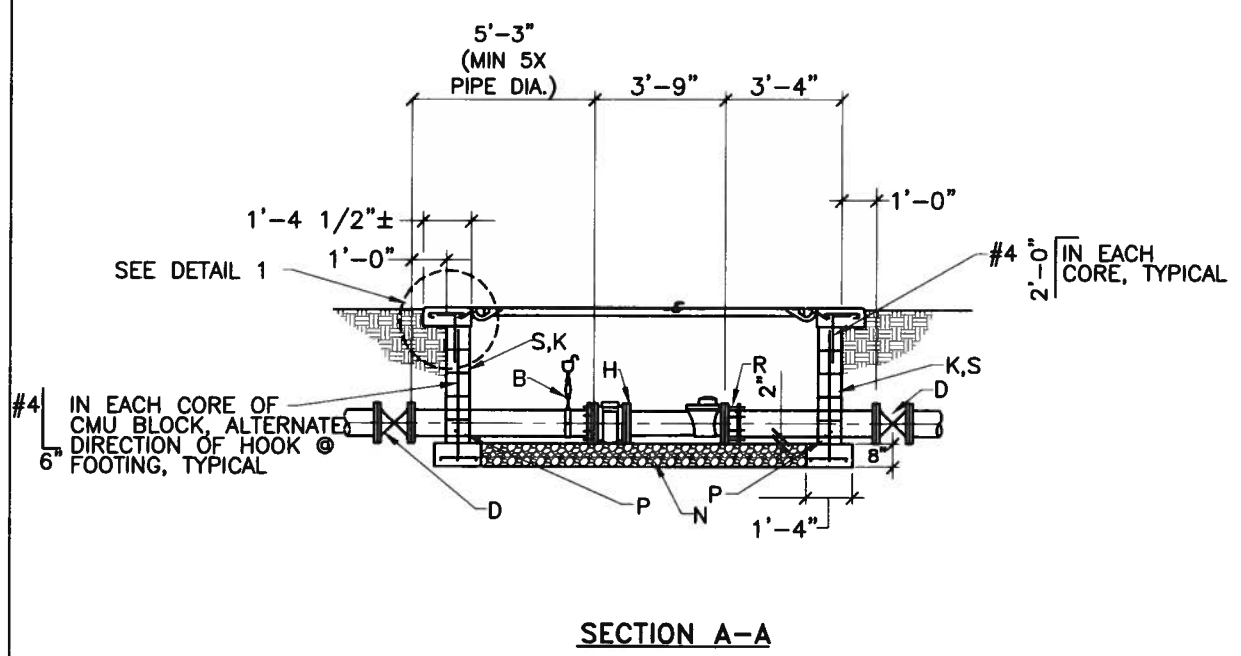
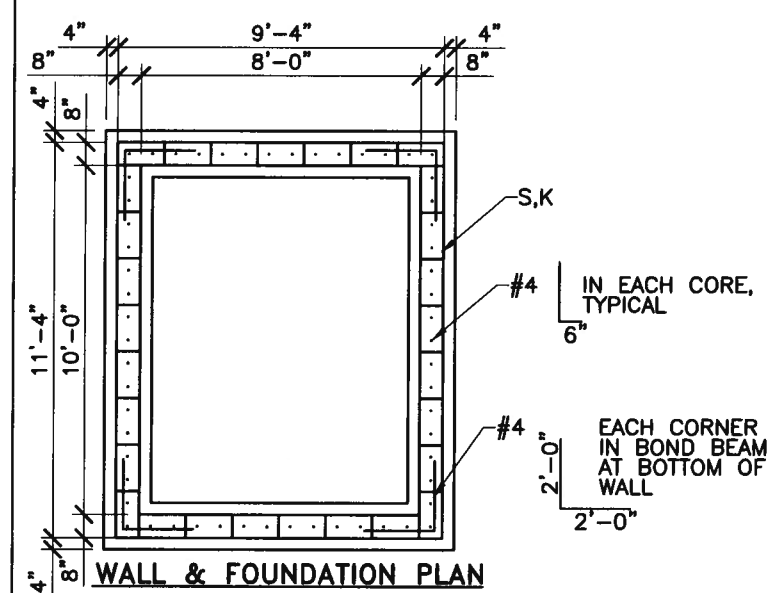
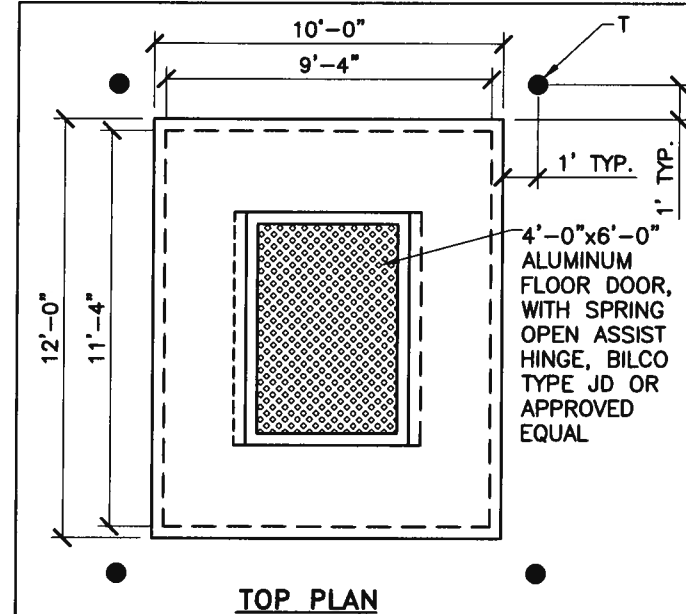
C METER LID KEYHOLE.

D 1/2" THICK RIB.

E 3/4" RAISED LETTERING (FLUSH).

F FLAT AREA.

REVISIONS	WATER AUTHORITY
	<b>WATER</b>
	<b>METER BOX COVER &amp; LID</b>
	<b>FOR 3/4" &amp; 1" METERS</b>
	DWG. 2368 JANUARY 2011



**GENERAL NOTES:**

- 1 COMPRESSIVE STRENGTH OF ALL CONCRETE SHALL BE 3000 PSI PER EXTERIOR CONC. SPEC SEC. 101.
- 2 COMPACT SUBGRADE UNDER AND 12" EITHER SIDE OF FOOTING TO 95% MAXIMUM DENSITY, PER ASTM D-1557 TO 6" MIN. DEPTH.
- 3 PRECAST CONCRETE VAULT MAY BE USED IN LIEU OF CMU. CONSTRUCTION WITH WATER AUTHORITY APPROVAL. SUBMIT DETAILS FOR REVIEW.
- 4 VAULT NOT TO BE PLACED IN TRAFFIC AREAS.
- 5 THE MAXIMUM DEPTH IS 4'.
- 6 NO BYPASS IS TO BE INSTALLED FOR IRRIGATION WATER USES - PARKS, MEDIANS, LANDSCAPING, ETC.
- 7 DO NOT CONSTRUCT DRAIN POCKETS WHEN CONSTRUCTING IN SHALLOW GROUNDWATER CONDITIONS. ENGINEER SHALL PROVIDE A WATERPROOF MANHOLE OR VAULT DESIGN FOR APPROVAL BY THE WATER AUTHORITY PRIOR TO INSTALLATION.
- 8 FILL PIPE PENETRATION VOIDS WITH NON-SHRINK GROUT OR WATER AUTHORITY APPROVED EQUAL.

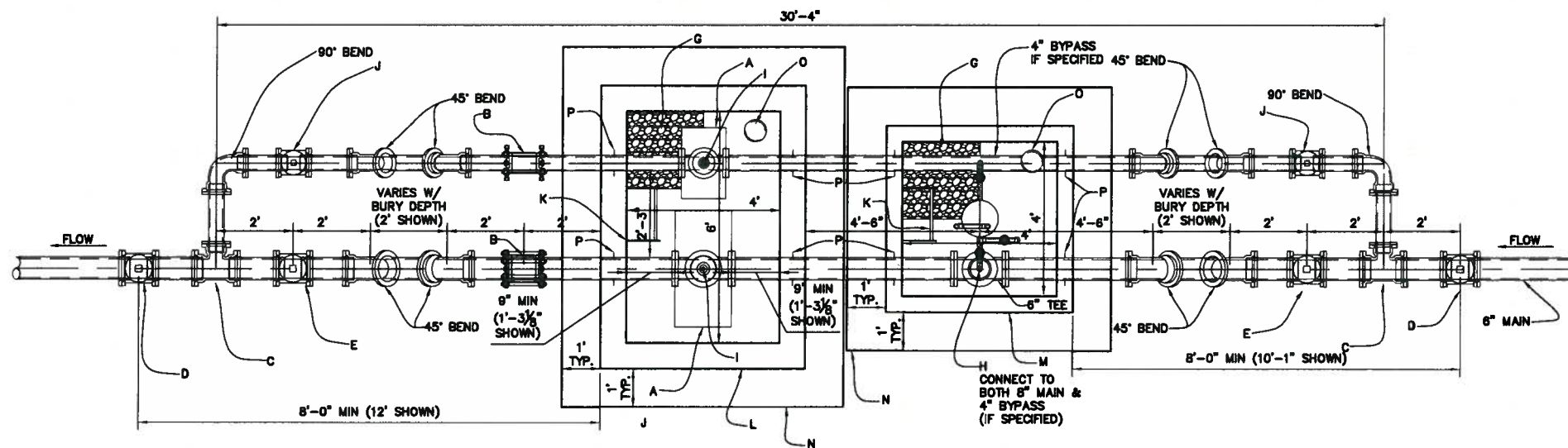
**CONSTRUCTION NOTES:**

- A METER LAY LENGTH VARIES DEPENDING ON METER SIZE. COORDINATE WITH LAYING LENGTH REQUIRED. METER AND STRAINER TO BE PROVIDED AND INSTALLED BY THE WATER AUTHORITY.
- B 1" SADDLE TAP, 1" GATE VALVE AND 1" AIR RELEASE VALVE. AIR RELEASE VALVE SHALL BE APCO MODEL NO. 200A OR APPROVED EQUAL.
- C D.I. SPOOL (FLANGExPE) LENGTH AS REQ'D. MINIMUM LENGTH SHALL BE 5 TIMES THE PIPE DIAMETER.
- D GATE VALVE (MJ) WITH MEGALUGS WITH VALVE BOX PER STANDARD DRAWING 2326.
- E 90° ELBOW (MJ) WITH MEGALUGS.
- F MAIN SERVICE LINE.
- G MJ TEE WITH MEGALUGS.
- H MEGA FLANGE-FLANGE ADAPTER, SERIES 2100 AS MANUFACTURED BY EBAA IRON SALES, OR APPROVED EQUAL.
- J MAIN DISTRIBUTION LINE.
- K FILL ALL CMU CORES WITH 3000 PSI. CONCRETE, TYP.
- L ROLL TEE UP AS REQUIRED.
- M ROLL 90° ELBOW DOWN AS REQUIRED.
- N 3/4" GRAVEL FILL PER ASTM C33, NO. 57 GRAVEL, 8" DEPTH.
- P CONTINUOUS BOND BEAM AT BOTTOM OF WALL WITH #4xCONT. SEE FOUNDATION PLAN FOR ADDITIONAL REINFORCING AT CORNERS.
- Q D.I. PIPE (FLANGExPE) LENGTH AS REQUIRED.
- R FLANGE COUPLING ADAPTER, (FCA).
- S 8"x16"x8" HOLLOW CORE CONCRETE BLOCK (CMU).
- T 6" CONCRETE FILLED GUARD POST, TYPICAL OF 4. SEC. 101 EXTERIOR CONCRETE, f'c=3000 psi @ 28 DAYS.

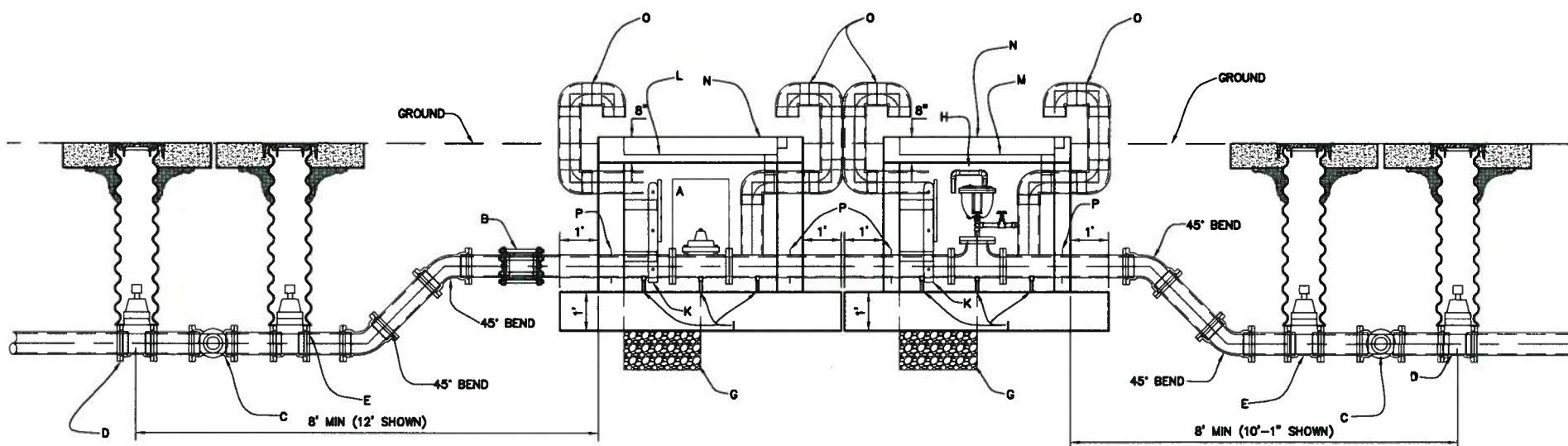
REVISIONS	WATER AUTHORITY
	<b>WATER</b> <b>LARGE DIAMETER</b> <b>METER VAULT</b> <b>3"-6" SERVICE</b>
	DWG. 2370 JANUARY 2011







PRV ASSEMBLY PLAN VIEW  
SCALE 1/4" = 1'-0"



PRV ASSEMBLY PROFILE VIEW  
SCALE 1/4" = 1'-0"

#### GENERAL NOTES:

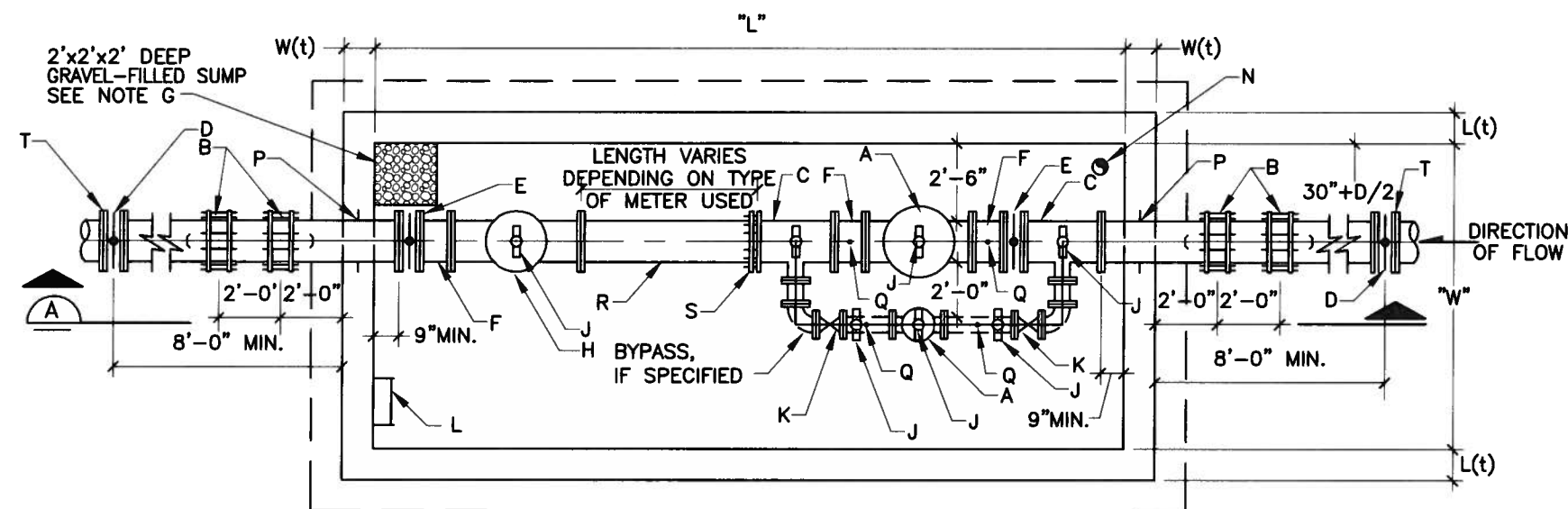
1. FOR STRUCTURAL DETAILS, VAULT DIMENSIONS AND REINFORCING SEE STANDARD PRV STATION STRUCTURAL DETAILS DWG 2375.
2. ALL EXTERIOR PIPING SHALL BE PAINTED SAFETY YELLOW.
3. SEE STANDARD PRV STATION, NO METER, DWG 2354 FOR ADDITIONAL CONSTRUCTION NOTES.
4. IN NON-TRAFFIC AREAS, THE TOP ELEVATION OF THE VAULT WILL BE 12" ABOVE FINISHED GRADE WITH BOLLARDS PAINTED SAFETY YELLOW AT EACH CORNER.
5. ALL PARTS WITHIN THE VAULT MUST COINCIDE WITH THE CURRENT WATER AUTHORITY APPROVED PRODUCTS LIST.
6. A PLATE SHALL BE INSTALLED ON THE VAULT WALL THAT SHOWS THE ELEVATION.
7. PRV LOCATION, FINAL DESIGN AND LAYOUT SHALL BE APPROVED BY THE WATER AUTHORITY TO CONFORM WITH SPECIFIC SYSTEM AND SITE REQUIREMENTS.
8. PRV STATION ACCESS OPENING COVERS SHOWN ARE SUITABLE FOR LOCATIONS NOT EXPOSED TO CONTINUOUS HIGH DENSITY TRAFFIC. IF THE PRV STATION MUST BE LOCATED IN AREAS OF CONTINUOUS HIGH DENSITY TRAFFIC, THE ACCESS OPENING COVERS SHALL BE SPECIFICALLY DESIGNED TO WITHSTAND THE CONDITIONS AND LOADINGS TO BE ENCOUNTERED.
9. DO NOT CONSTRUCT DRAIN POCKETS WHEN CONSTRUCTING IN SHALLOW GROUNDWATER CONDITIONS. ENGINEER SHALL PROVIDE A WATERPROOF MANHOLE OR VAULT DESIGN FOR APPROVAL BY THE WATER AUTHORITY PRIOR TO INSTALLATION.

#### CONSTRUCTION NOTES:

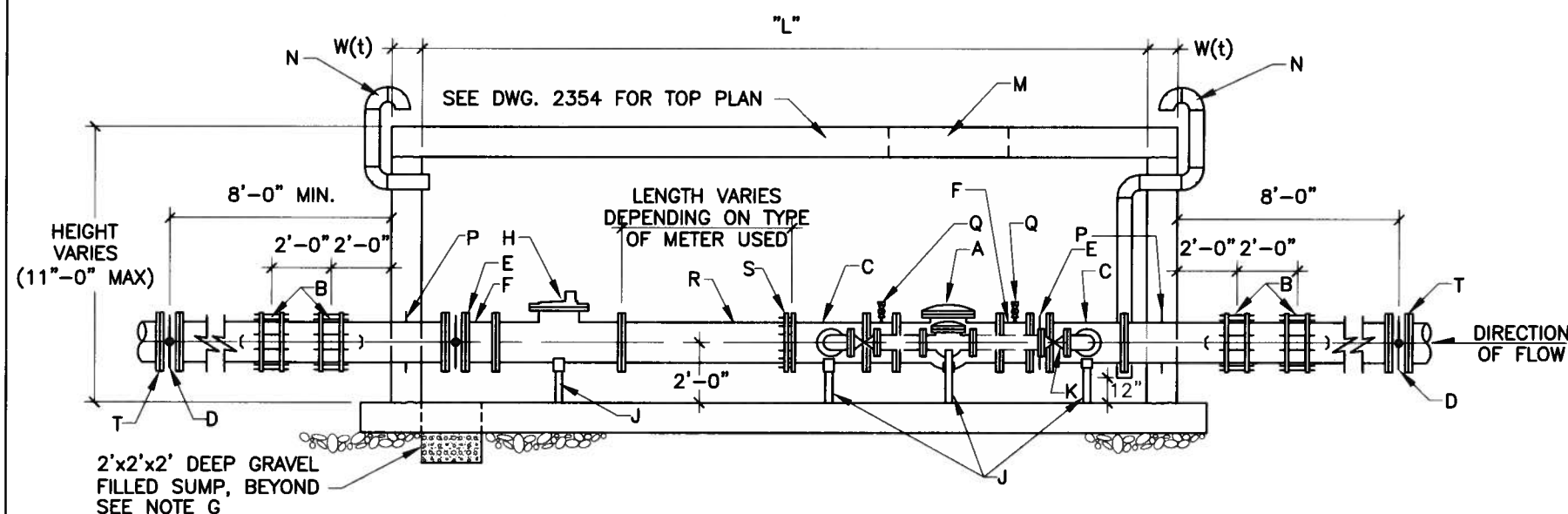
- A. PRESSURE REDUCING VALVE, AS SPECIFIED.
- B. FLEXIBLE COUPLING WITH THRUST TIES, SEE STANDARD DRAWING 2358 FOR THRUST TIE DETAIL.
- C. MECHANICAL JOINT TEE, REQUIRED ONLY IF BYPASS IS SPECIFIED.
- D. BURIED GATE VALVE (BUTTERFLY VALVE FOR SIZES GREATER THAN 14").
- E. BUTTERFLY VALVE WITH HAND WHEEL OPERATOR (GATE VALVE FOR SIZES GREATER THAN 14"), REQUIRED ONLY WHEN BYPASS IS SPECIFIED.
- F. FLANGED SPOOL, LENGTH = 1'-0"
- G. 2'x2'x2' DEEP GRAVEL-FILLED SUMP. GRAVEL MUST CONFORM TO ASTM C33, NO. 57 GRAVEL.
- H. AIR RELIEF VALVE.
- I. ADJUSTABLE PIPE SADDLE SUPPORT, GRINNEL FIG. 264, ELCEN FIG. 50, OR EQUAL.
- J. GATE VALVE WITH HAND WHEEL OPERATOR, REQUIRED ONLY IF BYPASS IS SPECIFIED.
- K. LADDER PER STANDARD DRAWING 2335.
- L. 6'x4' BILCO SINGLE LEAF DOOR RATED FOR H20 TRAFFIC LOADS.
- M. 4'x4' BILCO SINGLE LEAF DOOR RATED FOR H20 TRAFFIC LOADS.
- N. SEE STANDARD DRAWING 2375 FOR STRUCTURAL DESIGN OF PRECAST/CAST-IN-PLACE CONCRETE VAULT.
- O. 6" STEEL PIPE WITH GOOSENECK AND INSECT SCREEN. PIPING SHOULD BE ROUTED SUCH THAT THE ABOVE GROUND GOOSENECK AND INSECT SCREEN ARE LOCATED OUT OF VEHICULAR OR PEDESTRIAN TRAFFIC AREAS.
- P. LINK SEAL WITH GROUT AT WALL PENETRATION.
- Q. 1/2" PIPE TAP WITH 1/2" BALL VALVE AND CAP
- R. D.I. SPOOL FLG. x P.E.
- S. MEGA FLANGE - FLANGE ADAPTOR, AS MANUFACTURED BY EBAA IRON SALES, OR APPROVED EQUAL.
- T. INSULATING FLANGE KIT.

REVISIONS	WATER AUTHORITY
	WATER 6" PRV ASSEMBLY DETAILS
	DWG. 2372 JANUARY 2011





INTERIOR PLAN



SECTION A

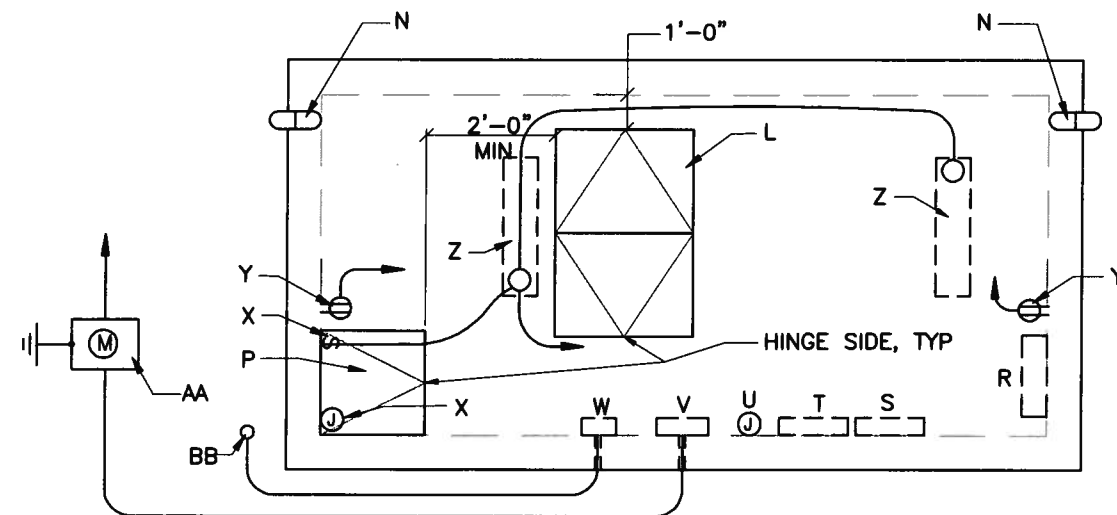
# GENERAL NOTES:

1. FOR STRUCTURAL DETAILS, VAULT DIMENSIONS AND REINFORCING SEE STANDARD PRV STATION STRUCTURAL DETAILS DWG. 2357
2. SEE STANDARD PRV STATION, NO METER, DWG. 2354 FOR ADDITIONAL CONSTRUCTION NOTES.
3. IN NON-TRAFFIC AREAS, THE TOP ELEVATION OF THE VAULT WILL BE 12" ABOVE FINISHED GRADE WITH BOLLARDS PAINTED SAFETY YELLOW AT EACH CORNER.
4. ALL PARTS WITHIN THE VAULT MUST COINCIDE WITH THE CURRENT WATER AUTHORITY APPROVED PRODUCTS LIST.
5. A PLATE SHALL BE INSTALLED ON THE VAULT WALL THAT SHOWS THE ELEVATION.
6. DO NOT CONSTRUCT DRAIN POCKETS WHEN CONSTRUCTING IN SHALLOW GROUNDWATER CONDITIONS. ENGINEER SHALL PROVIDE A WATERPROOF MANHOLE OR VAULT DESIGN FOR APPROVAL BY THE WATER AUTHORITY PRIOR TO INSTALLATION.

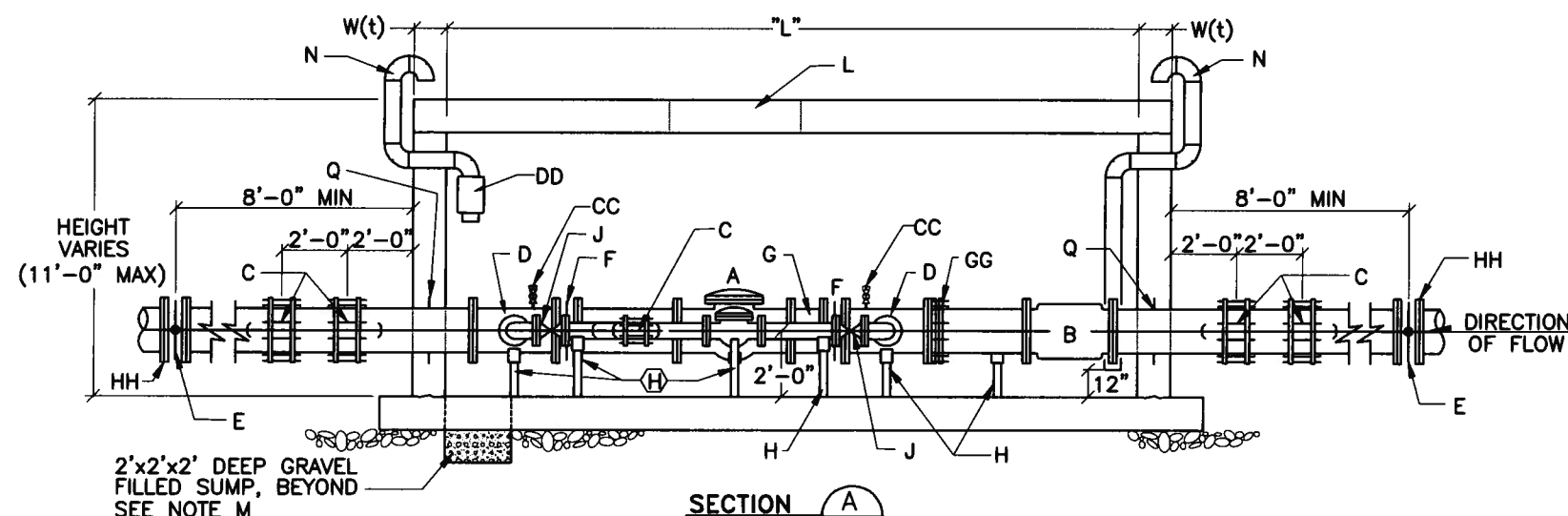
## CONSTRUCTION NOTES:

- A PRESSURE REDUCING VALVE, AS SPECIFIED
- B FLEXIBLE COUPLING WITH THRUST TIES, SEE THRUST TIE DETAIL ON DWG 2358.
- C FLANGED TEE, REQUIRED ONLY IF BYPASS SPECIFIED
- D BURIED BUTTERFLY VALVE (GATE VALVE FOR SIZE < 14")
- E BUTTERFLY VALVE WITH HAND WHEEL OPERATOR (GATE VALVE FOR SIZE < 14"), REQUIRED ONLY WHEN BYPASS SPECIFIED
- F FLANGED SPOOL, LENGTH = 1'-0"
- G ASTM C33, NO. 57 GRAVEL.
- H PROPELLER TYPE FLOW METER, SPARLING MODEL PDS-102 OR EQUAL, COMPLETE WITH TUBE, SADDLE AND STRAIGHTENING VANES.
- J ADJUSTABLE PIPE SADDLE SUPPORT, GRINNEL FIG. 264, ELCEN FIG. 50, OR EQUAL.
- K GATE VALVE WITH HAND WHEEL OPERATOR, REQUIRED ONLY IF BYPASS SPECIFIED
- L LADDER PER COA STANDARD DRAWING 2335.
- M ALUMINUM FLOOR DOOR WITH RECESSED HASP COVERED BY A HINGED LID FLUSH WITH TOP SURFACE. DOOR SIZE SHALL BE 4'x4' DOUBLE LEAF (WITHOUT BYPASS) AND 4'x6' DOUBLE LEAF (WITH BYPASS). HARDWARE AND HINGES SHALL BE 304 STAINLESS STEEL. BILCO TYPE JD, OR EQUAL.
- N 6" STEEL PIPE W/GOOSENECK AND INSECT SCREEN
- P WALL PIPE WITH THRUST COLLAR, CENTER IN WALL
- Q 1/2" PIPE TAP WITH 1/2" BALL VALVE AND CAP
- R D.I. SPOOL FLG. x P.E.
- S MEGA FLANGE - FLANGE ADAPTOR, AS MANUFACTURED BY EBAA IRON SALES, OR APPROVED EQUAL.
- T INSULATING FLANGE KIT.

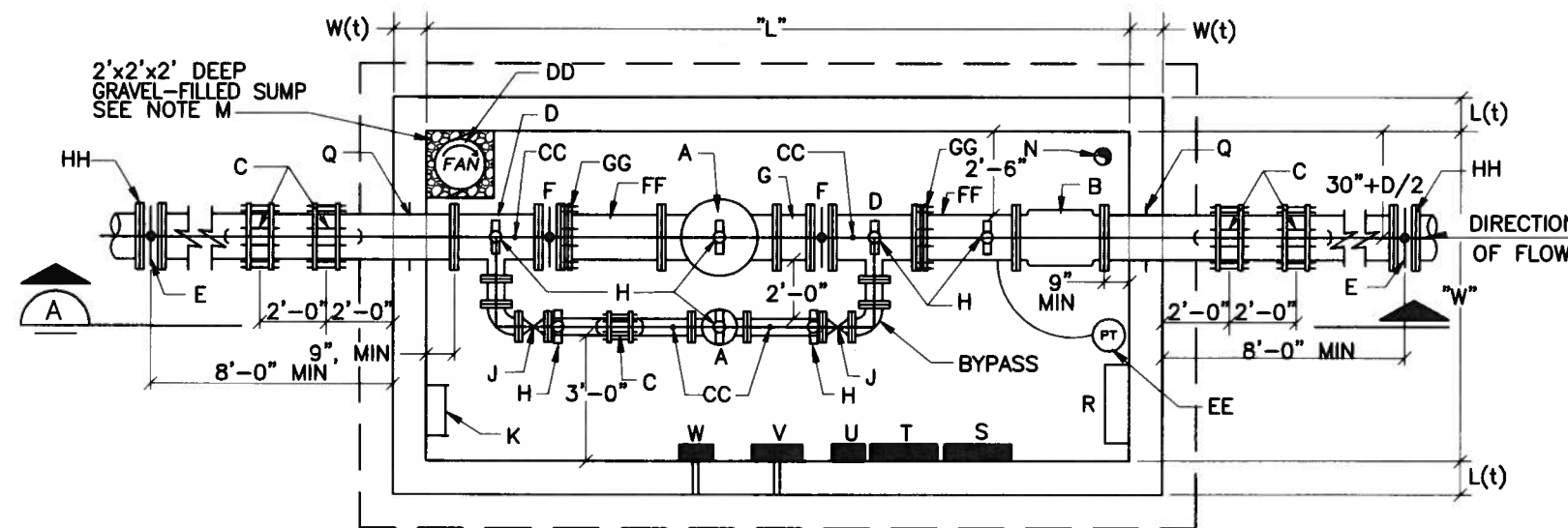
REVISIONS	WATER AUTHORITY
	WATER STANDARD PRV STATION WITH PROPELLER METER
	DWG. 2355 JANUARY 2011



TOP PLAN



SECTION (A)



INTERIOR PLAN

# GENERAL NOTES:

1. FOR STRUCTURAL DETAILS, VAULT DIMENSIONS AND REINFORCING SEE STANDARD PRV STATION STRUCTURAL DETAILS DWG. 2357.
2. SEE STANDARD PRV STATION NO METER, DWG. 2354 FOR ADDITIONAL CONSTRUCTION NOTES.
3. IN NON-TRAFFIC AREAS, THE TOP ELEVATION OF THE VAULT WILL BE 12" ABOVE FINISHED GRADE WITH BOLLARDS PAINTED SAFETY YELLOW AT EACH CORNER.
4. ALL PARTS WITHIN THE VAULT MUST COINCIDE WITH THE CURRENT WATER AUTHORITY APPROVED PRODUCTS LIST.
5. A PLATE SHALL BE INSTALLED ON THE VAULT WALL THAT SHOWS THE ELEVATION.
5. DO NOT CONSTRUCT DRAIN POCKETS WHEN CONSTRUCTING IN SHALLOW GROUNDWATER CONDITIONS. ENGINEER SHALL PROVIDE A WATERPROOF MANHOLE OR VAULT DESIGN FOR APPROVAL BY THE WATER AUTHORITY PRIOR TO INSTALLATION.

## CONSTRUCTION NOTES:

- A PRESSURE REDUCING VALVE, AS SPECIFIED
- B MAGNETIC FLOW METER, KROHNE M940/960, OR AS APPROVED BY THE WATER AUTHORITY, COMPLETE WITH SIGNAL CONVERTER
- C FLEXIBLE COUPLING WITH THRUST TIES, SEE THRUST TIE DETAIL ON DWG. 2358.
- D FLANGED TEE
- E BURIED BUTTERFLY VALVE (GATE VALVE FOR SIZE < 14")
- F BUTTERFLY VALVE (GATE VALVE FOR SIZE < 14")
- G FLANGED SPOOL, LENGTH = 1'-0"
- H ADJUSTABLE PIPE SADDLE SUPPORT, GRINNELL FIG. 264, ELCEN FIG. 50 OR EQUAL
- J GATE VALVE
- K LADDER PER COA STANDARD DRAWING 2335.
- L ALUMINUM FLOOR DOOR WITH RECESSED HASP COVERED BY A HINGED LID FLUSH WITH TOP SURFACE. DOOR SIZE SHALL BE 4'x6' DOUBLE LEAF. HARDWARE AND HINGES SHALL BE TYPE 304 STAINLESS STEEL. BILCO TYPE JD OR EQUAL.
- M GRAVEL PER ASTM C33, NO. 57 GRAVEL.
- N 6" STEEL PIPE W/GOOSENECK AND INSECT SCREEN
- P 3'-0" SQ ALUMINUM FLOOR DOOR WITH RECESSED HASP COVERED BY A HINGED LID FLUSH WITH TOP SURFACE. HARDWARE AND HINGES SHALL BE TYPE 304 STAINLESS STEEL. BILCO TYPE J OR EQUAL.
- Q WALL PIPE WITH THRUST COLLAR, CENTER IN WALL
- R RCP CABINET FURNISHED BY THE WATER AUTHORITY
- S POWER SUPPLY AND TERMINAL CABINET
- T FLOW INDICATING TRANSMITTER
- U WEATHERPROOF JUNCTION BOX FOR CONNECTION OF VAULT FLOOD LEVEL ELEMENT
- V 100 AMP, 120/240 VOLT, SINGLE PHASE THREE WIRE CIRCUIT BREAKER PANEL
- W RADIO AND TELEMETRY EQUIPMENT FURNISHED BY THE WATER AUTHORITY
- X WEATHERPROOF JUNCTION BOXES FOR CONNECTION TO TWO POLE MICROSWITCH FOR INTRUSION ALARM AND FOR CONNECTION TO DPDT MICROSWITCH TO ENERGIZE LIGHTS AND EXHAUST FAN WHEN ACCESS DOOR IS OPENED
- Y WEATHERPROOF, GFI DUPLEX RECEPTACLE 24" ABOVE FINISH FLOOR
- Z 2-LAMP STRIP FLUORESCENT ENCLOSED SURFACE MOUNTED LIGHT FIXTURE
- AA PEDESTAL TYPE 100 AMP, 120/240 VOLT, SINGLE PHASE METER AND MAIN CIRCUIT BREAKER. INSTALL ON 16"x16"x6" CONCRETE PAD PER PNM DWG #DS-19-84.0
- BB TELEMETRY SYSTEM MAST AND ANTENNA LOCATION TO BE DETERMINED BY THE WATER AUTHORITY
- CC 1/2" PIPE TAP WITH 1/2" BALL VALVE AND CAP
- DD INLINE EXHAUST FAN W/SWITCH AND ACCESS DOOR CONTROLS
- EE PRESSURE TRANSDUCER, HONEYWELL MODEL STG 644-EIG-0000-DM. PROVIDE 1/2" PIPE TAP, 1/2" BALL VALVE AND TUBING TO CONNECT TRANSDUCER TO PIPE BARREL
- FF D.I. SPOOL FLG. x P.E.
- GG MEGA FLANGE - FLANGE ADAPTER, AS MANUFACTURED BY EBAA IRON SALES, OR APPROVED EQUAL.
- HH INSULATING FLANGE KIT.

REVISIONS	WATER AUTHORITY
	<b>WATER</b>
	<b>STANDARD PRV STATION</b>
	<b>WITH POWER/TELEMETRY</b>
	DWG. 2356 JANUARY 2011

# PRV VAULT DIMENSION AND REINFORCING SCHEDULE

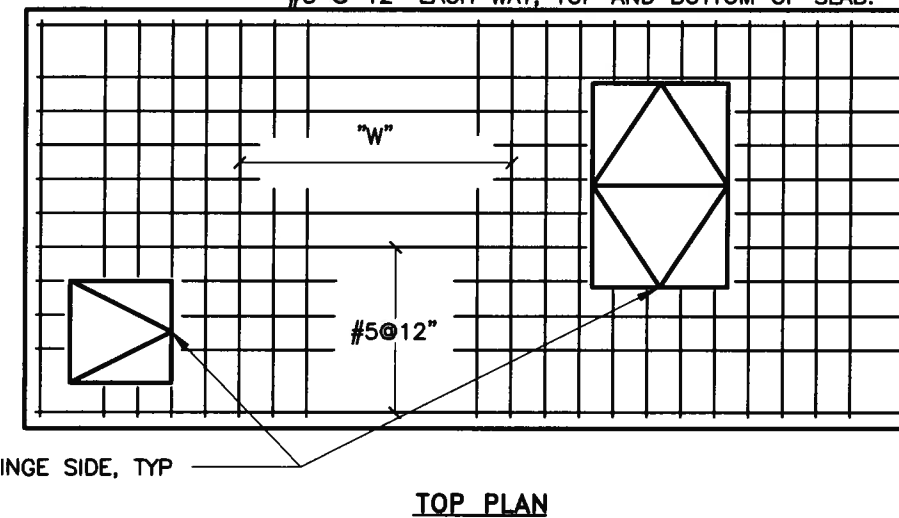
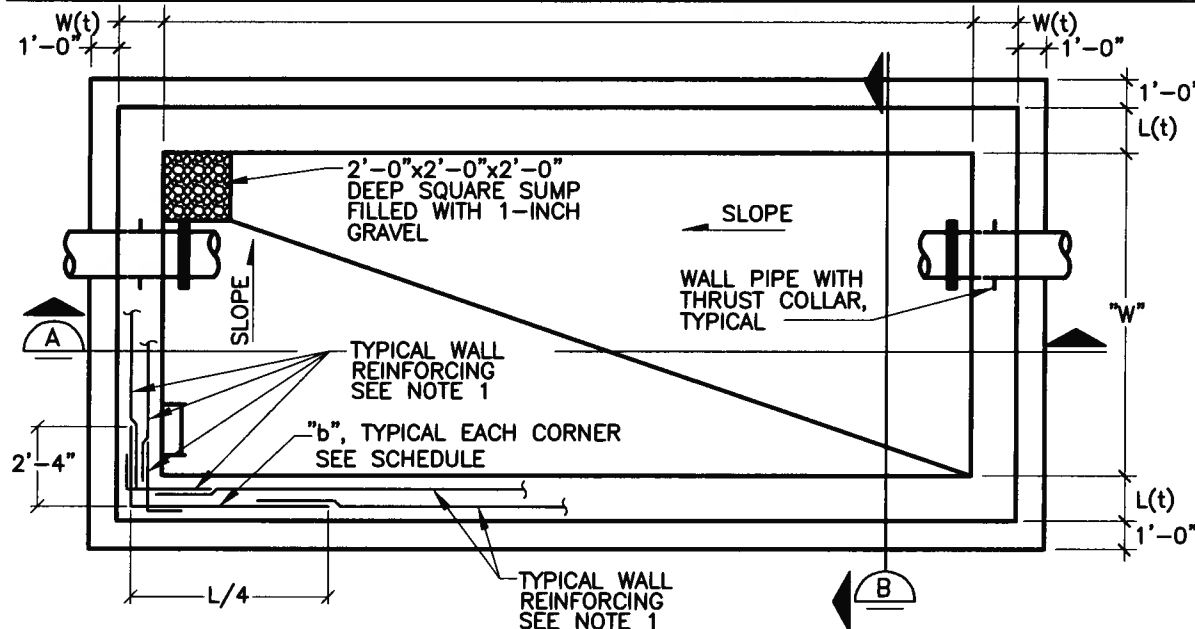
STANDARD PRV VAULT DIMENSIONS															WALL REINFORCING					
PIPE SIZE (IN)	STANDARD PRV NO METER, NO BYPASS		STANDARD PRV NO METER, W/BYPASS		WITH PROPELLER METER AND NO BYPASS		WITH PROPELLER METER AND BYPASS		WITH MAGNETIC FLOW METER AND BYPASS		WALL THICKNESS		TOP THICKNESS		WITHOUT BYPASS			WITH BYPASS		
	"L"	"W"	"L"	"W"	"L"	"W"	"L"	"W"	"L"	"W"	L(t)	W(t)	T(t)	NONTRAFFIC	"L"	"W"	b	"L"	"W"	b
6	10'-6"	5'-6"	11'-8"	8'-0"	10'-6"	5'-6"	14'-6"	8'-0"	15'-8"	8'-6"	1'-0"	1'-0"	1'-0"	0'-8"	#6 @ 12"	TYPICAL	TYPICAL	#5 @ 6"	TYPICAL	#6 @ 12"
8	10'-6"	5'-8"	12'-0"	8'-2"	10'-6"	5'-8"	15'-4"	8'-2"	16'-2"	8'-8"	1'-0"	1'-0"	1'-0"	0'-8"	#6 @ 12"	TYPICAL	TYPICAL	#5 @ 6"	TYPICAL	#6 @ 12"
10	10'-6"	5'-10"	13'-0"	8'-4"	11'-4"	5'-10"	17'-4"	8'-4"	17'-4"	8'-10"	1'-0"	1'-0"	1'-0"	0'-8"	#6 @ 12"	#6 @ 12"	TYPICAL	#5 @ 6"	#6 @ 12"	#6 @ 12"
12	10'-6"	6'-0"	13'-8"	8'-6"	12'-8"	6'-0"	19'-0"	8'-6"	18'-4"	9'-0"	1'-0"	1'-0"	1'-0"	0'-8"	#6 @ 12"	#6 @ 12"	TYPICAL	#5 @ 6"	#6 @ 12"	#6 @ 12"
14	10'-6"	6'-2"	14'-9"	8'-8"	14'-3"	6'-2"	21'-6"	8'-8"	20'-2"	9'-2"	1'-0"	1'-2"	1'-0"	0'-8"	#5 @ 6"	#5 @ 6"	#6 @ 12"	#5 @ 6"	#5 @ 6"	#6 @ 12"
16	10'-6"	6'-4"	15'-4"	8'-10"	16'-6"	6'-4"	24'-2"	8'-10"	21'-0"	9'-4"	1'-0"	1'-2"	1'-0"	0'-8"	#5 @ 6"	#5 @ 6"	#6 @ 12"	#5 @ 6"	#5 @ 6"	#6 @ 12"

**DIMENSIONAL NOTES:**  
 "L" = VAULT LENGTH  
 "W" = VAULT WIDTH  
 L(t) = WALL THICKNESS(LENGTH)  
 W(t) = WALL THICKNESS(WIDTH)  
 T(t) = TOP SLAB THICKNESS

**WALL REINFORCING NOTES:**  
 1. "a" BAR DESIGNATION REPRESENTS WALL DOWELS PROTRUDING VERTICALLY FROM BASE SLAB ALONG LENGTHWISE DIMENSION "L" OR WIDTH DIMENSION "W".  
 2. "b" BAR DESIGNATION REPRESENTS ADDITIONAL HORIZONTAL WALL CORNER REINFORCING.

**GENERAL NOTES:**  
 1. TYPICAL WALL REINFORCING SHALL BE #5 @ 12" O.C., EACH WAY, EACH FACE UNLESS SHOWN OTHERWISE ON THE SCHEDULE. PROVIDE BARS AS INDICATED ON THE SCHEDULE AND LAP W/ #5 @ 12" FOR REMAINDER OF WALL HT. OR LENGTH.  
 2. TYPICAL BASE SLAB REINFORCING SHALL BE #5 @ 12" EACH WAY, TOP AND BOTTOM OF SLAB.

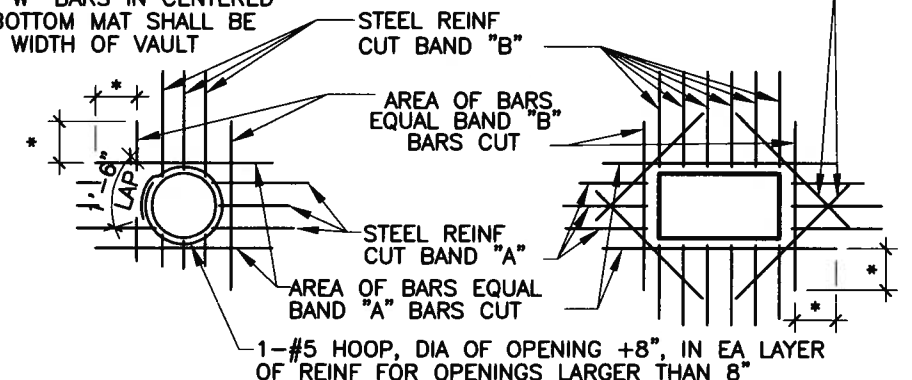
- CONCRETE SHALL BE IN ACCORDANCE WITH STD SPEC SEC. 510 AND SEC. 101 FOR HYDRAULIC CONCRETE  $f'c=3000$  psi @ 28 DAYS. ALL REINFORCING STEEL SHALL BE GRADE 60.
- IF THE DEPTH OF VAULT EXCEEDS THE 11'-0" MAX. DEPTH SHOWN, THE ENGINEER SHALL DESIGN THE REINFORCEMENT, WALL & FLOOR THICKNESS TO SUIT THE SPECIFIC CONDITIONS. ALL STRUCTURAL MODIFICATIONS SHALL BE DESIGNED AND STAMPED BY A LICENSED NEW MEXICO PROFESSIONAL ENGINEER.
- DO NOT CONSTRUCT DRAIN POCKETS WHEN CONSTRUCTING IN SHALLOW GROUNDWATER CONDITIONS. ENGINEER SHALL PROVIDE A WATERPROOF MANHOLE OR VAULT DESIGN FOR APPROVAL BY THE WATER AUTHORITY PRIOR TO INSTALLATION.



VAULT DIMENSION	VAULT TOP REINFORCING	
	T(t)=0'-8" CENTERED MAT	T(t)=1'-0" BOTTOM MAT
"W"	"W"	"W"
≤6'-0"	#5 @ 12"	#5 @ 12"
>6'-0" ≤7'-0"	#5 @ 12"	#6 @ 12"
>7'-0" ≤9'-0"	#6 @ 12"	#7 @ 12"
>9'-0" ≤10'-0"	#7 @ 12"	#7 @ 12"

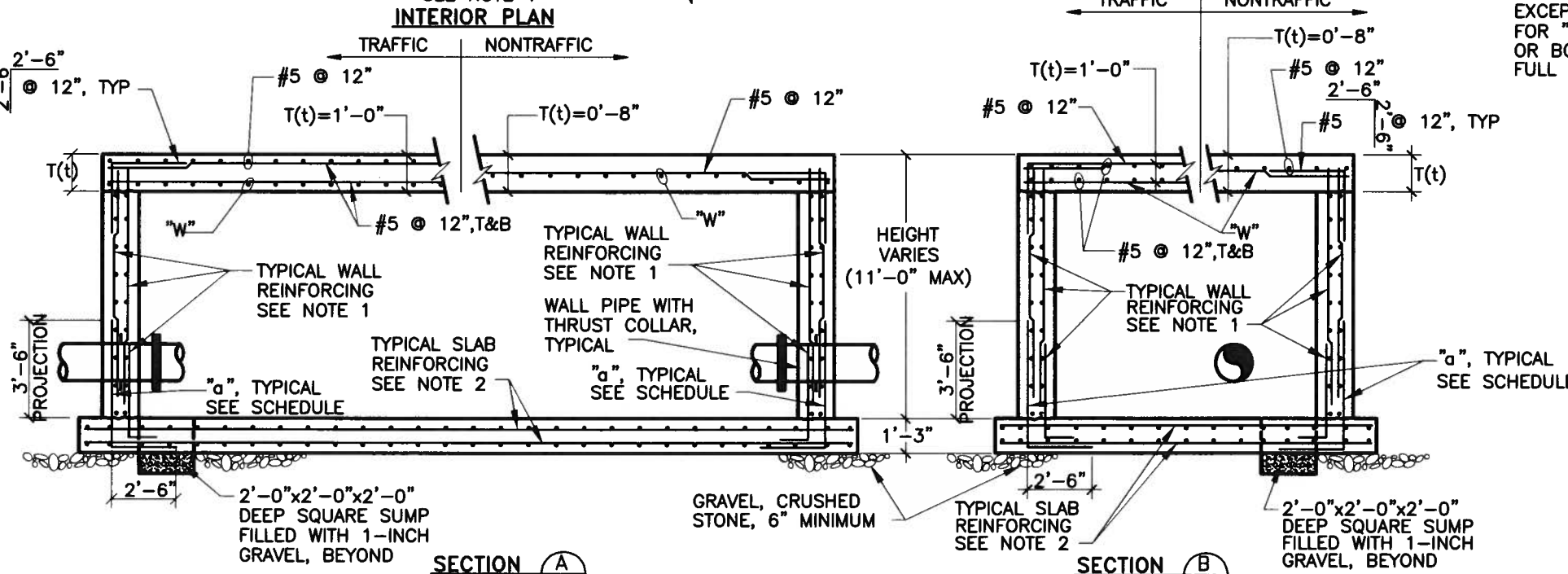
\* #5=2'-6", #6=3'-0", #7=3'-6"  
 EXCEPT REPLACEMENT BARS FOR "W" BARS IN CENTERED OR BOTTOM MAT SHALL BE FULL WIDTH OF VAULT

ADD 1-#5x4'-0" DIAG AT EA COR FOR EA LAYER OF REINF



## OPENING NOTES:

- TYPICAL FOR ALL OPENINGS IN CONCRETE WALLS AND SLABS.
- DO NOT WELD REINFORCEMENT TO PIPE SLEEVES AND INSERTS.



REVISIONS	WATER AUTHORITY
	STANDARD PRV STATION STRUCTURAL DETAILS
	DWG. 2357 JANUARY 2011

*SEE NOTES TIE ROD SCHEDULE			
TEST PRESSURE		150 PSI	
PIPE DIA. (IN.)	MINIMUM PIPE WALL THICKNESS (IN.)*	TIE RODS	
		DIA. (IN.)	NO. REQ'D
6	3/16	5/8	2
8	3/16	5/8	2
10	3/16	5/8	2
12	3/16	5/8	2
14	3/16	3/4	2
16	3/16	7/8	2

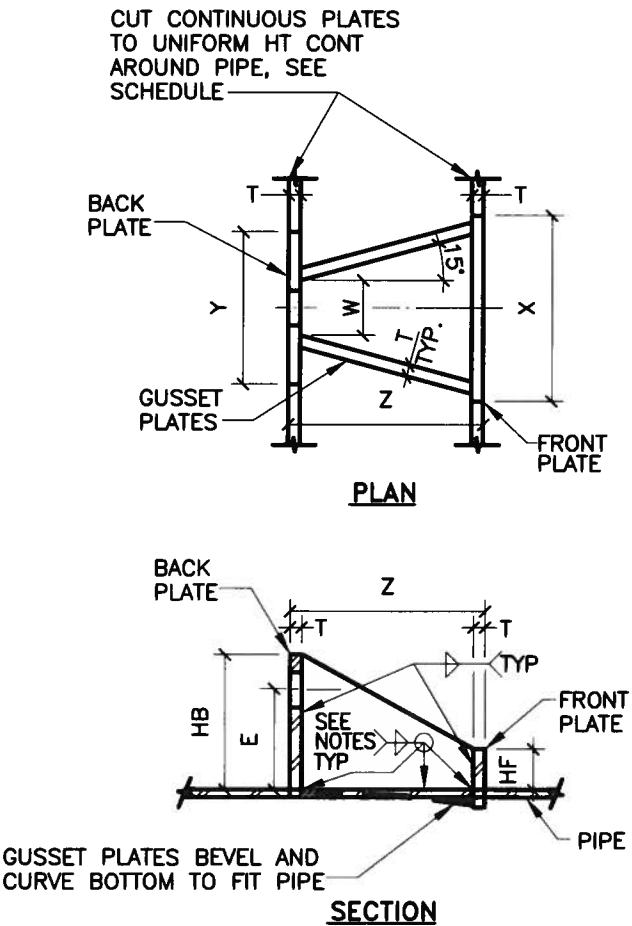
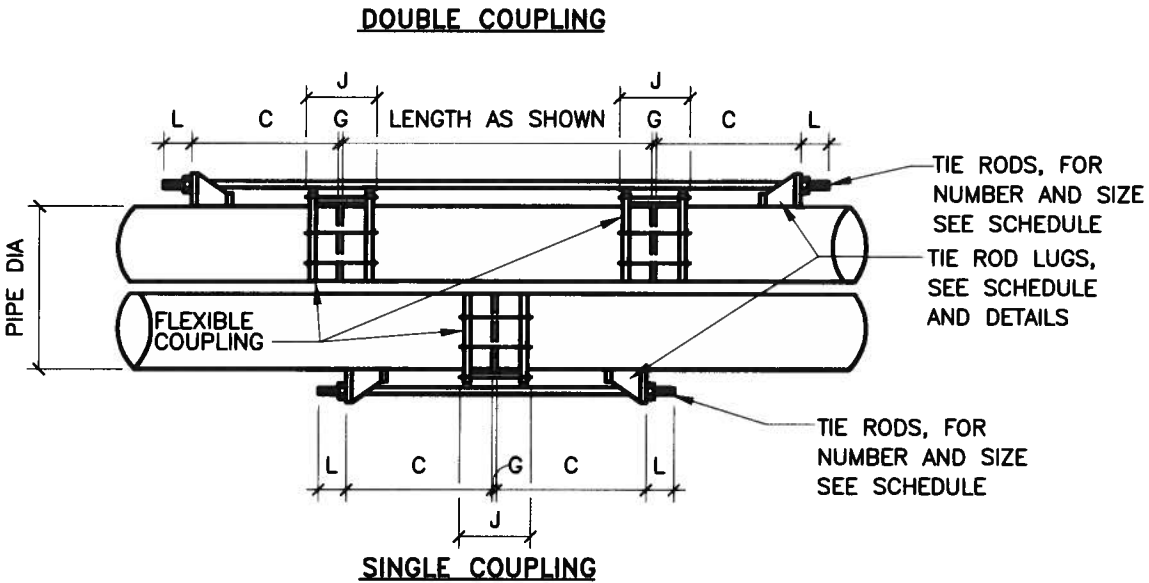
NOTES:

- THE CONTRACTOR SHALL DETERMINE THE LENGTH "J" (COUPLING BOLT LENGTH) FROM MANUFACTURER'S CATALOGS USING THE SPECIFIED MIDDLE RING LENGTH.
- "G" = MANUFACTURER'S RECOMMENDED SPACE BETWEEN ENDS OF PIPE.
- "C" = J+Z+1 INCH, (ROUND THIS VALUE UP TO NEXT EVEN INCH), MINIMUM. (FOR Z DIMENSIONS, SEE LUG SCHEDULE.)
- TIE ROD LENGTH = 2L+2C+G.

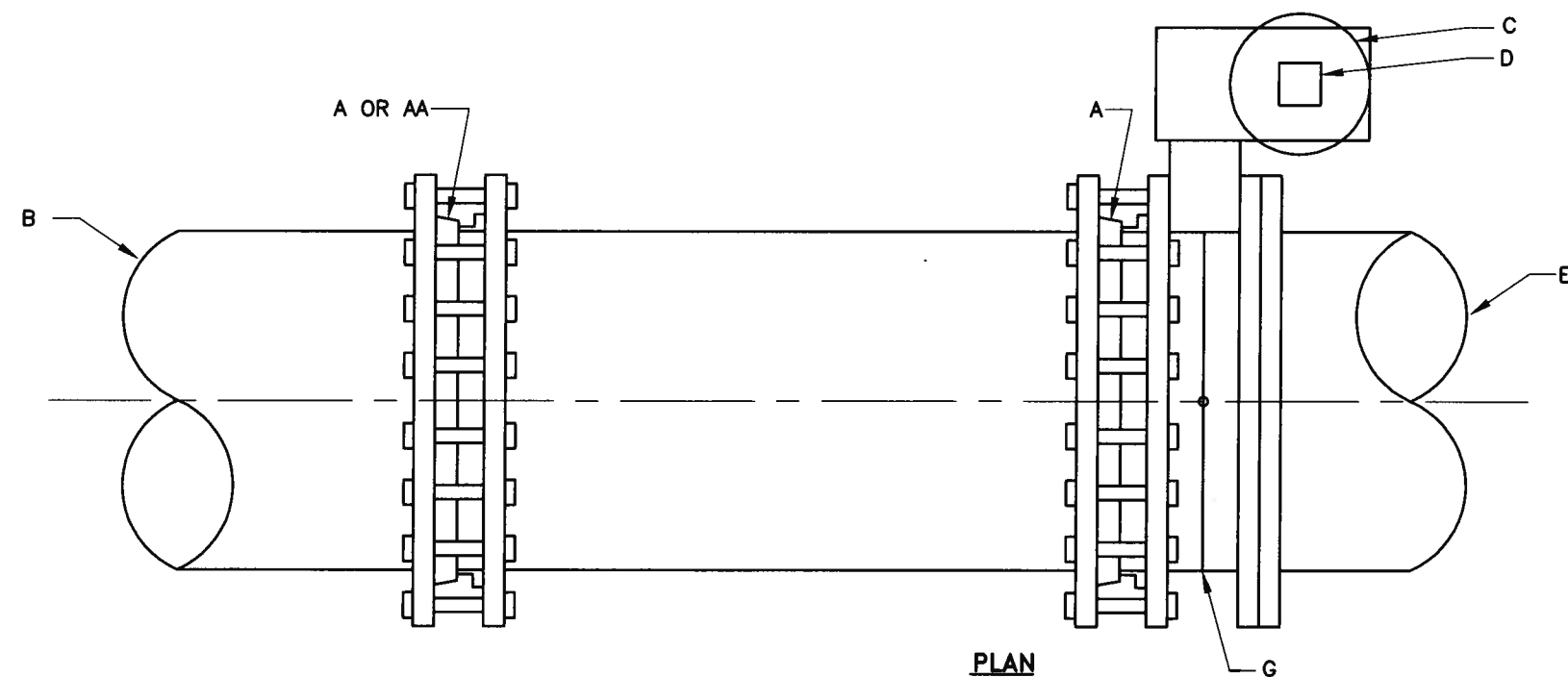
LUG SCHEDULE									
STUD DIA	T	W	X	Y	Z	HB	E	HF	L
5/8	3/8	1-3/8	4-1/16	4-1/2	3-3/8	3-7/8	3	1-3/4	3
3/4	3/8	1-1/2	5	4-1/2	5	4-1/8	3-1/8	1-3/4	3
7/8	1/2	1-5/8	5-1/2	4-1/2	5-1/8	4-1/4	3-1/8	1-3/4	4

NOTES:

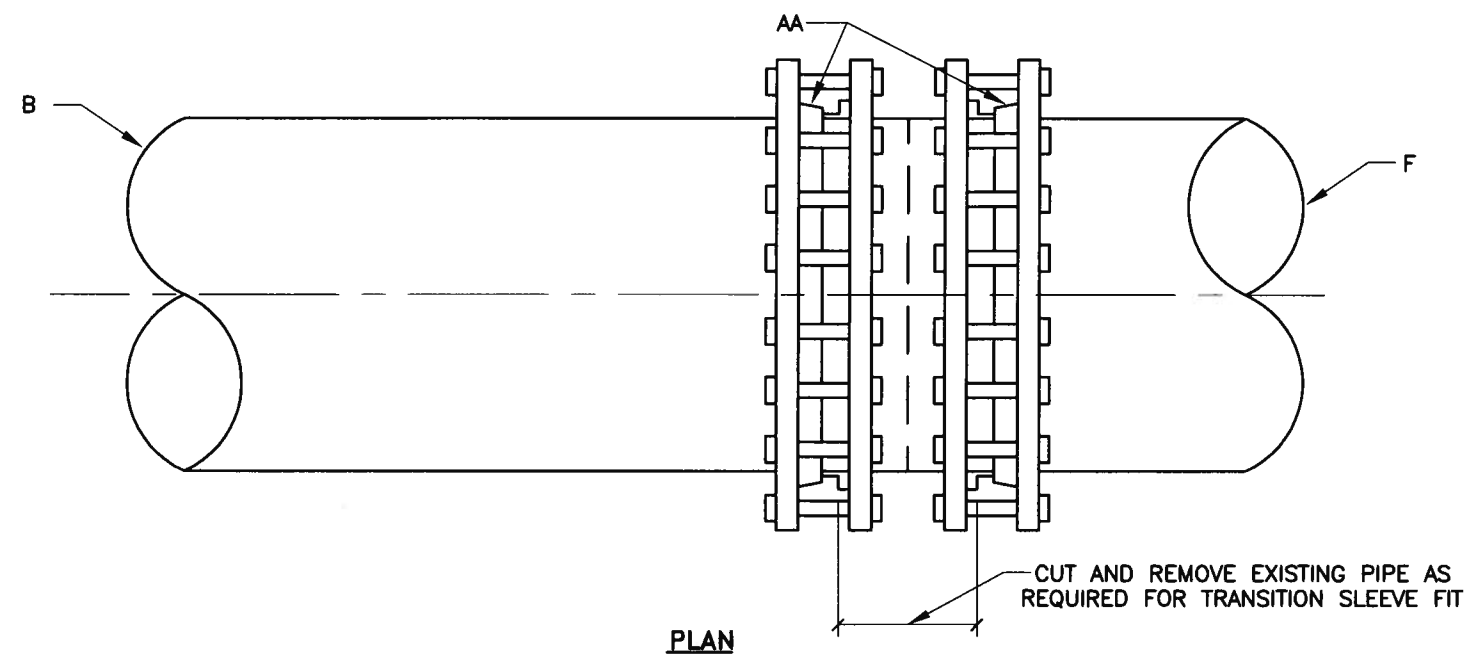
- LUG SCHEDULE DIMENSIONS IN INCHES.
- TIE RODS SHALL CONFORM TO ASTM A193 GRADE B7.
- NUTS SHALL CONFORM TO ASTM A194 GRADE 2H.
- PLATE SHALL CONFORM TO ASTM A283 GRADE D.
- TIE ROD NUTS SHALL BE TIGHTENED GRADUALLY AND EQUALLY IN STAGES TO PREVENT UNEVEN ALIGNMENT AND TO ALLOW EQUAL STRESS ON ALL TIE RODS UNDER PRESSURE. TIGHTEN UNTIL SNUG. THREADS SHALL PROTRUDE FROM NUTS. PEEN THREADS AFTER TIGHTENING NUTS.
- TIE ROD LUGS SHALL BE SPACED EQUALLY AROUND PIPE.
- FILLET WELDS SHALL MEET THE MINIMUM REQUIREMENTS OF THE AISC SPECIFICATION EXCEPT AS FOLLOWS: FILLET WELDS SHALL BE 1/4-INCH MINIMUM EXCEPT WHEN WELDING 3/16-INCH PLATE WHERE THEY SHALL BE 3/16-INCH.
- TIE RODS SHALL NOT BE ATTACHED TO A PIPE WHEN THE WALL THICKNESS IS LESS THAN THE MINIMUM SHOWN ON THE TIE ROD SCHEDULE.
- FOR ALL BURIED ASSEMBLIES, COAT WITH AN ENGINEER APPROVED PRODUCT OR AS APPROVED ON THE CURRENT WATER AUTHORITY APPROVED PRODUCTS LIST.



REVISIONS	WATER AUTHORITY
	WATER
	THRUST TIE DETAIL
	DWG. 2358      JANUARY 2011



**BUTTERFLY VALVE INSTALLATION DETAIL IN NEW D.I. PIPELINE**



**INSTALLATION DETAIL FOR TRANSITION BETWEEN DIFFERENT PIPE MATERIALS**

**CONSTRUCTION NOTES:**

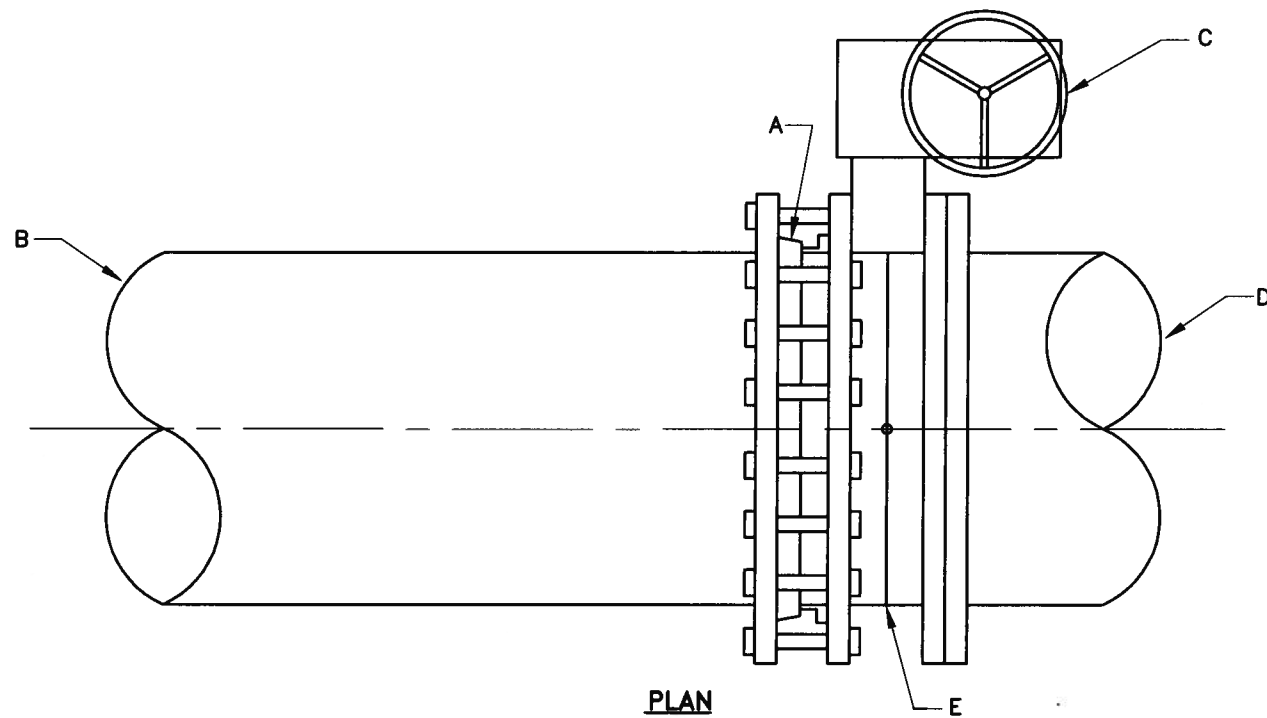
1 THIS DETAIL IS TO BE USED FOR NEW OR EXISTING DUCTILE IRON PIPE ONLY. WHERE EXISTING PIPE IS OF CAST IRON MATERIALS, VALVE INSTALLATION DETAILS SHALL BE SUBMITTED TO AND APPROVED BY THE WATER AUTHORITY.

**CONSTRUCTION NOTES:**

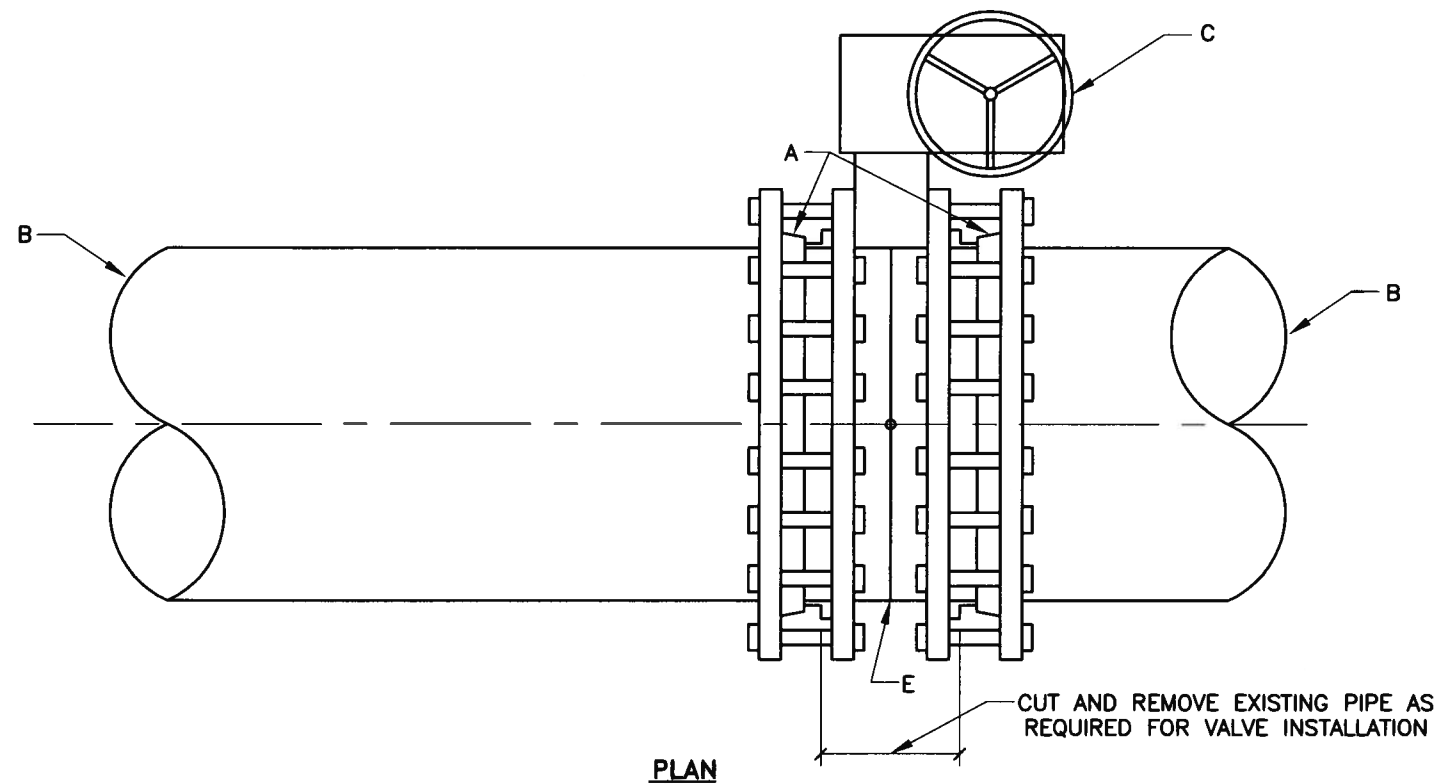
- A ADAPTER, SERIES 2100 AS MANUFACTURED BY EBAA IRON SALE, OR APPROVED EQUAL.
- AA TRANSITION SLEEVE ADAPTER, SERIES 2100 AS MANUFACTURED BY EBAA IRONSALE, OR APPROVED EQUAL.
- B MAIN PIPELINE (D.I.) WITH PLAIN END.
- C VALVE BOX AND COVER PER C.O.A. STD. DWG 2328.
- D 3" SQUARE OPERATING NUT.
- E MAIN PIPELINE (D.I.) WITH FLANGED END.
- F MAIN PIPELINE (OTHER) WITH PLAIN END.
- G BUTTERFLY VALVE (FLGxFLG), SIZE AS SHOWN ON DRAWINGS.

**DIRECT BURY INSTALLATION**

REVISIONS	WATER AUTHORITY
	WATER DUCTILE IRON BUTTERFLY VALVE DIRECT BURY INSTALLATION DETAILS
	DWG. 2359 JANUARY 2011



**BUTTERFLY VALVE INSTALLATION DETAIL IN NEW D.I. PIPELINE**



**BUTTERFLY VALVE INSTALLATION DETAIL IN EXISTING D.I. PIPELINE**

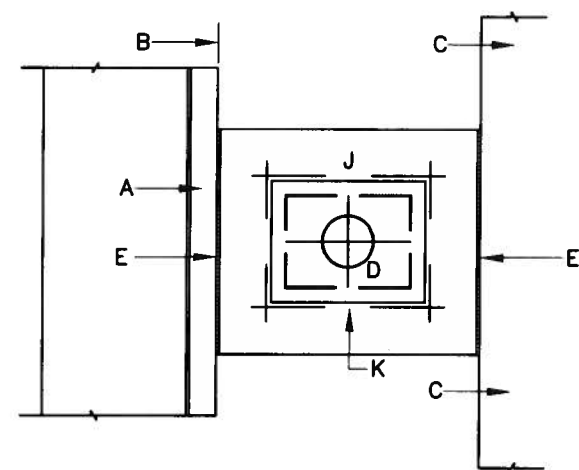
**CONSTRUCTION NOTES:**

- 1 THIS DETAIL IS TO BE USED FOR NEW OR EXISTING DUCTILE IRON PIPE ONLY. WHERE EXISTING PIPE IS OF CAST IRON MATERIALS, VALVE INSTALLATION DETAILS SHALL BE SUBMITTED TO AND APPROVED BY THE WATER AUTHORITY.
- 2 SEE STANDARD DRAWING 2334 FOR VALVE VAULT DETAILS.

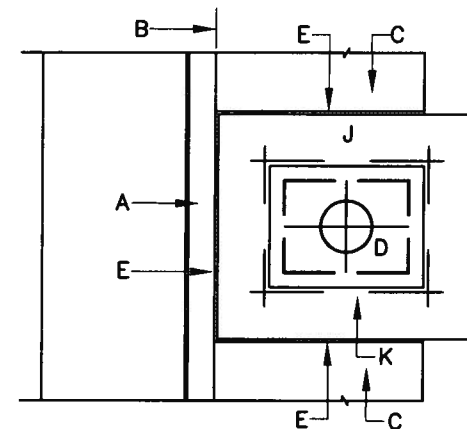
**CONSTRUCTION NOTES:**

- A MEGA FLANGE – FLANGE ADAPTER, SERIES 2100 AS MANUFACTURED BY EBAA IRON SALE, OR APPROVED EQUAL.
- B MAIN PIPELINE (D.I.) WITH PLAIN END.
- C HAND WHEEL.
- D MAIN PIPELINE (D.I.) WITH FLANGED END.
- E BUTTERFLY VALVE (FLGxFLG), SIZE AS SHOWN ON DRAWINGS.

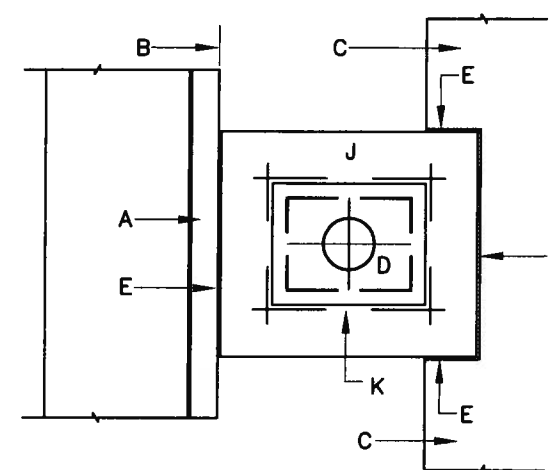
IN VAULT INSTALLATION	
REVISIONS	WATER AUTHORITY
	<b>WATER</b> <b>DUCTILE IRON BUTTERFLY VALVE</b> <b>IN VAULT INSTALLATION</b> DWG. 2360      JANUARY 2011



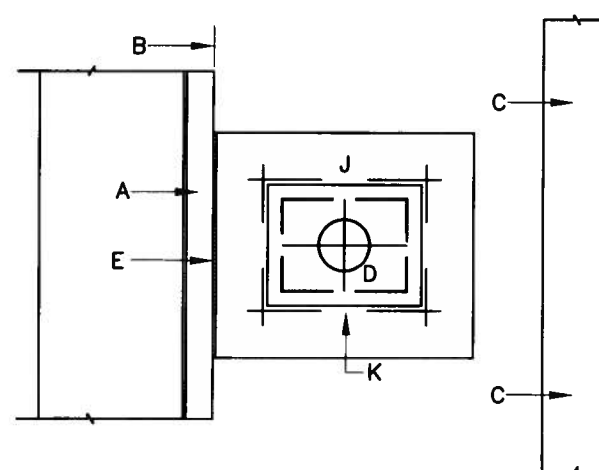
**CASE 1**  
(IN PARKWAY)



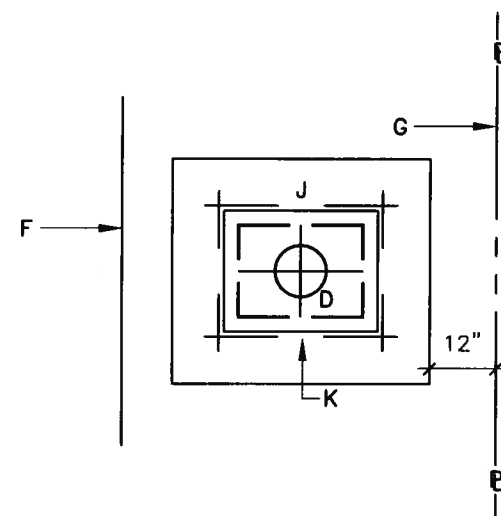
**CASE 2**  
(IN SIDEWALK)



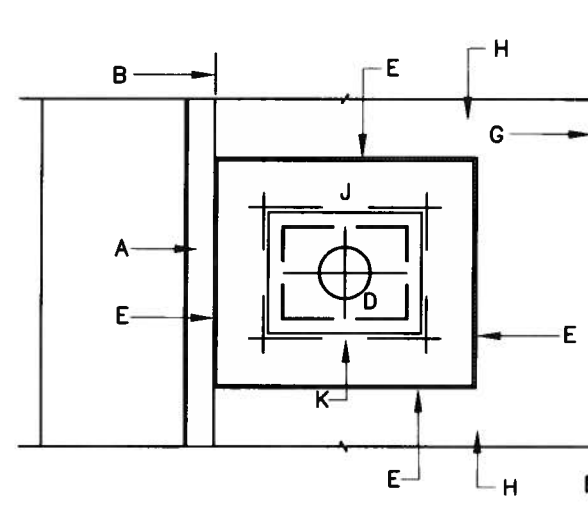
**CASE 3**  
(IN NARROW PARKWAY)



**CASE 4**  
(IN WIDE PARKWAY)



**CASE 5**  
(NO CURB AND GUTTER OR SIDEWALK)



**CASE 6**  
(IN DRIVEPAD)

**TYPICAL INSTALLATIONS 3/4" - 1" METERS**

**GENERAL NOTES:**

- 1 FOR CONSTRUCTION AND DIMENSIONS OF WATER METER BOX AND CONCRETE PAD, SEE STD. DWG. 2362, 2363 & 2368.
- 2 BECAUSE OF LIMITED SPACE, METER BOXES MAY BE ROTATED 90°. CONNECTIONS TO BE MADE PER WATER AUTHORITY APPROVAL.
- 3 DOUBLE METER BOXES SHALL BE CENTERED ON ADJOINING PROPERTY LINES.

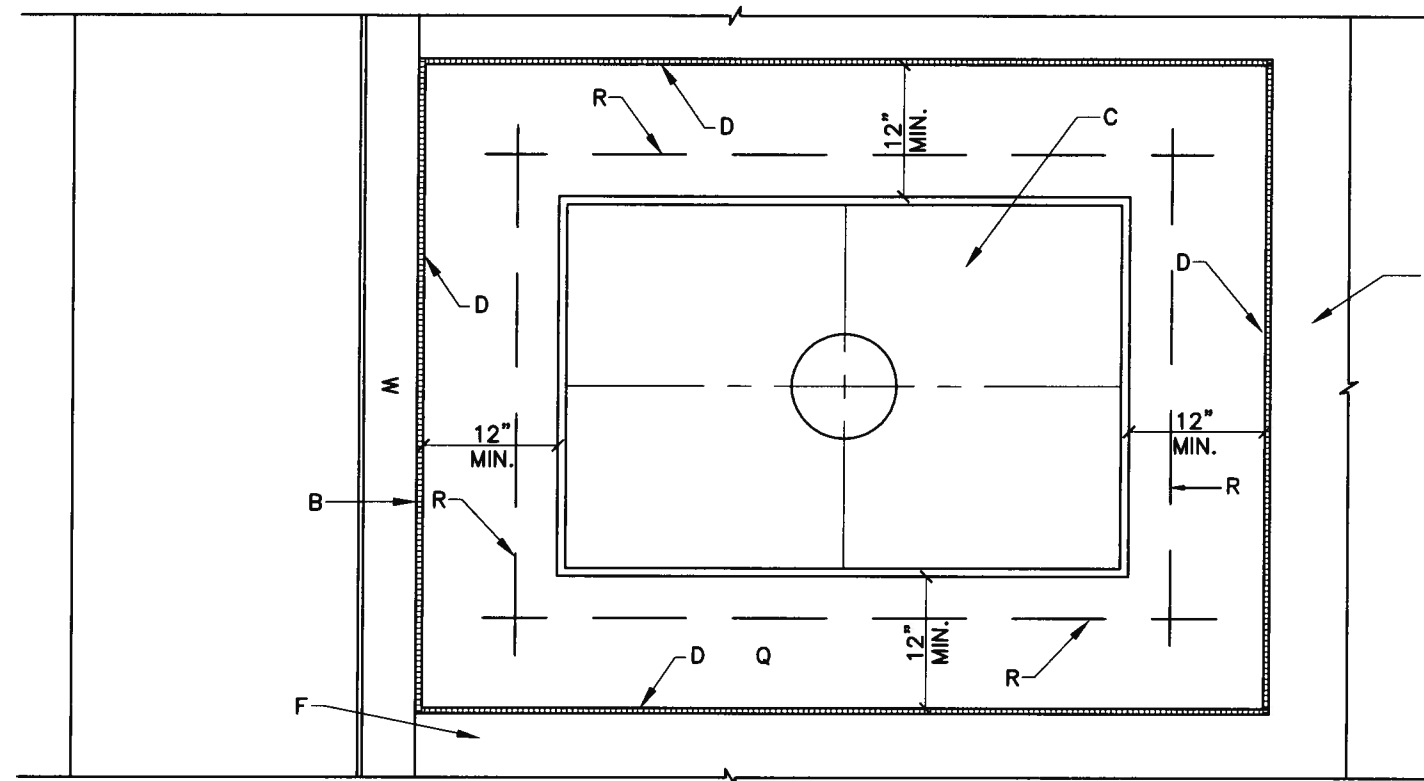
**CONSTRUCTION NOTES:**

- A CURB.
- B BACK OF CURB.
- C SIDEWALK.
- D METER BOX COVER, SEE STD. DWG. 2368.
- E 1/2" EXPANSION JOINT.
- F EDGE OF UNCURBED STREET OR GRADED STREET.
- G PROPERTY LINE.
- H DRIVEPAD.
- J CONCRETE PAD SEE DWG. 2362
- K #4 REBAR CONTINUOUS ALL AROUND METER BOX.

REVISIONS	WATER AUTHORITY
	WATER TYPICAL METER BOX INSTALLATIONS
	DWG. 2361 JANUARY 2011

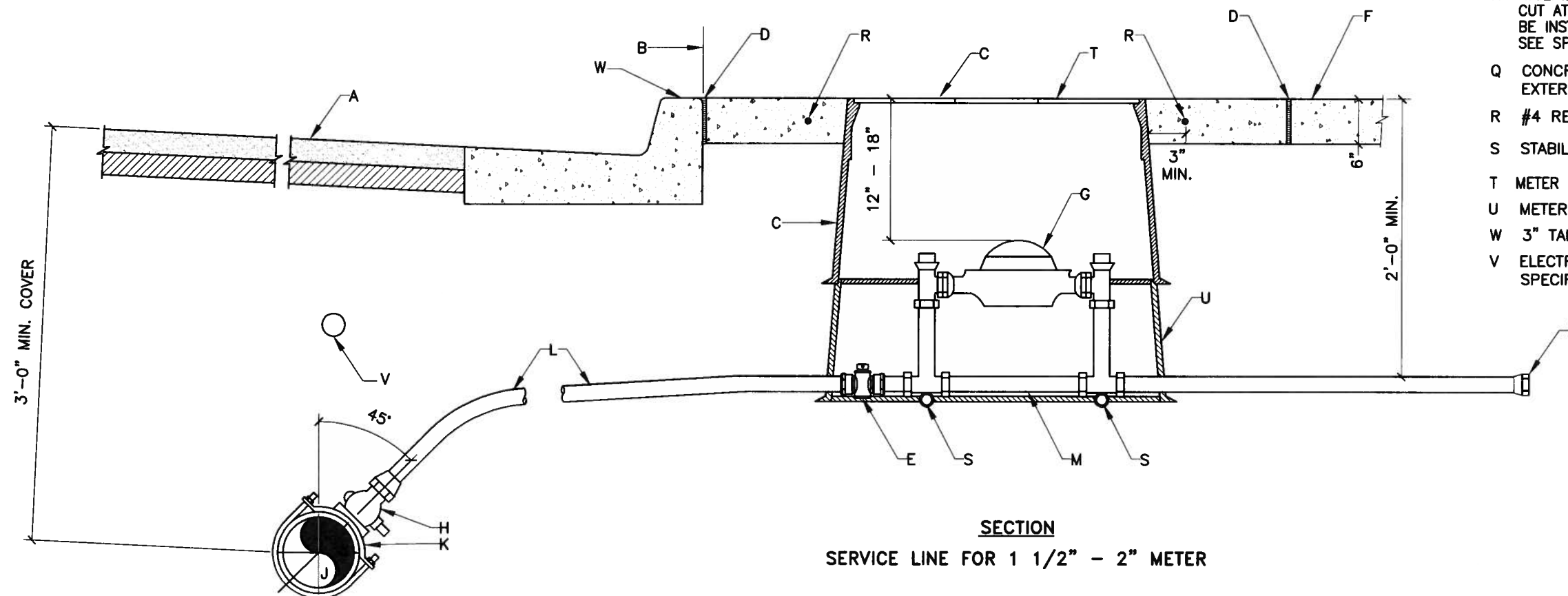






PLAN

SERVICE LINE FOR 1 1/2" - 2" METER



SECTION  
SERVICE LINE FOR 1 1/2" - 2" METER

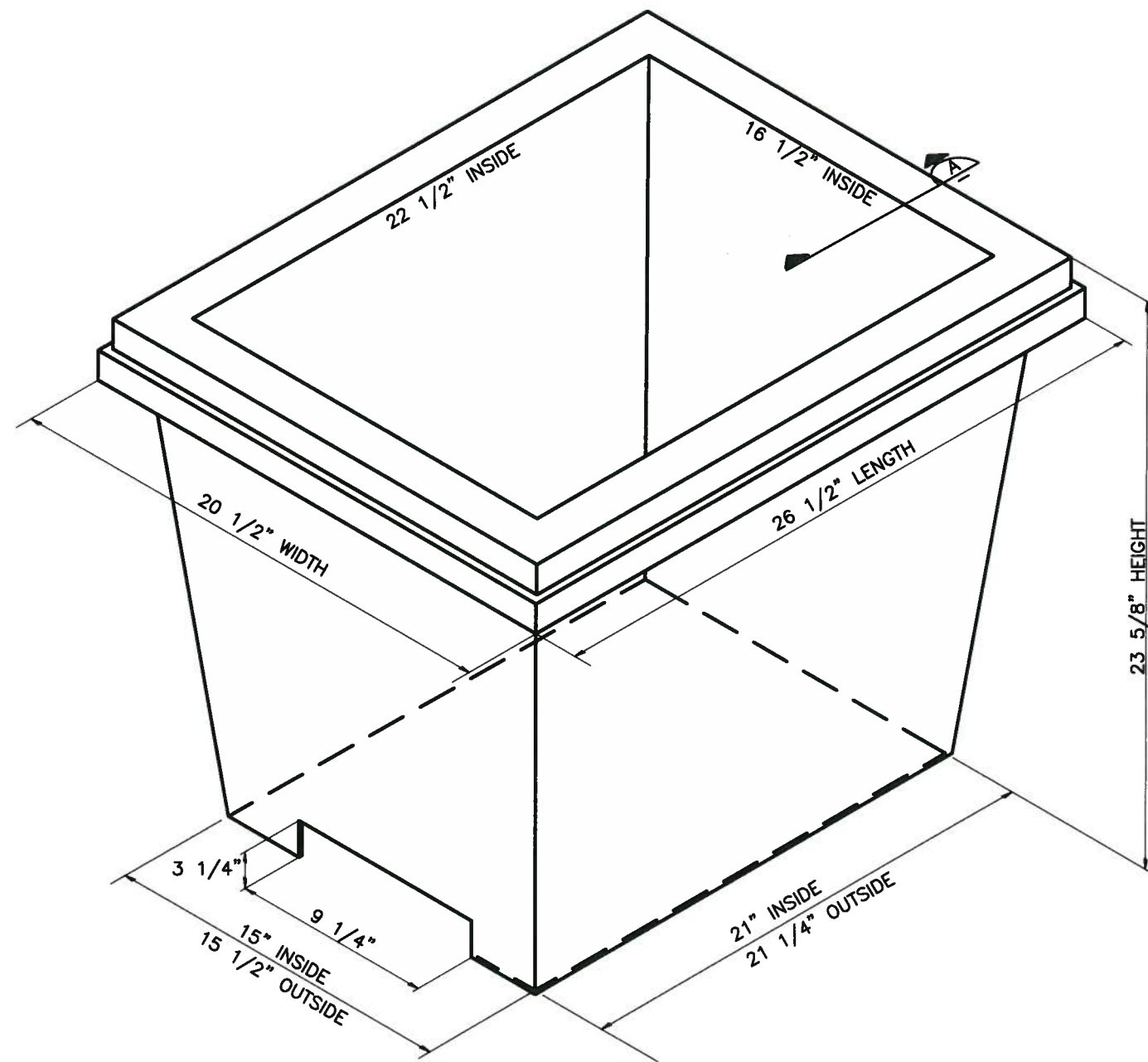
GENERAL NOTES:

- 1 METER BOX LOCATION TO CONFORM TO COA STANDARD DRAWING 2361.
- 2 THE (PRIVATE) TAILPIECE IS TO BE INSTALLED BY THE CONTRACTOR AND IS TO BE OWNED AND MAINTAINED BY THE CUSTOMER PER WATER AUTHORITY ORDINANCE.

**CONSTRUCTION NOTES:**

- A STREET SURFACE.
- B BACK OF CURB.
- C METER BOX, COVER AND LID, SEE DRAWING 2367.  
COVER FLUSH WITH SURFACE AND CENTERED  
OVER METER REGISTER.
- D 1/2" EXPANSION JOINT.
- E CURB STOP, LOCATE INSIDE METER BOX.
- F SIDEWALK OR DRIVEPAD.
- G METER. TOP OF METER TO BE 12"-18" BELOW COVER.
- H CORP STOP.
- J MAIN WATER LINE.
- K TAPPING SADDLE.
- L COPPER SERVICE LINE.
- M COPPER SETTER. PROVIDE WITH DUAL CHECK VALVE  
IN PRESSURE ZONES OW, 1W, 1E, AND FOR PRIVATE WELLS.  
SEE SPECIFICATION SECTION 802.3.9 FOR PRIVATE WELL PROVISIONS.
- N TAILPIECE 3' LONG, APPROVED COPPER TUBING WITH A CLEAN  
CUT AT END WITH A TEMPORARY PLUG. DUAL CHECK VALVE SHALL  
BE INSTALLED IN WATER ZONES OW, 1W, 1E AND FOR PRIVATE WELLS.  
SEE SPECIFICATION SECTION 802.3.9 FOR PRIVATE WELL PROVISIONS.
- Q CONCRETE PAD REQUIRED IN ALL AREAS PER SEC. 101  
EXTERIOR CONCRETE,  $f'c=3000$  psi @ 28 DAYS.
- R #4 REBAR CONTINUOUS ALL AROUND METER BOX.
- S STABILIZER BAR. 1/2" X 12" LONG GALVANIZED STEEL PIPE.
- T METER BOX LID SHALL BE FLUSH WITH SURROUNDING SIDEWALK.
- U METER BOX EXTENSION AS REQUIRED.
- W 3" TALL "W" STAMP ON CURB WHERE SERVICE LINE CROSSES.
- V ELECTRONIC MARKER DEVICE (EMD) SEE STANDARD  
SPECIFICATION SECTION 170.

REVISIONS	WATER AUTHORITY
	<p>WATER</p> <p>1-1/2" TO 2" METERED</p> <p>SERVICE LINE INSTALLATION</p> <p>DWG. 2363</p> <p>JANUARY 2011</p>



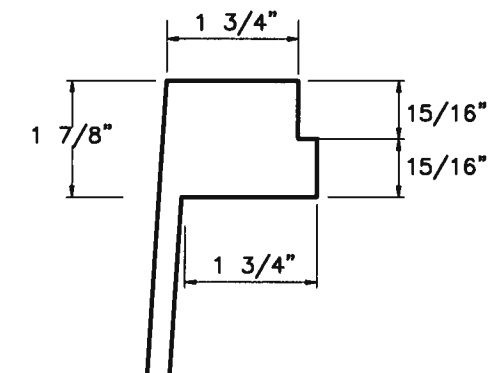
**BOX**  
N.T.S.

**GENERAL NOTES:**

- 1 METER BOX LOCATION TO CONFORM TO DWG. 2361.
- 2 CONSTRUCTION OF METER BOX TO CONFORM TO SECTION 802 FOR WATER METER BOX, 3/4" AND 1" METERS.
- 3 SEE DWG 2368 FOR METER BOX COVER AND LID.

**CONSTRUCTION NOTES:**

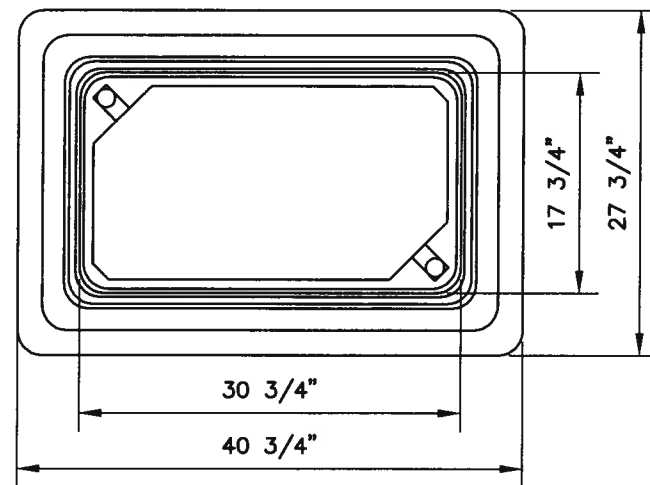
- A PIPE HOLE, 1 AT EACH END, 9 1/4" WIDE BY 3 1/4" HIGH.



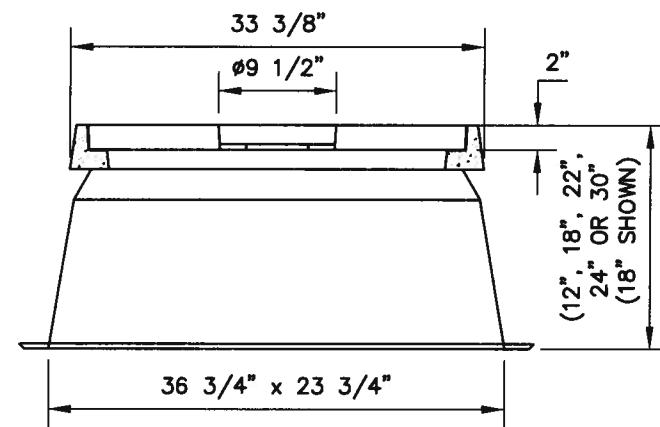
**SECTION**  
N.T.S. **A**

\*METER BOX FOR ONE OR TWO METER INSTALLATIONS

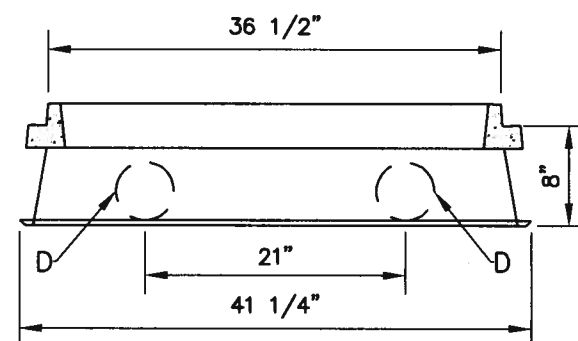
REVISIONS	WATER AUTHORITY
	<b>WATER METER BOX FOR 3/4" AND 1" METERS</b> DWG. 2366 JANUARY 2011



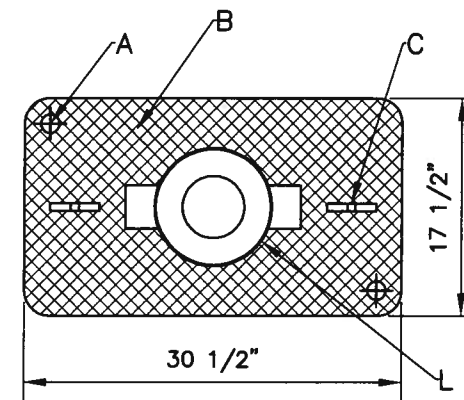
**TOP VIEW**



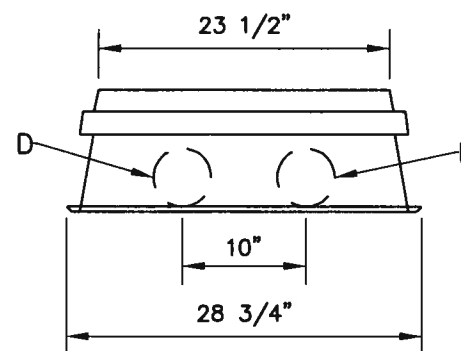
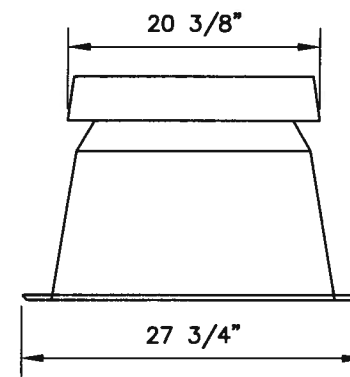
**BOX & COVER SECTION**



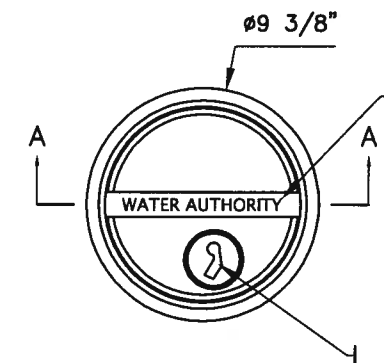
**EXTENSION SECTION**



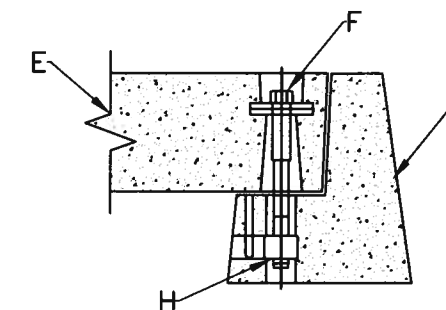
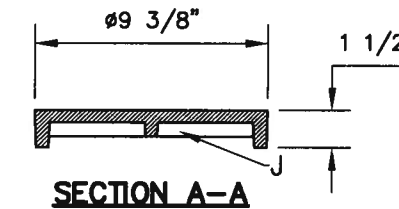
**COVER**



**END VIEWS**



**METER LID**



**COVER BOLTDOWN OPTION**

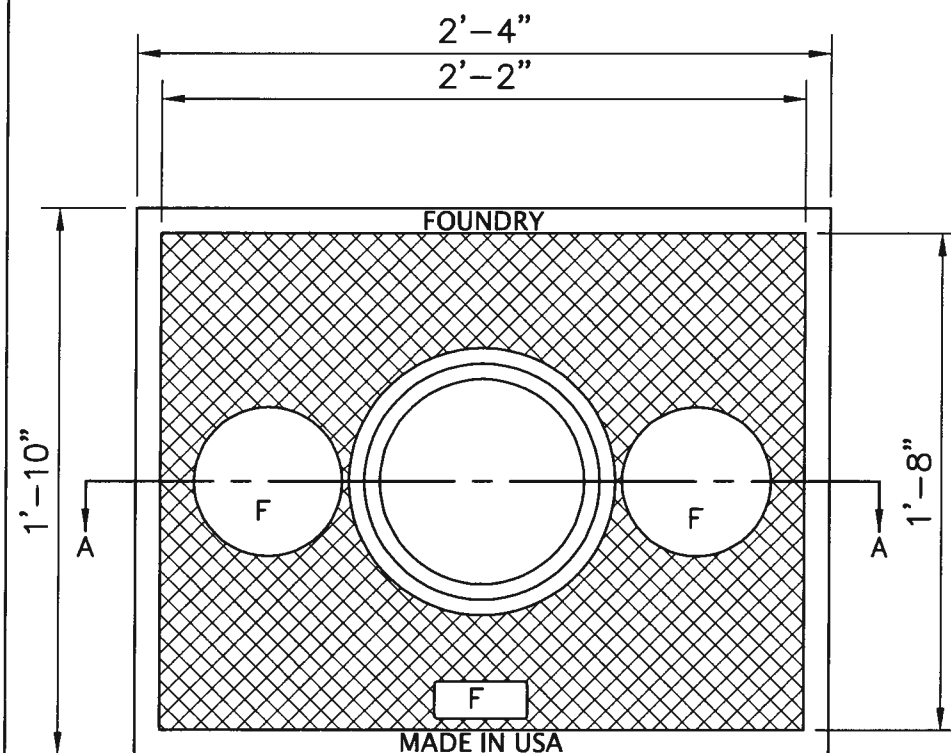
**GENERAL NOTES:**

1. MATERIAL: FIBERGLASS REINFORCED POLYMER CONCRETE AND FIBERGLASS REINFORCED POLYMER.
2. STANDARD COLOR: CONCRETE GRAY (OPTIONAL COLLARS ARE AVAILABLE FOR COVER AND COLLAR).
3. FLARED WALL BOXES ARE NESTABLE.
4. OPTIONAL CAST IRON READER LIDS ARE AVAILABLE.

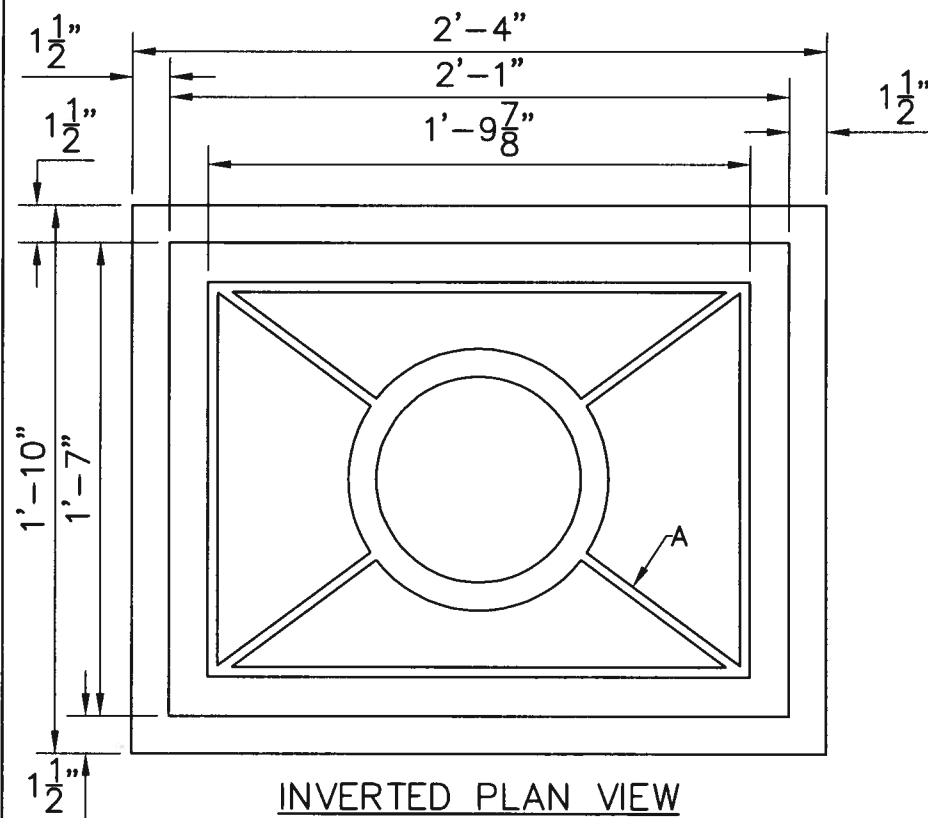
**CONSTRUCTION NOTES:**

- A. COVER BOLTDOWN OPTION
- B. SKID RESISTANT SURFACE
- C. 5/8" x 4" LIFTING SLOTS
- D. OPTIONAL KNOCKOUTS OR TERMINATORS
- E. COVER
- F. STAINLESS STEEL CAPTIVE BOLT
- G. BOX
- H. SELF-CENTERING CORROSION RESISTANT NUT
- I. METER LID KEYHOLE
- J. 1/2" THICK RIB
- K. 1/2" RAISED LETTERING (FLUSH)
- L. LID

REVISIONS	WATER AUTHORITY
	WATER METER BOX COVER & LID FOR 1-1/2" - 2" METERS
	DWG. 2367 JANUARY 2011



PLAN VIEW  
BOX COVER FOR 3/4" - 1" METERS



INVERTED PLAN VIEW  
BOX COVER FOR 3/4" - 1" METERS

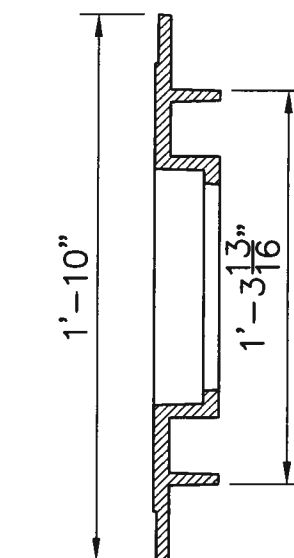
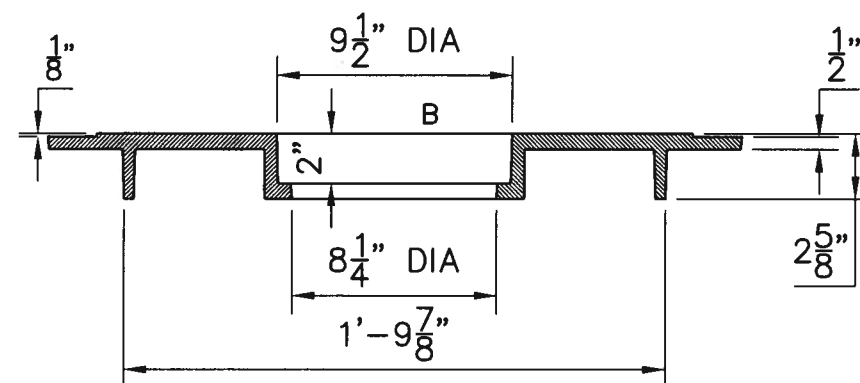
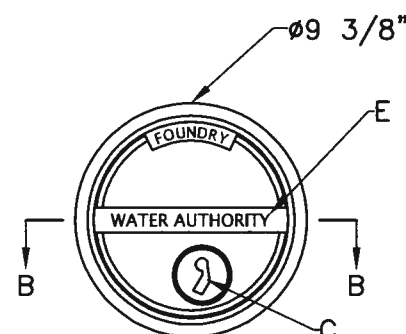


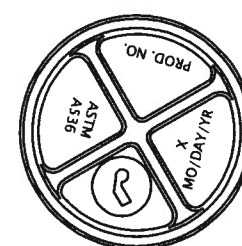
PLATE SECTION



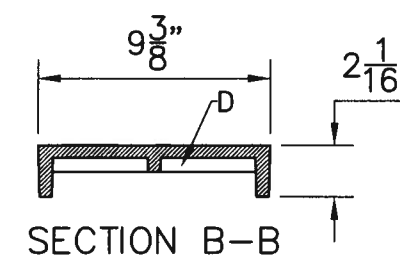
SECTION A-A



PLAN VIEW  
WATER  
METER LID



BOTTOM VIEW



SECTION B-B

# **GENERAL NOTES:**

1 TO BE USED IN SIDEWALKS, MOUNTABLE CURB OR IN UNPAVED AREAS.

## **COVER**

2 MATERIAL - DUCTILE IRON.

3 ROUND ALL EDGES.

4 TOP TO BE ASPHALT PAINTED.

5 TOP OF COVER SHALL HAVE AN INTEGRATED CORRUGATED DESIGN TO PREVENT SLIPPING.

## **LID**

6 MATERIAL - DUCTILE IRON.

7 ROUND ALL EDGES.

8 TOP TO BE ASPHALT PAINTED.

9 TOP OF LID SHALL HAVE INTEGRATED CORRUGATED DESIGN TO PREVENT SLIPPING.

10 TOP OF COVER SHALL HAVE INTEGRATED WORDS "WATER AUTHORITY".

11 LID SHALL NOT ROCK ON COVER AND SHALL BE EASILY OPENED.

12 THE TOP SURFACE OF THE LID SHALL BE FLUSH WITH TOP OF COVER.

## **CONSTRUCTION NOTES:**

A 3/8"x2 3/8" RIB (TYPICAL).

B LID OPENING.

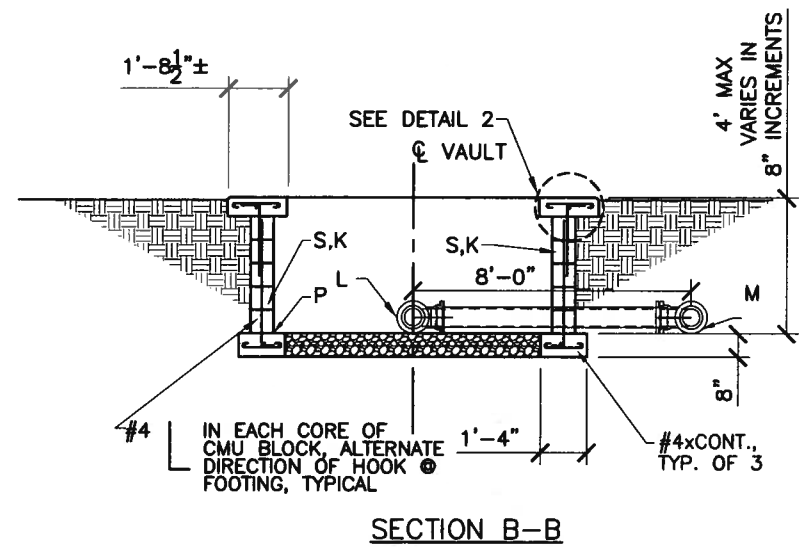
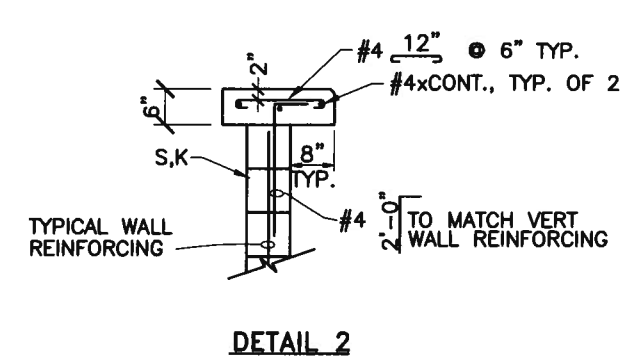
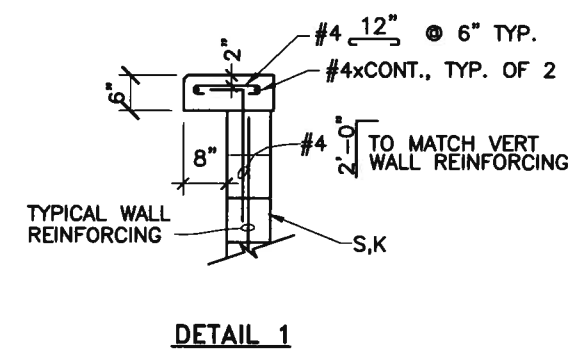
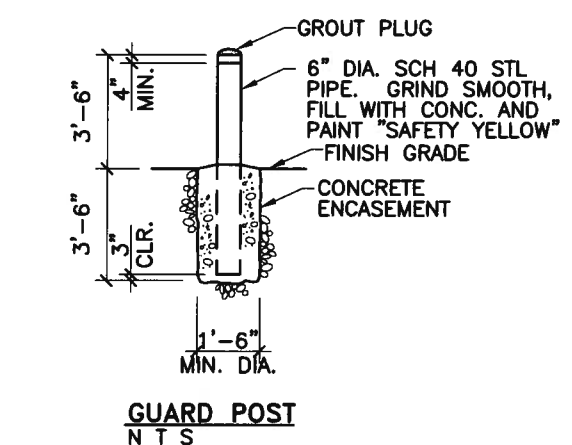
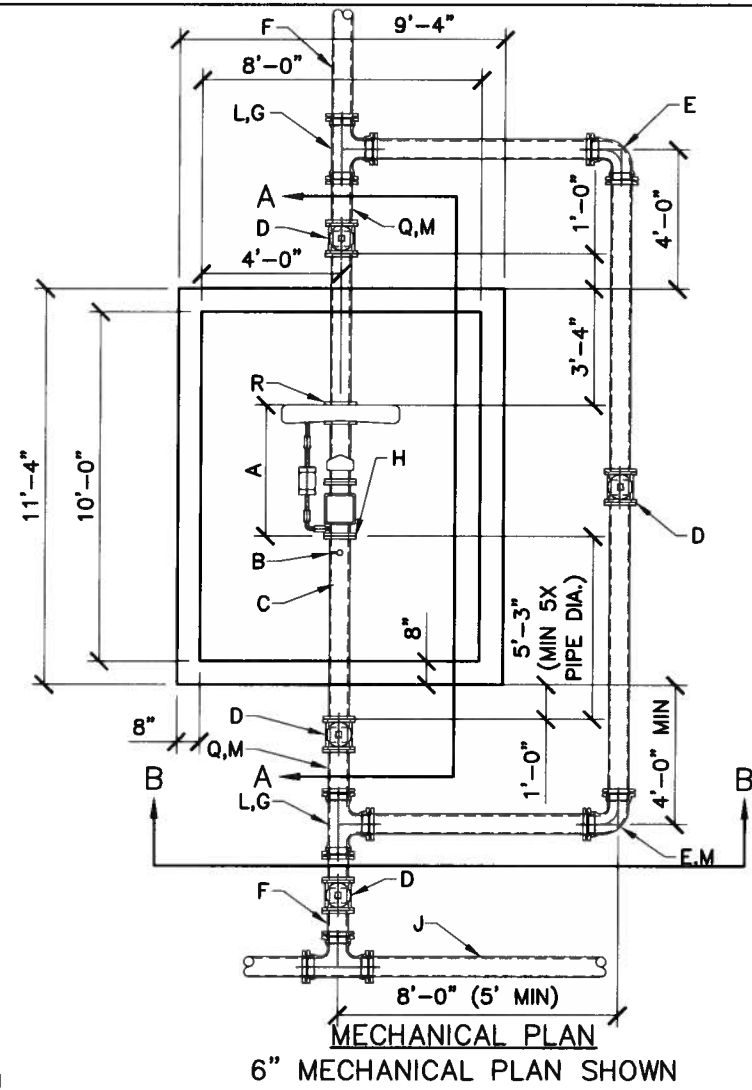
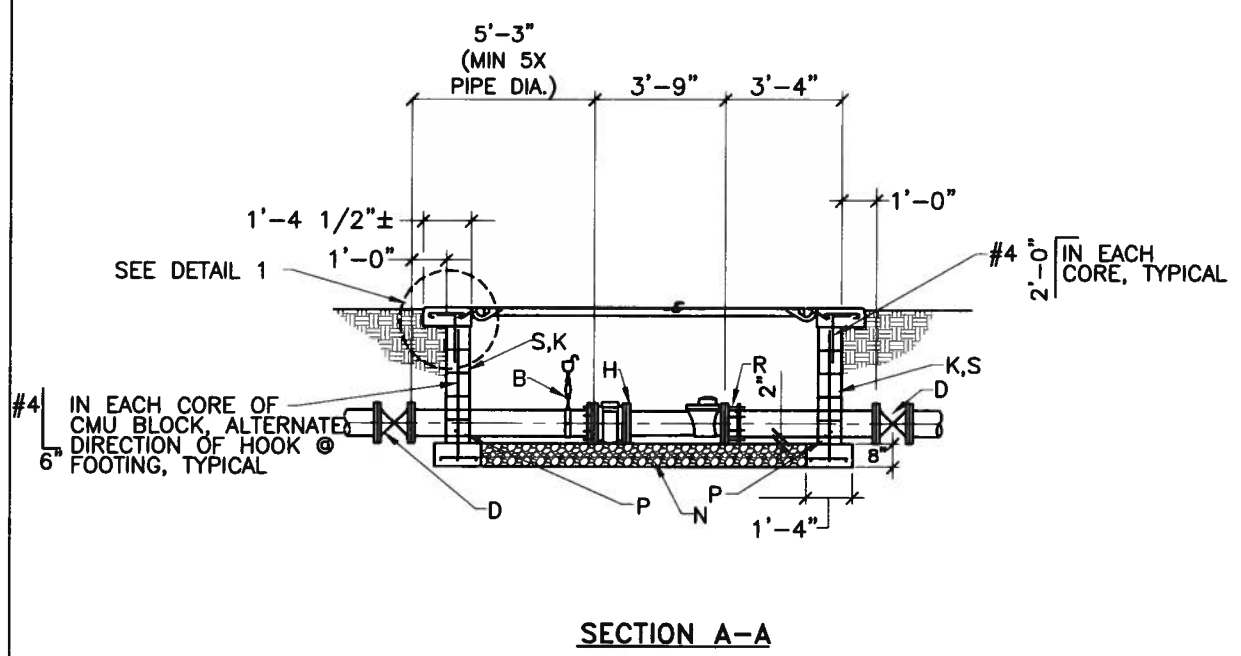
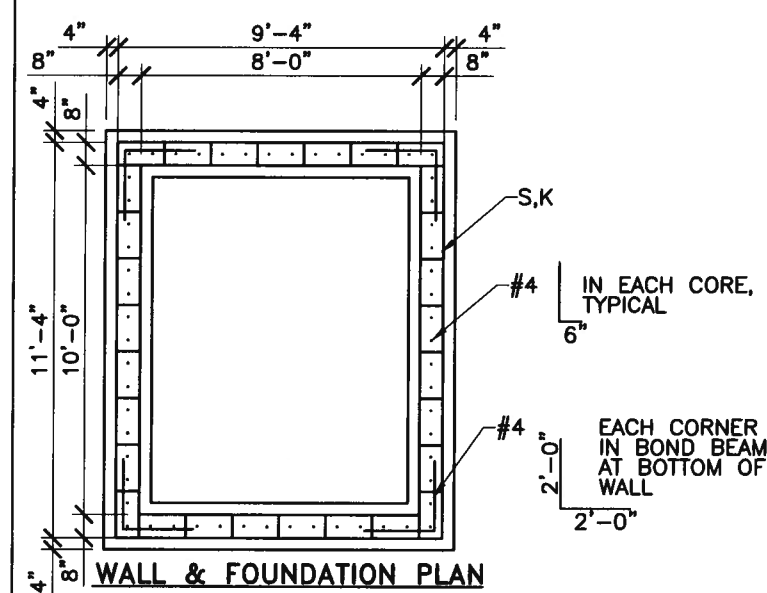
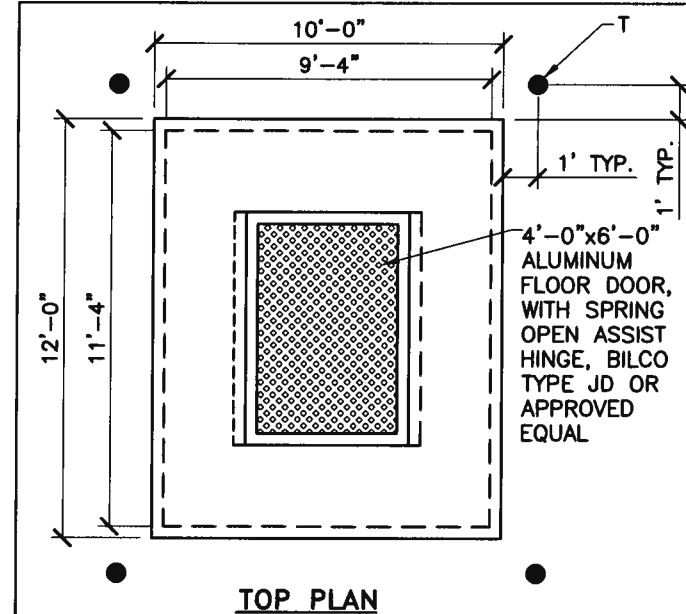
C METER LID KEYHOLE.

D 1/2" THICK RIB.

E 3/4" RAISED LETTERING (FLUSH).

F FLAT AREA.

REVISIONS	WATER AUTHORITY
	<b>WATER</b>
	<b>METER BOX COVER &amp; LID</b>
	<b>FOR 3/4" &amp; 1" METERS</b>
	DWG. 2368 JANUARY 2011



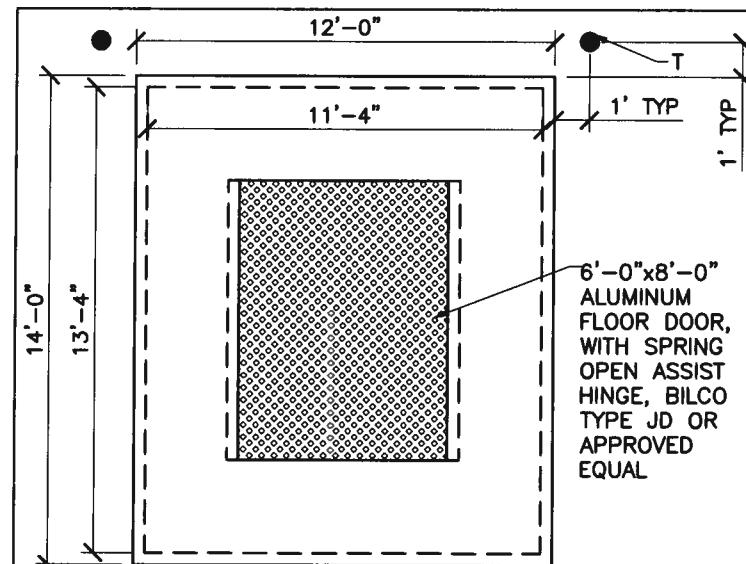
**GENERAL NOTES:**

- 1 COMPRESSIVE STRENGTH OF ALL CONCRETE SHALL BE 3000 PSI PER EXTERIOR CONC. SPEC SEC. 101.
- 2 COMPACT SUBGRADE UNDER AND 12" EITHER SIDE OF FOOTING TO 95% MAXIMUM DENSITY, PER ASTM D-1557 TO 6" MIN. DEPTH.
- 3 PRECAST CONCRETE VAULT MAY BE USED IN LIEU OF CMU. CONSTRUCTION WITH WATER AUTHORITY APPROVAL. SUBMIT DETAILS FOR REVIEW.
- 4 VAULT NOT TO BE PLACED IN TRAFFIC AREAS.
- 5 THE MAXIMUM DEPTH IS 4'.
- 6 NO BYPASS IS TO BE INSTALLED FOR IRRIGATION WATER USES - PARKS, MEDIANS, LANDSCAPING, ETC.
- 7 DO NOT CONSTRUCT DRAIN POCKETS WHEN CONSTRUCTING IN SHALLOW GROUNDWATER CONDITIONS. ENGINEER SHALL PROVIDE A WATERPROOF MANHOLE OR VAULT DESIGN FOR APPROVAL BY THE WATER AUTHORITY PRIOR TO INSTALLATION.
- 8 FILL PIPE PENETRATION VOIDS WITH NON-SHRINK GROUT OR WATER AUTHORITY APPROVED EQUAL.

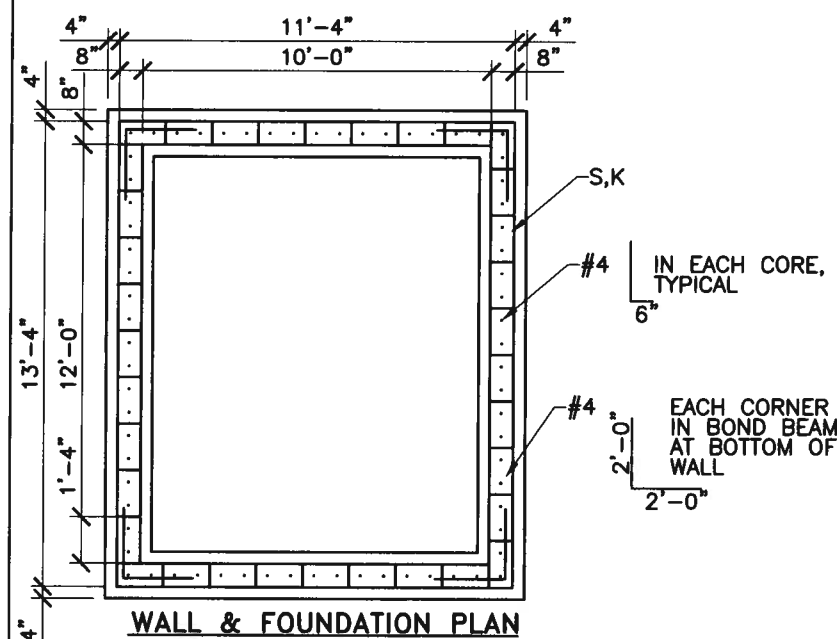
**CONSTRUCTION NOTES:**

- A METER LAY LENGTH VARIES DEPENDING ON METER SIZE. COORDINATE WITH LAYING LENGTH REQUIRED. METER AND STRAINER TO BE PROVIDED AND INSTALLED BY THE WATER AUTHORITY.
- B 1" SADDLE TAP, 1" GATE VALVE AND 1" AIR RELEASE VALVE. AIR RELEASE VALVE SHALL BE APCO MODEL NO. 200A OR APPROVED EQUAL.
- C D.I. SPOOL (FLANGExPE) LENGTH AS REQ'D. MINIMUM LENGTH SHALL BE 5 TIMES THE PIPE DIAMETER.
- D GATE VALVE (MJ) WITH MEGALUGS WITH VALVE BOX PER STANDARD DRAWING 2326.
- E 90° ELBOW (MJ) WITH MEGALUGS.
- F MAIN SERVICE LINE.
- G MJ TEE WITH MEGALUGS.
- H MEGA FLANGE-FLANGE ADAPTER, SERIES 2100 AS MANUFACTURED BY EBAA IRON SALES, OR APPROVED EQUAL.
- J MAIN DISTRIBUTION LINE.
- K FILL ALL CMU CORES WITH 3000 PSI. CONCRETE, TYP.
- L ROLL TEE UP AS REQUIRED.
- M ROLL 90° ELBOW DOWN AS REQUIRED.
- N 3/4" GRAVEL FILL PER ASTM C33, NO. 57 GRAVEL, 8" DEPTH.
- P CONTINUOUS BOND BEAM AT BOTTOM OF WALL WITH #4xcont. SEE FOUNDATION PLAN FOR ADDITIONAL REINFORCING AT CORNERS.
- Q D.I. PIPE (FLANGExPE) LENGTH AS REQUIRED.
- R FLANGE COUPLING ADAPTER, (FCA).
- S 8"x16"x8" HOLLOW CORE CONCRETE BLOCK (CMU).
- T 6" CONCRETE FILLED GUARD POST, TYPICAL OF 4. SEC. 101 EXTERIOR CONCRETE, f'c=3000 psi @ 28 DAYS.

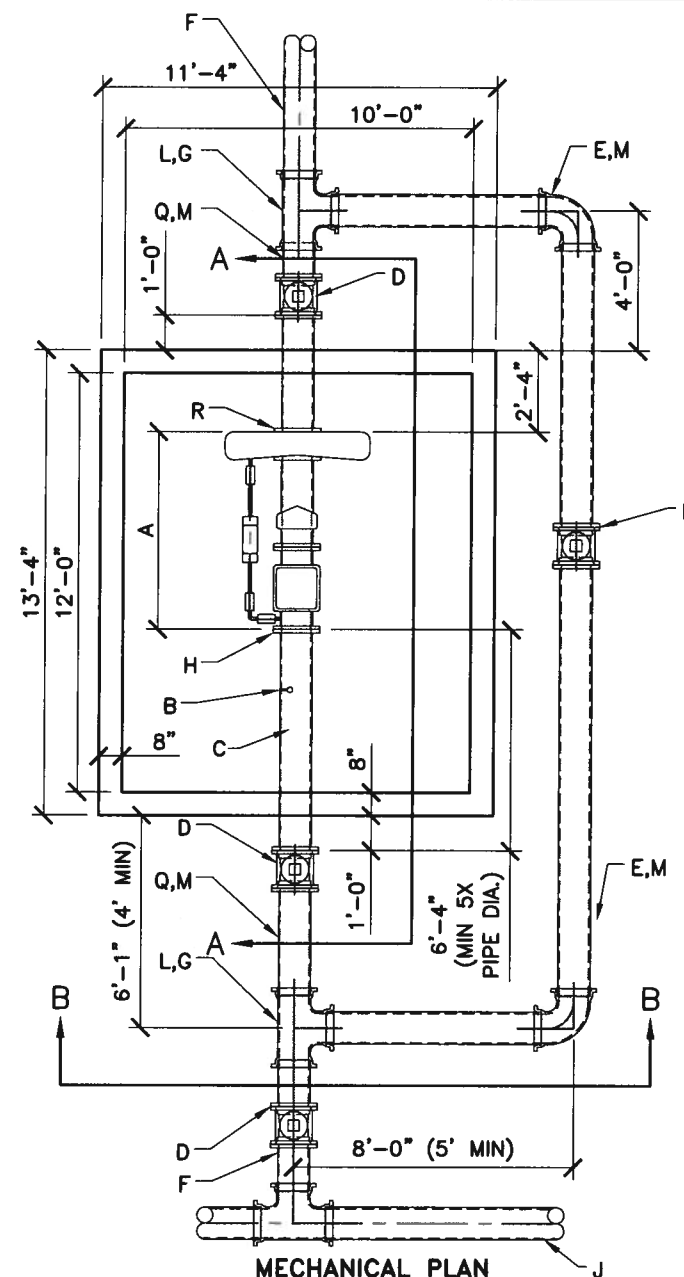
REVISIONS	WATER AUTHORITY
	<b>WATER</b> <b>LARGE DIAMETER</b> <b>METER VAULT</b> <b>3"-6" SERVICE</b>
	DWG. 2370 JANUARY 2011



TOP PLAN

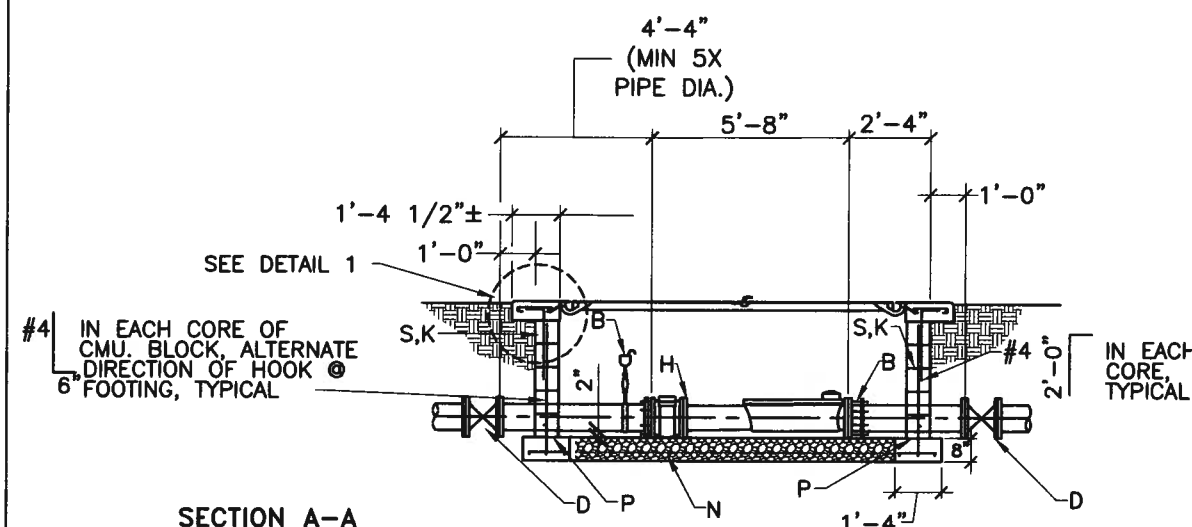


WALL & FOUNDATION PLAN

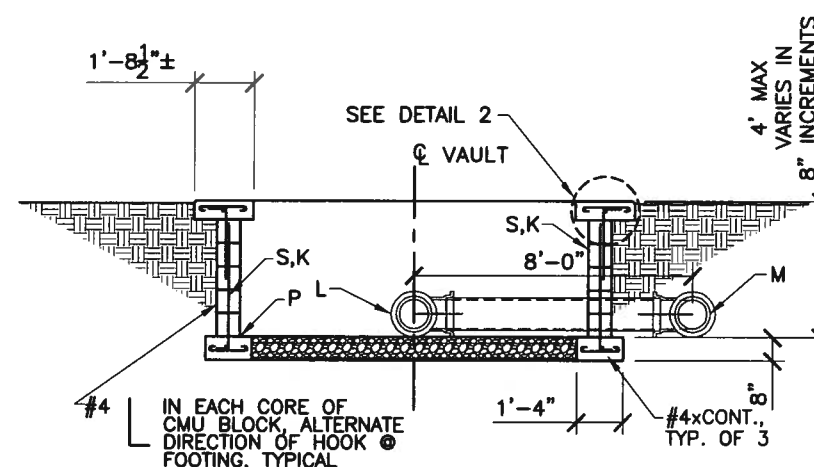


MECHANICAL PLAN

10" MECHANICAL PLAN SHOWN

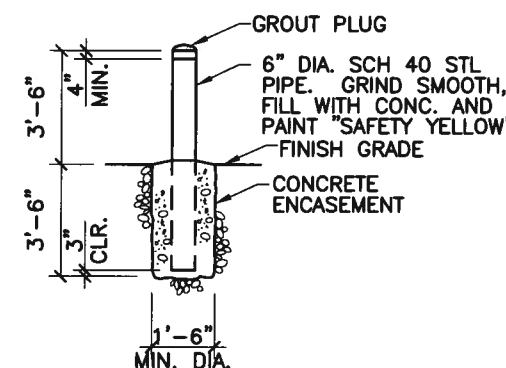


SECTION A-A

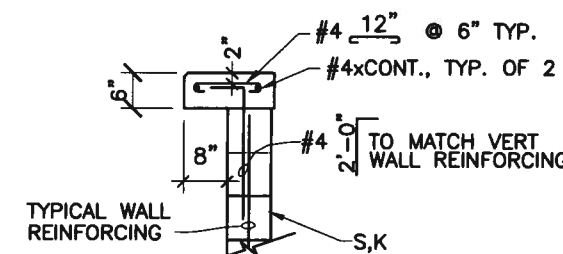


SECTION B-B

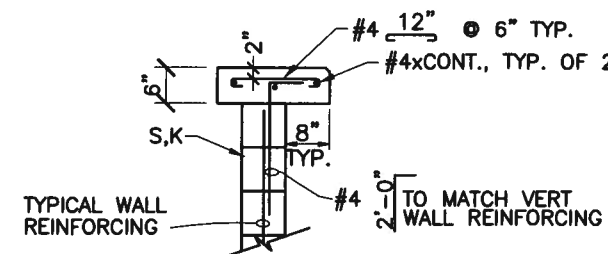
SCALE 3/16" = 1'



GUARD POST  
N T S



DETAIL 1



DETAIL 2

# GENERAL NOTES:

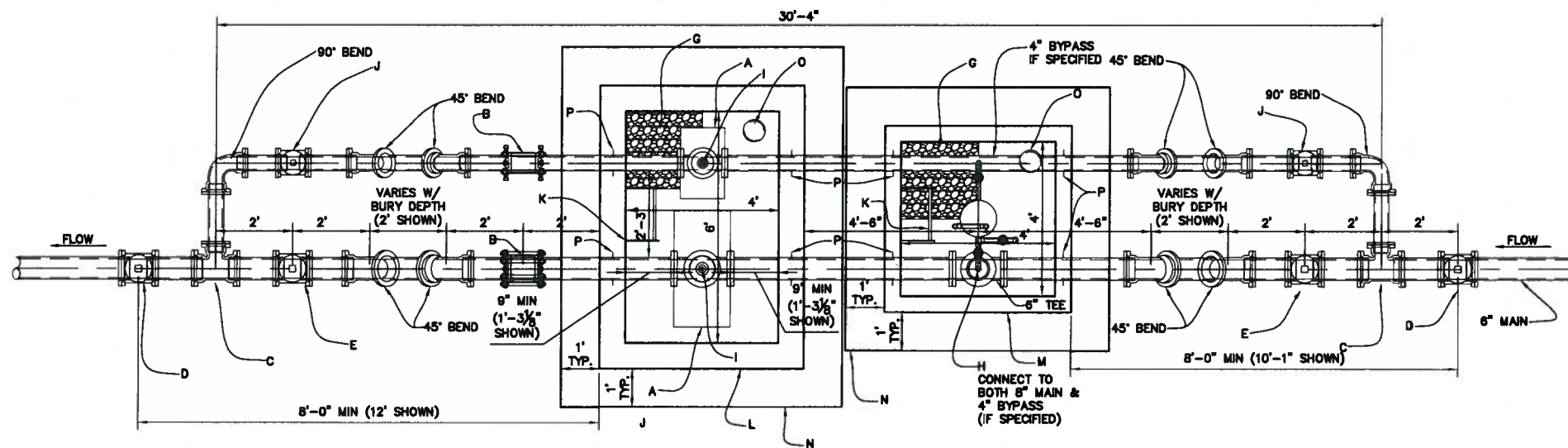
- 1 COMPRESSIVE STRENGTH OF ALL CONCRETE SHALL BE 3000 PSI PER EXTERIOR CONC. SPEC SEC. 101.
- 2 COMPACT SUBGRADE UNDER AND 12" EITHER SIDE OF FOOTING TO 95% MAXIMUM DENSITY, PER ASTM D-1557 TO 6" MIN. DEPTH.
- 3 PRECAST CONCRETE VAULT MAY BE USED IN LIEU OF CMU. CONSTRUCTION WITH WATER AUTHORITY APPROVAL. SUBMIT DETAILS FOR REVIEW.
- 4 VAULT NOT TO BE PLACED IN TRAFFIC AREAS.
- 5 THE MAXIMUM DEPTH IS 4'.
- 6 NO BYPASS IS TO BE INSTALLED FOR IRRIGATION WATER USES - PARKS, MEDIANS, LANDSCAPING, ETC.
- 7 DO NOT CONSTRUCT DRAIN POCKETS WHEN CONSTRUCTING IN SHALLOW GROUNDWATER CONDITIONS. ENGINEER SHALL PROVIDE A WATERPROOF MANHOLE OR VAULT DESIGN FOR APPROVAL BY THE WATER AUTHORITY PRIOR TO INSTALLATION.
- 8 FILL PIPE PENETRATION VOIDS WITH NON-SHRINK GROUT OR WATER AUTHORITY APPROVED EQUAL.

# CONSTRUCTION NOTES:

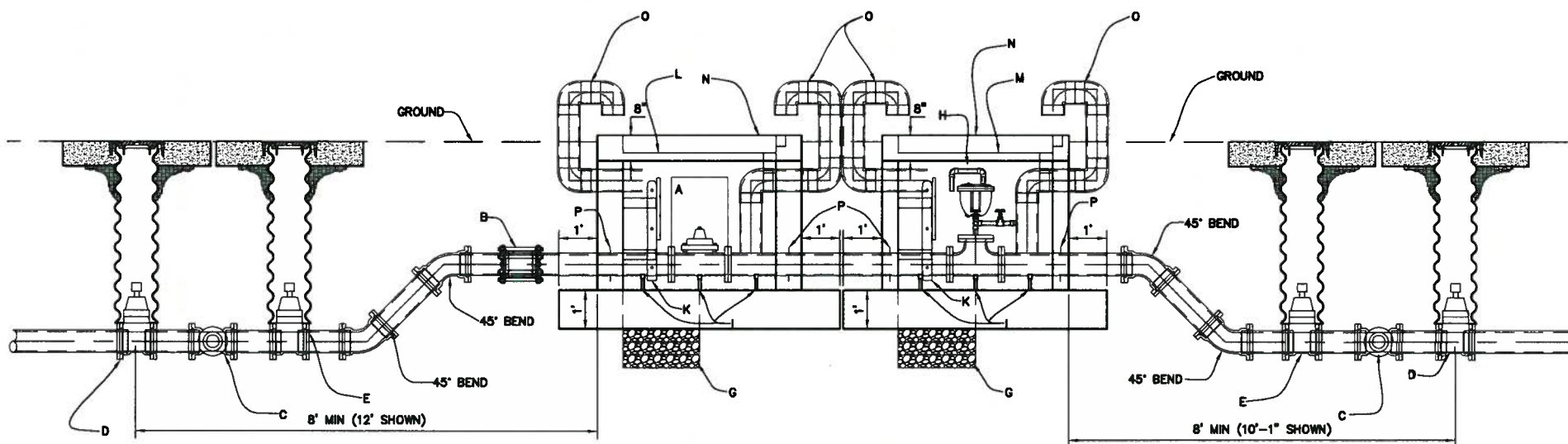
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- C D.I. SPOOL (FLANGExPE) LENGTH AS REQ'D. MINIMUM LENGTH SHALL BE 5 TIMES THE PIPE DIAMETER.
- D GATE VALVE (MJ) WITH MEGALUGS WITH VALVE BOX PER STANDARD DRAWING 2326.
- E 90° ELBOW (MJ) WITH MEGALUGS.
- F MAIN SERVICE LINE.
- G MJ TEE WITH MEGALUGS.
- H MEGA FLANGE-FLANGE ADAPTER, SERIES 2100 AS MANUFACTURED BY EBAA IRON SALES, OR APPROVED EQUAL.
- J MAIN DISTRIBUTION LINE.
- K FILL ALL CMU CORES WITH 3000 PSI. CONCRETE, TYP.
- L ROLL TEE UP AS REQUIRED.
- M ROLL 90° ELBOW DOWN AS REQUIRED.
- N 3/4" GRAVEL FILL PER ASTM C33, NO. 57 GRAVEL, 8" DEPTH.
- P CONTINUOUS BOND BEAM AT BOTTOM OF WALL WITH #4xCONT. SEE FOUNDATION PLAN FOR ADDITIONAL REINFORCING AT CORNERS.
- Q D.I. PIPE (FLANGExPE) LENGTH AS REQUIRED.
- R FLANGE COUPLING ADAPTER, (FCA).
- S 8"x16"x8" HOLLOW CORE CONCRETE BLOCK (CMU).
- T 6" CONCRETE FILLED GUARD POST, TYPICAL OF 4. SEC. 101 EXTERIOR CONCRETE, f'c=3000 psi @ 28 DAYS.

REVISIONS	WATER AUTHORITY
	WATER LARGE DIAMETER METER VAULT 8"-12" SERVICE
	DWG. 2371 JANUARY 2011





PRV ASSEMBLY PLAN VIEW  
SCALE 1/4" = 1'-0"



PRV ASSEMBLY PROFILE VIEW  
SCALE 1/4" = 1'-0"

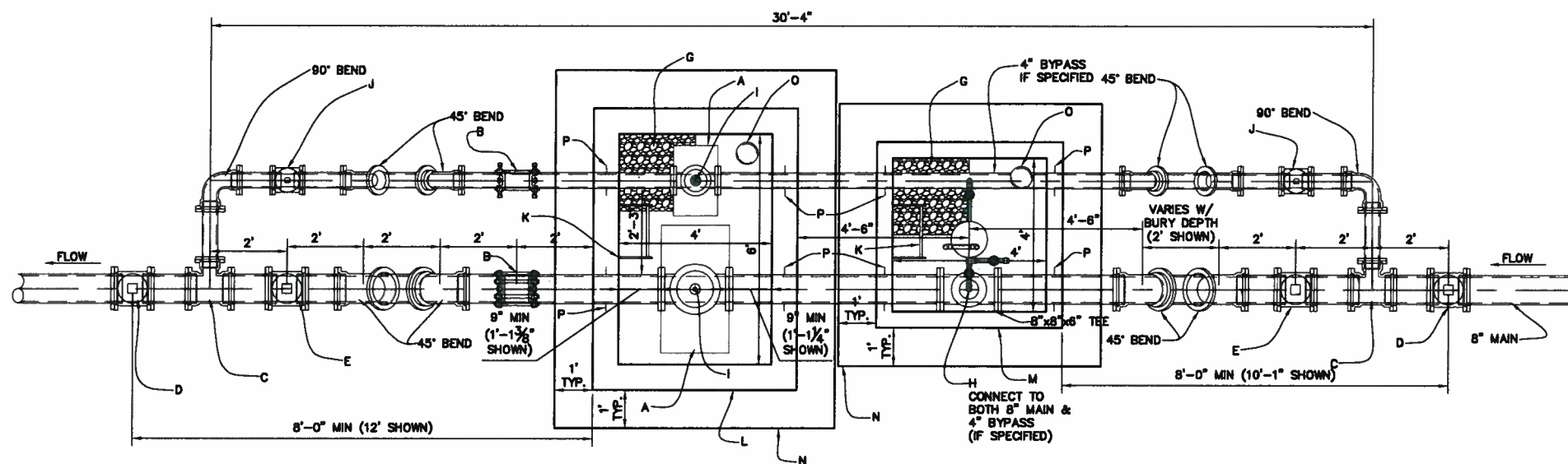
#### GENERAL NOTES:

1. FOR STRUCTURAL DETAILS, VAULT DIMENSIONS AND REINFORCING SEE STANDARD PRV STATION STRUCTURAL DETAILS DWG 2375.
2. ALL EXTERIOR PIPING SHALL BE PAINTED SAFETY YELLOW.
3. SEE STANDARD PRV STATION, NO METER, DWG 2354 FOR ADDITIONAL CONSTRUCTION NOTES.
4. IN NON-TRAFFIC AREAS, THE TOP ELEVATION OF THE VAULT WILL BE 12" ABOVE FINISHED GRADE WITH BOLLARDS PAINTED SAFETY YELLOW AT EACH CORNER.
5. ALL PARTS WITHIN THE VAULT MUST COINCIDE WITH THE CURRENT WATER AUTHORITY APPROVED PRODUCTS LIST.
6. A PLATE SHALL BE INSTALLED ON THE VAULT WALL THAT SHOWS THE ELEVATION.
7. PRV LOCATION, FINAL DESIGN AND LAYOUT SHALL BE APPROVED BY THE WATER AUTHORITY TO CONFORM WITH SPECIFIC SYSTEM AND SITE REQUIREMENTS.
8. PRV STATION ACCESS OPENING COVERS SHOWN ARE SUITABLE FOR LOCATIONS NOT EXPOSED TO CONTINUOUS HIGH DENSITY TRAFFIC. IF THE PRV STATION MUST BE LOCATED IN AREAS OF CONTINUOUS HIGH DENSITY TRAFFIC, THE ACCESS OPENING COVERS SHALL BE SPECIFICALLY DESIGNED TO WITHSTAND THE CONDITIONS AND LOADINGS TO BE ENCOUNTERED.
9. DO NOT CONSTRUCT DRAIN POCKETS WHEN CONSTRUCTING IN SHALLOW GROUNDWATER CONDITIONS. ENGINEER SHALL PROVIDE A WATERPROOF MANHOLE OR VAULT DESIGN FOR APPROVAL BY THE WATER AUTHORITY PRIOR TO INSTALLATION.

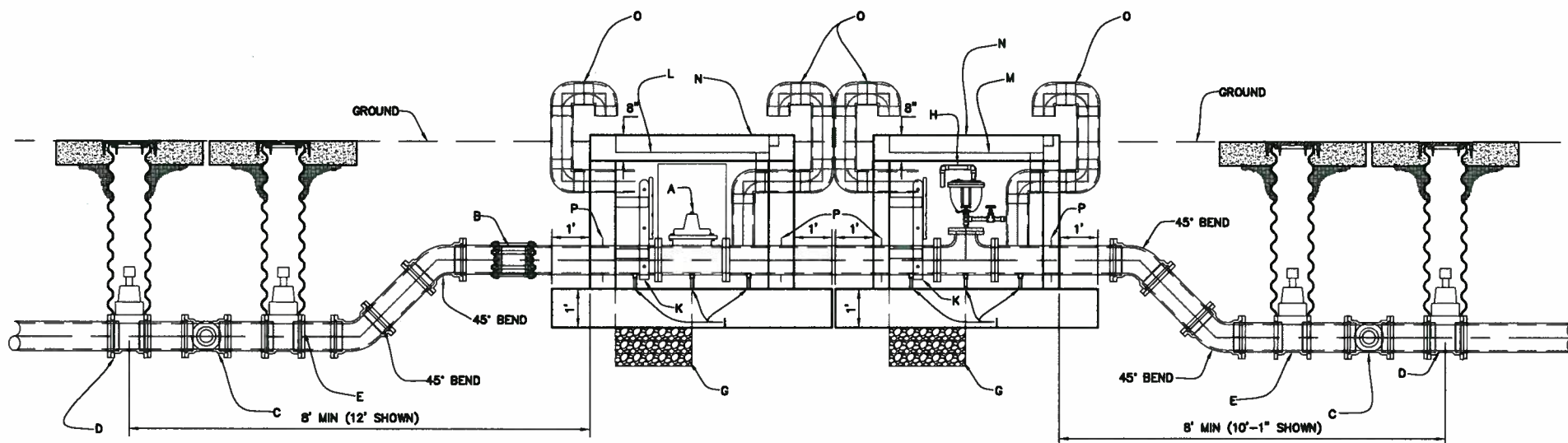
#### CONSTRUCTION NOTES:

- A. PRESSURE REDUCING VALVE, AS SPECIFIED.
- B. FLEXIBLE COUPLING WITH THRUST TIES, SEE STANDARD DRAWING 2358 FOR THRUST TIE DETAIL.
- C. MECHANICAL JOINT TEE, REQUIRED ONLY IF BYPASS IS SPECIFIED.
- D. BURIED GATE VALVE (BUTTERFLY VALVE FOR SIZES GREATER THAN 14").
- E. BUTTERFLY VALVE WITH HAND WHEEL OPERATOR (GATE VALVE FOR SIZES GREATER THAN 14"), REQUIRED ONLY WHEN BYPASS IS SPECIFIED.
- F. FLANGED SPOOL, LENGTH = 1'-0"
- G. 2'x2'x2' DEEP GRAVEL-FILLED SUMP. GRAVEL MUST CONFORM TO ASTM C33, NO. 57 GRAVEL.
- H. AIR RELIEF VALVE.
- I. ADJUSTABLE PIPE SADDLE SUPPORT, GRINNEL FIG. 264, ELCEN FIG. 50, OR EQUAL.
- J. GATE VALVE WITH HAND WHEEL OPERATOR, REQUIRED ONLY IF BYPASS IS SPECIFIED.
- K. LADDER PER STANDARD DRAWING 2335.
- L. 6'x4' BILCO SINGLE LEAF DOOR RATED FOR H20 TRAFFIC LOADS.
- M. 4'x4' BILCO SINGLE LEAF DOOR RATED FOR H20 TRAFFIC LOADS.
- N. SEE STANDARD DRAWING 2375 FOR STRUCTURAL DESIGN OF PRECAST/CAST-IN-PLACE CONCRETE VAULT.
- O. 6" STEEL PIPE WITH GOOSENECK AND INSECT SCREEN. PIPING SHOULD BE ROUTED SUCH THAT THE ABOVE GROUND GOOSENECK AND INSECT SCREEN ARE LOCATED OUT OF VEHICULAR OR PEDESTRIAN TRAFFIC AREAS.
- P. LINK SEAL WITH GROUT AT WALL PENETRATION.
- Q. 1/2" PIPE TAP WITH 1/2" BALL VALVE AND CAP
- R. D.I. SPOOL FLG. x P.E.
- S. MEGA FLANGE - FLANGE ADAPTOR, AS MANUFACTURED BY EBAA IRON SALES, OR APPROVED EQUAL.
- T. INSULATING FLANGE KIT.

REVISIONS	WATER AUTHORITY
	WATER 6" PRV ASSEMBLY DETAILS
	DWG. 2372 JANUARY 2011



PRV ASSEMBLY PLAN VIEW  
SCALE 1/4" = 1'-0"



PRV ASSEMBLY PROFILE VIEW  
SCALE 1/4" = 1'-0"

#### GENERAL NOTES:

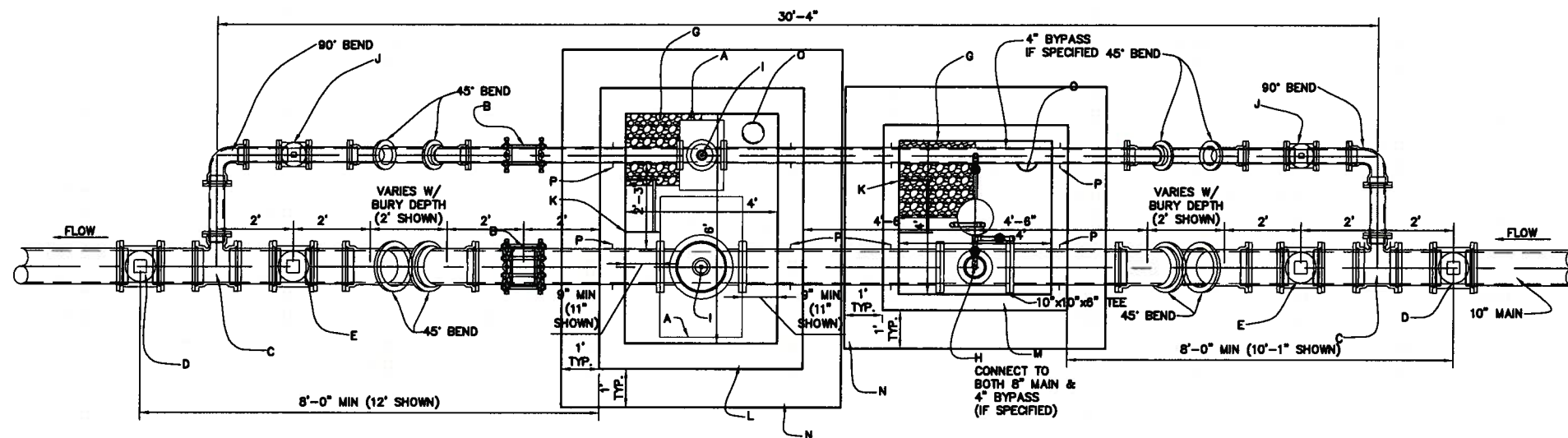
1. FOR STRUCTURAL DETAILS, VAULT DIMENSIONS AND REINFORCING SEE STANDARD PRV STATION STRUCTURAL DETAILS DWG 2375.
2. ALL EXTERIOR PIPING SHALL BE PAINTED SAFETY YELLOW.
3. SEE STANDARD PRV STATION, NO METER, DWG 2354 FOR ADDITIONAL CONSTRUCTION NOTES.
4. IN NON-TRAFFIC AREAS, THE TOP ELEVATION OF THE VAULT WILL BE 12" ABOVE FINISHED GRADE WITH BOLLARDS PAINTED SAFETY YELLOW AT EACH CORNER.
5. ALL PARTS WITHIN THE VAULT MUST COINCIDE WITH THE CURRENT WATER AUTHORITY APPROVED PRODUCTS LIST.
6. A PLATE SHALL BE INSTALLED ON THE VAULT WALL THAT SHOWS THE ELEVATION.
7. PRV LOCATION, FINAL DESIGN AND LAYOUT SHALL BE APPROVED BY THE WATER AUTHORITY TO CONFORM WITH SPECIFIC SYSTEM AND SITE REQUIREMENTS.
8. PRV STATION ACCESS OPENING COVERS SHOWN ARE SUITABLE FOR LOCATIONS NOT EXPOSED TO CONTINUOUS HIGH DENSITY TRAFFIC. IF THE PRV STATION MUST BE LOCATED IN AREAS OF CONTINUOUS HIGH DENSITY TRAFFIC, THE ACCESS OPENING COVERS SHALL BE SPECIFICALLY DESIGNED TO WITHSTAND THE CONDITIONS AND LOADINGS TO BE ENCOUNTERED.
9. DO NOT CONSTRUCT DRAIN POCKETS WHEN CONSTRUCTING IN SHALLOW GROUNDWATER CONDITIONS. ENGINEER SHALL PROVIDE A WATERPROOF MANHOLE OR VAULT DESIGN FOR APPROVAL BY THE WATER AUTHORITY PRIOR TO INSTALLATION.

#### CONSTRUCTION NOTES:

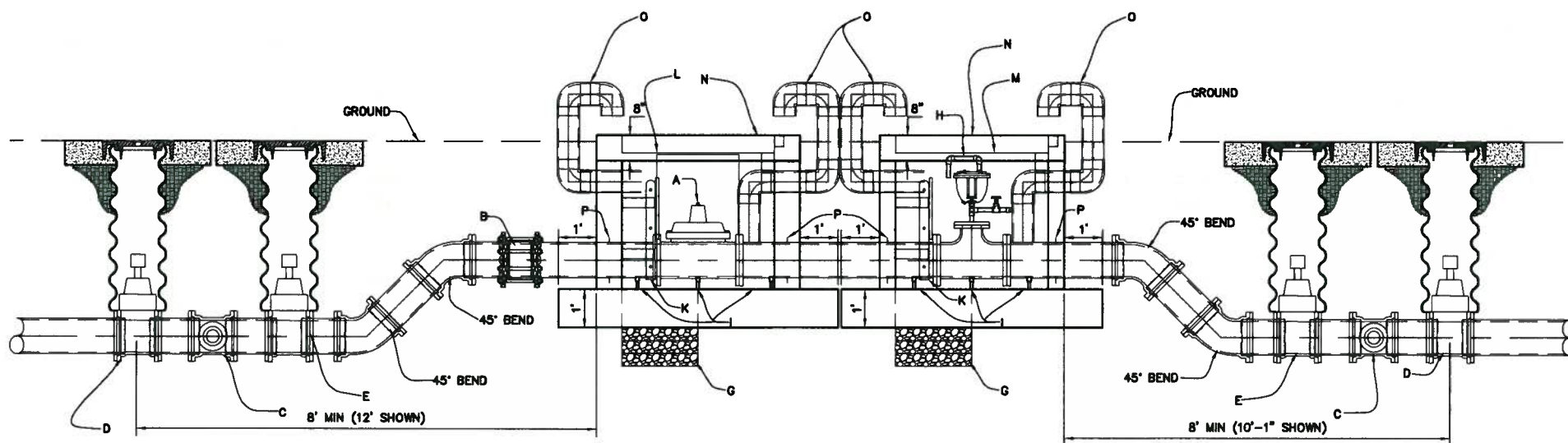
- A. PRESSURE REDUCING VALVE, AS SPECIFIED.
- B. FLEXIBLE COUPLING WITH THRUST TIES, SEE STANDARD DRAWING 2358 FOR THRUST TIE DETAIL.
- C. MECHANICAL JOINT TEE, REQUIRED ONLY IF BYPASS IS SPECIFIED.
- D. BURIED GATE VALVE (BUTTERFLY VALVE FOR SIZES GREATER THAN 14").
- E. BUTTERFLY VALVE WITH HAND WHEEL OPERATOR (GATE VALVE FOR SIZES GREATER THAN 14"), REQUIRED ONLY WHEN BYPASS IS SPECIFIED
- F. FLANGED SPOOL, LENGTH = 1'-0"
- G. 2'x2'x2' DEEP GRAVEL-FILLED SUMP. GRAVEL MUST CONFORM TO ASTM C33, NO. 57 GRAVEL.
- H. AIR RELIEF VALVE.
- I. ADJUSTABLE PIPE SADDLE SUPPORT, GRINNEL FIG. 264, ELCEN FIG. 50, OR EQUAL.
- J. GATE VALVE WITH HAND WHEEL OPERATOR, REQUIRED ONLY IF BYPASS IS SPECIFIED.
- K. LADDER PER STANDARD DRAWING 2335.
- L. 6'x4' BILCO SINGLE LEAF DOOR RATED FOR H20 TRAFFIC LOADS.
- M. 4'x4' BILCO SINGLE LEAF DOOR RATED FOR H20 TRAFFIC LOADS.
- N. SEE STANDARD DRAWING 2375 FOR STRUCTURAL DESIGN OF PRECAST/CAST-IN-PLACE CONCRETE VAULT.
- O. 6" STEEL PIPE WITH GOOSENECK AND INSECT SCREEN. PIPING SHOULD BE ROUTED SUCH THAT THE ABOVE GROUND GOOSENECK AND INSECT SCREEN ARE LOCATED OUT OF VEHICULAR OR PEDESTRIAN TRAFFIC AREAS.
- P. LINK SEAL WITH GROUT AT WALL PENETRATION.
- Q. 1/2" PIPE TAP WITH 1/2" BALL VALVE AND CAP
- R. D.I. SPOOL FLG. x P.E.
- S. MEGA FLANGE - FLANGE ADAPTOR, AS MANUFACTURED BY EBAA IRON SALES, OR APPROVED EQUAL.
- T. INSULATING FLANGE KIT.

REVISIONS	WATER AUTHORITY
	WATER 8" PRV ASSEMBLY DETAILS
	DWG. 2373 JANUARY 2011





PRV ASSEMBLY PLAN VIEW  
SCALE 1/4" = 1'-0"



PRV ASSEMBLY PROFILE VIEW  
SCALE 1/4" = 1'-0"

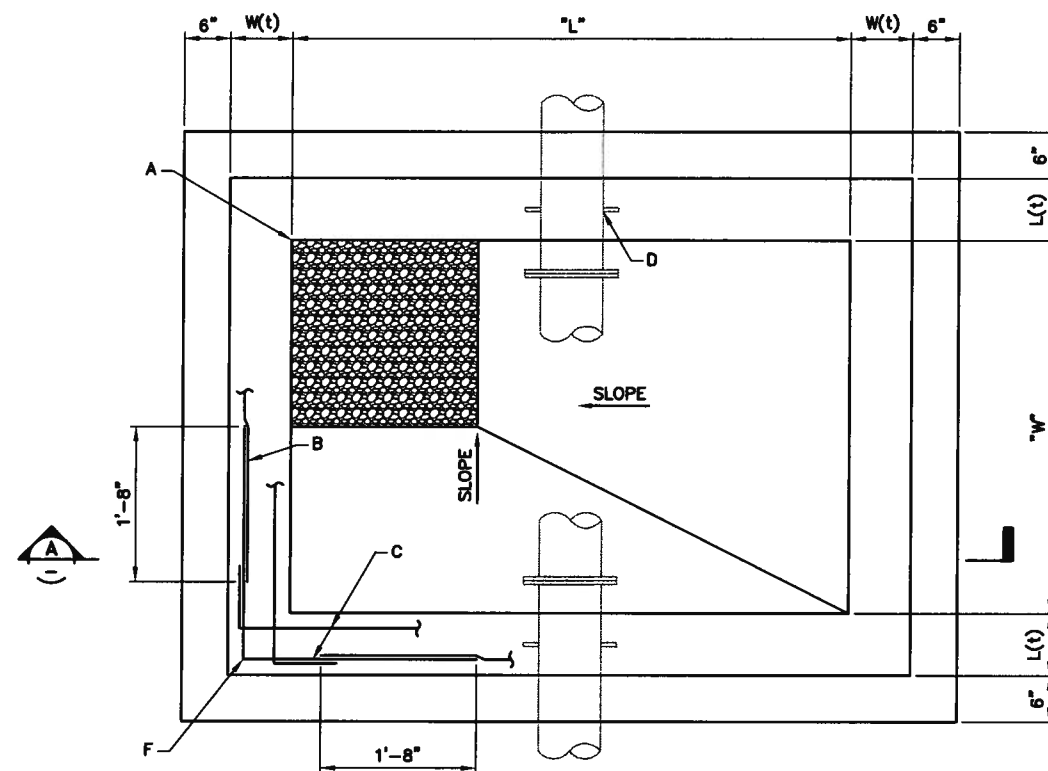
#### GENERAL NOTES:

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2. ALL EXTERIOR PIPING SHALL BE PAINTED SAFETY YELLOW.
3. SEE STANDARD PRV STATION, NO METER, DWG 2354 FOR ADDITIONAL CONSTRUCTION NOTES.
4. IN NON-TRAFFIC AREAS, THE TOP ELEVATION OF THE VAULT WILL BE 12" ABOVE FINISHED GRADE WITH BOLLARDS PAINTED SAFETY YELLOW AT EACH CORNER.
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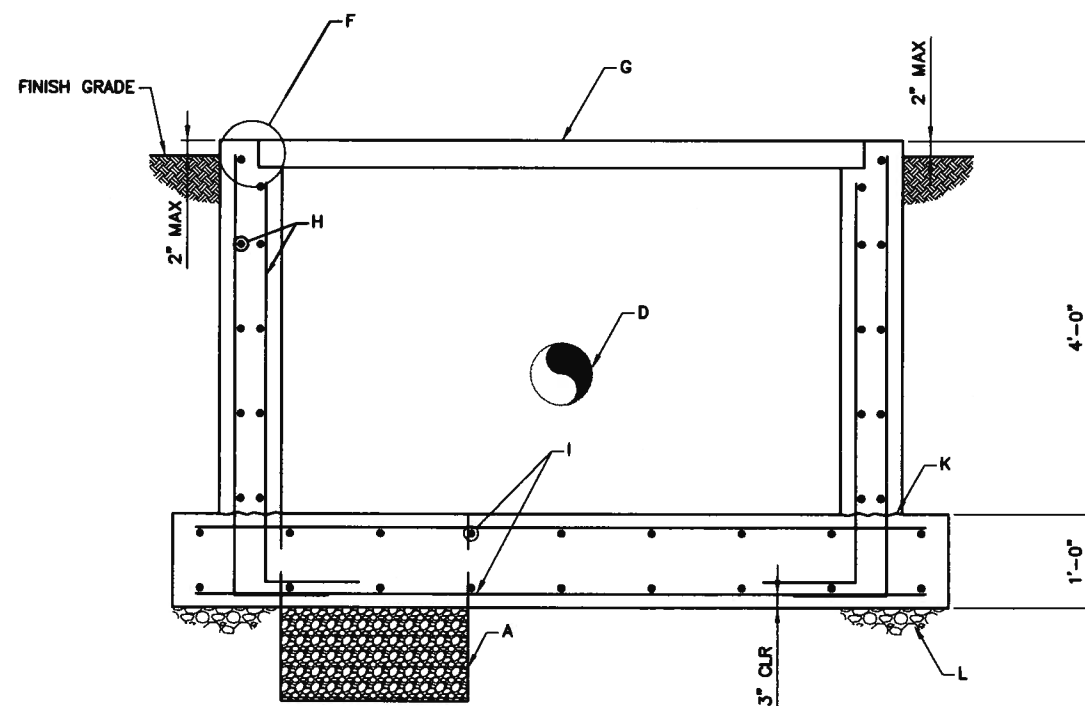
#### CONSTRUCTION NOTES:

- A. PRESSURE REDUCING VALVE, AS SPECIFIED.
- B. FLEXIBLE COUPLING WITH THRUST TIES, SEE STANDARD DRAWING 2358 FOR THRUST TIE DETAIL.
- C. MECHANICAL JOINT TEE, REQUIRED ONLY IF BYPASS IS SPECIFIED.
- D. BURIED GATE VALVE (BUTTERFLY VALVE FOR SIZES GREATER THAN 14").
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- F. FLANGED SPOOL, LENGTH = 1'-0"
- G. 2'x2'x2' DEEP GRAVEL-FILLED SUMP. GRAVEL MUST CONFORM TO ASTM C33, NO. 57 GRAVEL.
- H. AIR RELIEF VALVE.
- I. ADJUSTABLE PIPE SADDLE SUPPORT, GRINNEL FIG. 264, ELCEN FIG. 50, OR EQUAL.
- J. GATE VALVE WITH HAND WHEEL OPERATOR, REQUIRED ONLY IF BYPASS IS SPECIFIED.
- K. LADDER PER STANDARD DRAWING 2335.
- L. 6'x4' BILCO SINGLE LEAF DOOR RATED FOR H2O TRAFFIC LOADS.
- M. 4'x4' BILCO SINGLE LEAF DOOR RATED FOR H2O TRAFFIC LOADS.
- N. SEE STANDARD DRAWING 2375 FOR STRUCTURAL DESIGN OF PRECAST/CAST-IN-PLACE CONCRETE VAULT.
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- Q. 1/2" PIPE TAP WITH 1/2" BALL VALVE AND CAP
- R. D.I. SPOOL FLG. x P.E.
- S. MEGA FLANGE - FLANGE ADAPTOR, AS MANUFACTURED BY EBAA IRON SALES, OR APPROVED EQUAL.
- T. INSULATING FLANGE KIT.

REVISIONS	WATER AUTHORITY
	WATER 10" PRV ASSEMBLY DETAILS
	DWG. 2374 JANUARY 2011



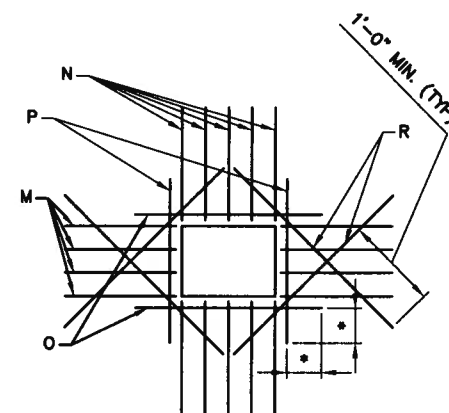
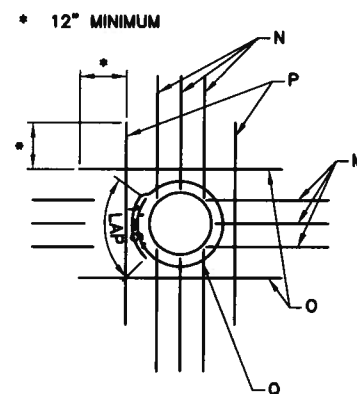
1 INTERIOR PLAN  
SCALE: 1"=1'-0"



A SECTION  
SCALE: 1"=1'-0"

PRV VAULT DIMENSIONS AND HATCH SIZES					
VAULT INNER DIMENSIONS		WALL THICKNESS		BILCO HATCH	
"L"	"W"	L(t)	W(t)	SIZE	MODEL #
4'-0"	4'-0"	8"	8"	48"X48"	JD-2 H20
6'-0"	4'-0"	8"	8"	48"X72"	JD-3 H20

"L" = VAULT LENGTH  
"W" = VAULT WIDTH



#### OPENING NOTES

1. TYPICAL FOR ALL OPENINGS IN CONCRETE WALLS AND SLABS.
2. DO NOT WELD REINFORCEMENT TO PIPE SLEEVES AND INSERTS.

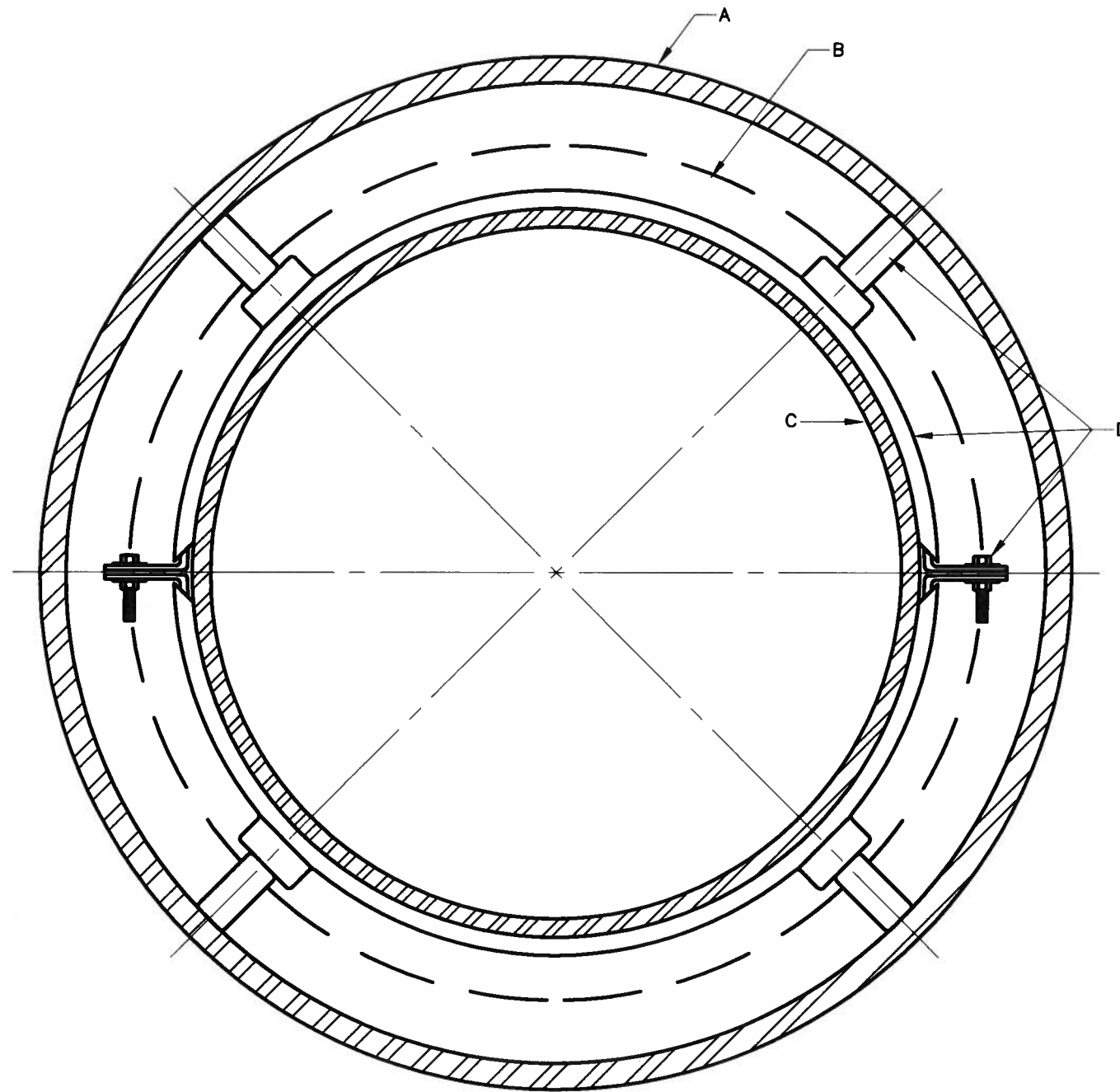
#### GENERAL NOTES

1. ALL CONSTRUCTION SHALL CONFORM TO "CITY OF ALBUQUERQUE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION". DESIGN IS IN ACCORDANCE WITH INTERNATIONAL BUILDING CODE, (IBC) 2006 WITH TRAFFIC LOADS DEFINED PER AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, 17TH EDITION, 2002.
2. CONCRETE SHALL BE IN ACCORDANCE WITH STD SPEC SEC. 510 AND SEC. 101 FOR HYDRAULIC CONCRETE WITH MIN COMP. STRENGTH  $f'_c=4000$  PSI @ 28 DAYS. ALL REINFORCING STEEL SHALL BE BLACK, GRADE 60 CONFORMING TO ASTM A615. ALL REINFORCING STEEL SHALL HAVE 2" CLEAR COVER FOR PRIMARY REINFORCEMENT UNLESS OTHERWISE NOTED.
3. DESIGN LOADS ON VAULT  
PRV EQUIPMENT 1000 LBS.  
BILCO HATCH 1300 LBS.  
LIVE LOAD AASHTO, H20 AXLE LOAD
4. DESIGN SOIL PROPERTIES  
ALLOWABLE BEARING CAPACITY 2000 PSF  
EFFECTIVE FRICTION ANGLE 20°  
WEIGHT OF SOIL 130 PCF  
TRAFFIC SURCHARGE 2 FT. SOIL  
WATER TABLE DEPTH BELOW BOTTOM OF SLAB
5. FOR ANY VAULTS INSTALLED DEEPER THAN 4'-0" BELOW FINISH GRADE, CALCULATIONS ENSURING THE STRUCTURAL INTEGRITY OF THE VAULT SIGNED AND SEALED BY AN ENGINEER REGISTERED IN THE STATE OF NEW MEXICO SHALL BE SUBMITTED TO THE OWNER.
6. DO NOT CONSTRUCT DRAIN POCKETS WHEN CONSTRUCTING IN SHALLOW GROUNDWATER CONDITIONS. ENGINEER SHALL PROVIDE A WATERPROOF MANHOLE OR VAULT DESIGN FOR APPROVAL BY THE WATER AUTHORITY PRIOR TO INSTALLATION.

#### CONSTRUCTION NOTES

- A. 2'x2'x2' DEEP SQUARE SUMP FILLED WITH 1-INCH GRAVEL (CONTRACTOR TO CONFIRM THAT WATER TABLE IS BELOW BOTTOM OF SLAB)
- B. STAGGER SPLICES (TYP).
- C. TYPICAL WALL REINFORCING.
- D. WALL PIPE, (TYP) FOR SIZE AND LOCATION SEE PRV ASSEMBLY DETAILS.
- E. CONTINUOUS CORNER REINFORCING.
- F. COORDINATE HATCH BEARING SEAT, ANCHORAGES AND DRAINAGE REQUIREMENTS FOR DOOR WITH MANUFACTURER SPECIFICATIONS.
- G. BILCO DOUBLE LEAF DOOR OR EQUIVALENT RATED FOR H20 TRAFFIC LOADS. SEE TABLE FOR SIZE & MODEL.
- H. TYPICAL WALL REINFORCING #5 @ 12" EA. WAY, EA. FACE.
- I. TYPICAL SLAB REINFORCING.
- J. #5 @ 12" EA. WAY, EA. FACE.
- K. OPTIONAL CONSTRUCTION JOINT (TYP).
- L. GRAVEL, CRUSHED STONE 6" MINIMUM.
- M. STEEL REINF CUT BAND "A."
- N. STEEL REINF CUT BAND "B."
- O. AREA OF BARS EQUAL BAND "A" BARS CUT (MIN. 1-#5 EA. SIDE).
- P. AREA OF BARS EQUAL BAND "B" BARS CUT (MIN. 1-#5 EA. SIDE).
- Q. 1-#5 HOOP, DIA OF OPENING +8", IN EA LAYER OF REINF FOR OPENINGS LARGER THAN 8".
- R. ADD 1-#5 DIAG AT EA CORNER FOR EA LAYER OF REINF.

REVISIONS	WATER AUTHORITY
	WATER STANDARD PRV STATION STRUCTURAL DETAILS
	DWG. 2375 JANUARY 2011



TYPICAL SECTION

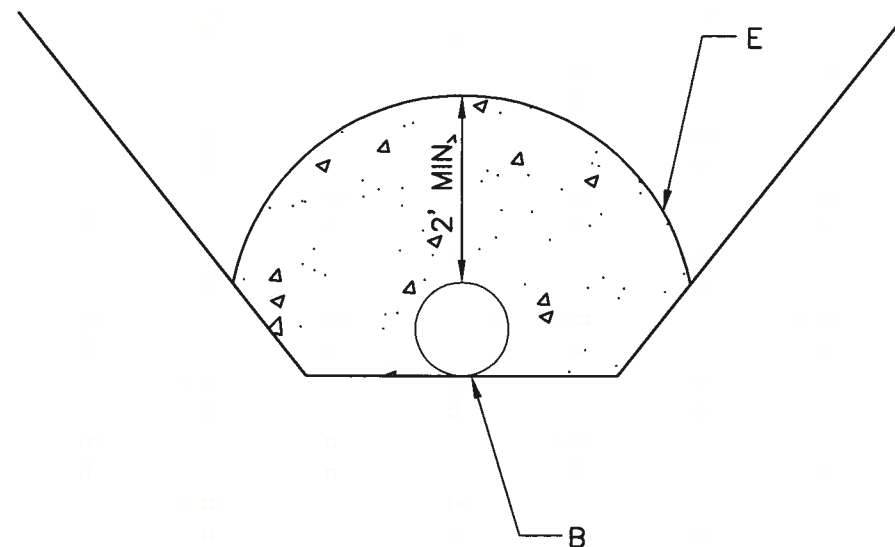
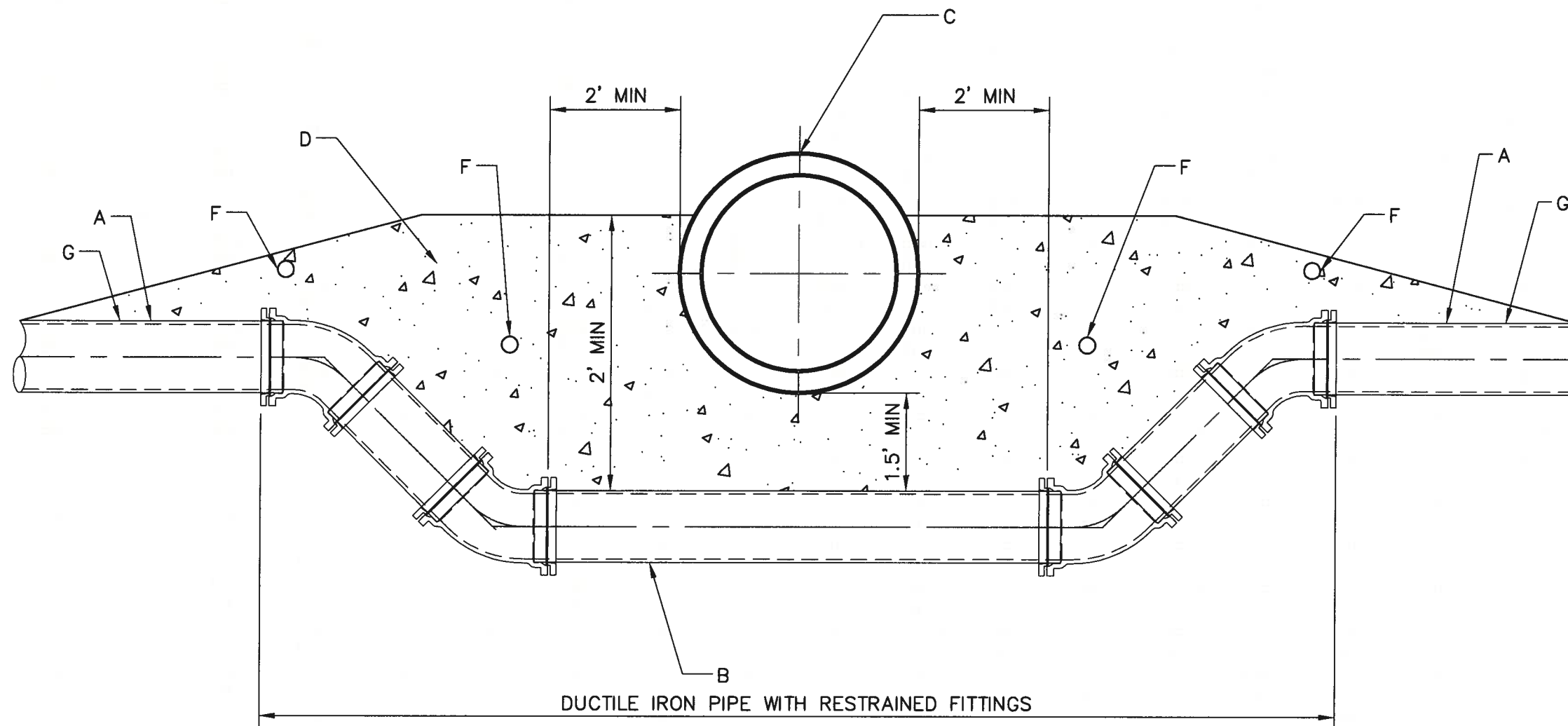
**GENERAL NOTES:**

- 1 METHOD OF END CLOSURE TO BE DESIGNED TO SUIT CONDITIONS.
- 2 FOR A METALLIC CARRIER PIPE (OTHER THAN DUCTILE IRON), CONTRACTOR SHALL ADD CORROSION MONITORING AND PROTECTION STATION PER STANDARD DRAWINGS 2396, 2397, AND 2398.
- 3 USE FULLY RESTRAINED PIPE JOINTS THROUGH THE CASING OR USE APPROPRIATE PIPE MATERIALS WITH INTERNAL RESTRAINTS AS APPROVED ON THE CURRENT WATER AUTHORITY APPROVED PRODUCTS LIST.

**CONSTRUCTION NOTES:**

- A WELDED STEEL PIPE CASING. DIAMETER AND WALL THICKNESS TO BE DESIGNED PER STANDARD SPECIFICATION SECTION 700 TO SUIT CONDITIONS.
- B BELL DIA. OF CARRIER PIPE.
- C CARRIER PIPE.
- D MANUFACTURED CASING SPACER. INSTALLATION AND SPACING PER MANUFACTURER'S RECOMMENDATIONS.

REVISIONS	WATER AUTHORITY
	WATER
	BORING INSTALLATION
	DWG. 2380 JANUARY 2011



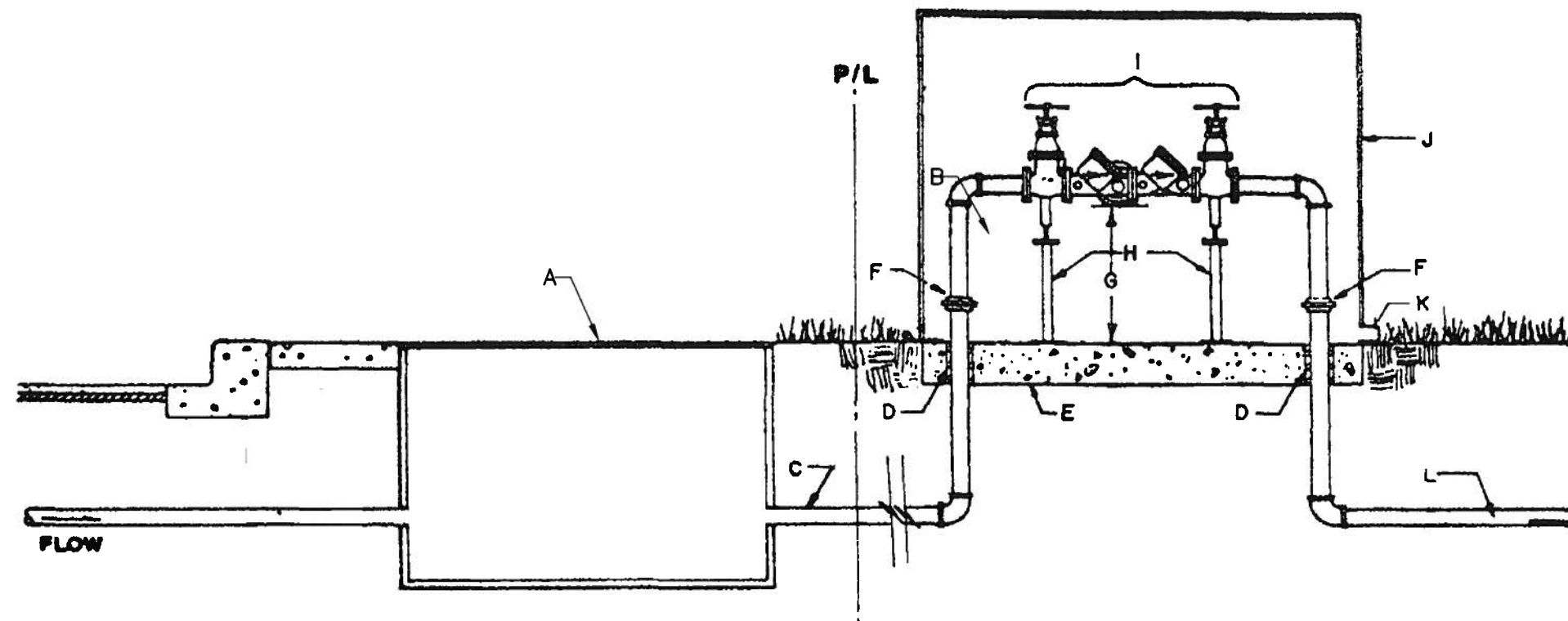
#### GENERAL NOTES:

1. ENTIRE ASSEMBLY MUST HAVE ADEQUATE THRUST RESTRAINT PER STANDARD DRAWING 2320. CONCRETE BLOCKING SHALL BE INSTALLED ONLY WHEN MECHANICAL RESTRAINT IS NOT POSSIBLE.

#### CONSTRUCTION NOTES:

- A. EXISTING WATERLINE.
- B. RELOCATED WATERLINE.
- C. NEW LINE.
- D. LEAN FILL.
- E. LEAN FILL 24" OVER PIPE
- F. ELECTRONIC MARKER DEVICE (EMD), SEE COA STANDARD SPECIFICATION SECTION 170.
- G. IF ANY EXISTING CCP JOINTS FALL WITHIN 10' OF THE PLANNED CUT, REMOVE CCP TO THE JOINT AND REPLACE WITH DIP.

REVISIONS	WATER AUTHORITY
	WATER
	TYPICAL LINE RELOCATION
	DWG. 2381 JANUARY 2011

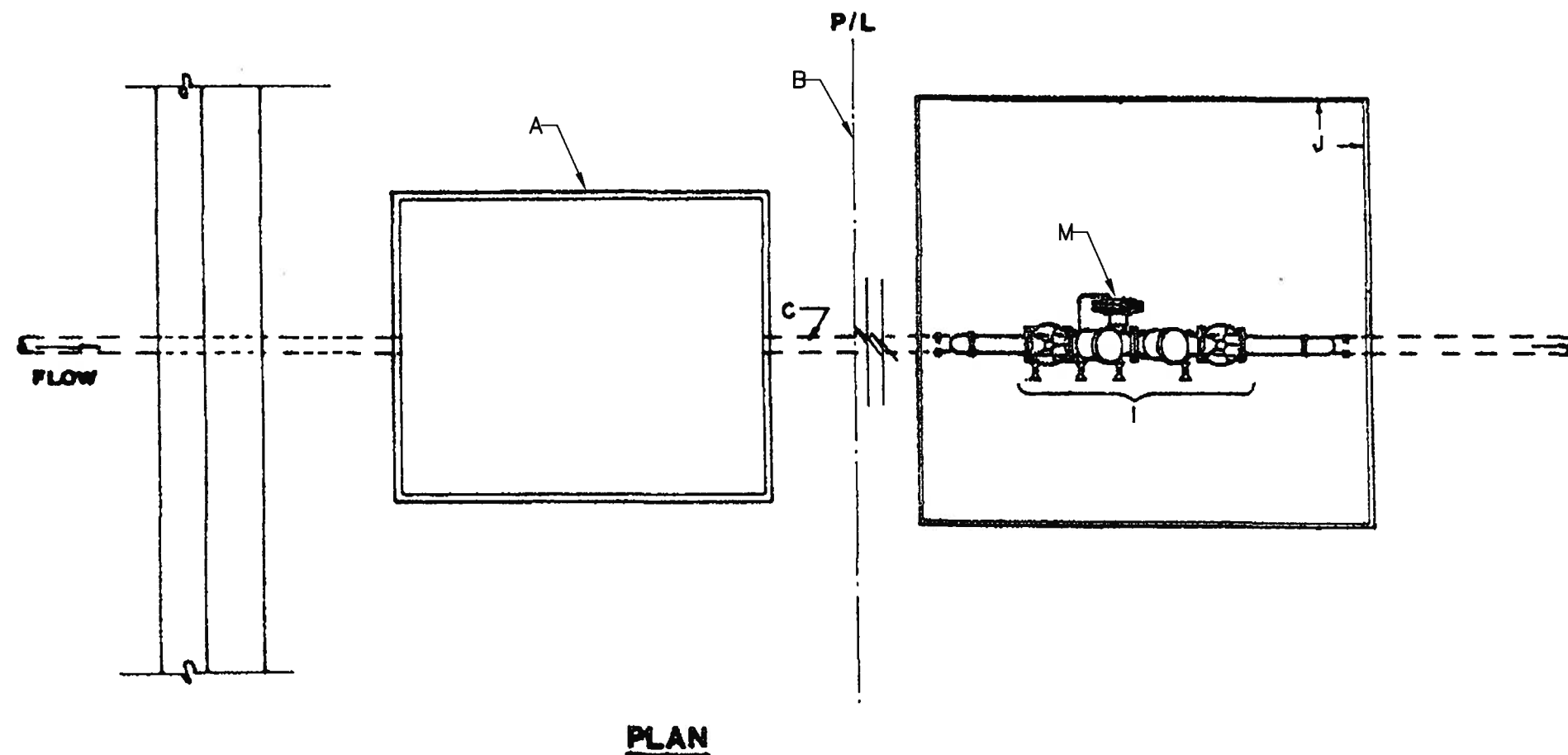


#### GENERAL NOTES:

1. HORIZONTAL RPBA INSTALLATION REQUIRED.
2. ABOVE GRADE RPBA INSTALLATION REQUIRED.
3. WATER LINE PRESSURE AND TEMPERATURE MUST NOT EXCEED RATED CAPACITY OF RPBA.
4. PROTECT FROM FREEZING WITH POSITIVE HEAT SOURCE AND INSULATION.
5. MINIMUM RPBA SIZE MUST BE THE BUILDING SERVICE LINE SIZE.
6. DO NOT INSTALL IN FLOOD PRONE AREAS OR IN STORM RETENTION OR DETENTION BASINS.
7. INSTALL WATER HAMMER ARRESTORS & THERMO EXPANSION PROTECTION, AS NECESSARY.
8. METALLIC RISER PIPING REQUIRED.
9. JOINTS TO BE ADEQUATELY RESTRAINED.
10. DEVIATIONS FROM THESE SPECIFICATIONS MUST HAVE PRIOR WRITTEN APPROVAL FROM THE WATER AUTHORITY CROSS CONNECTION OFFICE.
11. THE INSTALLATION OF A BACKFLOW ASSEMBLY MAY CREATE A CLOSED LOOP SYSTEM. THE CUSTOMER IS RESPONSIBLE FOR COMPLIANCE WITH CURRENT PLUMBING CODES WHICH MAY REQUIRE INSTALLATION OF (PRIVATE) PRESSURE RELIEF DEVICES AND/OR EXPANSION TANKS.

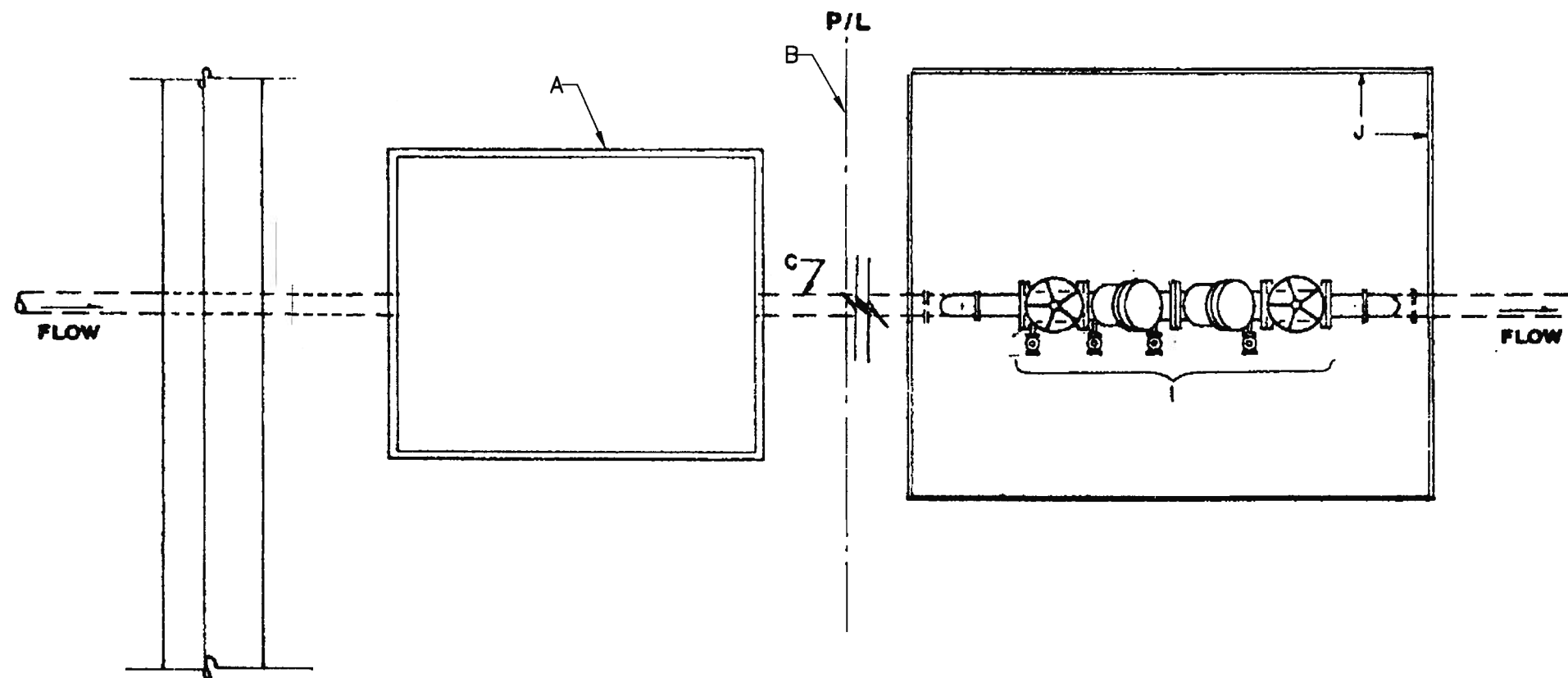
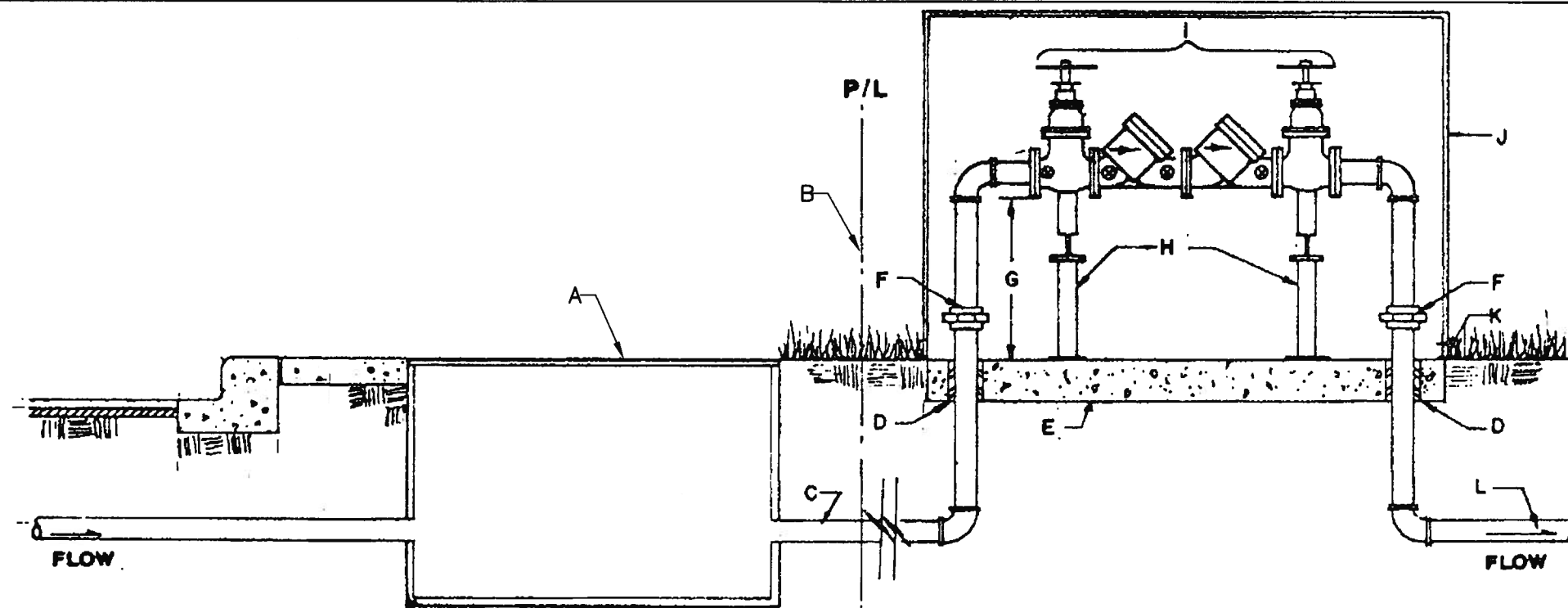
#### CONSTRUCTION NOTES:

- A. METER BOX PER STANDARD DRAWING 2362 OR 2363.
- B. PROPERTY LINE.
- C. SERVICE LINE WITHOUT TAPS OR TEES BETWEEN THE METER AND THE BACKFLOW PREVENTION ASSEMBLY.
- D. ADEQUATE SLEEVE & INSULATION. INSULATION SHALL BE (AT MINIMUM) 1" THICK.
- E. MINIMUM 4" CONCRETE (3000 PSI) SLAB.
- F. UNIONS OR FLANGED FITTINGS INSTALLED A MINIMUM OF 4" ABOVE GRADE.
- G. 36" MAXIMUM, 12" MINIMUM (FROM LOWEST POINT OF ASSEMBLY TO TOP OF CONCRETE SLAB).
- H. PROVIDE ADJUSTABLE METALLIC SUPPORTS ON UNITS 2.5" AND GREATER DIAMETER (TYPICAL).
- I. USC APPROVED RPBA, AS SHOWN
- J. PROTECTIVE ENCLOSURE, SEE STANDARD DRAWING 2389 FOR DESIGN CRITERIA.
- K. DRAIN: SIZE DRAIN TO HANDLE FULL DISCHARGE OF RELIEF VALVE. DRAIN TO DAYLIGHT. SCREEN RECOMMENDED TO PREVENT RODENT AND INSECT ENTRY.
- L. BUILDING SERVICE LINE.
- M. RELIEF VALVE.



**PLAN**

REVISIONS	WATER AUTHORITY
	WATER
	REDUCED PRESSURE PRINCIPLE
	BACKFLOW PREVENTION ASSEMBLY
	(RPBA)
	DWG. 2385 JANUARY 2011



**PLAN**

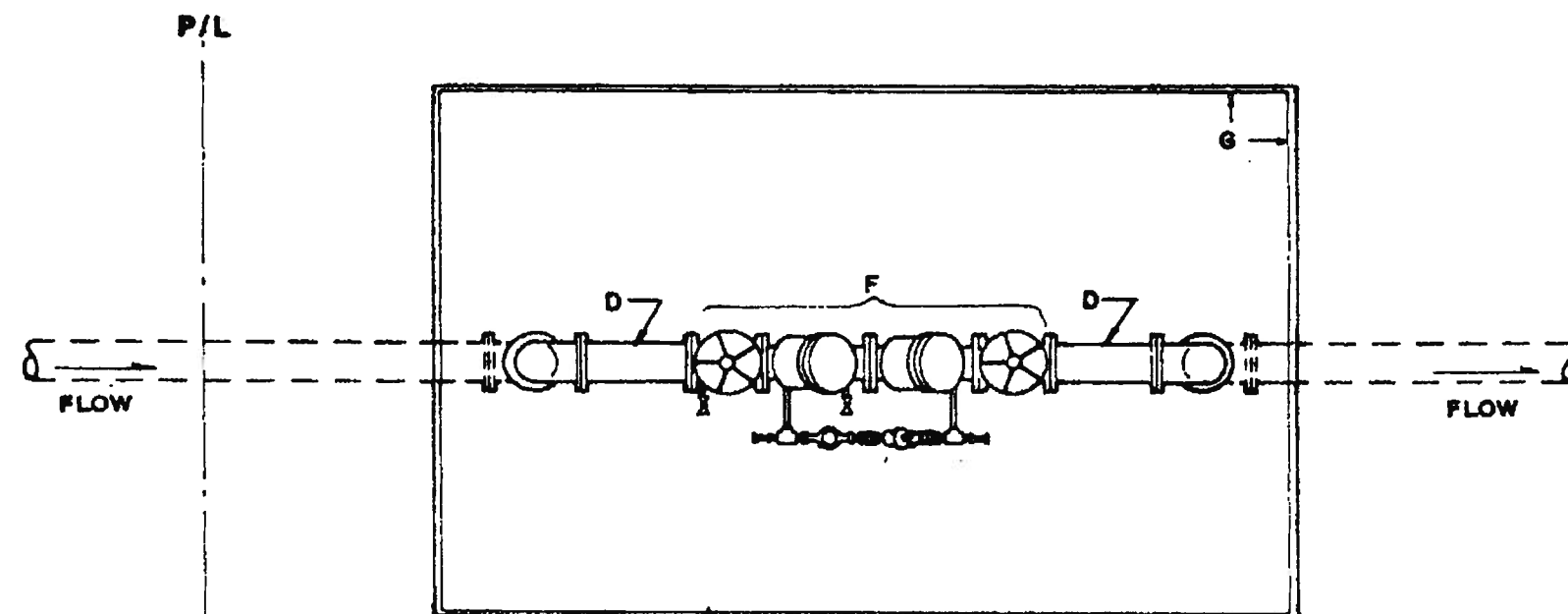
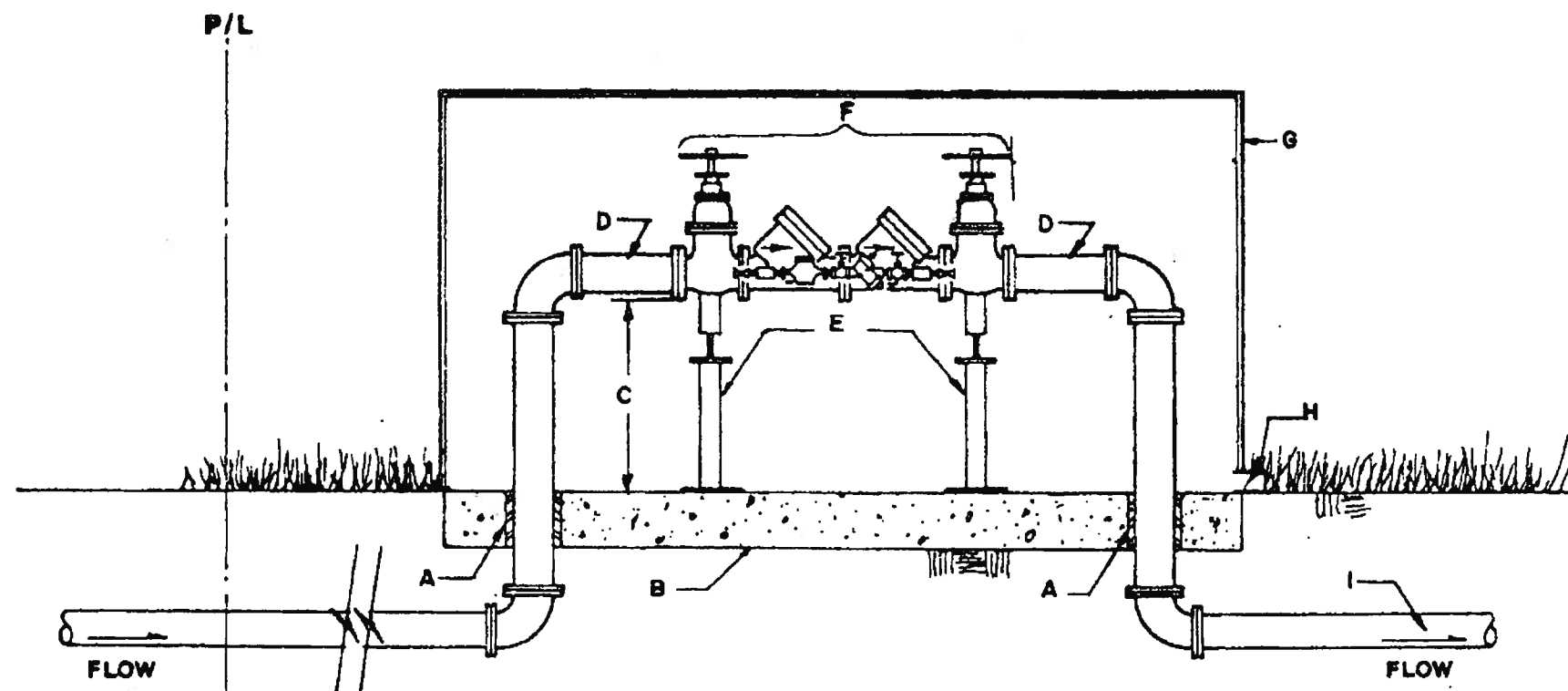
**GENERAL NOTES:**

1. DCVA'S ARE NOT APPROVED FOR LANDSCAPE IRRIGATION SYSTEMS.
2. HORIZONTAL DCVA INSTALLATION REQUIRED.
3. ABOVE GRADE DCVA INSTALLATION REQUIRED.
4. WATER LINE PRESSURE AND TEMPERATURE MUST NOT EXCEED RATED CAPACITY OF DCVA.
5. PROTECT FROM FREEZING WITH POSITIVE HEAT SOURCE AND INSULATION.
6. MINIMUM DCVA SIZE MUST BE THE BUILDING SERVICE LINE SIZE.
7. DO NOT INSTALL IN FLOOD PRONE AREAS OR IN STORM RETENTION OR DENTENTION BASINS.
8. INSTALL WATER HAMMER ARRESTORS & THERMO EXPANSION PROTECTION, AS NECESSARY.
9. JOINTS TO BE ADEQUATELY RESTRAINED.
10. METALIC RISER PIPING REQUIRED.
11. DEVIATIONS FROM THESE SPECIFICATIONS MUST HAVE PRIOR WRITTEN APPROVAL FROM THE WATER AUTHORITY CROSS CONNECTION OFFICE.
12. THE INSTALLATION OF A BACKFLOW ASSEMBLY MAY CREATE A CLOSED LOOP SYSTEM. THE CUSTOMER IS RESPONSIBLE FOR COMPLIANCE WITH CURRENT PLUMBING CODES WHICH MAY REQUIRE INSTALLATION OF (PRIVATE) PRESSURE RELIEF DEVICES AND/OR EXPANSION TANKS.

**CONSTRUCTION NOTES:**

- A. METER BOX PER STANDARD DRAWING 2362 OR 2363.
- B. PROPERTY LINE.
- C. SERVICE LINE WITHOUT TAPS OR TEES BETWEEN THE METER AND THE BACKFLOW PREVENTION ASSEMBLY.
- D. ADEQUATE SLEEVE & INSULATION. INSULATION SHALL BE (AT MINIMUM) 1" THICK.
- E. MINIMUM 4" CONCRETE (3000 PSI) SLAB.
- F. UNION OR FLANGED FITTINGS INSTALLED A MINIMUM OF 4" ABOVE GRADE.
- G. 36" MAXIMUM, 12" MINIMUM (FROM LOWEST POINT OF ASSEMBLY TO TOP OF CONCRETE SLAB).
- H. PROVIDE ADJUSTABLE METALIC SUPPORTS ON UNITS 2.5" AND GREATER DIAMETER (TYPICAL).
- I. USC APPROVED DCVA, AS SHOWN
- J. PROTECTIVE ENCLOSURE, SEE STANDARD DRAWING 2389 FOR DESIGN CRITERIA.
- K. DRAIN: DRAIN TO DAYLIGHT. SCREEN RECOMMENDED TO PREVENT RODENT AND INSECT ENTRY.
- L. BUILDING SERVICE LINE.

REVISIONS	WATER AUTHORITY
	WATER DOUBLE CHECK VALVE ASSEMBLY (DCVA)
	DWG. 2386 JANUARY 2011



**PLAN**

**GENERAL NOTES:**

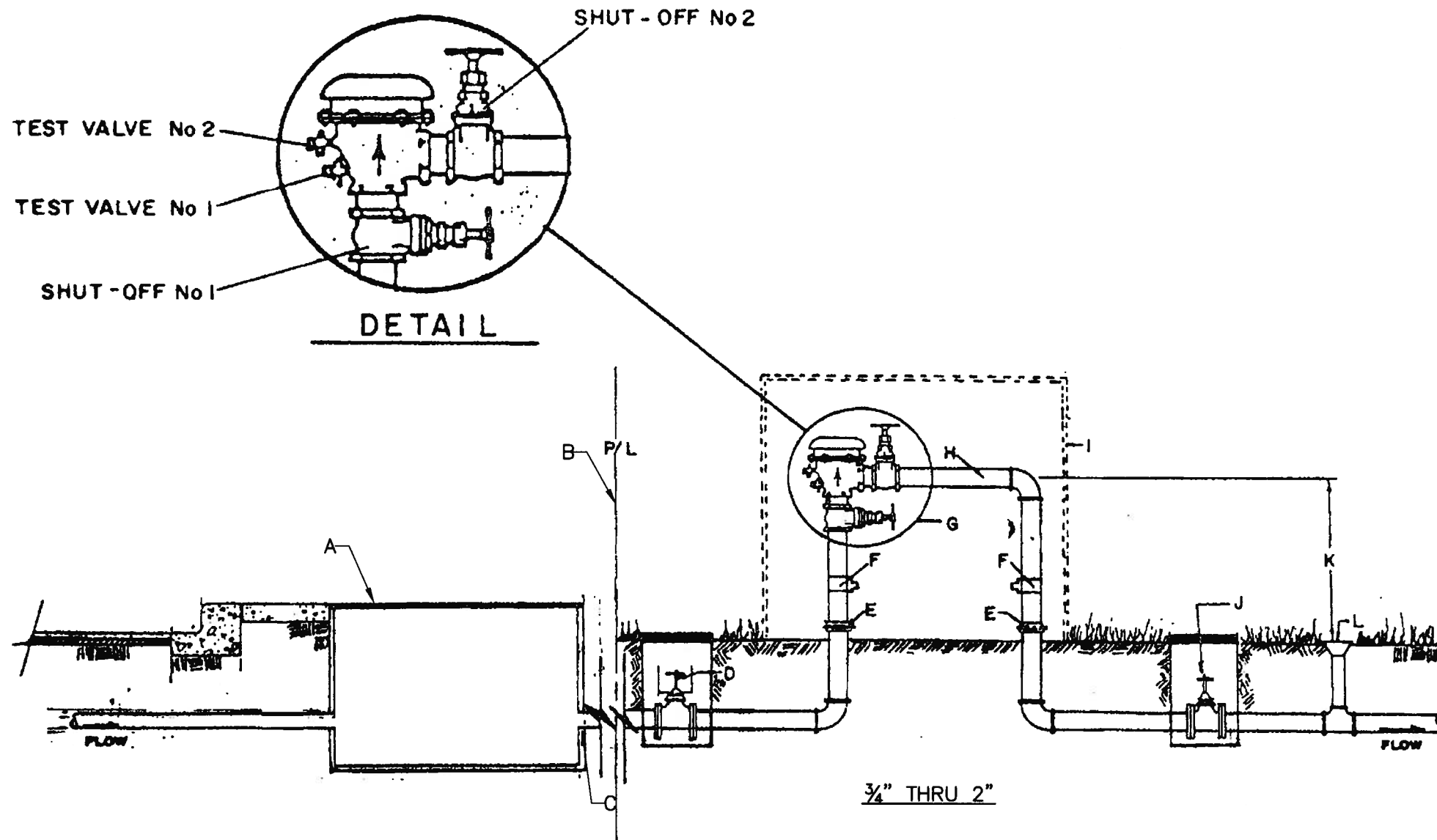
1. SEE MANUAL OF PROCEDURES FOR THE TYPE OF BACKFLOW PREVENTION ASSEMBLY REQUIRED ON PRIVATE FIRE PROTECTION SYSTEMS.
2. HORIZONTAL DCDA INSTALLATION REQUIRED.
3. PROTECT FROM FREEZING WITH A POSITIVE HEAT SOURCE AND INSULATION.
4. MINIMUM DCDA SIZE MUST BE THE BUILDING SERVICE LINE SIZE.
5. METALLIC RISER PIPING REQUIRED.
6. ABOVE GRADE DCDA INSTALLATION REQUIRED.
7. FLANGED FITTINGS REQUIRED. JOINTS TO BE ADEQUATELY RESTRAINED.
8. WATER LINE PRESSURE AND TEMPERATURE MUST NOT EXCEED THE CAPACITY OF DCDA.
9. INSTALL WATER HAMMER ARRESTORS & THERMO EXPANSION PROTECTION, AS NECESSARY.
10. DEVIATIONS FROM THESE SPECIFICATIONS MUST HAVE PRIOR WRITTEN APPROVAL FROM THE WATER AUTHORITY CROSS CONNECTION OFFICE.
11. THE INSTALLATION OF A BACKFLOW ASSEMBLY MAY CREATE A CLOSED LOOP SYSTEM. THE CUSTOMER IS RESPONSIBLE FOR COMPLIANCE WITH CURRENT PLUMBING CODES WHICH MAY REQUIRE INSTALLATION OF (PRIVATE) PRESSURE RELIEF DEVICES AND/OR EXPANSION TANKS.

**CONSTRUCTION NOTES:**

- A. ADEQUATE SLEEVE & INSULATION. INSULATION SHALL BE (AT MINIMUM) 1" THICK.
- B. MINIMUM 4" CONCRETE (3000 PSI) SLAB.
- C. 36" MAXIMUM, 12" MINIMUM (FROM LOWEST POINT OF ASSEMBLY TO TOP OF CONCRETE SLAB).
- D. PIPE SPOOL (OPTIONAL).
- E. PROVIDE ADJUSTABLE METALLIC SUPPORTS..
- F. USC APPROVED DCDA, AS SHOWN.
- G. PROTECTIVE ENCLOSURE, SEE STANDARD DRAWING 2389 FOR DESIGN CRITERIA.
- H. DRAIN: DRAIN TO DAYLIGHT. SCREEN RECOMMENDED TO PREVENT RODENT OR INSECT ENTRY.
- I. BUILDING SERVICE LINE.

REVISIONS	WATER AUTHORITY
	WATER DOUBLE CHECK-DETECTOR CHECK ASSEMBLY (DCDA)
	DWG. 2387 JANUARY 2011





#### GENERAL NOTES:

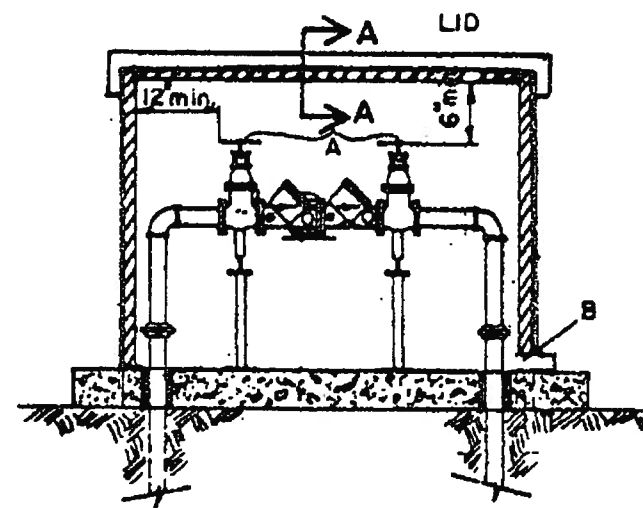
1. PVB'S UNAPPROVED FOR CONTAINMENT PROTECTION, EXCEPT FOR LAWN IRRIGATION SYSTEMS.
2. DO NOT INSTALL IN FLOOD PRONE AREAS OR IN STORM RETENTION OR DETENTION BASINS.
3. DO NOT INSTALL PVB'S > 5' ABOVE GROUND LEVEL.
4. PROTECT PVB'S FROM FREEZING WITH A POSITIVE HEAT SOURCE.
5. HORIZONTAL INSTALLATION REQUIRED AS SHOWN.
6. JOINTS TO BE ADEQUATELY RESTRAINED.
7. METALLIC RISER PIPING REQUIRED.
8. THE INSTALLATION OF A BACKFLOW ASSEMBLY MAY CREATE A CLOSED LOOP SYSTEM. THE CUSTOMER IS RESPONSIBLE FOR COMPLIANCE WITH CURRENT PLUMBING CODES WHICH MAY REQUIRE INSTALLATION OF (PRIVATE) PRESSURE RELIEF DEVICES AND/OR EXPANSION TANKS.

#### CONSTRUCTION NOTES:

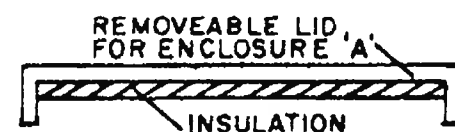
- A. METER BOX PER STANDARD DRAWING 2362 OR 2363.
- B. PROPERTY LINE.
- C. SERVICE LINE WITHOUT TAPS OR TEES BETWEEN THE METER AND THE BACKFLOW PREVENTION ASSEMBLY.
- D. ISOLATION VALVE (GATE VALVE OR BALL VALVE).
- E. UNIONS, MINIMUM 4" ABOVE GRADE.
- F. TEE WITH DRAIN PLUG OR BALL DRAIN VALVE, MINIMUM 6" ABOVE GRADE.
- G. USC APPROVED PVB, AS SHOWN.
- H. SPOOL, 12" MAXIMUM LENGTH.
- I. ENCLOSURE, OPTIONAL. SEE WATER STANDARD DRAWING 2389 FOR DESIGN CRITERIA IF ENCLOSURE IS USED.
- J. CONTROL VALVE (ELECTRIC OR MANUAL), OPTIONAL.
- K. 12" MINIMUM ABOVE ALL DOWNSTREAM PIPING & OUTLETS.
- L. SPRINKLER.

REVISIONS	WATER AUTHORITY
	LANDSCAPE PRESSURE VACUUM BREAKER (PVB)
	DWG. 2388 JANUARY 2011

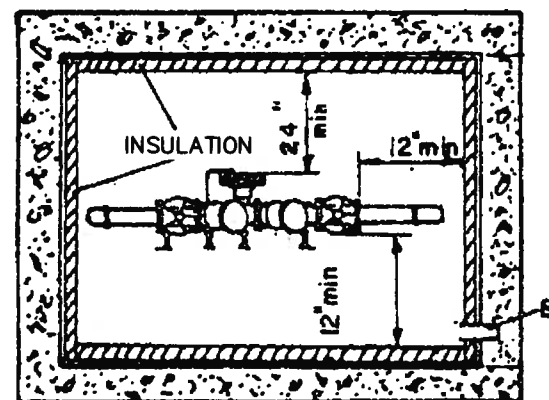




PROFILE

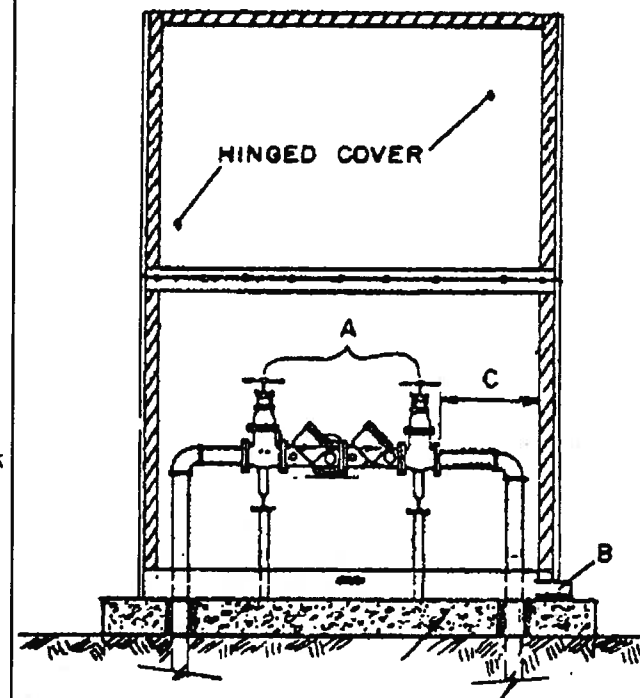


SECTION A-A

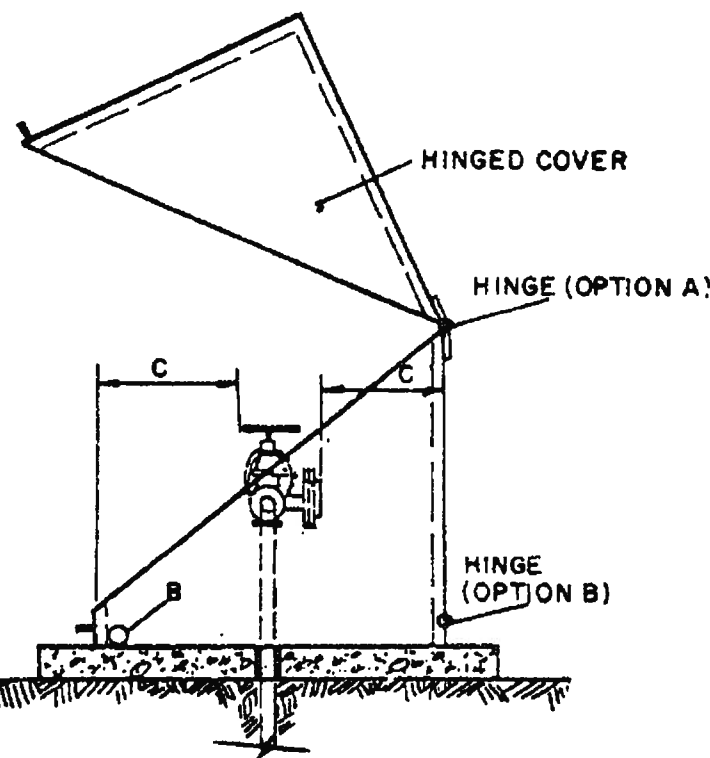


PLAN VIEW

TYPE A. ENCLOSURE: WITH PERMANENT SIDE WALLS

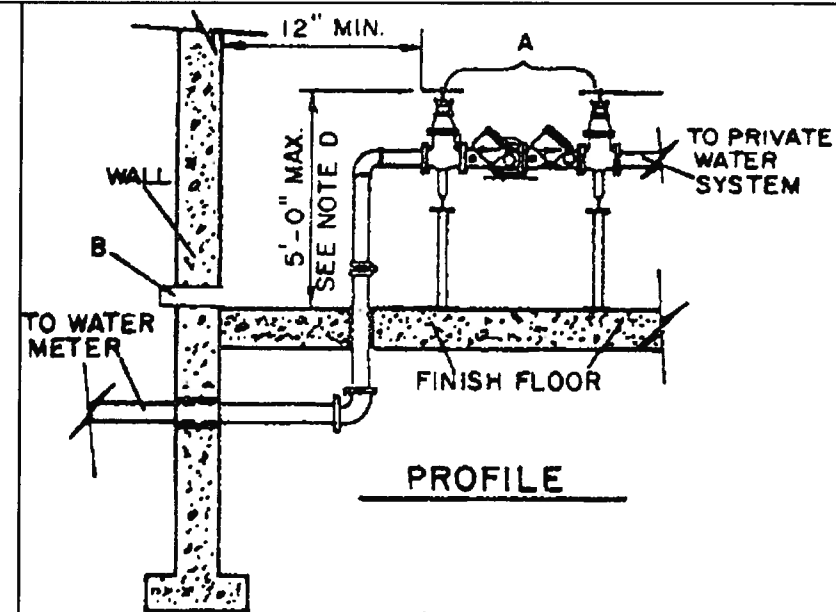


FRONT VIEW

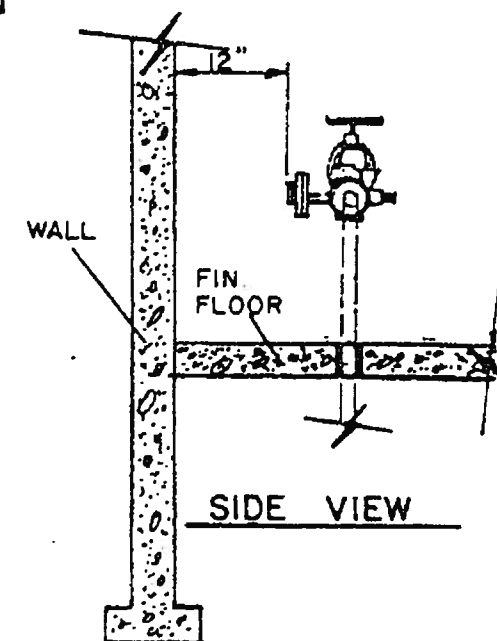


SIDE VIEW

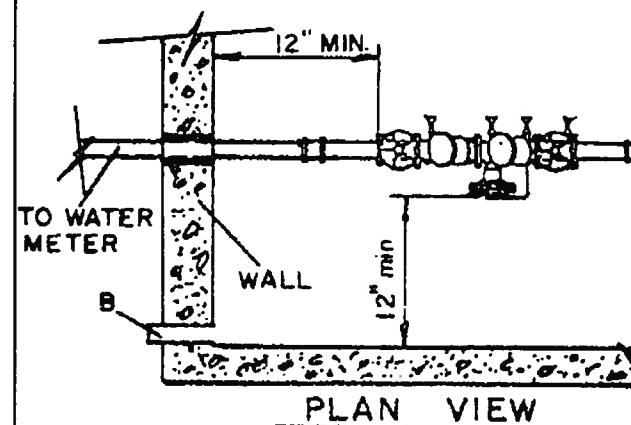
TYPE B. ENCLOSURE: WITH HINGED COVER



PROFILE



SIDE VIEW



PLAN VIEW

TYPE C. ENCLOSURE: AND TYPICAL INSTALLATION INDOOR STRUCTURE

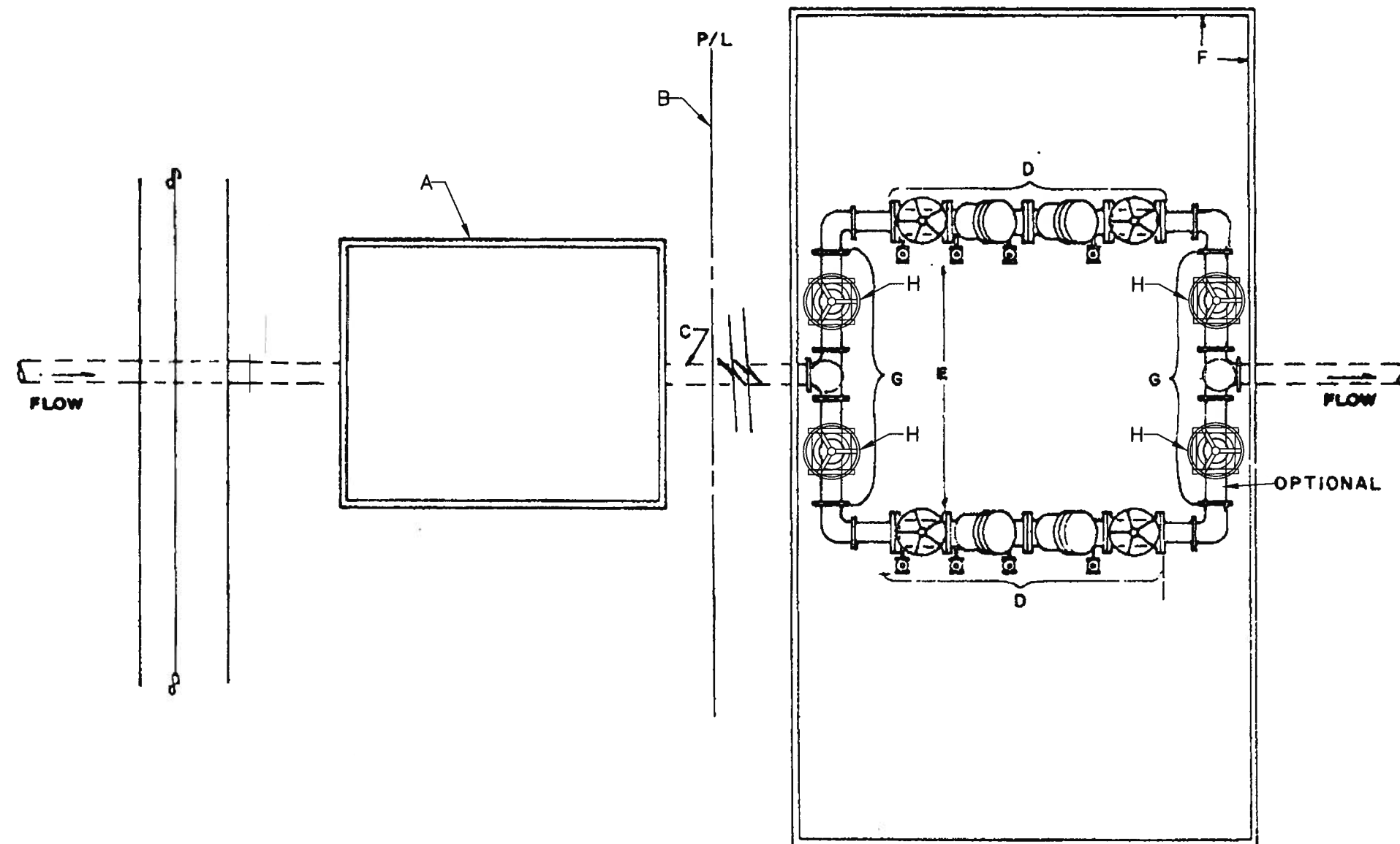
#### GENERAL NOTES:

1. ENCLOSURE DESIGN: CONSTRUCTION AND MAINTENANCE IS THE RESPONSIBILITY OF THE CONSUMER. THE DESIGN ENCLOSURES MUST MEET THESE MINIMUM SPECIFICATIONS. CONSUMER MAY SELECT THE USE OF TYPE A., B. OR C. ENCLOSURE.
2. INSTALLATION MUST BE PROTECTED FROM FREEZING.
3. ENCLOSURES MUST BE INSTALLED AND MAINTAINED SO THAT UNITS ARE SAFELY & READILY ACCESSIBLE FOR TESTING, MAINTENANCE & REPAIRS.
4. FOR TYPE B. ENCLOSURE, THE HINGE MAY BE LOCATED AT OPTION A. OR B. AS SHOWN.
5. ALTERNATE DESIGNS MAY BE USED WITH PRIOR WRITTEN APPROVAL FROM THE WATER AUTHORITY CROSS CONNECTION OFFICE.
6. IF FLOOR DRAIN IS USED, FLOOR SLAB SHALL BE SLOPED TOWARD DRAIN HOLE.

#### CONSTRUCTION NOTES:

- A. USC APPROVED RPBA, DCVA, DCDA OR PVB.
- B. DRAIN: DRAIN OF ADEQUATE SIZE TO ALLOW FOR PROPER DRAINAGE. SHIELD IS RECOMMENDED FOR SIDE DISCHARGING RELIEF VALVES. FOR TYPE C. ENCLOSURE, SWING CHECK IS RECOMMENDED WHEN DRAINING TO DAYLIGHT.
- C. ADEQUATE CLEARANCES REQUIRED FOR TESTING, MAINTENANCE & REPAIR.
- D. 5' MAXIMUM FROM HANDWHEEL TO FINISH FLOOR, AS SHOWN. UNITS INSTALLED HIGHER THAN 5', CONSUMER MUST PROVIDE PERMANENT ACCESS PLATFORM/LADDER.

REVISIONS	WATER AUTHORITY
	WATER ENCLOSURES
	DWG. 2389 JANUARY 2011



**PLAN**

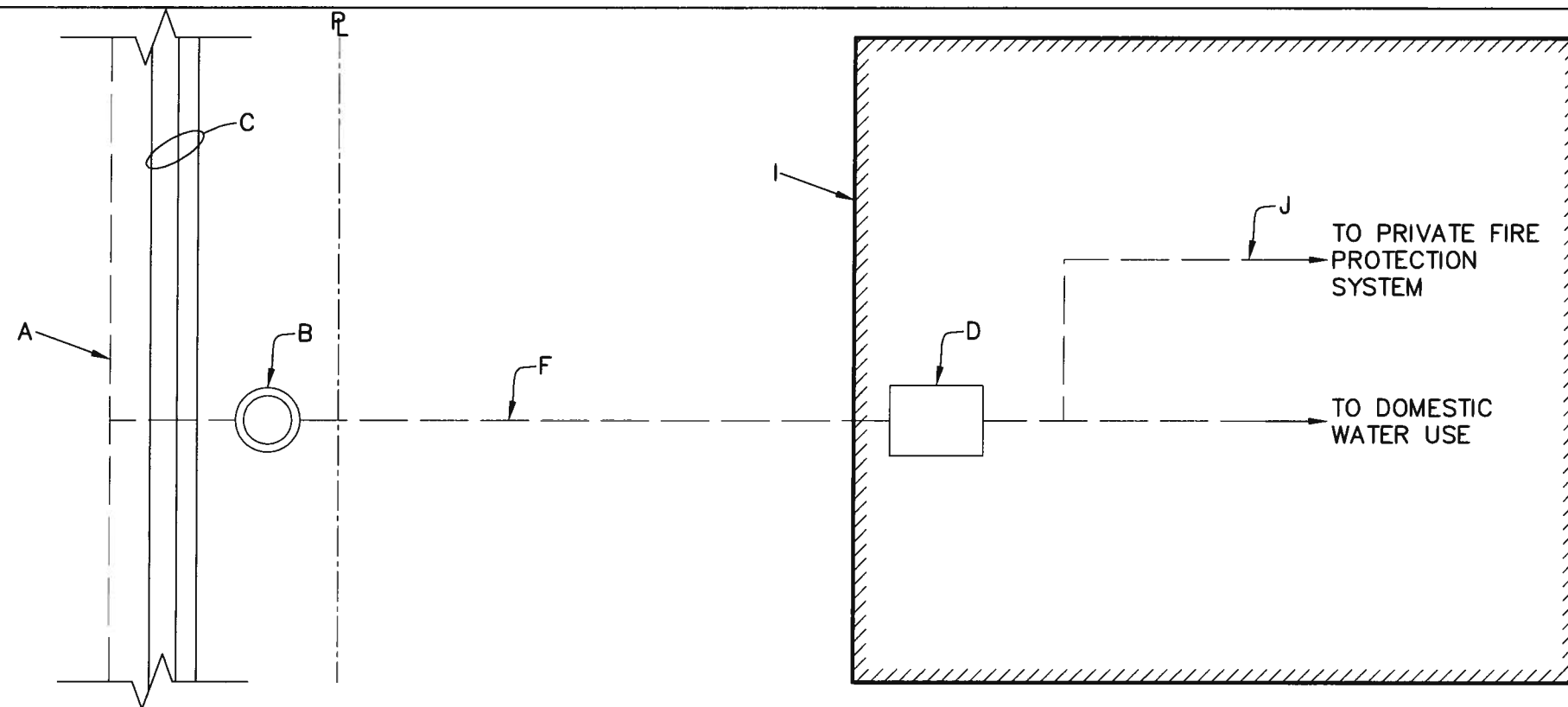
**GENERAL NOTES:**

1. SEE STANDARD DRAWINGS 2385, 2386 AND 2387.
2. THE INSTALLATION OF A BACKFLOW ASSEMBLY MAY CREATE A CLOSED LOOP SYSTEM. THE CUSTOMER IS RESPONSIBLE FOR COMPLIANCE WITH CURRENT PLUMBING CODES WHICH MAY REQUIRE INSTALLATION OF (PRIVATE) PRESSURE RELIEF DEVICES AND/OR EXPANSION TANKS.

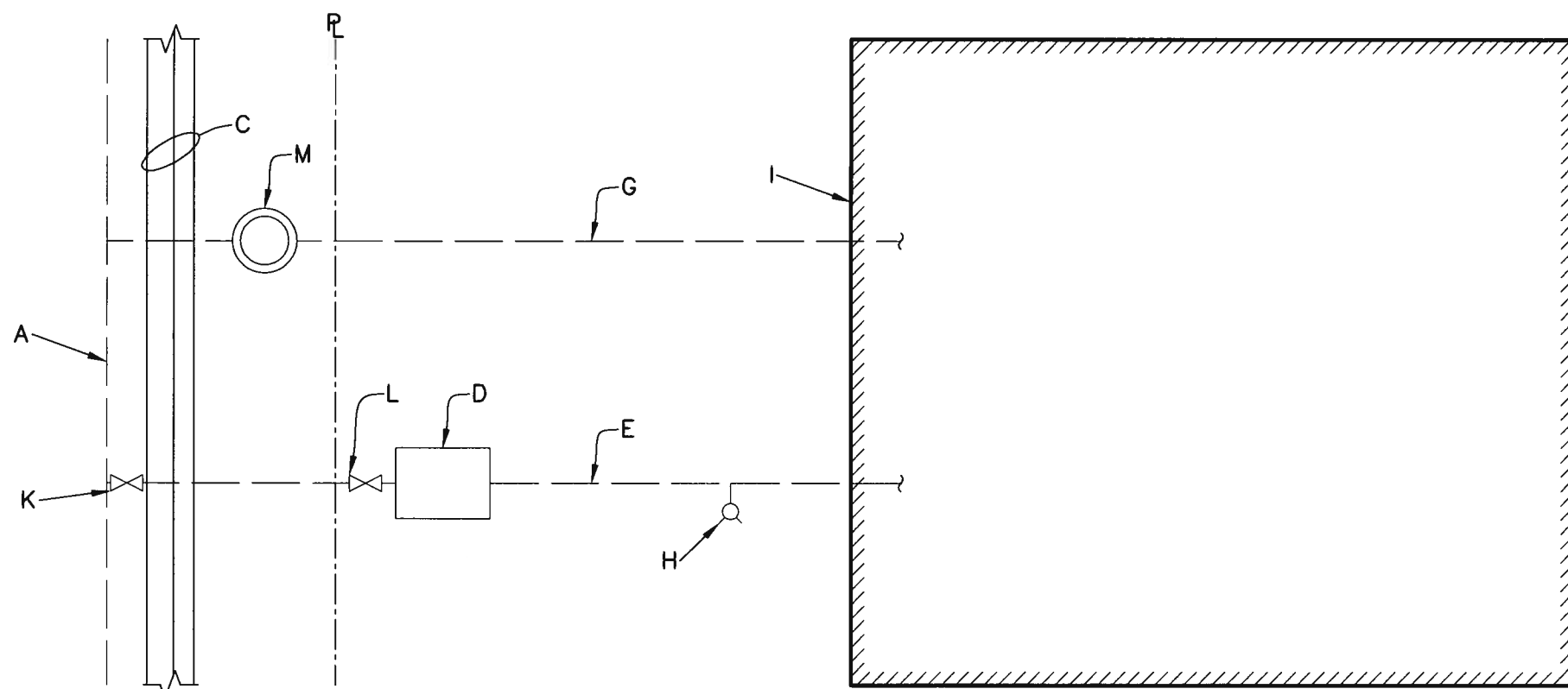
**CONSTRUCTION NOTES:**

- A. METER BOX PER STANDARD DRAWING 2362 OR 2363.
- B. PROPERTY LINE.
- C. SERVICE LINE WITHOUT TAPS OR TEES BETWEEN THE METER AND THE BACKFLOW PREVENTION ASSEMBLY.
- D. USC APPROVED RPBA, DCVA OR DCDA.
- E. ADEQUATE CLEARANCE REQUIRED FOR TESTING & MAINTENANCE.
- F. PROTECTIVE ENCLOSURE. SEE STANDARD DRAWING 2389 FOR DESIGN CRITERIA.
- G. PIPING AND FITTINGS MAY BE ABOVE OR BELOW GRADE.
- H. GATE VALVE WITH HAND WHEEL.

REVISIONS	WATER AUTHORITY
	WATER INSTALLATION FOR CONTINUOUS SERVICE
	DWG. 2390 JANUARY 2011



**CROSS-CONNECTION CONTROL CONTAINMENT  
WITH MULTI-USE DOMESTIC & FIRE SERVICE LINE**



**CROSS-CONNECTION CONTROL CONTAINMENT  
WITH UNMETERED FIRE SERVICE LINE**

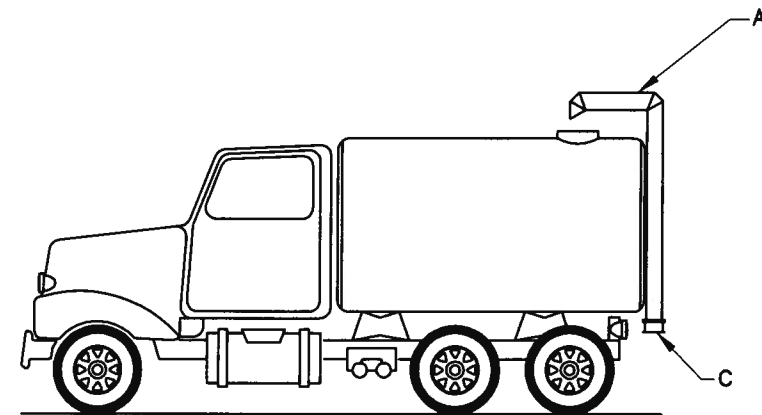
**GENERAL NOTES:**

1. IF METERED MULTI-USE SYSTEM IS USED, THE RPBA MUST BE THE FIRST CONNECTION FROM THE METER. NO TAPS WILL BE ALLOWED BETWEEN THE METER AND THE RPBA.
2. THE BACKFLOW PREVENTION ASSEMBLY MAY BE INSTALLED INDOORS OR OUTDOORS.
3. IT IS THE RESPONSIBILITY OF THE CUSTOMER TO ADEQUATELY SIZE THE METER FOR THE SERVICE TO SUSTAIN SIMULTANEOUSLY THE PRIVATE FIRE PROTECTION SYSTEM AND THE DOMESTIC WATER DEMANDS. THE METER SHOULD BE APPROPRIATELY SIZED TO ACCOMMODATE LOW (DOMESTIC) AND HIGH (FIRE + DOMESTIC) FLOWS.
4. THE INSTALLATION OF A BACKFLOW ASSEMBLY MAY CREATE A CLOSED LOOP SYSTEM. THE CUSTOMER IS RESPONSIBLE FOR COMPLIANCE WITH CURRENT PLUMBING CODES WHICH MAY REQUIRE INSTALLATION OF (PRIVATE) PRESSURE RELIEF DEVICES AND/OR EXPANSION TANKS.

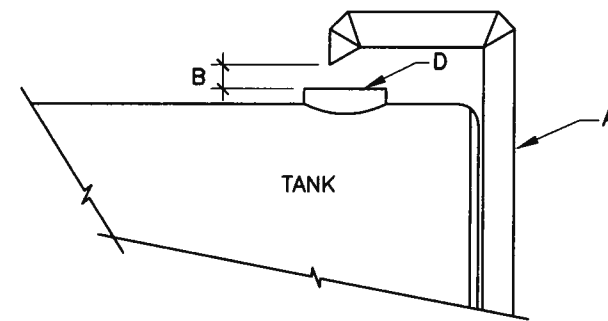
**CONSTRUCTION NOTES:**

- A. WATER MAIN.
- B. METER.
- C. CURB AND GUTTER.
- D. RPBA.
- E. UNMETERED FIRE LINE.
- F. SERVICE LINE FOR DOMESTIC FIRE.
- G. DOMESTIC SERVICE LINE.
- H. PRIVATE FIRE HYDRANT.
- I. BUILDING STRUCTURE.
- J. INTERNAL FIRE PROTECTION SYSTEM.
- K. PUBLIC GATE VALVE PER STANDARD DRAWING 2326.
- L. PRIVATE VALVE TO BE OWNED AND MAINTAINED BY THE CUSTOMER.
- M. METER WITH DUAL CHECK VALVE (PRIVATE) TO OWNED AND MAINTAINED BY THE CUSTOMER.

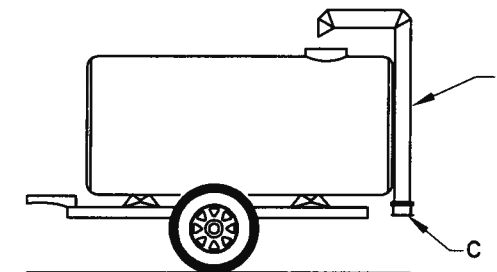
REVISIONS	WATER AUTHORITY
	WATER RESIDENTIAL WATER PRIVATE FIRE PROTECTION SYSTEMS
	DWG. 2394 JANUARY 2011



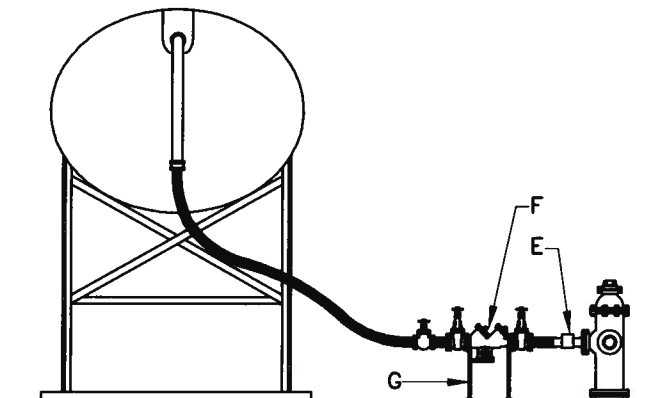
WATER TRUCK WITH AIR GAP



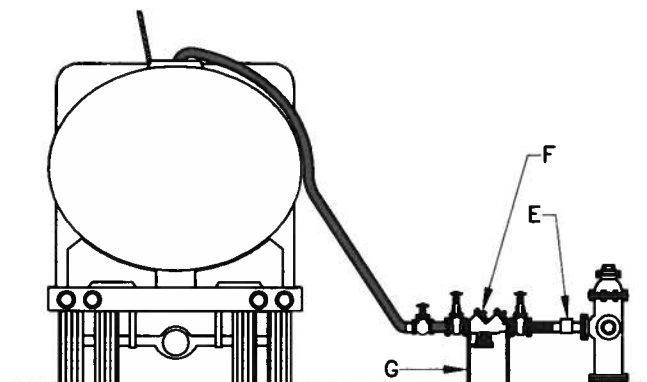
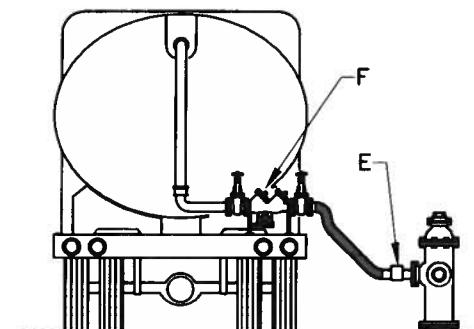
FILL PIPE DETAIL WITH AIR GAP



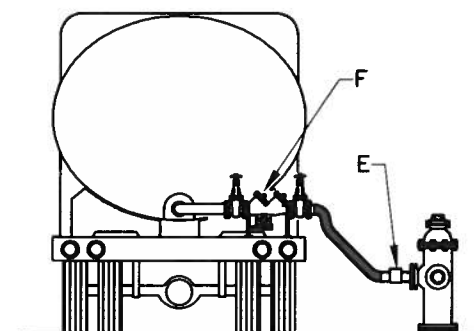
WATER WAGON WITH AIR GAP



ELEVATED TANK WITH RPBA'S



TANK TRUCKS WITH RPBA'S



**GENERAL NOTES:**

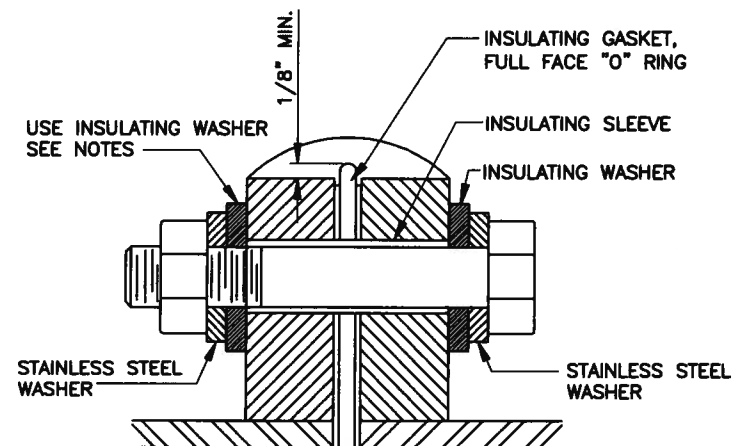
1. THERE SHALL BE NO TAPS OR TEES BETWEEN THE HYDRANT AND THE RPBA.
2. IN ALL CASES, A FIRE HYDRANT METER MUST BE USED AT ALL TIMES.
3. FIRE HYDRANT METER PERMIT MUST BE PRESENT WITH THE METER AT ALL TIMES.
4. ONLY APPROVED HYDRANTS CAN BE USED AS STATED IN THE FIRE HYDRANT METER PERMIT.

**KEYED NOTES:**

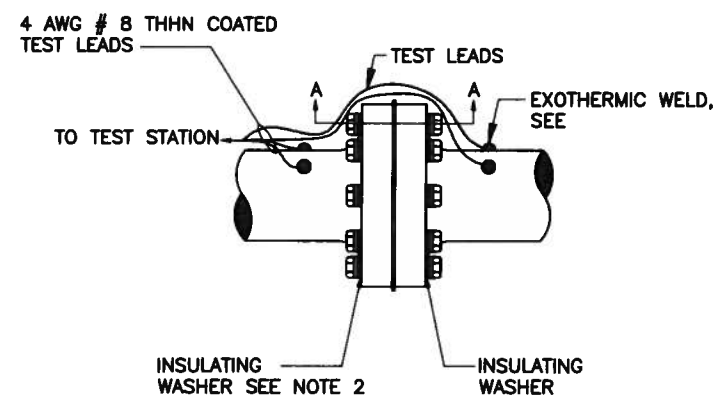
- A. FILL PIPE. PERMANENTLY MOUNTED ON TANK. SEE FILL PIPE DETAIL.
- B. AIR GAP. AIR GAP IS TWICE THE DIAMETER OF FILL PIPE ABOVE FLOOD RIM.
- C. HOSE CONNECTION.
- D. FLOOD RIM.
- E. FIRE HYDRANT METER.
- F. USC APPROVED RPBA.
- G. SUPPORTS REQUIRED.

RPBA = REDUCED PRESSURE BACKFLOW ASSEMBLY

REVISIONS	WATER AUTHORITY
	WATER APPROVED METHODS OF FILLING TANKS
	DWG. 2395 JANUARY 2011



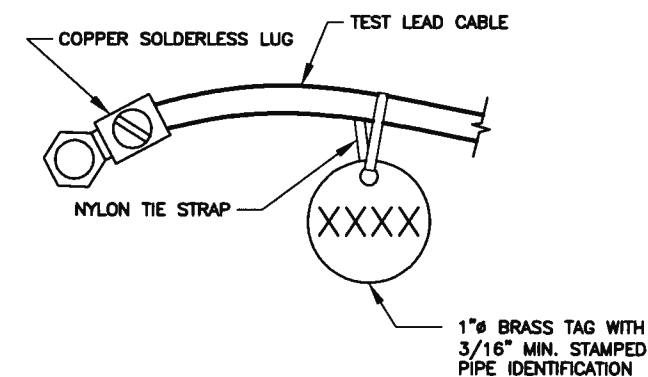
**SECTION A-A**



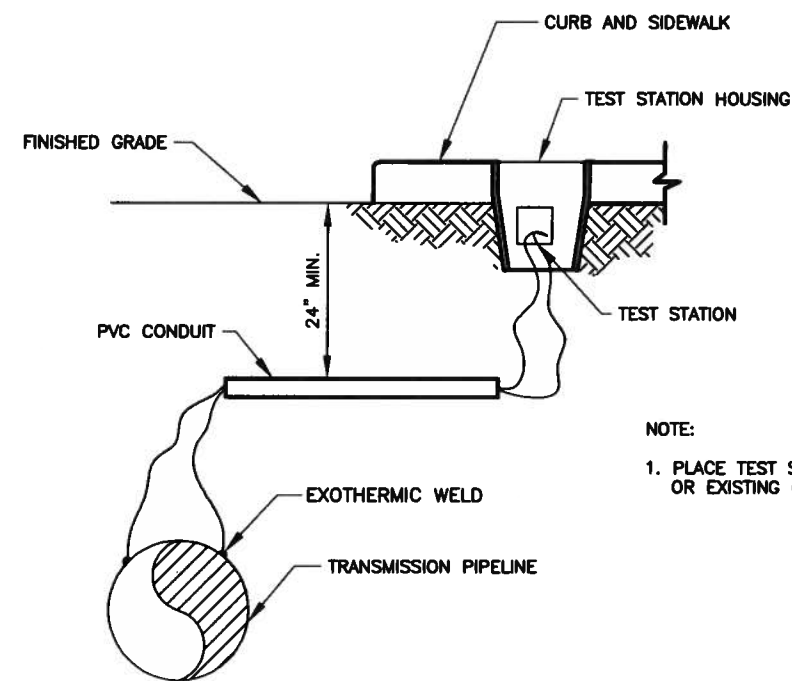
**ISOLATION FLANGE DETAIL**

**NOTES:**

1. HARDWARE QUANTITIES IN INSULATING FLANGE KIT WILL VARY BASED ON GASKET PATTERN AND PIPE SIZE.
2. SEE SPECIFICATIONS FOR ISOLATION GASKET, SLEEVE AND WASHER MATERIALS.
3. FOR CONNECTIONS TO FOREIGN INSTALLATIONS, INSTALL SINGLE-WASHER KITS WITH THE ISOLATING WASHERS ONLY ON THE FOREIGN SIDE OF THE FLANGES.
4. FOR NON-FOREIGN INSTALL DOUBLE WASHER KITS WITH ISOLATING WASHERS ON BOTH SIDES OF THE FLANGES.
5. DO NOT APPLY METALLIC OR OTHER NON-INSULATING PAINTS TO INSULATING PARTS OR OTHER EDGES OF FLANGES.
6. INSULATING SLEEVE TO BE 1/64\"



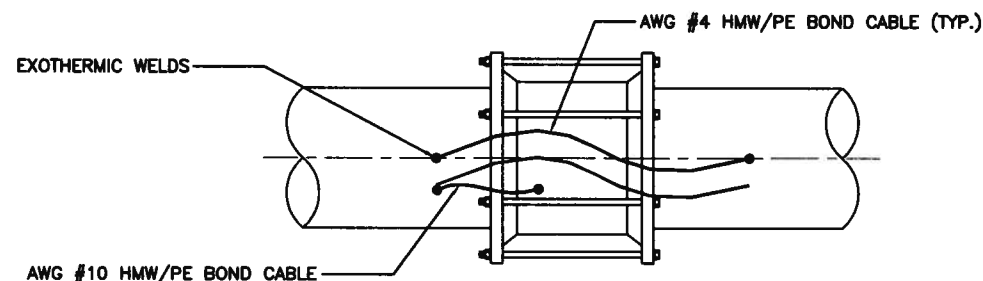
**CABLE IDENTIFIER**



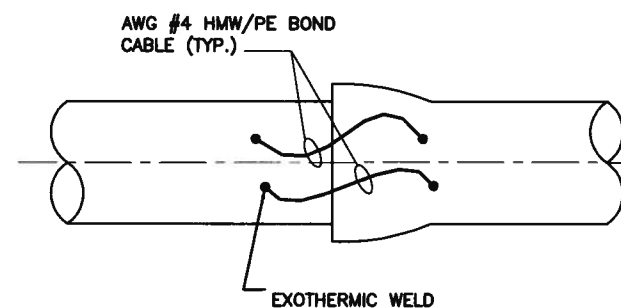
**NOTE:**

1. PLACE TEST STATION HOUSING BEHIND NEW OR EXISTING CURB IN THE SIDEWALK.

**TEST STATION INSTALLATION (TYP.)**



**FLEXIBLE COUPLING BONDING**



**DIP PIPE BONDING**

**ABBREVIATIONS:**

- THHN = THERMOPLASTIC HIGH HEAT-RESISTANT NYLON
- AWG = AMERICAN WIRE GAUGE
- HMW/PE = HIGH MOLECULAR WEIGHT POLYETHYLENE
- SST = STAINLESS STEEL

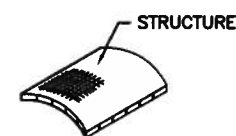
**REVISIONS**

**WATER AUTHORITY**

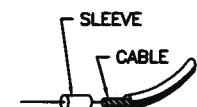
**WATER  
CORROSION MONITORING  
DETAILS - 1**

DWG. 2396

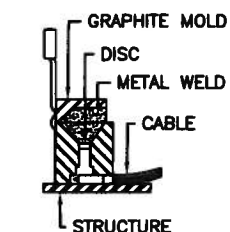
JANUARY 2011



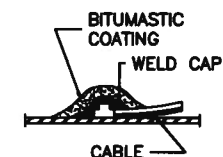
1) FILE STRUCTURE TO BARE METAL AND CLEAN SURFACE



2) STRIP INSULATION FROM WIRE AND ATTACH SLEEVE



3) HOLD MOLD FIRMLY WITH OPENING AWAY FROM OPERATOR. IGNITE WITH FLINT GUN

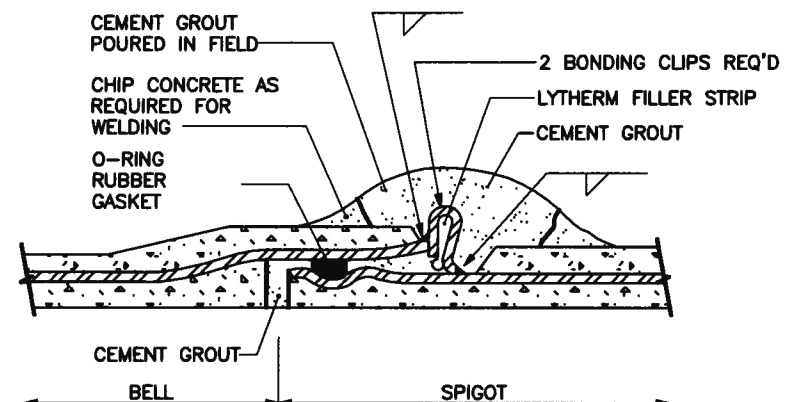


4) REMOVE SLAG FROM CONNECTION WITH CHIPPING HAMMER

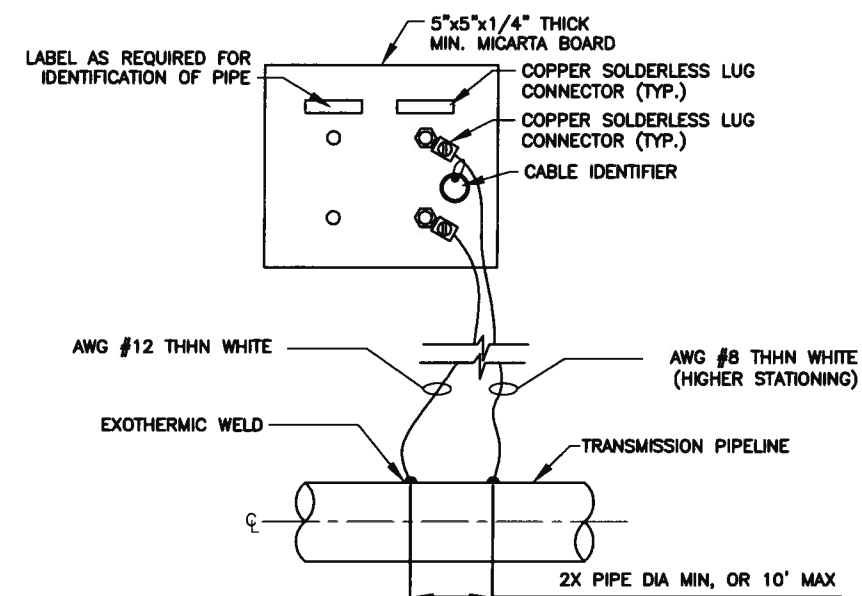


5) COVER CONNECTION WITH BITUMASTIC COATING OVER ALL EXPOSED METAL

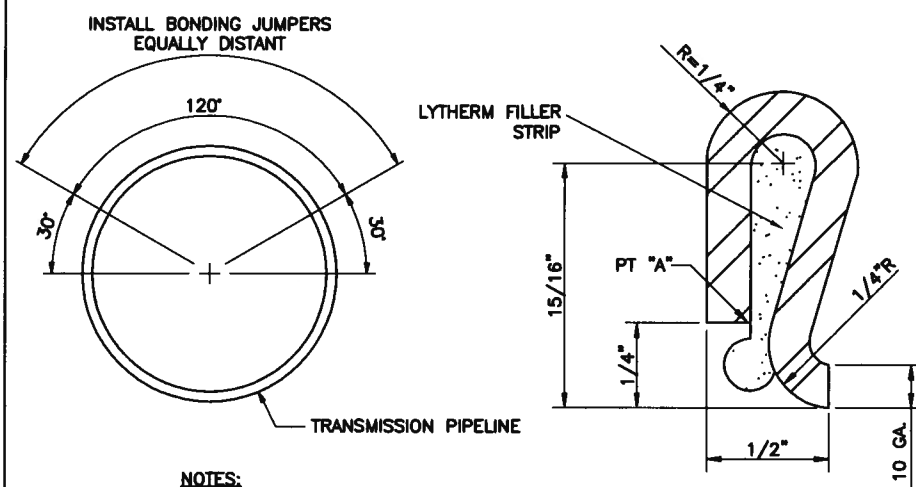
### EXOTHERMIC WELD DETAIL



### CCP OR CML&C STEEL PIPE BONDING INSTALLATION



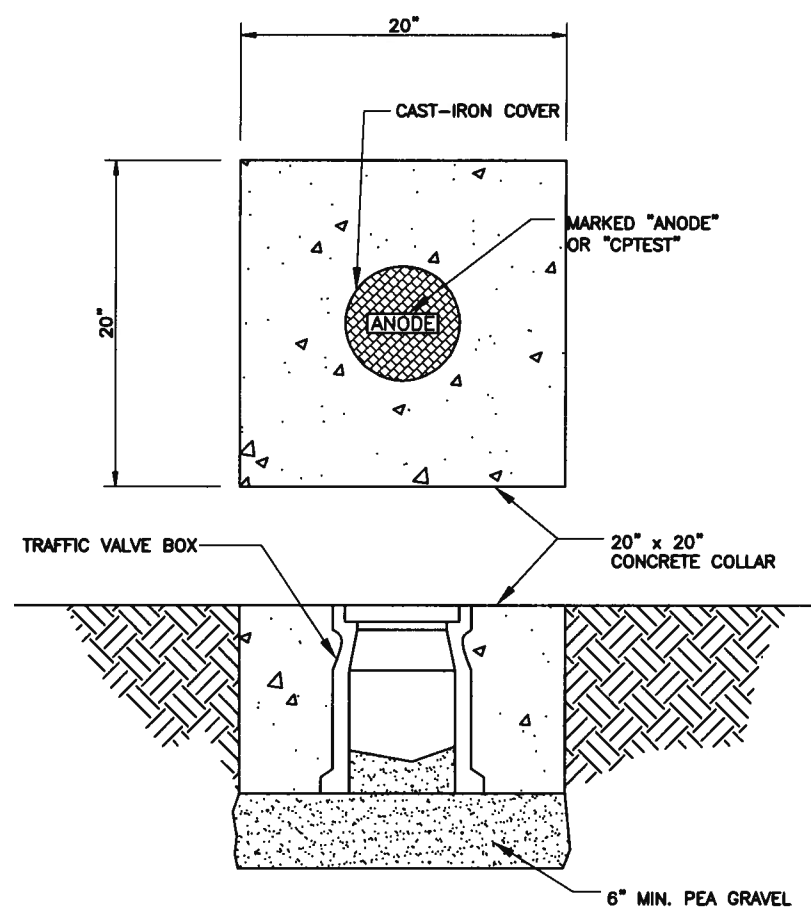
### 2 WIRE TEST STATION



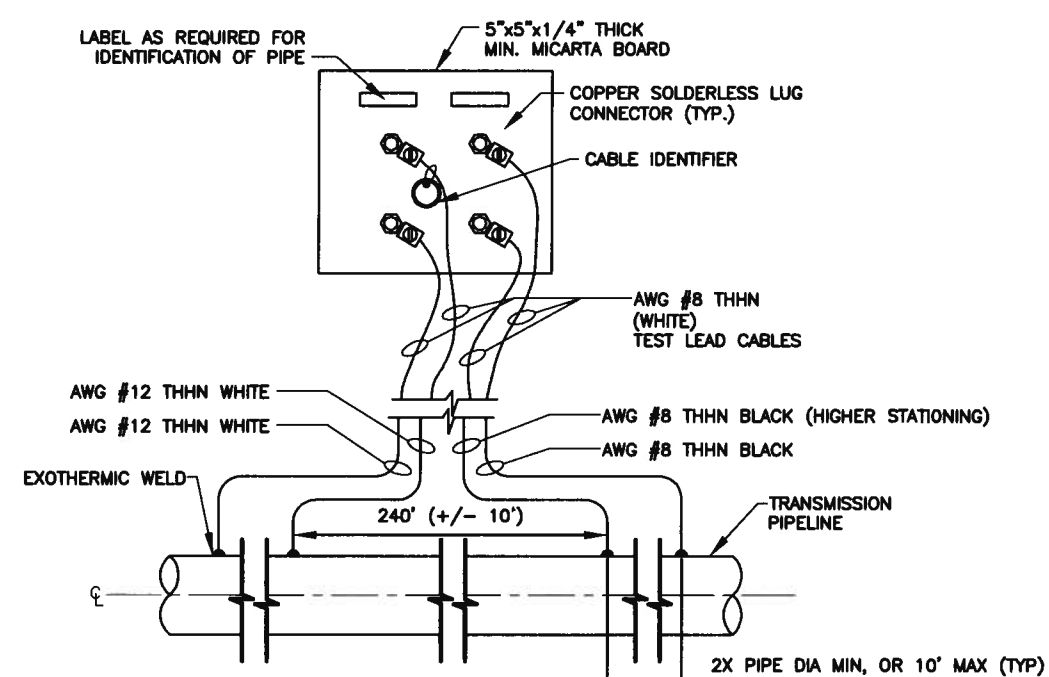
#### NOTES:

1. MATERIAL SPECIFICATION - ASTM A336 (COMMERCIAL QUALITY)  
CUT LENGTH -  $2 \frac{1}{2} \pm \frac{1}{16}$ "  
WIDTH -  $1 \frac{1}{4} \pm \frac{1}{16}$ "
2. LYTHERM FILLER STRIP TO BE  $1" \times 1 \frac{1}{2}"$  WIDE TO OVERLAP SIDES OF JUMPER.
3. CRIMP BONDING JUMPER OVER FILLER AT PT "A" TO COMPRESS FILLER.

### BONDING CLIPS



### TEST STATION HOUSING



### 4 WIRE TEST STATION

#### ABBREVIATIONS:

- THHN = THERMOPLASTIC HIGH HEAT-RESISTANT NYLON
- AWG = AMERICAN WIRE GAUGE

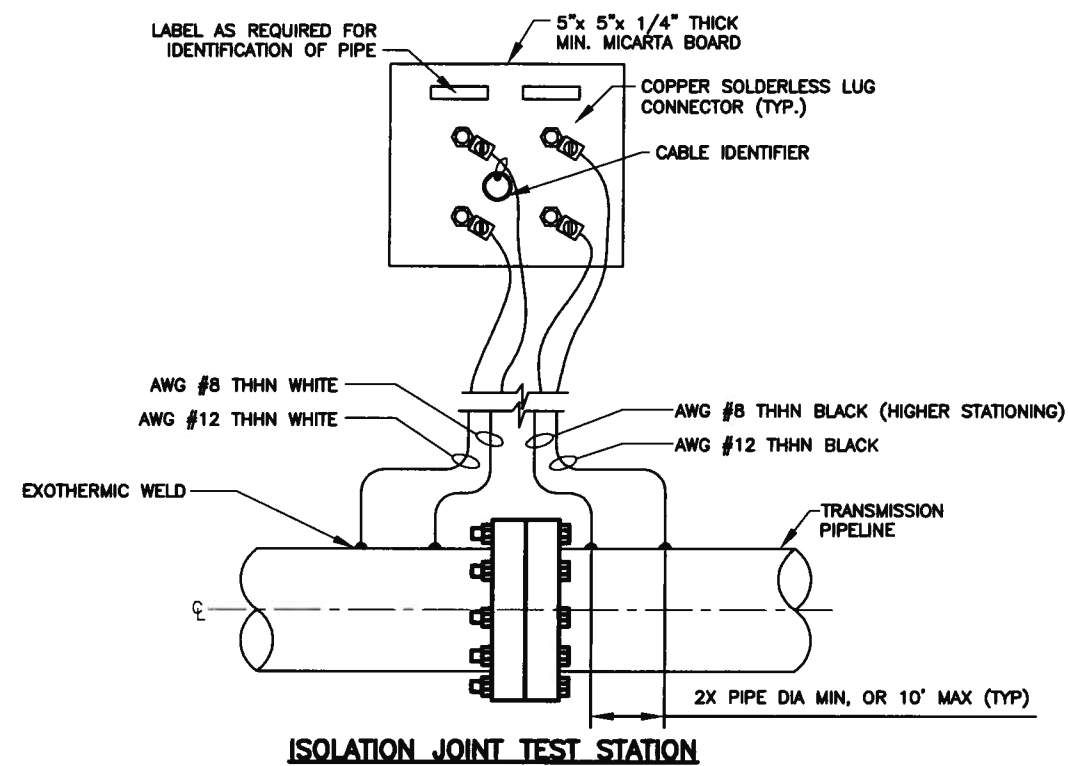
#### REVISIONS

#### WATER AUTHORITY

#### WATER CORROSION MONITORING DETAILS - 2

DWG. 2397

JANUARY 2011

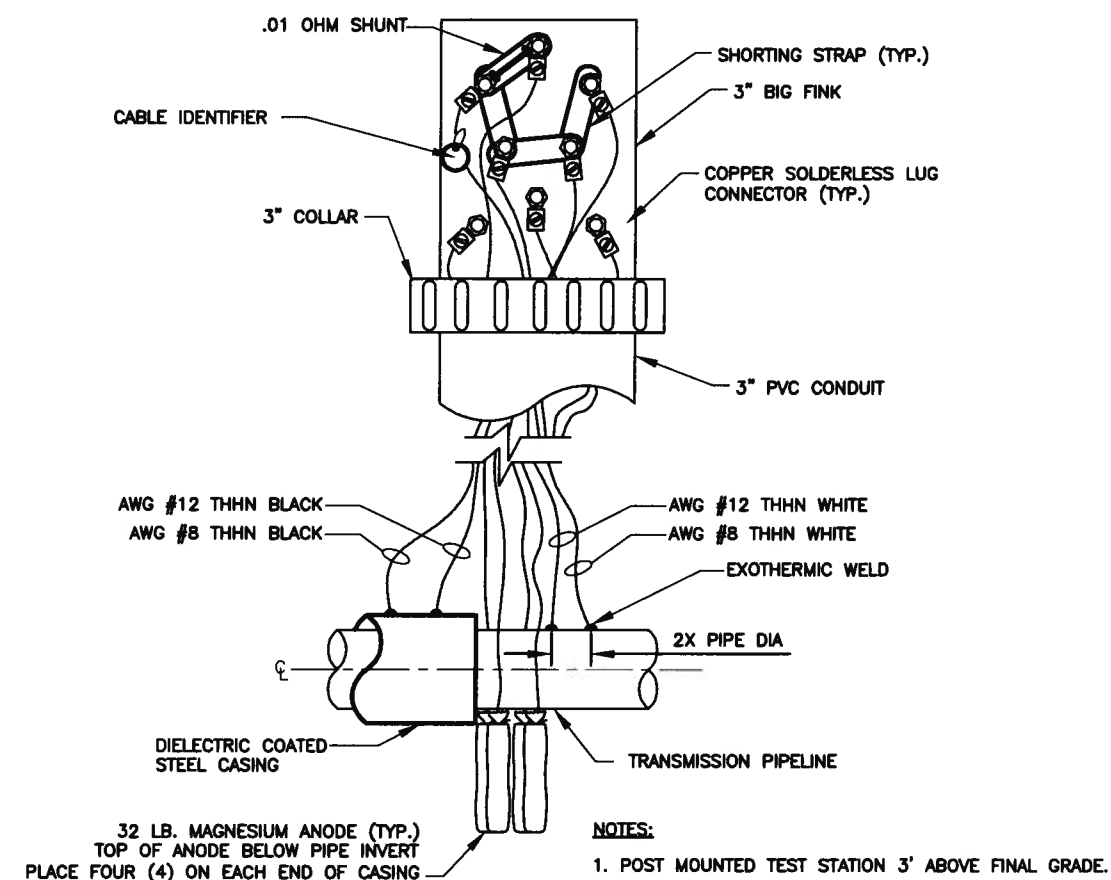


**NOTES:**

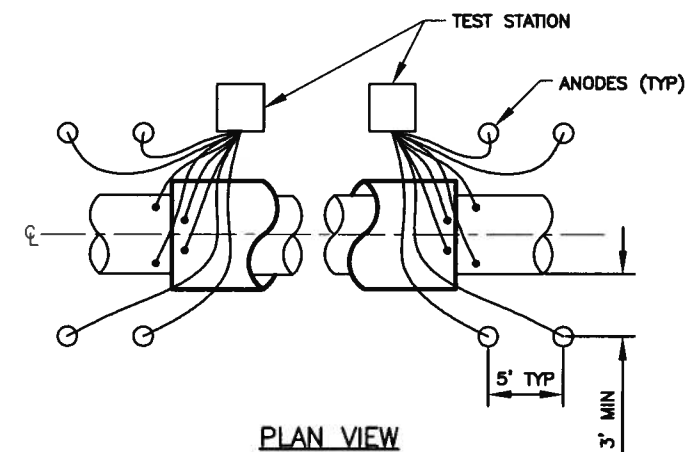
1. ENGRAVE LABEL ON MICARTA BOARD 3/16" THICK MIN.
2. FOR CASING TEST STATIONS SCREEN PRINT LABEL 1/2" MIN. ON TEST STATION CAP.

PROJECT #	6811-03
STATION #	XXX+XX

**TEST BOARD LABEL**



**ELEVATION VIEW**



**CASING TEST STATION**

**ABBREVIATIONS:**

- THHN = THERMOPLASTIC HIGH HEAT-RESISTANT NYLON
- AWG = AMERICAN WIRE GAUGE

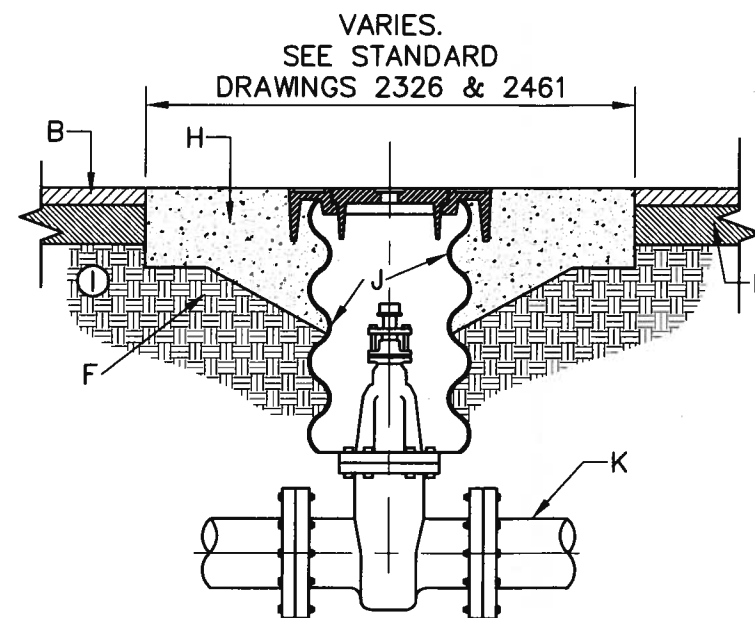
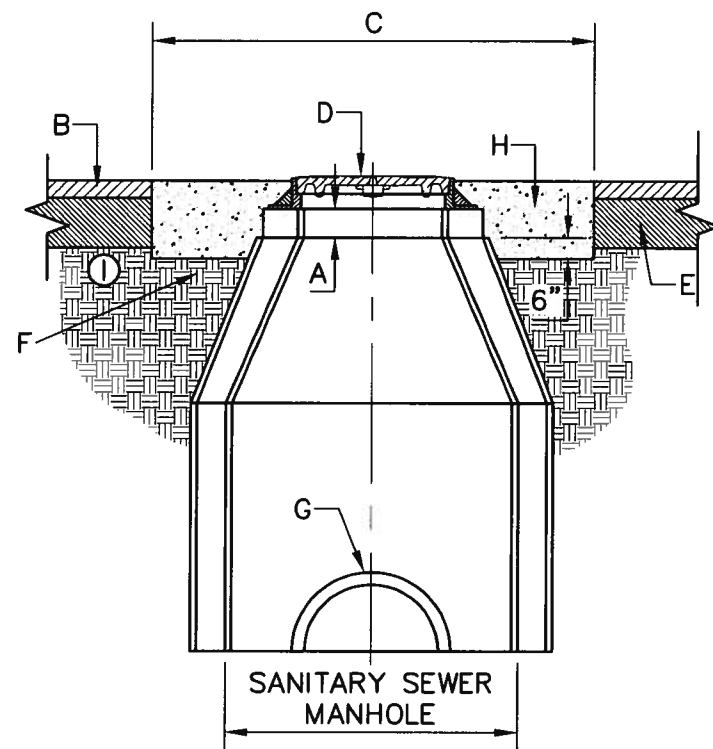
**REVISIONS**

**WATER AUTHORITY**

**WATER  
CORROSION MONITORING  
DETAILS - 3**

DWG. 2398

JANUARY 2011



#### GENERAL NOTES:

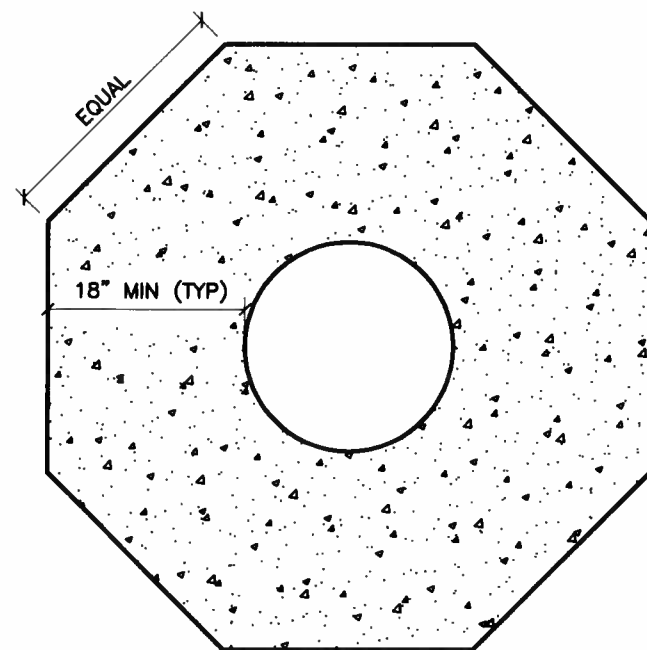
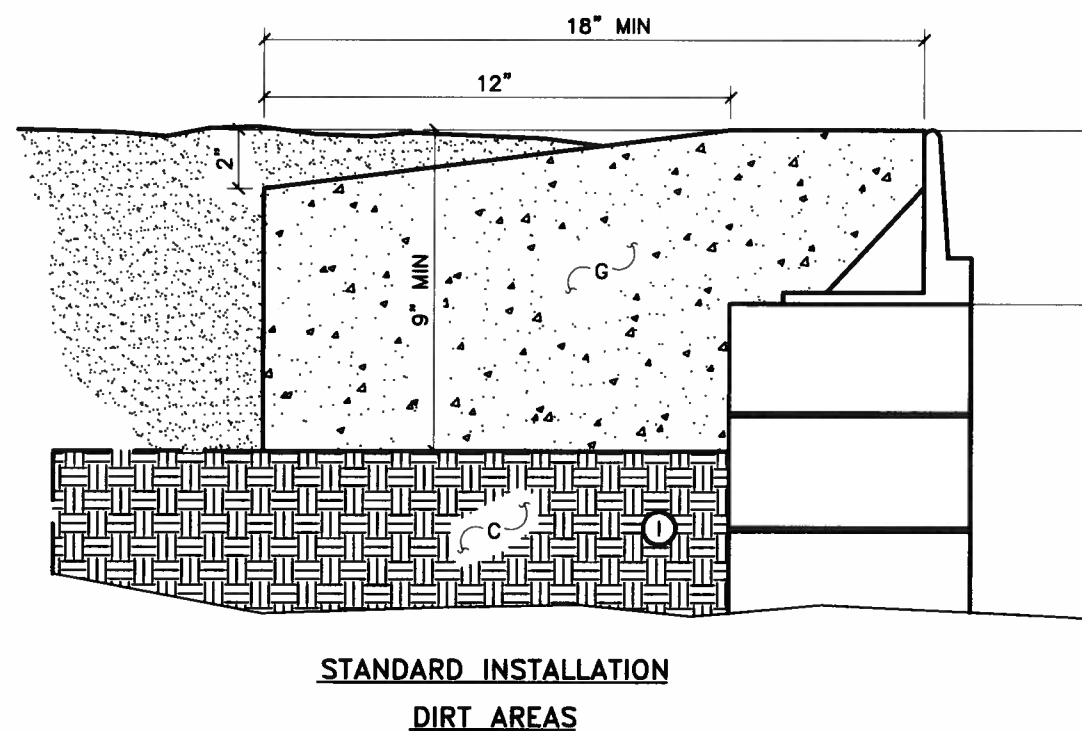
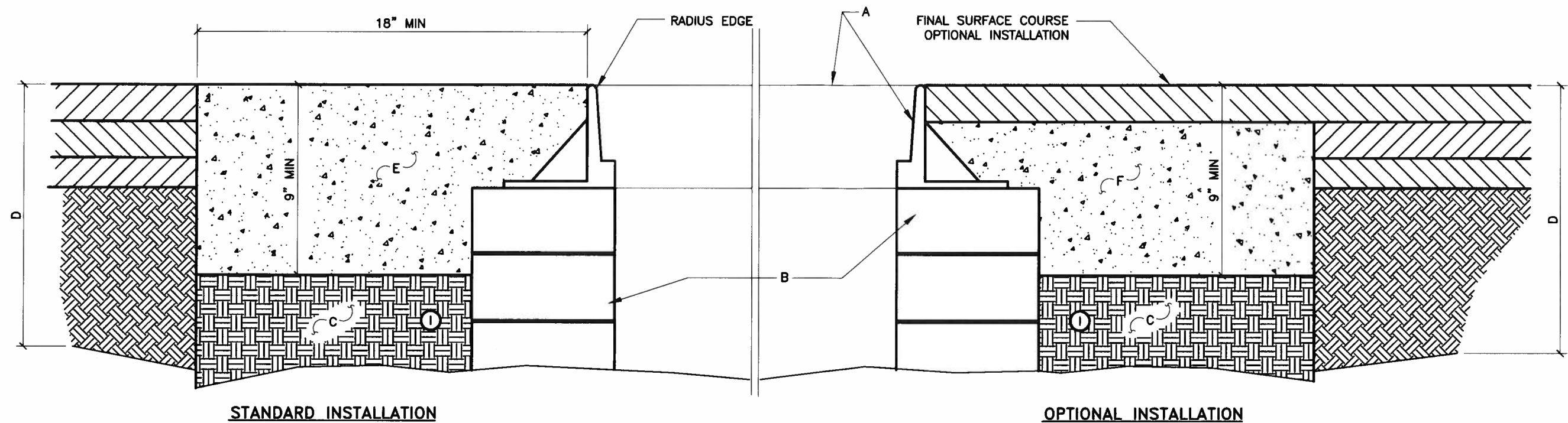
1. GRADE ADJUSTMENTS OF MANHOLE FRAME AND COVER SHALL BE MADE BY ADDING BRICK COURSES OR STEEL/CONCRETE ADJUSTMENT RINGS DIRECTLY UNDER THE FRAME. THE ADJUSTMENT MAY BE MADE IN THIS FASHION TO A MAXIMUM HEIGHT OF 24" FOR THE ADJUSTMENT BRICKS/RINGS. IF ADJUSTMENTS REQUIRE GREATER THAN A 24" ADJUSTMENT, THE CONE SHALL BE REMOVED, THE BARREL HEIGHT ADJUSTED AND CONE REPLACED. IF LESS THAN ONE COURSE OF BRICKS (6") IS REQUIRED, GROUT MAY BE USED. THE USE OF CONCRETE AND STEEL ADJUSTMENT RINGS IS PREFERRED.
2. ALL MATERIALS MUST COMPLY WITH THE CURRENT WATER AUTHORITY APPROVED PRODUCTS LIST.
3. NEW RINGS AND COVERS, REMOVAL AND REPLACEMENT OF CONCRETE COLLARS, INSTALLATION OF EMD'S AND THE INSTALLATION OF NEW POLYMER COATED CORRUGATED METAL PIPE FOR VALVE CANS SHALL BE CONSIDERED INCIDENTAL TO THE ADJUSTMENT PAY ITEM.
4. NEW RINGS AND COVERS WILL BE REQUIRED IF CURRENT RINGS AND COVERS DO NOT MEET CURRENT STANDARD SPECIFICATIONS.
5. INSTALLATION MUST COMPLY WITH THE FOLLOWING STANDARD DRAWINGS:
  - 5.1. 2109 - SANITARY SEWER MANHOLE COVERS
  - 5.2. 2110 - STORM MANHOLE COVERS
  - 5.3. 2128 - VACUUM SEWER VALVE RINGS AND COVERS
  - 5.4. 2310 - WATER MANHOLE COVERS
  - 5.5. 2328 - WATER VALVE AND HYDRANT RINGS AND COVERS
  - 5.6. 2329 - FIRE LINE RINGS AND COVERS
6. TO ENSURE THE SPECIFIED QUALITY OF CASTINGS WILL BE GUARANTEED, ONLY CASTINGS MANUFACTURED IN THE UNITED STATES OF AMERICA WILL BE ACCEPTABLE.
7. EMD PLACEMENT MUST COMPLY WITH THE FOLLOWING:
  - 7.1. SANITARY SEWER MANHOLES - EMD SHALL BE PLACED 1 FOOT UPSTREAM OF THE MANHOLE OVER THE MAIN
  - 7.2. WATER VALVE AND SANITARY SEWER VALVE CANS - EMD SHALL BE PLACED 1 FOOT NORTH OR WEST (DEPENDING ON LINE DIRECTION) OF THE VALVE OVER THE WATER MAIN OR VACUUM SEWER MAIN
  - 7.3. STORM SEWER MANHOLES - EMD'S ARE NOT REQUIRED AND SHALL NOT BE PLACED AT STORM SEWER MANHOLES

#### CONSTRUCTION NOTES:

- A. BRICKS OR ADJUSTMENT RINGS, 24" MAXIMUM.
- B. OVERLAY.
- C. USE A CONCRETE PAD PER STANDARD DRAWING 2461.
- D. MANHOLE FRAME AND COVER PER STANDARD DRAWINGS 2109, 2110 AND 2310.
- E. EXISTING PAVING SECTION.
- F. SUBGRADE SHALL BE COMPACTED TO 95%.
- G. SEWER LINE.
- H. NEW PORTLAND CEMENT CONCRETE COLLAR (4000 PSI). ALL ADJUSTMENTS SHALL BE INSTALLED WITH A NEW CONCRETE COLLAR. THE OLD COLLAR(S) SHALL BE REMOVED AND DISPOSED OF PROPERLY. REFER TO STANDARD DRAWINGS 2326 & 2461 FOR PROPER LINE IDENTIFICATION ON THE COLLAR.
- I. ELECTRONIC MARKER DEVICE (EMD), SEE COA STANDARD SPECIFICATION SECTION 170. EMD'S ARE REQUIRED ON ALL WATER AND SANITARY SEWER ADJUSTMENT, THEY ARE NOT TO BE INSTALLED ON STORM SEWER MANHOLES.
- J. POLYMER COATED STEEL PIPE CMP.
- K. WATER LINE.

REVISIONS	WATER AUTHORITY
	PAVING MANHOLE AND VALVE BOX REGRADING
	DWG. 2460 JANUARY 2011





#### GENERAL NOTES:

- A MANHOLE OR VALVE BOX RING AND COVER PER CITY STANDARDS.
- B MANHOLE CONE/EXTENSION OR VALVE PIPE PER CITY STANDARDS. PIPE WITH SMOOTH INTERIOR.
- C 12" SUBGRADE, 95% COMPACTION (ASTM).
- D PAVING SECTION PER APPROVED DRAWINGS.
- E CONCRETE COLLAR IN PAVED AREAS – TYPICAL INSTALLATION.
- F CONCRETE COLLAR IN PAVED AREAS WITH ASPHALT CAP. TO BE USED WHEN CALLED FOR ON PLANS OR AS DIRECTED BY THE ENGINEER. WATER AUTHORITY APPROVAL MUST BE OBTAINED PRIOR TO INSTALLATION ON SANITARY SEWER AND/OR WATER APPLICATIONS.
- G CONCRETE COLLAR IN DIRT AREAS – SET RING 1" ABOVE GRADE AND SLOPE CONCRETE DOWN AS SHOWN TO 1" BELOW GRADE.
- H WATER VALVE INSTALLATIONS SHALL HAVE SURFACE STAMPED WITH LINE INFORMATION PER CITY STANDARD DWG 2326.
- I ELECTRONIC MARKER DEVICE (EMD) REQUIRED FOR ALL SANITARY SEWER MANHOLES AND WATER VALVES, SEE COA STANDARD SPECIFICATION SECTION 170.

REVISIONS	WATER AUTHORITY MANHOLE/VALVE CONCRETE COLLAR DETAIL
	DWG. 2461 JANUARY 2011

PAVEMENT DESIGN STANDARDS

1. TRANSVERSE LIMITS OF PAVING SUBGRADE PREP SHALL EXTEND TO A MIN OF 1 FOOT BEYOND THE BACK OF CURB.
2. FOR TRANSVERSE PAVEMENT STRUCTURE EXTENDING BELOW BOTTOM OF CURB:

A. AGGREGATE BASE COURSE (ABC), TREATED ABC, TREATED SUBGRADE SOILS, AND ASPHALT CONCRETE (AC) STRUCTURE EXTENDING MORE THAN 1/2 INCH BELOW THE BOTTOM OF A CURB OR CURB & GUTTER SHALL EXTEND TRANSVERSELY UNDER AND BEHIND THE CURB OR CURB & GUTTER TO A MIN OF 1 FOOT BEYOND THE BACK OF CURB.

B. SEE TABLE FOR LIFT MATERIAL REQUIREMENTS.
3. CITY STANDARD PAVEMENT DESIGNS BASED ON AN R-VALUE <sup>50</sup>2 AND MAXIMUM TRAFFIC VOLUMES DEFINED BELOW:

a. LOCAL RESIDENTIAL STREETS (SEE STD. DWG 2405 A)  
ROADWAY PROVIDES ACCESS TO A MAXIMUM OF 50 RESIDENTIAL LOTS OR HAS A MAXIMUM AWDT OF 500.

LIFT	THICKNESS
AC SURFACE COURSE	1 1/2"
AC BASE COURSE	1 1/2"

b. MAJOR LOCAL STREETS (SEE STD DWG 2405 B)  
ROADWAY TO HAVE A MAXIMUM AWDT OF 3000.

LIFT	THICKNESS
AC SURFACE COURSE	2"
AC BASE COURSE	2"

c. ROADS CLASSIFIED ON THE LONG RANG MAJOR STREET PLAN REQUIRE A PAVEMENT DESIGN IN ACCORDANCE WITH SECTION 23 OF THE DEVELOPMENT PROCESS MANUAL
4. THE PAVEMENT STRUCTURE SECTION SHALL BE SELECTED SUCH THAT THE LIFTS OF MATERIAL MODULE TO 1/2 INCH OF THE BOTTOM OF CURB AND COMPLY WITH MATERIAL LIMITS SPECIFIED BELOW. (SEE STD. DWGS 2407 & 2408)
5. ALL PAVEMENT MATERIAL THAT EXTENDS MORE THAN 1/2 INCH BELOW THE BOTTOM OF THE CURB SHALL BE EXTENDED TO 1 FOOT BEYOND THE BACK OF CURB.

MATERIAL LIFT THICKNESS REQUIREMENTS

PAVEMENT CONSTRUCTION MATERIALS				
MATERIAL	COMPACTED LIFTS [1]		NOTES	CONSTRUCTION TOLERANCES [3]
	MINIMUM	MAXIMUM		
FILL	4'	8'	SEE SECTION 204	± 1 1/4' (0.10 FT)
SUBGRADE	4'	8'	SEE SECTION 301 FOR SUBGRADE DEPTH REQUIREMENTS	± 1 1/4' (0.10 FT)
AGGREGATE BASE COURSE (ABC)	4'	6'	SEE SECTION 302 FOR ABC CONSTRUCTION REQUIREMENTS	± 1/2' (0.04 FT)
BITUMINOUS TREATED BASE (BTB)	4'	6'	SEE SECTION 305 FOR BTB CONSTRUCTION REQUIREMENTS	± 1/2' (0.04 FT)
CONCRETE TREATED BASE (CTB)	4'	6'	SEE SECTION 307 FOR CTB CONSTRUCTION REQUIREMENTS	± 1/2' (0.04 FT)
ASPHALT CONCRETE (AC)			SEE SECTION 116 FOR AC CONSTRUCTION REQUIREMENTS	
TYPE A, SP-II	3'	4'		± 1/4' (0.02 FT)
TYPE B, SP-III	2'	3'		± 1/4' (0.02 FT)
TYPE C, SP-IV	1 1/2'	2 1/2'		± 1/4' (0.02 FT)
TYPE D, SP-V	1'	2'		± 1/4' (0.02 FT)
TREATED SOILS	4'	8'	SEE SECTION 304, 342 FOR CONSTRUCTION REQUIREMENTS	

[1] THE LIFT THICKNESS/DEPTH(S) FOR A PAVEMENT SECTION SHALL BE IDENTIFIED IN TYPICAL PAVEMENT SECTIONS ON A PROJECTS PLANS AND IN A PROJECT'S SPECIFICATIONS.

[2] AGGREGATE BASE COURSE MAY BE USED IF PROPER DRAINAGE CAN BE PROVIDED.

[3] MEASURED WITH A 10-FOOT STRAIGHT EDGE IN ANY DIRECTION.

SECTION 2500

STANDARD DETAILS FOR Traffic

<i>DWG.NO.</i>	TITLE
2501	STANDARD TRANSITION
2502	TYPICAL STREET INERSECTION PLAN
2503	TYPICAL STREET INTESECTION PLAN
2504	CURB RETURN RADIUS TABLE
2505	CHANNELIZED RIGHT TURN FOR INTER. WITH PRINCIPAL ARTERIAL
2510	PLAN CUL-DE-SACS
2511	ISLAND CUL-DE-SACS
2512	HAMMER HEAD CUL-DE-SACS
2528	POLE INSTALLATION FOR PARKING METERS
2529	BICYCLE GATEWAY
2535.1	BUS SHELTER "C" – CUT SECTION, FILL SECTION
2535.2	BUS SHELTER "C" – PLAN & ROOF PLAN (W/SIDEWALK)
2535.3	BUS SHELTER "C" – (W/O SIDEWALK)
2535.4	BUS SHELTER "D" – PLAN & ROOF PLAN (W/SIDEWALK)
2535.5	BUS SHELTER "D" – (W/O SIDEWALK)
2535.6	BUS SHELTER "C" – ELEVATION / SECTION
2535.7	BUS SHELTER "D" – ELEVATION / SECTION
2535.8	BUS SHELTER "C" & "D" DETAILS
2535.9	BUS SHELTER "C" & "D" BENCH
2535.10	BUS SHELTER "C" & "D" TRASH RECEPTACLE
2550	TRAFFIC SIGNAL PULL BOX DETAILS
2551	TRAFFIC SIGNAL MANHOLE DETAILS
2552	TRAFFIC SIGNAL LOOP DETECTOR DETAILS
2555	TRAFFIC SIGNAL CONTROLLER CABINET & PEDESTRIAN FOUNDATION DETAILS
2556	TRAFFIC SIGNAL CABINET FOUNDATION CONVERSION
2557	TRAFFIC SIGNAL SPLICE CABINET GROUND MOUNT (LARGE)
2558	TRAFFIC SIGNAL FOUNDATION DETAILS TYPE II AND TYPE III STANDARDS
2560	TRAFFIC SIGNAL MISCELLANEOUS DETAILS
2561	TRAFFIC SIGNAL MASTARM DETAILS, ALUMINUM
2562A	TRAFFIC SIGNAL MASTARM DETAILS, TYPE II STANDARD
2562B	TRAFFIC SIGNAL MASTARM DETAILS, TYPE II STANDARD
2562C	TRAFFIC SIGNAL MASTARM DETAILS, TYPE III STANDARD
2562D	TRAFFIC SIGNAL TYPE III STANDARD MISC. DETAILS
2565	TRAFFIC SIGNAL SCHOOL BEACON DETAILS (MASTARM)
2566A	TRAFFIC SIGNAL SCHOOL BEACON DETAILS (PEDESTAL)
2566B	TRAFFIC SIGNAL WARNING TRAFFIC BEACON DETAILS
2568	TRAFFIC SIGNAL MACHINE VISION VEHICLE DETECTOR SYSTEM
2569	TRAFFIC SIGNAL OPTICAL DETECTOR INSTALLATION DETAILS
2570	TRAFFIC SIGNAL ELECTRICAL SERVICE DETAILS
2571	TRAFFIC SIGNAL METER PEDESTAL DETAILS FOR SIGNAL
2572	TRAFFIC SIGNAL METER PEDESTAL DETAILS COMBINATION SIGNALS & LIGHTING
2573	STREET LIGHTING CONTROL CABINET SIX CIRCUIT, METERED
2574	STREET LIGHTING CONTROL CABINET SIX CIRCUIT UNMETERED
2580	STREET LIGHTING FOUNDATION & MISCELLANEOUS DETAILS
2581	STREET LIGHTING INSTALLATION & POLE DETAILS