March 19, 2013

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

From: Anthony Montoya, Jr., P.E., Chief Engineer,
Albuquerque Bernalillo County Water Utility Authority

Subject: City of Albuquerque Standard Specifications for Public Works Construction
Amendment 1 to Update 8
Albuquerque Bernalillo County Water Utility Authority
Revisions, Deletions, and Additions - Summary

The following is a brief summary of the Water Authority's changes to the City of Albuquerque Standard Specifications for Public Works Construction that will, upon approval, become adopted as Amendment 1 to Update No.8. The section numbers are shown along with a brief description about the proposed changes to the given specification or detail drawing.

SECTION 18 UTILITIES

18.3.6 Extension of Water Shutoff Moratorium: The period is now from April 1 through September 30 for Transmission, Well Collector, San Juan Chama, or other lines designated at critical for operations.

SECTION 100 MATERIALS

100.2 Contents section revised to remove Section 125 Vitrified Clay Pipe and to add the Section 131 Centrifugally Cast Fiberglass Reinforced Polymer Pipe;

SECTION 125 VITRIFIED CLAY PIPE - REMOVE ENTIRE SECTION
The entire vitrified clay pipe section was removed from the specifications because this type of pipe is no longer an acceptable material for use;

SECTION 131 CENTRIFUGALLY CAST FIBERGLASS REINFORCED POLYMER MORTAR PIPE
This is a new section to the standard specifications;

SECTION 170 ELECTRONIC MARKING DEVICES

170.4.1.4 Addition of EMD to deflections (points of curvature) to gravity sanitary sewer lines;

170.4.1.9.2 Change the EMD bend requirement to deflections, and bends of 11 ¼ degrees and larger for sanitary sewer force mains;

170.4.1.9.6 Creation of a maximum distance between EMDs of 100-feet on sanitary sewer lines;

170.4.2.3 Change the EMD bend requirement to pipe deflections and bends of 11 ¼ degrees and larger for water lines;

170.4.2.8 Creation of a maximum distance between EMDs of 100-feet on water lines;

SECTION 900 SANITARY AND STORM SEWER FACILITIES

900.2 Changed title of Section 905 to "Sanitary Sewer Service Lines" from Sanitary Service Lines;

900.2 Change title of Section 920 to "Sanitary Sewer Manholes" from Sanitary and Storm Sewer Manholes;

900.2 Addition of Section 921 Storm Manholes;

SECTION 901 SANITARY SEWER COLLECTOR AND INTERCEPTOR FACILITIES

901.2.1 Removal of reference to ASTM C425 Standard Specification for Compression Joints for Vitrified Clay Pipe and Fittings;

901.2.1 Removal of reference to ASTM C 43 Standard Terminology of Structural Clay Products (Withdrawn by ASTM in 2009);

901.2.1 Removal of reference to ASTM C443 Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets;

901.2.1 Removal of reference to ASTM C478 Standard Specification for Precast Reinforced Concrete Manhole Sections;

901.2.2 Removal of reference to AWWA C603 Standard for Installation of Asbestos-Cement Pressure Pipe;

901.2.3 Removal of reference to Section 101 Portland Cement Concrete;

901.2.3 Removal of reference to Section 102 Steel Reinforcement;

901.2.3 Removal of reference to Section 105 Concrete Curing Compound;

901.2.3 Removal of reference to Section 106 Cement Mortar and Grout;

901.2.3 Removal of reference to Section 108 Brick;

901.2.3 Removal of reference to Section 123 Reinforced Concrete Pipe;

901.2.3 Removal of reference to Section 124 Reinforced Concrete Pressure Pipe;

901.2.3 Removal of reference to Section 125 Vitrified Clay Pipe;
901.2.3 Removal of reference to Section 129 Ductile Iron Pipe;

901.3.1 Removal of Reinforced Concrete Pipe, Reinforced Concrete Pressure Pipe, Vitrified Clay Pipe, and Ductile Iron Pipe references; Addition of Fiberglass Pipe Section 131;

901.5.1.3 The subsection was updated to reflect the responsibility of the Contractor to remove plugs from the sanitary sewer system. Written authorization by the ENGINEER or Water Authority will be issued and the Contractor shall certify the plug removal task prior to project acceptance;

901.5.1.4 Removal of reference to "staked in the field";

901.5.1.6 Replace socket or collar ends reference with bell end;

901.5.1.7 Removal of concrete saw option on concrete structure removal for installation of line;

901.5.1.8 New specification for installation of sewer warning tape;

901.5.2.3 Addition of fiberglass pipe to section for connection to manholes;

901.5.2.3 Delete reference to PS-10 by Press Seal Gasket Corporation, Large Diameter Waterstops for Concrete Manhole Adapters by Fernco;

901.5.2.4 Include reference to fiberglass pipe in section and include minimum mandrel diameter;

901.5.2.6 Include reference to fiberglass pipe in section;

901.6 Delete entire subsection: Joints for CLAY PIPE;

901.6.2 Delete entire subsection: Joints for CONCRETE PIPE;

901.6.4 Addition of Joint for Fiberglass Pipe section;

901.7.2.4 Add requirement for Contractor to remove plugs installed for the Infiltration Test;

901.7.3.4 Add requirement for Contractor to remove plugs installed for the Exfiltration Test;

901.7.4.5 Add requirement for Contractor to remove plugs installed for the Air Test;

901.7.4.2.3 Change maximum Air Test pressure given the presence of groundwater surrounding the test pipe to 9 psig.;

901.7.4.2.8 New Air Test passing provision for zero leakage after 1 hour of testing;

901.7.4.2.10 Addition of requirement to properly install plugs and braces to avoid blowouts;

901.7.5 Revision of section for a single Air testing table that will be applied for groundwater and non-groundwater conditions;

901.8.1.1 Add requirement for Contractor to remove plugs installed for pipe cleaning;

901.8.2 Television inspection subsections were renumbered to match numbering format;

901.8.2.2 Addition of requirement for Contractor to remove plugs prior to television inspection;

901.8.2.3 Remove VHS videotape submittal and replace with a submittal in a format acceptable to the Water Authority;

901.9.1.3 Delete sub section on payment for lateral lines;

901.9.4.2 The reference was removed and replaced with television inspection and documentation being incidental to the construction item unless otherwise specified in the Bid Proposal;

901.9.5 Removal of reference to Storm Sewers and deleted reference to salvaged materials to the Liquid Waste Division

SECTION 905 SANITARY SEWER SERVICE LINES

905.1.2 Addition of coordinate to location of service line language in subsection;

905.2.1 Addition of ASTM A 74 Standard Specification for Cast Iron Soil Pipe and Fittings to reference;

905.2.2 Addition of Section 170 Electronic Marker Devices to reference;

905.3.1 Include reference to Water Authority Approved Product List for materials;

905.3.2 Removal of pre-approved products in this section;

905.3.2.1 Deleted subsection on saddles pre-approved in specification;

905.3.2.2 Deleted sub section on saddles pre-approved in specification;

905.3.2.3 Renumbered to 905.3.2.1; Change specification to require a 2 ½ inch strap when attaching to a sewer line;

905.3.3 Addition of reference to Water Authority Approved Product List;

905.3.3.1 Deleted subsection on pre-approved saddles for connection of service line to a manhole;

905.3.4 Addition of reference to ASTM A 74 Standard Specification for Cast Iron Soil Pipe and Fittings;

905.4.3 Increased soil compaction density to 95% minimum; Correction of compaction reference from Section 801 to Section 701;

905.4.4 Addition of reference to Section 170

905.4.5 New section requiring coordinates at the service connection to the main;

905.5.3 New section requiring coordinates on service riser;

905.6.1 Addition of Cured-In-Place exception for new saddle requirement for reconnection on replacement/rehabilitation type projects;

905.6.3 Increased soil compaction to 95% on bedding under the service line;

905.6.4 Sub-section moved to 905.6.5 and replaced with the placement of an electronic marking device per Section 170;

905.6.5 Movement of requirement to stamp or saw cut an “S” in the curb to this subsection;

905.7 Change specification to require coordinates for location of service on records;

SECTION 910 STORM SEWER PIPE INSTALLATIONS

910.2.1 Delete reference to ASTM C43 (Withdrawn in 2009)

910.2.1 Delete reference to ASTM 425 Standard Specification for Compression Joints for Vitrified Clay Pipe and Fittings

910.2.1 Delete reference to ASTM D3034 Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings

910.2.1 Delete reference to ASTM F679 Standard Specification for Poly (Vinyl Chloride) (PVC) Large Diameter Plastic Gravity Sewer Pipe and Fittings

910.2.2 Delete reference to AWWA specifications;

910.2.3 Delete reference to Section 121 Plastic Pipe;

910.2.3 Delete reference to Section 129 Ductile Iron Pipe;

910.2.3 Delete reference to Section 801 Installation of Water Transmission, Collector, and Distribution Lines;

910.5.1.3 Delete plug installation requirement;

SECTION 915 – STORM SEWER DRAINAGE APPURTENANCES

915.4.2 Corrected reference sections listed to the appropriate sections for 701 Trenching Excavation and Backfill and 910 Storm Sewer Pipe Installations;

915.4.6 Corrected reference sections listed to the appropriate sections for 343 Removal and Disposal of Existing Pavements, Curb and Gutter, Sidewalk, Drivepads, and Slope Pavement

915.6.6 Delete payment for storm drainage manholes in this section and moved to the new Section 921 Storm Sewer Manholes and Appurtenances;

SECTION 920 – SANITARY AND STORM SEWER MANHOLES

920.0 Change title to “SANITARY SEWER MANHOLES”; Storm sewer manhole specifications were moved to New Section 921 Storm Manholes;

920.1 Remove storm sewer reference; Inclusion of rehabilitation to section description;

920.2.1 Addition of reference to ASTM C 32 Standard Specification for Sewer and Manhole Brick (Made From Clay or Shale);

920.2.1	Removal of reference to ASTM C 43 Standard Terminology of Structural Clay Products;
920.2.1	Removal of reference to ASTM C 1557 Standard Test Method for Tensile Strength and Young's Modulus of Fibers;
920.2.1	Addition of reference to ASTM D 1557 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort;
920.2.2	Addition of reference to Section 170 Electronic Marker Devices;
920.3	Materials references moved to REFERENCES subsection 920.2.2;
920.4	Change subsection title to "SANITARY SEWER MANHOLE CONSTRUCTION";
920.4.1.3	Addition of coordinate requirement to specification;
920.4.1.5	Change specification to reference Section 101;
920.4.1.6	Type-O: changed "performed" with "preformed";
920.4.1.7	NEW sub-section requiring placement of electronic marker devices at all manholes;
920.4.2.2	Changed eccentric cone to concentric cone for precast concrete manholes;
920.4.2.2	Change specification to reference Section 101 rather than listing concrete strength;
920.4.2.4	Changed eccentric cone to concentric cone for shop drawings;
920.4.2.5	Remove the listed approved products and add reference to Water Authority Approved Product List;
920.4.3.2	Change specification to reference Section 101for formed in place concrete manhole concrete strength;
920.4.3.3	Remove eccentric cone and replace with concentric cone for formed in place manholes; Remove "flat cover" and replace with "flat top cover" for approved use;
920.4.4.3	Remove eccentric cone and replace with concentric cone for use; Remove "flat-type" and replace with "flat top" for use;

920.4.5	Tee Pipe Manhole removed from Sanitary Sewer Manhole Section and moved to Storm Manhole Section;
920.4.5.1	Specification is updated for Tee type manhole to be used where specified;
920.4.5.4	Change of approver to OWNER for products related to joint sealants in vertical portions of tee pipe manholes;
920.4.6.2	Removal of specification approved products and inclusion of reference to Water Authority Approved Product List;
920.4.7	Manhole Steps removed from Sanitary Sewer Manhole Section and moved to Storm Manhole Section;
920.4.9	Removal of storm drain manhole and Section 161 references and addition of reference to Section 163 Ductile Iron Castings to section;
920.5.1.1	Addition of requirement for Contractor to remove plugs after manhole testing;
920.5.4	Testing of storm sewer manholes moved to Storm Sewer Manhole Section;
920.6.4	Deleted section on Salvaged Material and replaced with disposal by the CONTRACTOR requirement;
920.6.8	Change survey requirement to require a GPS location on abandoned manholes;
920.7	NEW section for Sanitary Sewer Manhole Rehabilitation; Storm Sewer manhole rehabilitation moved to Storm Sewer Manhole section;
920.8.1.1	Delete reference to manhole type “F” and manhole type “G”; Manhole diameter size range is from 4’ to 8’. Depth for additional payment was corrected for depths greater than 14-feet;
920.8.1.3	Delete payment description for Tee-Type manholes and replace with an updated subsection with general included items;
920.8.1.4	Subsection moved to 920.8.1.3; Replace “shelving” with “benching” and include EMD placement;
920.8.2.2.1	Payment for adjustment ring removed;
920.8.2.3	Inclusion of EMD and reinforced concrete collar to manhole adjustment payment section and removal of adjusting rings;
920.8.3	New Section on payment for Exterior Coating of Manhole;

920.8.4 Manhole steps moved to storm manhole section and replaced with Interior Coating of Manhole payment section;

SECTION 921 STORM SEWER MANHOLES AND APPURTENANCES

All storm sewer manhole specifications were added to this new section;

SECTION 925 VACUUM SEWER COLLECTOR, INTERCEPTOR AND FORCE MAIN FACILITIES

925.2.1 Remove reference to Section 106 Cement Mortar and Grout;

925.2.1 Remove reference to Section 108 Brick;

925.2.1 Addition of reference to Section 163 Ductile Iron Castings;

925.2.1 Update reference to Section 170 from Electronic Marker Disks to Electronic Marker Devices;

925.2.1 Addition of reference to Section 920 Sanitary Sewer Manholes

925.3.1 Addition of green color to sanitary sewer PVC pipe requirement;

925.3.2 Change pipe certification requirement from 24 inches of mercury vacuum to 22 inches of mercury vacuum;

925.3.3.1 Change in classification for fittings from Schedule 40 to Schedule 80;

925.3.5 Addition of reference to Section 101 Table 101.C;

925.3.6 Corrected reference number for Precast Concrete Manholes to Section 920.4.2;

925.3.7 Include reference to Section 161, 163, and Standard Detail Drawings for manhole frames and covers;

925.3.8 Removed concrete strength specification in this section due to redundancy with concrete specifications;

925.3.9 Removal of extension bar requirement in valve assembly;

925.3.9.1 New requirement for coordinates for isolation valves on Record Drawings;

925.3.10 Removal of specification approved valve and added reference to Water Authority Approved Product List;

925.3.12.1 Addition of reference to Water Authority Approved Product List;

925.3.12.2 Removal of specification approved vacuum valve pit product;

925.3.13 Removal of AISI abbreviation and changed Stainless Steel Type to Type 316;

925.5.1.4 The subsection was updated to reflect the responsibility of the Contractor to remove plugs from the sanitary sewer system. Written authorization by the ENGINEER or Water Authority will be issued and the Contractor shall certify the plug removal task prior to project acceptance;

925.5.2.1 The reference to laser equipment use for laying the pipe to line and grade was removed; The elevation recording interval was changed from being required at each pipe joint to being required at 100 foot intervals along the pipe;

925.5.2.2 The reference to laser equipment use for laying the pipe to line and grade was removed;

925.5.2.8 Removal of concrete shall be performed to the nearest full expansion joint or edge. The option of removal of sections using a concrete saw has been eliminated;

925.5.2.10 Update to the warning tape specification to include tape minimum width, inscription, and material;

925.5.2.11 Change pipe end marker from a stainless steel marker to an electronic marking device with reference to Section 170;

925.5.2.12 Addition of reference to Standard Detail Drawing 2180 Casing Detail for Bore and Jack Vacuum Sewer System to the installation specification of pipe through a casing;

925.5.2.13 New requirement to add GPS coordinates on fittings, grade changes, and runs of mainline with a maximum spacing of 100 feet along pipeline to the Record Drawings;

925.5.3 Remove references to Gage Taps in the Isolation Valve section;

925.5.3.2 New requirement to add GPS coordinates to Record Drawings for isolation valves;

925.5.4.3 New requirement for GPS coordinates for vacuum valve pits on Record Drawings;

925.5.5.4 Corrected the buffer tank reference to Standard Detail Drawing 2167/2168;

925.5.5.5.3 Change reference from Owner to Water Authority-furnished vacuum pump and gage;

925.5.5.6 New requirement for GPS coordinates for buffer tanks on Record Drawings;

925.5.6 Addition of reference to Standard Detail Drawing 2180 Casing Detail for vacuum main or force main installation;

925.5.7 NEW Air Release Valve Installation subsection;

925.6.1 Change reference from Owner to Water Authority-furnished vacuum pump and chart recorder;

925.6.1 Change vacuum level from 24 inches of mercury to 22 inches of mercury for vacuum test;

925.6.5 Change the valve reference from division valve to isolation valve;

925.6.5 Change vacuum level from 24 inches of mercury to 22 inches of mercury for vacuum test;

925.7.1.1 Change OWNER to Water Authority as the coordination entity with Contractors for the vacuum sewer line flushing procedure;

925.7.1.1.1 Change vacuum from 24 inches of mercury to 22 inches of mercury during vacuum sewer flushing operation;

925.9.1.1 Change valve reference from division valves to isolation valves;

925.9.1.2 Inclusion of installation of electronic marking devices and warning tape to sanitary sewer force main payment section;

925.9.2.1 Change pig launcher drawing reference from “standard drawing” to “construction drawings”;

925.9.2.2 Inclusion of electronic marker device to pig launcher payment section;

925.9.4.2 Inclusion of electronic marker device to air release valve payment section;

925.9.5 Change title to ISOLATION VALVE AND VALVE BOX

925.9.5.1 Replace valve reference from “division valve and vault” to “isolation valve and valve box”;

925.9.5.2 Inclusion of electronic marker devices in payment section included items for valve and vault; Replace OWNER with Water Authority as recipient of the socket and T-handle bar and remove gage tap assembly from payment section included items for Vacuum Sewer Isolation Valve and Valve Vault;

925.9.7 Changed title to Vacuum Valve Pit in this payment section;

925.9.8.2 Replace OWNER furnished trailer with Water Authority furnished trailer in payment inclusion section;

Section 2000 Standard Detail Drawings

2000.2 Changed Title of Section No. 2100 to “Standard Details for Sanitary Sewer";

Section 2100 – STANDARD DETAILS FOR SEWER

2100 Changed Title to “STANDARD DETAILS FOR SANITARY SEWER”;
The detail drawing titles were updated to include “Sanitary Sewer” in the drawing name for drawing number 2101 through 2160;
Drawing 2107, 2128, 2170, 2181, 2182, 2183, 2184, and 2185 are new details that were added to the section;
Drawings 2110 and 2111 were moved to Section 2200 Drainage Detail Drawings;
Drawings 2151 and 2172 were removed;

2101 Changed drawing title to Sanitary Sewer Manhole Type “C”; Steps were removed; Addition of pipe size and flow direction arrows in concrete collar; Rebar is now shown in the concrete collar;

2102 Changed drawing tile to Sanitary Sewer Manhole Type “E”; Steps were removed; Addition of pipe size and flow direction arrows in concrete collar; Rebar is now shown in the concrete collar;

2107 NEW DETAIL – Sanitary Sewer Concrete Manhole Top Slab Type “C”. This detail shows the opening centered over the top of the manhole rather than the side as shown on the older detail which has been moved to the Drainage Section detail No.2212;

2109 This detail shows the new 32” sanitary sewer manhole cover in addition to the existing 24” cover;

2110 Moved to Section 2210 - Details for Drainage, Storm Manhole Frame and Covers;

2111 Detail moved to Drainage Section, Detail No. 2211 Manhole Cover Adjustment Ring;

2125 New General Note No. 2: The sanitary sewer service lateral is considered ‘private’ from the main line including the service tee to the property line and beyond. All maintenance and/or replacement is the responsibility of the property owner for which it is providing the service;

2128 NEW DETAIL – SANITARY SEWER RING AND COVER FOR VALVE BOX;

2134 EMD included in detail;

2145 EMD shown as a sphere in detail;

2150 Door change to a 3 foot square aluminum hinged door; Entry steps changed to a ladder;

2151 Detail removed: SEWER SAMPLING & METERING MANHOLE 8 FOOT DIAMETER;

2160 EMD included in detail; Pipe size and direction of flow in concrete collar are now shown in detail;

2162 Note I changed to Note J and the valve is referenced as an Isolation Valve;

2163 Vent Inlet Detail was added to the drawing;

2164 EMD is shown in the drawing as a sphere;

2165 Construction note minor cleanup;

2167 Change Construction Note E for location of vent location to be between 20 feet and 60 feet of the vacuum valve collection pit;

2168 Minor Construction Notes cleanup;

2169 Minor Construction Notes cleanup;

2170 New vacuum sewer valve boxes will be constructed from 4 foot diameter precast manhole sections with a 24” manhole frame and cover;

2171 Concrete collar modified to show collar construction detail for Paved Areas (Type A) and Unpaved Areas (Type B);

2172 Detail removed with information combined into detail 2171;

2173 EMD shown as a sphere;

2174 Minor Construction Notes cleanup;

2180 Minor Construction Notes cleanup;

2181 NEW DETAIL – Forcemain Sewer Valve Box;

2182 NEW DETAIL – Forcemain Sewer Low Pressure Sanitary Sewer;

2183 NEW DETAIL – Forcemain Sewer Connection to Gravity Sewer at Manhole;

2184 NEW DETAIL – Forcemain Sewer Typical Forcemain Configuration;

2185 NEW DETAIL – Forcemain Sewer Service Line Detail;

Section 2200 STANDARD DETAILS FOR DRAINAGE
Storm detail drawings 2208, 2209, 2210, 2211, 2212, and 2213 were added to the drawing index;

2208 Storm Manhole Type "C" – Moved from Section 2100, Detail 2101;

2209 Storm Manhole Type "E" – Moved from Section 2100, Detail 2102;

2210 Storm Manhole Frame and Covers – Moved from Section 2100, Detail 2110

2211 Storm Manhole Cover Adjustment Ring – Moved from Section 2100, Detail 2111;

2212 Storm Conc. MH Cover Type "C" – Moved from Section 2100, Detail, 2107;

2213 Storm Vertical Drop at MH – Moved from Section 2100, Detail, 2116;

Section 2300 – STANDARD DETAILS FOR WATER

2310 The 24" water manhole cover has been eliminated; A 36" water manhole is now used;

2321 NEW Detail – WATER CONCRETE ENCASEMENT DETAILS;

2322 NEW Detail – WATER STATIONARY POST DETAIL

2326 WATER VALVE BOX – Change/clarification to Construction Note A to require FIRE Ring and Cover (detail 2329) on fire line valve boxes; Rebar has been added to the concrete collar;

2328 Minor General Notes cleanup;

2334 Valve vault detail modifications to eliminate conflicts with the 36” manhole type frame and cover;

2341 NEW Detail – WATER SAMPLING STATION;

2350 Combination Air and Vacuum Release Valve detail change from a manhole type structure to a precast with removable concrete lid type structure;

2367 General Note 4 removed for optional cast iron reader lid;

2368 Remove Note requiring Asphalt Paint on meter cover; Endpoint Cap is added to the meter box cover installation; Automatic Meter Reading Touch Read hole added to specification;

Section 2400 – STANDARD DETAILS FOR PAVING

2460 Water valve concrete collar detail revised to match geometry of detail 2461; Rebar in the collar is shown;

2461 – Addition of rebar around manhole and valve concrete collar; Correction to Note D: change “PAYING” to “PAVING”

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 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, Well Collector, San Juan Chama, or other Water Authority designated lines may not be permitted from April 1 through September 30 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 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 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.

100.1 GENERAL

The contents of Section 100 pertain to materials which are common on public works construction items. For convenience selected materials in this section will be referenced in the appropriate construction activity. Materials which are incidental to only one construction activity will be defined in the activity's section.

100.2 CONTENTS

SECTION 131

CENTRIFUGALLY CAST FIBERGLASS REINFORCED POLYMER MORTAR PIPE

131.1 GENERAL

131.1.1 The design, materials, manufacture, testing, and construction requirements of the centrifugally cast fiberglass reinforced polymer mortar pipe in sizes of 18-inch through 96-inch with gasketed bell and spigot joints shall conform to this specification.

131.1.2 The piping for sliplining and/or direct-bury applications supplied in compliance with this section shall be listed on the Water Authority Approved Products List.

131.1.3 The piping shall be in accordance with the latest edition of ASTM D 3262, Standard Specification for Glass-Fiber-Reinforced-Thermosetting-Resin Sewer Pipe; and all applicable sections of AWWA C950: Fiberglass Pressure Pipe.

131.1.4 The pipe shall consist of interior surface, interior layer and an exterior surface. The resins, reinforcing materials, and fillers materials, when combined as a composite structure, shall produce a pipe which meet or exceed the service and design conditions specified.

131.1.5 The interior surface of the pipe shall be a resin rich finish, 40 mils thick minimum, of epoxy, polyester or vinylester resin with no fillers and shall be free of cracks and crazing when placed under the design loading.

131.1.6 The interior and exterior layers of the pipe shall be composed of resin impregnated glass fibers and silica sand fillers in layers.

131.2 REFERENCES

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

C33 Specification for Concrete Aggregates

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

D3262 Specification for Fiberglass Sewer Pipe

D3681 Test Method for Chemical Resistance of Fiberglass (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe in Deflected Condition

D4161 Specification for Fiberglass (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe Joints Using Flexible Elastomeric Seals

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

131.2.2 American Water Works Association (Latest Edition) (AWWA)

C950 Fiberglass Pressure Pipe

131.2.3 THIS PUBLICATION

SECTION 900 SANITARY AND STORM SEWER FACILITIES

SECTION 1502 SUBMITTALS

131.3 MATERIALS:
The centrifugally cast fiberglass liner shall conform to ASTM D 3262, Type 1, Liner 2, Grade 3. The pipe shall also meet the strain corrosion resistance requirements of ASTM D 3681 and joint requirements of ASTM D 4161. Certified test data proving conformance with specifications shall be required from the pipe manufacturer and submitted to the ENGINEER.

131.3.1 Resin Systems:
The manufacturer shall use a thermosetting polyester resin system with a minimum tensile elongation of 2 percent.

131.3.2 Glass Reinforcements:
The reinforcing glass fibers used to manufacture the components shall be commercial grade of E-type glass filaments with binder and sizing compatible with impregnating resins.

131.3.3 Fillers:
Sand shall be in accordance with ASTM C 33 and shall be a minimum 98% silica, kiln-dried and graded, with a maximum moisture content of 0.2%.

131.3.4 Fittings:
Flanges, elbows, reducers, tees, wyes, laterals, and other fittings shall be capable of withstanding all operating conditions when installed. Fittings may be contact molded or manufactured from mitered sections of pipe joined by glass-fiber reinforced overlays.

131.4 JOINING SYSTEM
The CCFRPM pipe shall be field connected with low profile or flush gasketed fiberglass bell and spigot joints meeting the performance requirements of ASTM D 4161. An O-ring type elastomeric gasket meeting the requirements of ASTM F 477 shall be used to provide a positive leak proof sealing system at each pipe joint. Maximum allowable joint angular deflection shall be 1.0 degrees.

131.5 PIPE LENGTHS
Pipe shall be supplied in nominal lengths of 20 feet. Where radius curves in the existing pipe or limitations in the entry pipe dimensions restrict the pipe to shorter lengths, nominal

sections of 10 feet or other even divisions of 20 feet shall be used.

131.6 PIPE STIFFNESS
The CCFRPM pipe produced shall have a minimum pipe stiffness of 46 psi at 5% deflection as set forth in ASTM D 2412.

131.7 CERTIFICATIONS

131.7.1 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.

131.7.2 Certifications of the materials shall include the cell classification, grades, type of resins, glass fibers, and all other materials used in the manufacturing of the pipe.

131.7.3 Pipe certification shall include calculations with parameter listing, formulas, and all other data which are necessary for the pipe design. Calculations submitted shall use a design temperature of 80°F and shall include, but not be limited to; soil loads, live loads, hydrostatic loads, pipe stiffness, Standard Dimension Ratio, pipe wall crushing strength, initial and long term (50 years) values of pipe deflection including grout load deflection, pipe bonding strain, hydrostatic collapse resistance, constrained buckling strength, and allowable jacking force and length.

131.7.3.1 The CONTRACTOR shall submit the liner pipe manufacturer's details of the pushing or pulling heads to be used.

131.7.4 Certifications shall include drawings showing the cross sectional profile of the pipe wall and pipe joint details.

131.7.5 The manufacturer of pipe and fittings must demonstrate a ten-year minimum history of successful installations in the United States for direct-bury and slip line rehabilitation of sanitary sewers.

131.8 PIPE QUALIFICATION AND PRE INSTALLATION INSPECTION: Pipes shall be inspected by the OWNER or ENGINEER for damage prior to installation.

131.8.1 If pipe is found to be superficially damaged by cracks, holes, delaminations, foreign inclusions, blisters, or other defects that would, due to their nature, degree, or extent, have a deleterious effect on the pipe performance as determined by the ENGINEER; the ENGINEER may reject the pipe or may allow the pipe to be repaired. Rejected pipe shall be replaced with a new section of pipe at no additional cost to the OWNER.

131.10 INSTALLATION

131.10.1 Liner Pipe Installation Plan and Procedures: The CONTRACTOR shall prepare and submit, for review and approval a minimum of 30 working days prior to commencing work, the plan with procedures, and the locations of insertion/access pits. The pits shall be located such that their total number shall be minimized, and the footage of liner pipe installed in a single push shall be maximized. As directed by the OWNER, insertion pits shall be located where obstructions or damaged pipe are planned to be removed.

131.10.2 LINER PIPE INSERTION

131.10.2.1 The existing sewer shall remain in operation during the relining process.

131.10.2.2 Obstructions such as roots, hanging gaskets, special duct and grout invert, large joint offsets, rocks or other debris, that would prevent passage or damage to the liner sections shall be removed or repaired prior to installing the liner.

131.10.2.3 After completing the insertion pit excavation, the top of the existing sanitary sewer interceptor shall be removed, where required, down to the spring line. Bumpers shall be provided in the insertion pit in order to prevent the edges of the existing pipe from damaging the outside of the liner as it is inserted into the existing sewer.

131.10.2.4 The liner shall be inserted into the existing sewer spigot end first with the bell end trailing.

131.10.2.4 The pushing force shall be applied to the pipe wall end inside of the bell in accordance with the manufacturer's printed instructions. No jacking load shall be applied to the end of the bell. The installation heads or mechanism shall incorporate a gauging system which shall provide a continuous monitor of the force being applied during liner insertion operations.

131.10.2.4.1 If the gauging system does not provide a direct reading of the force being applied to the pipe in pounds, the system shall be calibrated and such calibrated data shall be tabulated in written form to allow the ENGINEER to readily determine the force in pounds being applied to the pipe during the insertion operation.

131.10.2.4.2 The insertion force used by the CONTRACTOR shall not exceed the liner pipe manufacturer's recommended maximum allowable pulling or pushing force that can be exerted on the pipe without damaging integrity of the liner pipe or pipe joints.

131.10.2.4.3 Maximum allowable joint angular deflection shall be 1.0 degree.

131.10.2.5 For manholes where no point of intersection occurs in the manhole, the interceptor liner shall be inserted through the manholes with no pipe joints in the manhole. For manholes where points of intersection occur in the manhole, the interceptor liner shall be terminated and sealed.

131.10.3 DIRECT-BURY PIPE:
Direct-bury pipe installation and testing shall be in accordance with Section 901.

131.11 MEASUREMENT AND PAYMENT

131.11.1 Payment for pipe liner or direct-bury pipe shall be measured and paid for at the contract unit price as specified in Section 900 or as defined in the Bid Proposal.

131.11.2 The payment shall include all labor, materials, tools, equipment, and performance all of the work involved in furnishing, installing, testing, and incidentals required to complete the installation, as specified in the construction drawings.

131.11.2.1 Modification of the pipe thickness or other properties to meet varying site conditions shall be incidental to the bid amount.

131.11.3 Measurement and payment for obstruction removal by remote device or by excavation, reconnecting sewer services, abandonment of sewer service, insertion and access pits, backfill, paving replacement, clamps and encasement, sealing the liner at the manhole, and grouting of the annular space shall be defined in the Bid Proposal.

131.11.4 Measurement and payment for sewer line cleaning shall be as specified in the Bid Proposal unless otherwise stated in the bid documents.

131.11.5 Measurement and payment for sewer line inspection by CCTV shall be considered incidental unless otherwise stated in the bid documents.

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, wyes or deflections (points of curvature).

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 pipe deflections and bends, 11 ¼ -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.

170.4.1.9.6 On runs of main line, the maximum spacing between EMDs shall be 100 feet.

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 pipe deflections and bends 11 ¼ -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.

170.4.2.8 On runs of main line, the maximum spacing between EMDs shall be 100 feet.

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 900

SANITARY AND STORM SEWER FACILITIES

900.1 GENERAL: This section pertains to the collection and conveyance facilities for sewage and storm runoff in underground piping systems.

900.2 CONTENTS

SECTION 901

SANITARY SEWER COLLECTOR AND INTERCEPTOR FACILITIES

901.1 GENERAL:
The construction items, specified in this section, are common to sanitary sewer collector and interceptor facilities.

901.2 REFERENCES

901.2.1 ASTM

D 2321 Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications

D 3034 Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings

F 679 Standard Specification for Poly (Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings

F 794 Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter

901.2.2 (intentionally left blank)

901.2.3 This publication per SECTIONS:
121 Plastic Pipe
131 Fiberglass Pipe
701 Trenching, Excavation and Backfill

901.3 MATERIALS

901.3.1 PIPE:
Sewer line pipe and fittings shall be as specified in other sections, as follows:

Section 121	Plastic Pipe
Section 131	Fiberglass Pipe

901.4CERTIFICATION:
The OWNER / ENGINEER will be supplied with a certification on each item or type of material required in the sewer line, as to that item meeting the specifications and / or the reference specifications before that item is installed.

901.5 INSTALLATION

901.5.1 GENERAL

901.5.1.1 Pipe and appurtenances shall be new and unused. The type of pipe to be installed shall be as approved by these specifications or unless otherwise shown on the project construction drawings. Pipe and appurtenances shall be handled in such a manner as to ensure delivery to the trench in sound, undamaged condition. Particular care shall be taken to prevent damage to any pipe coating.

901.5.1.2 The interior of the pipe shall be thoroughly cleaned of foreign material before being lowered into the trench and shall be kept clean during construction operations. When work is not in progress, the open ends of pipe shall be securely closed so that no foreign materials will enter the pipe. Any section of pipe found to be defective before or after installation, shall be replaced with sound pipe, or repaired in a manner satisfactory to the ENGINEER, without additional expense to the OWNER.

901.5.1.3 The CONTRACTOR shall install a plug in the new sewer at any point of connection to an existing system. The CONTRACTOR shall not flush or otherwise discharge any flow into an existing system unless approved in writing by the ENGINEER and Water Authority.

901.5.1.3.1 The plug shall remain in place until the ENGINEER or Water Authority authorizes its removal in writing. Under all circumstances, the CONTRACTOR shall be required to remove all plugs prior to acceptance of the work.

901.5.1.3.2 The CONTRACTOR shall certify in writing the completion of the plug removal task. The certification shall include the locations of removed plugs and corresponding date of removal. The Water Authority assumes no liability for damages caused by plugs inadvertently left in the line by the Contractor.

901.5.1.4 Pipe shall be laid to line and grade as shown on the project construction plans. The bedding of the trench shall be graded and prepared to provide a firm and uniform bearing throughout the entire length of the pipe barrel. Suitable excavation shall be made to receive the bell of the pipe and the joint shall not bear upon the bottom of the trench. All adjustment to the line and grade shall be made by scraping away or filling in with pipe zone material under the body of the pipe, and not by wedging or blocking. When connections are to be made to any existing manhole, pipe, or other improvement, the actual elevation or position of which cannot be determined without excavation, the CONTRACTOR shall excavate for and expose the existing improvement before laying the connecting pipe or conduit. When existing underground improvements may reasonably be expected to conflict with the line or grade established for the new sewer line, the ENGINEER shall request the CONTRACTOR to excavate as necessary to expose and locate such potentially conflicting underground improvements prior to laying the new pipe. Any adjustment in line or grade which may be necessary to accomplish the intent of the construction plans will be made, and the CONTRACTOR will be paid for any additional work resulting from such change in line or grade in the manner provided for in the General Conditions.

901.5.1.5 Connections to existing sanitary sewer manholes shall be made by core drilling through the

manhole wall. The CONTRACTOR shall take care to avoid unnecessary damage to the existing manhole.

901.5.1.6 Pipe shall be laid upgrade in a continuous operation from structure to structure, with the bell end of the pipe upgrade unless otherwise permitted by the ENGINEER.

901.5.1.7 Sanitary sewer mains shall not be constructed under walkways, sidewalks, curbs and gutters, drive pads, or similar concrete structures by tunneling underneath them. The CONTRACTOR will remove the section of the concrete structure to the nearest full expansion joint or edge.

901.5.1.8 Prior to completely backfilling the sewer excavation, install a green metalized detectable warning tape 12" to 18" below finished grade. The tape shall be detectable with a standard metal pipe locator. The tape shall be a minimum of 2 inches wide and inscribed at 10-foot intervals with the words, "CAUTION BURIED SEWER LINE BELOW". The tape shall be constructed of material that is impervious to alkalis, acids, chemical reagents, and solvents found in the soils.

901.5.2 PLASTIC PIPE INSTALLATION:

901.5.2.1 Plastic sewer pipe shall be connected and placed in the trench in accordance with the manufacturer's recommendations. Where a conflict arises with this Specification, this Specification shall control. Trenching, embedment, and backfill shall be as specified in Section 701.

901.5.2.2 The reference mark (a distinct circumferential line) is placed on the pipe's spigot end by the manufacturer to indicate the correct depth of spigot penetration into the pipe gasket joint. If the pipe is seated too deep or too shallow, the pipe may buckle or separate due to thermal expansion / contraction. Spigot penetration shall be within ¼-inch of the manufacturer's recommended mark.

901.5.2.3 For plastic or fiberglass pipe connection to manholes the CONTRACTOR shall install an appropriately sized and approved press seal gasket. The gasket shall be installed per manufacturer's directions. No direct payment shall be made for this item. This cost shall be incidental to the pipe's bid item.

901.5.2.4 Not less than thirty (30) days after the installation and backfilling of plastic or fiberglass sewers, including any service connections, the CONTRACTOR shall, in the presence of the ENGINEER, test deflection of the pipe with a mandrel. The mandrel shall be hand pulled. All pipe with deflections in excess of five (5) percent of the base internal diameter, as determined by ASTM D 3034, ASTM F 679, or ASTM F 794 shall be excavated, re-rounded, backfilled and retested after an additional period of at least thirty (30) days. Mandrels shall have nine (9) ribs and be only hand pulled through the test section. The CONTRACTOR shall furnish the mandrels. The length of the minimum radius portion of the mandrel shall not be less than the one-third (1/3) of the nominal diameter of the pipe tested. The minimum mandrel diameter shall be no less than ninety (90) percent of the pipe inside diameter. The pipe shall be flushed and cleaned by the CONTRACTOR prior to testing. No flow will be permitted in the pipe while testing for deflections.

901.5.2.5 All expense for trenching, backfill, compaction, paving, and related work that is required because of failure to meet deflection test requirements shall be borne by the CONTRACTOR.

901.5.2.6 Acceptance of plastic pipe or fiberglass pipe sewers will be made only after these deflection test requirements have been met.

901.5.2.7 Minimum Diameters of Mandrels

901.5.2.7.1

Nominal Pipe Size Diameter	Min. Mandrel
8 in.	7.28 in.
10 in.	9.08 in.
12 in.	10.80 in.
15 in.	13.20 in.
18 in.	16.13 in.
21 in.	19.00 in.
24 in.	21.36 in.
27 in.	24.07 in.

901.6 JOINTS FOR PIPE

901.6.1 (deleted section)

901.6.2 (deleted section)

901.6.3 JOINT FOR PLASTIC SEWER PIPE (PVC):

901.6.3.1 Refer to ASTM D 2321 and ASTM F 794 for pipe laying and joining of pipe guidelines.

901.6.3.2 Prior to the laying of pipe, each pipe component shall be inspected for damage and cleaned. Damaged components shall be rejected or repaired.

901.6.3.3 All joints will be assembled in accordance with manufacturer's published recommendations. If a lubricant is required to facilitate assembly, it shall have no detrimental effect on the gasket

or on the pipe when subjected to prolonged exposure. Proper jointing may be verified by rotation of the spigot by hand or with a strap wrench. If unusual joining resistance is encountered or if the insertion mark does not reach the flush position, disassemble the joint components and repeat the assembly steps. Note that fitting bells may permit less insertion depth than pipe bells. When mechanical equipment is used to assemble joints, care should be taken to prevent over insertion.

901.6.4 JOINT FOR FIBERGLASS PIPE

901.6.4.1 All joints shall be as specified in Section 131 FIBERGLASS PIPE

901.7 TESTING FOR LEAKAGE

901.7.1 GENERAL:

901.7.1.1 Unless otherwise shown on the construction drawings or specifically deleted by the ENGINEER, in writing, all sanitary sewers shall be tested for leakage.

901.7.1.2 The CONTRACTOR may Air Test the sanitary sewer line before backfilling the trench to aid the CONTRACTOR in checking the installation for any defects. Such testing is at the option of the CONTRACTOR and shall not constitute an acceptance test under these specifications.

901.7.1.3 The test for acceptance and compliance with these specifications shall be performed after the pipe zone backfilling has been completed. In the case of new sanitary sewer lines with house laterals included as an integral part of the project, the test for acceptance and compliance with these specifications shall be performed after the house laterals or stubs have been completed and backfilled. The CONTRACTOR has the option to leave the end of the service line exposed.

901.7.1.4 If the leakage, as shown by the test, is greater than allowed by these specifications, the pipe shall be overhauled at the CONTRACTOR's expense and, if necessary, re-laid until the pipe will satisfactorily pass the test.

901.7.1.5 The CONTRACTOR shall, at no additional expense to the OWNER, furnish all water, material, tools and labor for performing the required tests. All tests shall be made under observation of the ENGINEER.

901.7.2 INFILTRATION TEST:

901.7.2.1 An Infiltration Test shall be used only when excessive ground water prevents satisfactory testing by either the Exfiltration Test or the Air Test. In addition, the Infiltration Test must be performed after backfilling, before any service connections are functioning and at a time when the ground water is over the entire section of pipe and at or near its maximum level.

901.7.2.2 The procedure for conducting an Infiltration Test shall be as follows:

901.7.2.2.1 The pipe section shall be cleaned.

901.7.2.2.2 Determine the groundwater table. The groundwater table shall be determined for each section of sanitary sewer tested.

901.7.2.2.3 Plug the upstream pipe outlet from upstream manhole of the sections being tested with a plug which will assure a tight seal against flow from the upstream portion of the sewer system. Also plug all house laterals and any other connections to the section being tested.

901.7.2.2.4 Install a 90-degree V-notch weir in the downstream manhole of the section being tested. Weir must be installed plumb and sealed to the pipe wall surface.

901.7.2.2.5 A sufficient period of time must be allowed to permit the infiltrated waters to collect and flow over the weir. Water shall flow over the weir for at least 30-minutes prior to taking measurements.

901.7.2.2.6 The head (H) of water flowing over the weir must be measured accurately and the measurement taken at least 18-inches upstream from the crest of the weir.

901.7.2.2.7 Discharge over the 90-degree V-notch weir shall be calculated according to:

$$Q = 3240\ H^{2.5}$$

H = Head in inches
Q = Discharge in gallons per day

901.7.2.3 The allowable infiltration shall be 200-gallons per inch of pipe diameter per mile of pipe per day. When there is significantly more than two feet of groundwater above the top of the pipe at the highest point of the section being tested, ten percent additional infiltration above the permitted 200 gal/in.-dia/mi/day limit will be allowed for every 2-foot of additional head.

901.7.2.4 Under all circumstances, the CONTRACTOR shall be required to remove all plugs prior to acceptance of the work. The Water Authority assumes no liability for damages caused by plugs inadvertently left in the line by the Contractor. The CONTRACTOR shall certify in writing to the Water Authority the completion of the plug removal task. The certification shall include the locations of removed plugs and corresponding date of removal.

901.7.3 EXFILTRATION TEST

901.7.3.1 An Exfiltration Test may be conducted wherever the groundwater level is below the crown of the pipe at the highest elevation of the section of sanitary sewer being tested. If the groundwater level is above the crown of the pipe either the Air Test, properly adjusted, or Infiltration Test should be used.

901.7.3.2 The procedure for conducting an Exfiltration Test shall be as follows:

901.7.3.2.1 The pipe section shall be cleaned.

901.7.3.2.2 Plug the downstream pipe outlet to the manhole with a plug which will assure a tight seal against water leakage. Also plug all house laterals and any other connections to the section being tested.

901.7.3.2.3 If the upstream manhole is to be used as a reservoir for maintaining the pressure head on the sewer pipe, the inlet sewer pipe of pipes must be plugged. If a standpipe is to be used as a reservoir for maintaining the pressure head on the sewer pipe, the standpipe must be connected to the sewer pipe in the upstream manhole by a tightly sealed connection.

901.7.3.2.4 The amount of water (volume required to fill the section of sewer under test plus the manhole or standpipe) shall be calculated.

901.7.3.2.5 Water shall then be introduced through the manhole or standpipe. The amount of water introduced shall be metered. The amount of water introduced to fill the sewer should be approximately equal to the calculated amount. If the amount of water required to fill the sewer pipe is significantly greater than the calculated amount, it is an indication of a leak or leaks and consequent saturation of the backfill around the sewer pipe. Saturation of the backfill will invalidate the test.

901.7.3.2.6 The level of water in the manhole or standpipe shall be at least two feet above the crown of the pipe at the highest section of the section of sanitary sewer being tested.

901.7.3.2.7 After filling the pipe at least one hour shall be allowed for water absorption in the pipe. For some materials, up to six hours may be required. After the absorption period, the manhole or standpipe shall be refilled to the established measuring mark and the test begun.

901.7.3.2.8 If the upstream manhole is used as a reservoir for maintaining the pressure head on the sewer pipe, the difference in water surface elevation from original to final level in a two hour period shall be used to calculate the water lost. The water lost in the two hour period shall be converted into gallons per day. If a standpipe is used as a reservoir for maintaining the pressure head on the sewer pipe, the standpipe shall be refilled periodically during the two hour test period to maintain an essentially constant head on the test section of pipe. The amount of water added shall be measured and shall be used to calculate the loss in gallons per day.

901.7.3.2.9 The allowable exfiltration shall be computed based upon the average pressure head above the crown of the pipe for the section tested as follows:

$$\text{Allowable leakage} = \frac{\sqrt{h}}{\sqrt{3}} \times 200$$

Allowable leakage in gallons per inch of pipe diameter per mile of pipe per day

h = average pressure head above the crown of the pipe, in feet (elevation of water at center run)

901.7.3.2.10 When the upstream manhole is used as a reservoir for maintaining the pressure head, the allowable leakage from the manhole shall be added to the allowable leakage calculated for the sewer pipe.

901.7.3.3 If the sanitary sewer line fails to pass the Exfiltration Test, a re-test shall be permitted only after the groundwater conditions surrounding the pipe return to a condition similar to those existent at the beginning of the test period. The groundwater elevation shall be determined prior to initiation of a second test.

901.7.3.4 Under all circumstances, the CONTRACTOR shall be required to remove all plugs prior to acceptance of the work. The Water Authority assumes no liability for damages caused by plugs inadvertently left in the line by the Contractor. The CONTRACTOR shall certify in writing to the Water Authority the completion of the plug removal task. The certification shall include the locations of removed plugs and corresponding date of removal.

901.7.4 AIR TEST:

901.7.4.1 An Air Test may be conducted under all conditions of groundwater levels surrounding the sanitary sewer pipe. If the groundwater is above the crown of the pipe, the air pressure shall be increased by an increment equal to the pressure exerted by the groundwater over the pipe.

901.7.4.2 The procedure for conducting an Air Test shall be as follows:

901.7.4.2.1 Clean the pipe section (manhole to manhole reach of sewer) being tested by propelling a snug-fitting inflated ball, or other adequate method, through the pipe with water. It is important that the pipe is thoroughly wetted if consistent results are to be expected.

901.7.4.2.2 Plug all pipe outlets with pneumatic plugs. The pneumatic plugs shall be able to resist internal testing pressures without requiring external bracing. Give special attention to house laterals.

901.7.4.2.3 Determine the groundwater level surrounding the section of sewer under test. If the groundwater level is above the crown of the pipe, the test pressures shall be increased by 0.43 psig for each foot of water above the average elevation of the crown of the pipe. If the average vertical height of groundwater above the pipe invert is more than 12.7 feet, the section so submerged shall be tested using 9.0 psig as the starting test pressure. In no case should the starting test pressure exceed 9 psig.

901.7.4.2.4 Introduce air slowly to the section of pipe under evaluation until the internal air pressure is raised to 4.0 psig plus any increase required by a high groundwater level.

901.7.4.2.5 Allow the air pressure to stabilize. Air may be added slowly to maintain a pressure in the 3.5 to 4.0 psig (plus groundwater allowance) for two minutes.

901.7.4.2.6 After the stabilization period, when the pressure reaches exactly 3.5 psig (plus groundwater allowance) the stopwatch is started and when the pressure reaches exactly 2.5 psig (plus groundwater allowance) the stopwatch is stopped.

901.7.4.2.7 If the time required for a one pound pressure drop is not less than the allowable time for the pipe section under test to lose air, the section shall pass the leakage test.

901.7.4.2.8 If there has been no leakage (zero psi drop) after one hour of testing, the test section shall pass the leakage test.

901.7.4.3 In all cases where an Air Test is conducted, the manholes shall be tested separately as previously specified.

901.7.4.4 All persons conducting an Air Test must be aware that an Air Test may be dangerous if improperly conducted. It is extremely important and essential that all plugs be properly installed and braced by the CONTRACTOR in such a way that blowouts are prevented.

901.7.4.5 Under all circumstances, the CONTRACTOR shall be required to remove all plugs prior to acceptance of the work. The Water Authority assumes no liability for damages caused by plugs inadvertently left in the line by the Contractor. The CONTRACTOR shall certify in writing to the Water Authority the completion of the plug removal task. The certification shall include the locations of removed plugs and corresponding date of removal.

901.7.5 AIR TESTING TABLE: Table 901.7.5.1 will be used to determine the required test duration for the section of line being tested.

TABLE 901.7.5.1
LOW-PRESSURE AIR TEST TIME SPECIFICATION
FOR A NON-PRESSURE SEWER LINE

(A)	(B)	(C)	(D)	(E)							
Pipe Diameter (inches)	Minimum Time (min:sec)	Maximum Length for Minimum Time (feet)	Time for Longer Length (seconds)	Specification Time for Length (L) Shown (min:sec)							
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft
4	3:46	597	.38*L	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	398	.854*L	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8	7:34	298	1.52*L	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24
10	9:26	239	2.374*L	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48
12	11:20	199	3.418*L	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38
15	14:10	159	5.342*L	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04
18	17:00	133	7.692*L	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41
21	19:50	114	10.47*L	19:50	26:10	34:54	43:37	52:21	61:00	69:48	78:31
24	22:40	99	13.674*L	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33
27	25:30	88	17.306*L	28:51	43:16	57:41	72:07	86:32	100:57	115:22	129:48
30	28:20	80	21.366*L	35:37	53:25	71:13	89:02	106:50	124:38	142:26	160:15
33	31:10	72	25.852*L	43:05	64:38	86:10	107:43	129:16	150:43	172:21	193:53
36	34:00	66	30.768*L	51:17	76:55	102:34	128:12	153:50	179:29	205:07	230:46
42	39:48	57	41.883*L	69:48	104:42	139:37	174:30	209:24	244:19	279:13	314:07
48	45:34	50	54.705*L	91:10	136:45	182:21	227:55	273:31	319:06	364:42	410:17
54	51:02	44	69.236*L	115:24	173:05	230:47	228:29	346:11	403:53	461:34	519:16
60	56:40	40	85.476*L	142:28	213:41	284:55	356:09	427:23	498:37	569:50	641:04

901.7.5.2 EXPLANATION AND USE OF TABLE

Explanation of Tables

Column A — Nominal diameter of pipe (any pipe material)

Column B — Minimum duration of air test up to a maximum of length of line being tested -
(e.g., 0-feet through 298-feet of 8-inch PVC:
Test Duration: 7 minutes 34 seconds)

Column C — Maximum length of line associated with minimum duration of time for the air test shown in Column B

Column D of air test — L = length of line in feet; product of computation yields duration

(e.g., 250-feet of 12-inch PVC where ground water is not present)

Test Duration—3.418 * (250) = 854.5 sec. = 14 min. 15 sec.

Column E — Duration of air test for given incremental lengths of line.

901.8 CLEANING AND INSPECTION

901.8.1 CLEANING:
No pipe spalls, rocks, dirt, joint compounds, cement mortar and other trash or obstructions shall be left in a sewer pipe of any size or type. During the flushing operations the manhole outlet shall be bagged or plugged so that debris will not be carried into or contaminate an existing or active line.

901.8.1.1 Under all circumstances, the CONTRACTOR shall be required to remove all plugs prior to acceptance of the work. The Water Authority assumes no liability for damages caused by plugs inadvertently left in the line by the Contractor. The CONTRACTOR shall certify in writing to the Water Authority the completion of the plug removal task. The certification shall include the locations of removed plugs and corresponding date of removal.

901.8.2 TELEVISION:

901.8.2.1 All completed sewer lines shall be inspected by a television camera before lines become operational or final acceptance of the installation.

901.8.2.2 After the CONTRACTOR has cleaned, flushed, and retrieved all debris and plugs in the line, the CONTRACTOR will notify the project engineer that the line is ready for television inspection. The CONTRACTOR in the presence of the ENGINEER or the engineer's representative shall televise the line with televising equipment specifically designed and constructed for sewer line visual inspection.

901.8.2.2.1 The television camera shall be of color and equipped with a rotating lens capable of 360-degree rotation with zoom focus and a wide-angle optical lens permitting spontaneous focal adjustments, allowing viewing of service lateral connections, joints, pipe walls, etc.

901.8.2.2.2 A television report log, completed on the OWNER'S log form, shall be maintained during the television inspection. This log shall be completed to the OWNER'S satisfaction noting the location, project title, name of OWNER, date, type of pipe material, line size, location of services (live or stub-outs), manhole or station numbers, and any abnormal or line defects within the line segment.

901.8.2.2.3 The CONTRACTOR shall be responsible for subsequent televising when line repairs are required or when the previous televising is not satisfactory to the OWNER.

901.8.2.3 When the televising is complete, the CONTRACTOR shall turn over the complete television report logs and the recordings in a format acceptable to the Water Authority.

901.9 MEASUREMENT AND PAYMENT

901.9.1 SANITARY SEWER PIPE: Installed pipe shall be measured and paid for as follows:

901.9.1.1 For straight lines, the pipe length shall be the intervening distance between the centers of manholes along a line parallel to the pipe invert.

901.9.1.2 For curvilinear lines, the pipe length shall be the intervening arc distance between the centers of manholes along a line parallel to the pipe invert.

901.9.1.3 Payment for pipe will be in accordance with the unit price per linear foot per size and material as defined in the Bid Proposal, and shall include: pipe installed in the trench, jointing and coupling materials, and other materials necessary to connect to other sections of pipe, manholes, and other appurtenances.

901.9.2 CONNECTIONS: Connections, tying new sewer lines into existing manholes, shall be measured and paid for on a unit price per each within the size increments as specified in the Bid Proposal. Connections to the shelf section of the floor will not be considered for payment.

901.9.3 VERTICAL DROPS: Vertical drops at manholes shall be measured by the linear foot of pipe from the invert of the sewer line to be dropped to the spring line of the receiving main. Payment will be made on the unit price per linear foot per size and type of pipe as specified in the Bid Proposal.

901.9.4 TESTING:

901.9.4.1 Infiltration, exfiltration, and air tests of sewer mains shall include sewer service lines to the property lines or right-of-way lines as installed per the construction plans. No payment will be made for the initial test or subsequent tests.

901.9.4.2 Television inspection and documentation is considered incidental and shall be included in the construction item's unit cost unless otherwise specified in the Bid Proposal.

901.9.4.3 There will be no payment for required testing of sanitary sewer manholes.

901.9.4.4 No payment will be made for deflection tests after the required waiting period for PVC sewer pipe installations.

901.9.5 REMOVAL AND DISPOSAL OF SANITARY SEWER PIPE: Removal and disposal of sanitary sewer lines shall be measured by the linear foot within the specified pipe size increments. Payment will be made on

the unit price per linear foot of specified pipe size in the Bid Proposal. Trenching, backfilling, and pavement removal and replacement will be paid for based on the unit prices for each appropriate bid item in the Bid Proposal. If new pipe is to be installed in the same trench as the removed pipe, only one payment will be made for trenching backfilling, and pavement removal and replacement.

SECTION 905

SANITARY SEWER SERVICE LINES

905.1 GENERAL

905.1.1 The requirements of this section apply only to sanitary sewer service lines installed or reconnected within the public right-of-way or easement. Although the maintenance of sanitary sewer lines is the responsibility of the property owner, including the portion within the public right-of-way as established by City Ordinance, the CONTRACTOR shall be responsible for the integrity of the installation or reconnection of all sanitary sewer service lines during the warranty period.

905.1.2 Sanitary sewer service lines shall be installed at all locations shown on the construction plans. The CONTRACTOR shall be aware of the importance of accurately recording coordinate horizontal and vertical locations of sanitary sewer service lines.

905.2 REFERENCES

905.2.1 ASTM:

A 74 Standard Specification for Cast Iron Soil Pipe and Fittings

D 1557 Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort

D 2661 Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe and Fittings

D 2665 Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings

905.2.2 This publication:

SECTION 170 Electronic Marker Devices

SECTION 701 Trenching, Excavation and Backfill

905.3 MATERIALS

905.3.1 Materials to be utilized on the project shall be those listed in the current Water Authority Approved Products List. All materials not listed must be submitted to the ENGINEER for approval no less than thirty (30) calendar days prior to the proposed date of use.

905.3.2 The CONTRACTOR shall be responsible for assuring that the supplied saddle is compatible with the size and type of both the collection line and service line. Saddles shall be so constructed to have a positive stop to prevent service line from protruding into the main.
905.3.2.1 A 2½-inch wide strap will be required when saddle is attached to the collector line.

905.3.3 Materials to be utilized in the connection of sanitary sewer services to manholes shall be those listed in the current Water Authority Approved Products List. Manhole connections shall only be allowed if shown on the construction plans or approved by the ENGINEER.

905.3.4 Service risers, if required, shall be PVC Schedule 40 pipe conforming to ASTM D 2665, cast iron soil pipe (service weight) conforming to ASTM A 74, or ABS Schedule 40 sewer pipe conforming to ASTM D 2661. Only PVC or ABS shall be used when connecting to flexible pipe.

905.3.5 Fittings shall be compatible with the service line material. PVC or ABS fittings shall be schedule 40 injection molded only.

905.3.6 Service line laterals shall be cast iron soil pipe (service weight), PVC Schedule 40, or ABS Schedule 40.

905.4 INSTALLATION
(NEW CONSTRUCTION STUB-OUTS)

905.4.1 Service lines shall be installed to the right-of-way line or 5-feet beyond any existing or proposed improvements (i.e., pavement, curb and gutter, sidewalk, etc.).

905.4.2 Saddle connections shall be installed at a 45-degree angle (upward) above the springline of the main sewer and shall be spaced a minimum of 3 feet apart (centerline to centerline).

905.4.3 Service lines shall be installed at a minimum slope of 2 percent with a minimum bury at the terminus of 4 feet, unless otherwise authorized by the ENGINEER. The pipe shall be placed on suitable bedding having a soil compaction density of not less than 95 percent of maximum density, as determined by ASTM D 1557. The pipe shall be uniformly supported by the bedding. Backfill of the service line shall be carefully placed and compacted per the requirements of Section 701.

905.4.4 The terminus of the service line shall be plugged with an end cap compatible with the pipe size and material. An electronic marker device shall be placed above the service tap at the main and over the end of the service line at the property line per Section 170. An “S” (3 inches high and ¼ inch depth) shall be stamped or saw-cut into top of the curb surface directly over the service.

905.4.5 RECORD INFORMATION:
The CONTRACTOR shall provide coordinates, accurate to within 0.3 feet, determined from a field survey by a Professional Surveyor, licensed in the state of New Mexico, to the ENGINEER regarding the horizontal and vertical location of the service at the connection point to the public sewer collector line. Use the NAD 1983 NM STATE PLANE CENTRAL ZONE for x and y coordinates and

NAVD 1988 for z coordinate. A report certified by the licensed Professional Surveyor shall be referenced on the Record Drawings.

905.5 RISERS

905.5.1 Risers shall be utilized where the sewer main is 15-feet or greater in depth. The riser shall extend to an elevation such that the service line can be installed as specified in Subsection 905.4.3.

905.5.2 The riser shall be installed in accordance with the Standard Detail Drawings. The riser shall be one length of pipe cut to the appropriate length as necessary, unless otherwise approved by the ENGINEER.

905.5.3 RECORD INFORMATION:
The CONTRACTOR shall provide coordinates, accurate to within 0.3 feet, determined by a field survey by a Professional Surveyor, licensed in the state of New Mexico, to the ENGINEER regarding the horizontal and vertical location of the service. Coordinates shall be provided at the service tee and at the top elbow of the riser on the service. Use the NAD 1983 NM STATE PLANE CENTRAL ZONE for x and y coordinates and NAVD 1988 for z coordinate. A report certified by the licensed Professional Surveyor shall be referenced on the Record Drawings.

905.6 SERVICE RECONNECTIONS

905.6.1 On replacement/rehabilitation type projects, all existing services shall be reconnected to the new sewer main utilizing new saddles and service line pipe, except for Cured-In-Place rehabilitations. The length of removed existing service line shall be as necessary to accommodate the trench excavation and backfill conditions.

905.6.2 The CONTRACTOR shall visually assess the condition of the existing service line and notify the ENGINEER of any obviously deteriorated or defective conditions. The ENGINEER or CONTRACTOR shall notify the property owner of the situation and the property owner shall be given the opportunity to visually assess the service within a reasonable amount of time as dictated by normal construction activity.

905.6.3 The CONTRACTOR shall connect the new service line pipe to the existing pipe at the same slope and alignment as the existing service. Particular care shall be taken to assure a sound connection. The service line shall be uniformly supported on suitable bedding compacted to a density of not less than 95 percent of maximum density, as determined by ASTM D 1557. If service lines are reconnected such that the pipe is not fully supported, hand tampers shall be used to properly compact under the pipe.

905.6.4 The CONTRACTOR shall place an electronic marker device above the service connection to the public sewer line per Section 170.

905.6.5 The CONTRACTOR shall stamp or saw-cut an “S” (3 inches high and ¼ inch depth) into top of curb surface directly over the service line.

905.7 RECORD INFORMATION:
The CONTRACTOR shall provide coordinates, accurate to within 0.3 feet, determined by a field survey by a Professional Surveyor, licensed in the state of New Mexico, to the ENGINEER regarding the horizontal and vertical location of the service. Coordinates shall be provided at the service tee or saddle tap, and if applicable at the top elbow of a riser. Use the NAD 1983 NM STATE PLANE CENTRAL ZONE for x and y coordinates and NAVD 1988 for z coordinate. A report certified by the licensed Professional Surveyor shall be referenced on the Record Drawings.

905.8 MEASUREMENT AND PAYMENT

905.8.1 Sanitary sewer service lines installed on new construction shall be measured by the linear foot horizontally from the center of the sewer main, or top of riser, if applicable, to the end of the service line. Payment shall be made at the unit price per linear foot and shall include the saddle connection, pipe, trenching, compaction and backfill, electronic marker device, testing, and all incidental work necessary to complete the installation.

905.8.2 Sanitary sewer service risers shall be measured by the vertical foot from the top of the sewer main to the top of the riser. Payment shall be made at the unit price per vertical foot, and shall include the pipe and casing (if required).

905.8.3 Sanitary sewer service reconnections shall be measured per each. Payment shall be made at the unit price per each reconnection shall include the saddle connection, new service pipe, connection to the existing service line, and all incidental work necessary for a complete reconnection.

SECTION 910

STORM SEWER PIPE INSTALLATIONS

910.1 GENERAL

910.1.1 The construction items, specified in this section, are common to storm sewer pipe installation and pipe type culverts.

910.1.2 Reinforced concrete pipe may be used for storm sewer pipe installations or pipe type culverts. Corrugated metal pipe will only be used for pipe-type culverts.

910.2 REFERENCES

910.2.1 ASTM

C361 Standard Specification for Reinforced Concrete Low Head Pressure Pipe

C443 Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets

C478 Standard Specification for Precast Reinforced Concrete Manhole Sections

910.2.2 This publication per SECTIONS:

101 Portland Cement Concrete
102 Steel Reinforcement
105 Concrete Curing Compound
106 Cement Mortar and Grout
108 Brick
123 Reinforced Concrete Pipe
124 Reinforced Concrete Pressure Pipe
125 Vitrified Clay Pipe
135 Corrugated Metal Pipe and Arches (Steel)
136 Structural Steel Plate for Pipe, Arches and Pipe Arches
137 Corrugated Aluminum Pipe and Arches
161 Gray Iron Castings

910.3 MATERIALS

910.3.1 Pipe: Storm sewer line pipe and fittings shall be as specified in other sections as follows:

Section 123 Reinforced Concrete Pipe
Section 124 Reinforced Concrete Pressure Pipe
Section 125.8 Perforated Clay Pipe
Section 135 Corrugated Metal Pipe and Arches
Section 136 Structural Steel Plate for Pipe, Arches, and Pipe Arches
Section 137 Corrugated Aluminum Pipe and Arches
Section 138 Pipe Arches and Box Culverts

910.4 CERTIFICATION

The OWNER/ENGINEER will be supplied with a certification on each item or type of material required in the storm sewer line, as to that item meeting the specifications and/or the reference specifications before that item is installed.

910.5 INSTALLATION

910.5.1 GENERAL:

910.5.1.1 Pipe and appurtenances shall be new and unused. The type of pipe to be installed shall be as approved by these specifications or unless otherwise shown on the drawings. Pipe and appurtenances shall be handled in such a manner as to insure delivery to the trench in sound, undamaged condition. Particular care shall be taken to prevent damage to any pipe coating.

910.5.1.2 The interior of the pipe shall be thoroughly cleaned of foreign material before being lowered into the trench and shall be kept clean during construction operations. When work is not in progress, the open ends of pipe shall be securely closed so that no foreign materials will enter the pipe. Any section of pipe found to be defective before or after laying shall be replaced with sound pipe, or repaired in a manner satisfactory to the ENGINEER, without additional expense to the owner.

910.5.1.3 Pipe shall be laid to line and grade as shown on the plans and as staked in the field. The bottom of the trench shall be graded and prepared to provide a firm and uniform bearing throughout the entire length of the pipe barrel. Suitable excavation shall be made to receive the bell of the pipe and the joint shall not bear upon the bottom of the trench. All adjustment to the line and grade shall be made by scraping or filling in with pipe zone material under the body of the pipe, and not by wedging or blocking. When connections are to be made to any existing manhole, pipe, or other improvement, the actual elevation or position of which cannot be determined without excavation, the CONTRACTOR shall excavate for and expose the existing improvement before laying the connecting pipe or conduit. When existing underground improvements may reasonably be expected to conflict with the line or grade established for the new sewer line, the ENGINEER shall request and the CONTRACTOR shall excavate as necessary to expose and locate such potentially conflicting underground improvements prior to laying the new pipe. Any adjustment in line or grade which may be necessary to accomplish the intent of the plans will be made, and the CONTRACTOR will be paid for any additional work resulting from such change in line or grade in the manner provided for in the General Conditions.

910.5.1.4 CONTRACTOR shall submit to the ENGINEER the proposed method for making connections to existing manholes. Connection methods will be dependent upon manhole size and pipe sizes. Unnecessary damage to the existing manhole should be avoided.

910.5.1.5 Pipe shall be laid upgrade in a continuous operation from structure to structure, with the socket or collar ends of the pipe upgrade unless otherwise permitted by the ENGINEER. Concrete pipe with elliptical reinforcement shall be laid with the minor axis of the reinforcement cage in a vertical position. Corrugated metal pipe shall be laid with the external laps of the circumferential seams toward the inlet end.

910.6 JOINTS FOR PIPE

910.6.1 JOINTS FOR CONCRETE PIPE:

910.6.1.1 The type of joint to be used shall be O-ring rubber gasket joints conforming to ASTM C 361 and C 443.

910.6.1.2 Gasketed Type of Joints for Reinforced Concrete Pipe

910.6.1.2.1 General – The ends of the pipe shall be so formed that when the pipes are laid together and joined, they shall make a continuous and uniform line of pipe with a smooth and regular surface.

910.6.1.2.2 Rubber gaskets for making compression-type joints for concrete pipe shall be factory fabricated in accordance with ASTM C 443; for pipes 12 inches in diameter and larger shall be O-ring and shall be handled, primed, installed, etc. in strict accordance with the manufacturer's recommendations.

910.6.1.2.3 The CONTRACTOR'S attention is particularly called to ASTM C 443, regarding storage of gaskets.

910.6.1.2.4 The CONTRACTOR shall furnish the ENGINEER complete information concerning the type and make of all joint material which he intends to use under the contract, including certification that the joint material meets the requirements of the specifications.

910.6.2 JOINTS FOR CORRUGATED METAL PIPE:

910.6.2.1 The seams of the pipe are to be placed at the sides, not on the bottom. The inside circumferential seams should be placed pointing downstream. Care should be taken to insure that dirt or other particles do not get between the outside of the pipe and the pipe coupling. Paved inverts should be placed and centered on the bottom of the trench. Any damage to the protective lining and coating shall be repaired prior to the backfilling around the pipe.

910.6.2.2 If waterproof joints are called for on the plans or specified in the Supplementary Specifications, the caulking compound or other waterproofing material used shall be subjected to the approval of the ENGINEER.

910.7 TESTING FOR LEAKAGE

Normally storm sewer lines need not be tested, but if in the opinion of the ENGINEER, the workmanship or materials do not appear to be satisfactory, the ENGINEER may require that a section of the storm sewer line be tested in a similar manner as that for a sanitary sewer line, see Section 901.

910.8 CLEANING AND INSPECTION

910.8.1 CLEANING: No pipe spalls, rocks, dirt, joint compounds, cement mortar and other trash or obstructions shall be left in a storm sewer pipe of any size or type. During flushing operations the manhole outlet shall be bagged or plugged so that the debris will not be carried into an existing active line.

910.8.2 INSPECTION: Before lines become operational or final acceptance of the installation, small size lines shall be inspected by a television camera and larger size lines will be inspected by walking through the line.

910.8.3 TELEVISION: After the CONTRACTOR has cleaned and flushed the line, the CONTRACTOR will notify the ENGINEER that the line is ready for television inspection. Prior to the television inspection (possibly during flushing operation) the CONTRACTOR will insert a ¼ inch nylon rope in the line for the purpose of towing the television unit through the pipe. The OWNER will perform the first television inspection at no cost to the CONTRACTOR. If during the first inspection debris is found in the line, the television inspection will cease. When further cleanup has been completed, the CONTRACTOR will request the ENGINEER to have a second inspection performed. The cost of the second inspection and any subsequent inspections of that segment of the line will be paid for by the CONTRACTOR at the rate of $50.00 per hour while the television crew is at the line site.

910.9 MEASUREMENT AND PAYMENT

910.9.1 STORM SEWER PIPE: Installed pipe shall be measured and paid for as follows:

910.9.1.1 For straight lines the pipe length shall be the intervening distance between the centers of manholes along a line parallel to the pipe invert.

910.9.1.2 For curvilinear lines the pipe length shall be the intervening arc distance between the centers of manholes along a line parallel to the pipe invert.

910.9.1.3 For lateral lines, such as from main or manhole to a storm inlet, the pipe length shall be the distance between the center of a manhole or centerline of the main to the interior wall face of the storm inlet along a line parallel to the pipe invert.

910.9.1.4 Payment for pipe will be in accordance with the unit price per linear foot per size and material as defined in the Bid Proposal, and shall include pipe installed in the trench, jointing and coupling materials, and other materials necessary to connect to other sections of pipe, manholes, and other appurtenances.

910.9.2 REMOVAL AND DISPOSAL OF SEWER PIPE: Removal and disposal of storm sewer pipe shall be measured by the linear foot within the specified pipe size increments. Payment will be made on the unit price per linear foot of specified pipe size in the Bid Proposal. Trenching, backfilling, and pavement removal and replacement will be paid for based on the unit prices for each appropriate bid item in the Bid Proposal. If new pipe is to be installed in the same trench as the removed pipe, only one payment will be made for trenching, backfilling, and pavement removal and replacement.

910.9.3 TESTING OF PIPE: No payment will be made for required initial or subsequent tests on sections of the storm sewer line.

SECTION 915

STORM SEWER DRAINAGE APPURTENANCES

915.1 GENERAL – The construction items, specified in this section, are related to the storm sewer underground facilities.

915.2 REFERENCES

915.2.1 This publication:

SECTION 300	Streets and Related Work
SECTION 501	Excavation and Backfill for Structures
SECTION 701	Trenching, Excavation and Backfill

915.3 MATERIALS

915.3.1 The construction plans will specify the size and material for the pipe between the storm sewer main and the storm water collection structure.

915.3.2 The various types of storm inlets and their relation to curb and gutter, or valley gutter are shown in the Standard Detail Drawings. Construction plans will identify the type to be constructed.

915.3.3 Grating size, material, and configuration shall conform to the Standard Detail Drawings.

915.4 INSTALLATION OF DRAINAGE FACILITIES

915.4.1 Excavation and backfilling for the storm inlet shall be accomplished in accordance with Section 501.

915.4.2 Trenching, backfilling, and compaction for the connecting pipe between the storm sewer main and the storm inlet shall conform to the specification contained in Section 701. Pipe shall be installed in accordance with Section 910.

915.4.3 All pipe and structures shall be installed per location and elevations, as shown on the construction plans. If during the course of installation, an underground obstruction (i.e., existing utility line) the work shall stop and the ENGINEER shall be immediately notified so that the problem can be resolved.

915.4.4 Direct connection to storm sewer main will be permitted if the main is a minimum of 36 inches in diameter (I.D.) and the connecting line is not greater than 12 inches (I.D.). If storm sewer mains are 48 inches (I.D.) or larger, the connecting line diameter may be increased to 18 inches (I.D.). For connecting line sizes greater than those specified above, the connection to the main will be made into a manhole or by inserting into the main a factory constructed wye. Connection to the main will comply with the Standard Detail Drawings.

915.4.5 Removal of curb and gutter, and sidewalk for installation of a storm inlet shall be made at a scored or full depth joint.

915.4.6 Existing pavement removal and replacement shall conform to Sections 343 and shall conform to residential or arterial pavement sections of the same material (asphalt or Portland Cement concrete) as the existing pavement.

915.4.7 No width greater than ½ inch will be permitted between the inlet grate and the roadside portion of the inlet frame.

915.5 Private drainage facility installations, which are to be constructed under the authorization of "Drainage Facilities Within Public Right-of Way," shall comply with the Standard Detail Drawings and appropriate sections of this publication.

915.6 MEASUREMENT AND PAYMENT

915.6.1 Pavement removal and replacement will be measured by square yard. Payment will be made at the unit price per square yard per type of replacement paving material, as specified in the Bid Proposal.

915.6.2 Trenching, backfilling, and compaction shall be measured by the linear foot from the main side wall of the inlet to the centerline of the main. Payment will be made at the unit price per linear foot per the average depth increment between connection points, as defined in the Bid Proposal.

915.6.3 Connecting pipe shall be measured by the linear foot along centerline of pipe from the main side wall of the inlet to the centerline of the main. Payment will be made at the unit price per linear foot per type and size of pipe, and shall include pipe in place and all necessary jointing materials.

915.6.4 Storm inlets shall be measured on a unit basis. Payment will be made at the unit price per each type of storm inlet, and shall include structure, grating, excavation, backfilling and compaction, and curb removal and replacement, as defined in Bid Proposal.

915.6.5 Removal and replacement of sidewalk shall be measured by the square foot and payment will be made at the unit price per square foot.

SECTION 920

SANITARY SEWER MANHOLES

920.1 GENERAL: This section contains items which are relative to the installation and rehabilitation of sanitary sewer manholes.

920.2 REFERENCES

920.2.1 ASTM

C 32 Standard Specification for Sewer and Manhole Brick (Made From Clay or Shale)

C 139 Standard Specification for Concrete Masonry Units for Construction of Catch Basins and Manholes

C 478 Standard Specification for Precast Reinforced Concrete Manhole Sections

C 497 Standard Test Methods for Concrete Pipe, Manhole Sections, or Tile

D 1557 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort

920.2.2 This publication:

SECTION 101 PORTLAND CEMENT CONCRETE
SECTION 102 STEEL REINFORCING
SECTION 105 CONCRETE CURING COMPOUND
SECTION 106 CEMENT MORTAR AND GROUT
SECTION 108 BRICK
SECTION 161 GRAY IRON CASTINGS
SECTION 163 DUCTILE IRON CASTINGS
SECTION 170 ELECTRONIC MARKER DEVICES

920.3 MATERIALS

920.4 SANITARY SEWER MANHOLE CONSTRUCTION

920.4.1 GENERAL

920.4.1.1 Soil Foundations for manhole base shall be compacted to a density of 95 percent of the maximum density per ASTM D 1557. Compaction limits shall be one foot beyond the perimeter of the concrete base and shall be a minimum of one foot in depth.

920.4.1.2 Manholes shall be constructed in accordance with the Standard Detail Drawings and as shown on the construction plans. Precast reinforced concrete units, concrete blocks or formed in-place, reinforced concrete may be used to construct manhole.

920.4.1.3 Invert elevation of the pipes entering or exiting the manhole and interior inverts shall not vary more than 0.05 feet from the elevation indicated on the construction plans. In order to ensure compliance with the design drawings, the CONTRACTOR shall provide the ENGINEER with coordinates, determined by a field survey by a Professional Surveyor licensed in the state of New Mexico. The vertical precision of the coordinates shall be, at a minimum, accurate to within 0.05 feet. Use the NAD 1983 NM STATE PLANE CENTRAL ZONE for x and y coordinates and NAVD 1988 for z coordinate. A report certified by the licensed Professional Surveyor shall be referenced on the Record Drawings.

920.4.1.4 All cement used for poured foundations, mortar, fillets, grout, and concrete shelf construction shall be Type II or approved equal.

920.4.1.5 All concrete for formed in place foundations or bases, concrete shelves, and pipe supports shall conform to Section 101.

920.4.1.6 Depending on the size of the pipe, connections to existing and new manholes shall be made by either core drilling through the manhole wall, preformed for new precast units, or for large-size pipe the manhole wall may be removed by carefully chipping the wall segment which will permit entry of the pipe. In the latter operation, exposed manhole reinforcement should be bent and tied to the reinforcement of the pipe tied to the reinforcement of the pipe collar. If core drilling is not practical, the CONTRACTOR shall request the ENGINEER to authorize the chipping operation. During either operation the CONTRACTOR shall take care to avoid unnecessary damage to the manhole surfaces or walls.

920.4.1.7 Electronic marker devices shall be installed at all sanitary sewer manholes, one foot upstream of the manhole over the centerline of the main line as specified in Section 170.

920.4.2 PRECAST CONCRETE MANHOLES:

920.4.2.1 The vertical sections of the manhole may be of different dimensions in order that manholes of various depths can be readily assembled.

920.4.2.2 Concrete, used for precast bases, vertical sections, and concentric cones, shall conform to Section 101.

920.4.2.3 Vertical sections of the manhole shall conform to the requirements of ASTM C 478.

920.4.2.4 The CONTRACTOR shall submit shop drawings of the precast base and concentric cone to the ENGINEER for review and approval.

920.4.2.5 Circular precast manhole sections shall be provided with mastic gasket to seal joints between sections. Material used shall con form to the Water Authority Approved Product List.

920.4.2.6 All lifting holes, except Type "C" manhole covers, and gaps at joints shall be filled with a non-shrink grout.

920.4.2.7 Precast concrete manhole bases may be used when approved by the ENGINEER. If approved, it shall be with the understanding that the CONTRACTOR shall be responsible for placing the bases at the specified elevation, location, and alignment.

920.4.3 FORMED-IN-PLACE REINFORCED CONCRETE MANHOLE:

920.4.3.1 The CONTRACTOR shall submit preconstruction drawings of the proposed manholes to the ENGINEER for review and approval.

920.4.3.2 Concrete used for this type of manhole construction shall conform to Section 101.

920.4.3.3 If desired, a precast concentric cone or a flat top cover can be used.

920.4.4 CONCRETE BLOCK MANHOLE:

920.4.4.1 The CONTRACTOR shall submit preconstruction drawings of the proposed manhole to the ENGINEER for review and approval.

920.4.4.2 Concrete masonry units for the construction of this type of manhole shall conform to ASTM C 139 and the Standard Detail Drawings. All blocks shall be mortared into place.

920.4.4.3 Concentric cone or flat top cover shall be used.

920.4.5 (intentionally left blank)

920.4.6 COATING OF MANHOLES:

920.4.6.1 Exterior of Manholes:
Exterior coating of manholes shall be required in areas where ground water is present. The coating shall be a waterproofing type of bitumastic or asphaltic material, as approved by the ENGINEER. Application shall be in accordance with the manufacturer's published recommendations.

920.4.6.2 Interior of Manholes:
Interior coating of manholes shall be required only when specified on the construction plans. The coating shall be an epoxy resin-type material, listed on the Water Authority Approved Product List, and shall be capable of protecting the concrete from deterioration due to a gaseous environment. Application shall be in accordance with the manufacturer's published recommendations.

920.4.6.3 Plastering of Manholes:
The work shall include the coating of the surface of existing block manholes with plaster as required on the construction plans.

920.4.7 (intentionally left blank):

920.4.8 ADJUSTMENT BRICKS:

920.4.8.1 Manhole adjustment bricks shall conform to the requirements for manhole bricks, per ASTM C 32 for Grade MS.

920.4.8.2 Mortar shall be used to lay the bricks, as well as coating the interior and exterior surfaces of the laid brick. Thickness of the mortar coating shall be ½-inch.

920.4.9 MANHOLE FRAME AND COVER:
The manhole frame and cover for the sanitary sewer shall conform to the specifications contained in Section 163 Ductile Iron Castings.

920.5 LEAKAGE TESTING OF SEWER MANHOLES:

920.5.1 All sanitary sewer manholes shall be tested for leakage by either a water exfiltration test or a vacuum test. Whichever leakage test is utilized, it is recommended that the test be performed prior to backfilling around the manhole and prior to placement of the manhole frame and cover. All inlet and outlet lines shall be properly plugged and the lift holes and barrel joints filled and sealed as specified. The CONTRACTOR shall be responsible for all materials and equipment necessary to perform the test and shall conduct the test in the presence of the ENGINEER or his representative. The CONTRACTOR has the option of performing a manhole test in increments appropriate to the depth of the manhole.

920.5.1.1 Under all circumstances, the CONTRACTOR shall be required to remove all plugs immediately after testing and prior to acceptance of the work. The Water Authority assumes no liability for damages caused by plugs inadvertently left in the line by the Contractor. The CONTRACTOR shall certify in writing to the Water Authority the completion of the plug removal task. The certification shall include the locations of removed plugs and corresponding date of removal.

920.5.2 The water exfiltration test shall consist of filling the entire manhole with water to the bottom of the frame elevation. A stabilization period of one hour will be allowed for absorption, after which the manhole shall be refilled as necessary before starting the test. The test period shall be two (2) hours, after which the manhole shall be refilled, measuring the necessary quantity of water. The allowable leakage shall be 0.25 gallons per foot diameter

per vertical foot per day and is represented by the following formula:

V = 0.25 DHT / 24

Where: V = Allowable loss in gallons
D = Manhole diameter in feet
H = Initial depth of water to invert in feet
T = Duration of test in hours

920.5.3 The vacuum test shall consist of utilizing an inflatable compression band, vacuum pump, gauges and appurtenances specifically designed for vacuum testing. Test procedures shall be in accordance with the manufacturer's printed recommendations. The ENGINEER shall be the sole judge as to the adequacy of the equipment.

920.5.3.1 A vacuum of 10" Hg shall be placed in the manhole and the time measured for a drop to 8.5" Hg. The test shall be considered to be successful if the measured time exceeds the test period. Should the test fail, the manhole shall be repaired as necessary and the test rerun. The test periods are:

920.5.3.2 Sixty (60) seconds for four (4) foot diameter manholes

920.5.3.3 Seventy-five (75) seconds for five (5) foot diameter manholes

920.5.3.4 Ninety (90) seconds for six (6) foot diameter manholes

920.5.3.5 One hundred and twenty (120) seconds for eight (8) foot diameter manholes

920.6 ABANDONMENT OF MANHOLES

920.6.1 Abandonment of manhole, which is part of a sewer line being abandoned, shall require the following work and materials:

920.6.2 Manhole will not be removed but will be abandoned in place.

920.6.3 All manhole inlet and outlet lines shall be plugged with a 12-inch –thick concrete or concrete mortar plug.

920.6.4 The concrete collar, ring, and cover shall be removed and disposed of by the CONTRACTOR.

920.6.5 Manhole bottom will be pulverized.

920.6.6 The manhole shall be filled with cement treated base (CTB) material to the bottom elevation of the asphalt base course of the pavement or to the ground surface level.

920.6.7 All labor, materials, and equipment necessary to complete this work shall be furnished by the CONTRACTOR.

920.6.8 For historical information the ENGINEER shall provide coordinates accurate to within 0.3 feet, determined by a field survey by a Professional Surveyor licensed in the state of New Mexico, on the record drawings. Use the NAD 1983 NM STATE PLANE CENTRAL ZONE for x and y coordinates and NAVD 1988 for z coordinate. A report certified by the licensed Professional Surveyor shall be referenced on the Record Drawings.

920.7 SANITARY SEWER MANHOLE REHABILITATION

920.7.1 GENERAL

920.7.1.1 Sanitary sewer manhole rehabilitation shall include coating of manholes with a cementitious liner, rebuilding of manhole invert benches to the profile shown on Standard Drawings 2101 and 2102 or to the specific profiles provided on the construction plans, and installation of protective epoxy or polyurethane coating systems. Where shown on the construction plans, sanitary sewer manhole rehabilitation shall also include miscellaneous structural modifications including installation of 30-inch diameter opening with approved manhole cover and frame, and installation of new concrete collar.

920.7.2 SANITARY SEWER MANHOLE REHABILITATION ASSOCIATED WITH TRENCHLESS REHABILITATION WORK

920.7.2.1 This specification shall govern all work, materials, and equipment required for new manhole lining or manhole rehabilitation for the purpose of eliminating infiltration, providing corrosion protection, repair of voids, and restoration of the structural integrity of the manhole as a result of applying a monolithic fiber-reinforced cementitious liner to the wall and bench surfaces of brick, concrete, or any other construction material followed by a protective epoxy or polyurethane coating system, where specifically required on the construction plans.

920.7.2.2 For sliplining and cured-in-place pipe technologies where no point of intersection occurs in the manhole, the sewer liner may be installed continuous through the manhole. If installed in this manner, the portion within the manhole shall be neatly cut out and removed, and terminations sealed per liner manufacturer's recommendation. For those manholes where point of intersections occur in the manholes, the sewer liner shall be terminated and sealed per liner manufacturer's recommendation at the inside wall of the manhole. For those sewer rehabilitation methods that require annular grouting, a bulkhead shall be installed. The manhole shall be thoroughly cleaned using a high pressure washing

system as recommended. A new bench shall be constructed to the pipe soffit and the manhole wall sealed with a monolithic, cementitious liner followed by application of a protective epoxy or polyurethane coating system.

920.7.2.3 Described are procedures for manhole preparation, cleaning, application and testing. The applicator, approved and trained by the manufacturer, shall furnish all labor, equipment and materials for applying a cementitious mix to form a monolithic liner of minimum 1/2-inch thickness using a machine specially designed for the application.

920.7.2.3.1 All aspects of the installation shall be in accordance with the manufacturer's recommendations and with the following specifications which include: Elimination of all infiltration prior to making the application; Repair and sealing the invert benches; Removal of any loose and unsound material; Re-building of manhole invert benches to the pipe soffit; Spray application of a cementitious liner mix to form a monolithic liner; and Spray application of a protective epoxy or polyurethane liner system.

920.7.3 MATERIALS

920.7.3.1 All materials used shall be listed on the Water Authority Approved Product list.

920.7.3.1.1 Patching Mix: a quick setting fiber reinforced, calcium aluminate, corrosion resistant cementitious material shall be used as patching material to fill large voids.

920.7.3.1.2 Infiltration Control: a rapid setting cementitious product specifically formulated for leak control shall be used to stop minor water infiltration of water into the manhole.

920.7.3.1.3 Grouting Mix: a cementitious grout shall be used for stopping active infiltration into the manhole and filling voids in the manhole wall. Chemical grouts may be used to stop excessively active infiltration.

920.7.3.1.4 Cementitious Liner Mix: shall be used to form the monolithic liner covering all interior manhole surfaces. The liner mix shall be made with calcium aluminate cement or other approved corrosion preventative admixture and shall be applied according to the manufacturer's recommendations.

920.7.3.1.5 Protective Epoxy or Polyurethane Liner: shall be used to resist chemical attack and deterioration of the manhole walls.

920.7.4 SUBMITTALS AND CERTIFICATIONS

920.7.4.1 Before commencing work, the CONTRACTOR shall submit the following for Approval:

920.7.4.1.1 Technical Data Sheets for proposed materials.

920.7.4.1.2 Certifications that the proposed materials meet or exceed the requirements listed in the Specifications.

920.7.4.1.3 Installation procedures as recommended by the manufacturer.

920.7.4.1.4 Product testing results.

920.7.4.1.5 Design calculations.

920.7.4.1.6 Applicator qualifications and proof of manufacturer training.

920.7.5 APPLICATION

920.7.5.1 PREPARATION, CLEANING, AND LEAK PREVENTION

920.7.5.1.1 Place covers over sewer invert to prevent extraneous material from entering the lines.

920.7.5.1.2 All foreign material, deposits, and other contaminants shall be removed from the manhole wall and bench using a high pressure washer or water sprayer having a minimum nozzle discharge pressure of 1,200 psi. Care shall be taken not to cause additional damage to the manhole structure resulting from overpressure used in cleaning process.

920.7.5.1.2.1 Loose and protruding brick, mortar, and concrete shall be removed using a mason's hammer and chisel and/or scraper.

920.7.5.1.2.2 Large voids shall be filled with quick setting patching mix.

920.7.5.1.2.3 Active leaks shall be stopped using quick setting specially formulated mixes according to the manufacturer's recommendations.

920.7.5.1.2.4 Existing manhole steps or ladders shall be removed by cutting off flush to the manhole wall prior to application of any rehabilitation coatings.

920.7.5.2 INVERT REPAIR

920.7.5.2.1 Invert Repair shall be performed on all inverts with visible damage, where infiltration is present, or when vacuum testing is specified.

920.7.5.2.2 After blocking flow through the manhole and thoroughly cleaning the invert, the quick setting patch material shall be applied to the invert and bench. The material shall be troweled uniformly onto the

damaged invert at a minimum thickness of ½-inch at the invert extending out onto the bench of the manhole sufficiently to tie into the structurally enhanced monolithic liner.

920.7.5.2.3 The finish invert surfaces shall be smooth and free of ridges and shall be tapered at the inlets and outlet of the channel for flow.

920.7.5.3 MIXING LINER MATERIALS

920.7.5.3.1 The material shall be mixed per the manufacturer's recommendations at a rate to allow for continuous spraying without interruption until each application is complete.

920.7.5.3.2 If ambient temperatures are in excess of 95° F, precautions shall be taken to keep the mix temperature at time of application below 90° F. If necessary, use ice or chilled water during mixing.

920.7.5.4 SPRAYING LINER MATERIALS

920.7.5.4.1 Prior to spraying, the surface shall be clean and free of all foreign material and shall be damp without noticeable free water droplets or running water. Materials shall be applied by spraying a minimum uniform thickness to ensure that all cracks, crevices, and voids are filled and a smooth surface remains after light troweling. The troweling shall compact the material into voids and set the bond.

920.7.5.4.2 Material shall not be applied to frozen surfaces or if freezing is expected to occur within the manhole for 24 hours after application.

920.7.5.4.3 The second application of material shall not begin before the first application has achieved an initial set. The minimum total finished thickness of cementitious material shall not be less than 1/2 inch. The second application shall be trowelled to a smooth finish being careful not to over trowel and to bring additional water to the surface thereby weakening it.

920.7.5.4.4 Ambient manhole conditions are adequate for curing so long as the manhole is covered. It is imperative that the manhole be covered as soon as possible after the application has been completed.

920.7.5.4.5 Contractor shall protect surfaces from contamination of any type between coats and through curing periods.

920.7.5.4.6 Epoxy or polyurethane liner systems shall be applied to a dry film thickness no less than 125 mils excluding any primer coats required by the manufacturer.

920.7.5.4.7 Active flows shall not be introduced through the manhole until the manufacturer's recommended cure time for the product's final coat has been achieved.

920.7.6 TESTING AND INSPECTION

920.7.6.1 A visual inspection of the manhole shall be performed to evaluate workmanship of the coating application

920.6.2 The cementitious materials used shall be compression strength tested as described in ASTM C39. The Contractor shall provide at least two (2) cylinders of material for testing, each 3 inch diameter x 6 inch long.

920.6.3 All manholes shall be tested per Section 920.5 of this Specification.

920.6.4 If requested by the Water Authority or Engineer, a Spark test shall be performed to ensure that there is a full monolithic lining and to ensure that there are no pinholes in the coating.

920.6.5 If requested by the Water Authority or the Engineer due to concerns regarding delamination or disbanding of the coating resulting from the integrity of the substrate under the coating, the strength of the substrate, or the contamination of substrate, a Pull Test shall be required.

920.8 MEASUREMENT AND PAYMENT

920.8.1 NEW MANHOLES:

920.8.1.1 Type "C" or "E" manholes of 4-foot, 6-foot, and 8-foot diameters shall be measured per each within the following increments of depth: 3 to 6 feet, 6 to 10 feet, and 10 to 14 feet. Manholes greater than 14 feet deep shall be measured and paid per Section 9.8.1.2. Measurements will be made to the nearest foot and will be from the manhole rim elevation to the manhole invert elevation.

920.8.1.2 Payment for manholes 14 feet deep or less will be made on the unit price per manhole diameter per depth increment as specified in the Bid Proposal. Payment for manhole depths which exceed 14 feet will be made on the unit price per manhole diameter per vertical foot. This payment is in addition to the manhole unit price for the portion above the 14 foot depth.

920.8.1.3 Payment for any type diameter or depth of manhole will include excavation, compacted backfilling, benching, cover or cone, leveling bricks, frame and cover, concrete pad or collar, and placement of EMD for sanitary sewers.

920.8.2 ELEVATION ADJUSTMENTS:

920.8.2.1 When a new manhole is installed, no measurement or payment will be made for rim elevation adjustments to conform to street surface grades.

920.8.2.2 The following measurements and payments for rim elevation adjustments on existing manholes will be made for indicated conditions:

920.8.2.2.1 Unit price per inch of leveling brick adjustment.

920.8.2.2.2 Unit price per manhole diameter per vertical foot of adjustment to cone and/or barrel.

920.8.2.3 As required, the following items will be included in the unit price per appropriate adjustment: pavement removal and replacement, excavation, compacted backfilling, concrete collar or pad, leveling bricks, frame, cover, and EMD placement.

920.8.3 EXTERIOR COATING OF MANHOLE: Exterior waterproof coating for manholes shall be measured and paid for on the unit price per square foot of surface area covered.

920.8.4 INTERIOR COATING OF MANHOLE: Plastering or epoxy coating for manholes shall be measured and paid for on the unit price per square foot of surface area covered.

920.8.5 ABANDONMENT OF MANHOLES: Measurement and payment for abandonment of a manhole shall be the unit price per manhole for defined work in Subsection 920.6.

920.8.6 MANHOLE REHABILITATION IN REPLACEMENT WORK: Work under this item shall be measured and paid for by the unit price per manhole for work specified in the Bid Proposal.

920.8.7 TESTING: There will be no payment for required testing of sewer manholes.

SECTION 921

STORM MANHOLES

921.1 GENERAL: This section contains items which are relative to the installation of storm manholes.

921.2 REFERENCES

921.2.1 ASTM

C 43 Standard Terminology of Structural Clay Products

C 139 Standard Specification for Concrete Masonry Units for Construction of Catch Basins and Manholes

C 478 Standard Specification for Precast Reinforced Concrete Manhole Sections

C 497 Standard Test Methods for Concrete Pipe, Manhole Sections, or Tile

C 1557 Standard Test Method for Tensile Strength and Young's Modulus of Fibers

921.2.2 This publication:

SECTION 101	PORTLAND CEMENT CONCRETE
SECTION 102	STEEL REINFORCING
SECTION 105	CONCRETE CURING COMPOUND
SECTION 106	CEMENT MORTAR AND GROUT
SECTION 161	GRAY IRON CASTINGS

921.3 MANHOLE MATERIALS

Storm manhole materials shall be as specified in other sections, as follows:

Portland Cement Concrete	Section 101
Steel Reinforcing	Section 102
Concrete Curing Compound	Section 105
Cement Mortar and Grout	Section 106
Gray Iron Castings	Section 161

921.4 MANHOLE CONSTRUCTION

921.4.1 GENERAL

921.4.1.1 Soil Foundations for manhole base shall be compacted to a density of 95 percent of the maximum density per ASTM D 1557. Compaction limits shall be one foot beyond the perimeter of the concrete base and shall be a minimum of one foot in depth.

921.4.1.2 Manholes shall be constructed in accordance with the Standard Detail Drawings and as shown on the construction plans. Precast reinforced concrete units, concrete blocks or formed in-place, reinforced concrete may be used to construct manhole.

921.4.1.3 Invert elevation of the pipes entering or exiting the manhole and interior inverts shall not vary more than 0.05 foot from the elevation indicated on the construction plans.

921.4.1.4 All cement used for poured foundations, mortar, fillets, grout, and concrete shelf construction shall be Type II or approved equal.

921.4.1.5 All concrete for formed in place foundations or bases, concrete shelves, and pipe supports shall be 3000 psi compressive strength concrete.

921.4.1.6 Depending on the size of the pipe, connections to existing and new manholes shall be made by either core drilling through the manhole wall, performed for new precast units, or for large-size pipe the manhole wall may be removed by carefully chipping the wall segment which will permit entry of the pipe. In the latter operation, exposed manhole reinforcement should be bend and tied to the reinforcement of the pipe tied to the reinforcement of the pipe collar. If core drilling is not practical, the CONTRACTOR shall request the ENGINEER to authorize the chipping operation. During either operation the CONTRACTOR shall take care to avoid unnecessary damage to the manhole surfaces or walls.

921.4.2 PRECAST CONCRETE MANHOLES:

921.4.2.1 The vertical sections of the manhole may be of different dimensions in order that manholes of various depths can be readily assembled.

921.4.2.2 Concrete, used for precast bases, vertical sections, and eccentric cones, shall be 4000 psi compressive strength concrete.

921.4.2.3 Vertical sections of the manhole shall conform to the requirements of ASTM C 478

921.4.2.4 The CONTRACTOR shall submit shop drawings of the precast base and eccentric cone to the ENGINEER for review and approval.

921.4.2.5 Circular precast manhole sections shall be provided with mastic gasket to seal joints between sections, such as RAM-NEK, KENT SEAL, or approved equal.

921.4.2.6 All lifting holes, except Type "C" manhole covers, and gaps at joints shall be filled with a non-shrink grout.

921.4.2.7 Precast concrete manhole bases may be used when approved by the ENGINEER. If approved, it shall be with the understanding that the CONTRACTOR shall be responsible for placing the bases at the specified elevation, location, and alignment.

921.4.3 FORMED INPLACE REINFORCED CONCRETE MANHOLE:

921.4.3.1 The CONTRACTOR shall submit preconstruction drawings of the proposed manholes to the ENGINEER for review and approval.

921.4.3.2 Concrete used for this type of manhole construction shall be 4000 psi compressive strength concrete.

921.4.3.3 If desired, a precast eccentric cone or a flat cover can be used.

921.4.4 CONCRETE BLOCK MANHOLE:

921.4.4.1 The CONTRACTOR shall submit preconstruction drawings of the proposed manhole to the ENGINEER for review and approval.

921.4.4.2 Concrete masonry units for the construction of this type of manhole shall conform to ASTM C 139 and the Standard Detail Drawings. All blocks shall be mortared into place.

921.4.4.3 Eccentric cone or flat-type cover shall be used.

921.4.5 TEE PIPE MANHOLE:

921.4.5.1 Tee pipe manholes will be used for all 4-foot-diameter mainline pipes and larger. Horizontal section of the tee pipe shall be the same class of pipe as the adjacent sections. The vertical sections shall comply with the requirements set forth in ASTM C 478.

921.4.5.2 Top of the vertical portion of tee pipe unit will extend a minimum of 18-inches above the outside diameter of the horizontal pipe. The 4-foot-diameter vertical section of the tee pipe shall be connected at the longitudinal center point of the horizontal pipe section. The minimum length of horizontal pipe section shall be 8 feet.

921.4.5.3 The CONTRACTOR shall submit to the ENGINEER for review and approval preconstruction shop drawings on the fabrication of the tee pipe section as developed by a precast reinforced concrete pipe manufacturer. Field fabrication of this eccentric pipe unit will not be accepted. Shop drawings for the eccentric cone will also be submitted for review and approval.

921.4.5.4 RAM-NEK, Kent Seal, or approved equal sealants shall be used to seal the joints in the vertical portion of this manhole.

921.4.5.5 All lifting holes, except for Type “C” manhole covers, and gaps at joints shall be filled with a non-shrink grout.

921.4.5.6 Standard Detail Drawings show some of the components of the tee-type pipe manhole.

921.4.6 MANHOLE STEPS:

921.4.6.1 Manhole steps shall be ½” diameter, grade 60, reinforcing rod completely encapsulated in copolymer polypropylene or corrosion resistant rubber compound. Steps shall be designed to be cast in place or hammered into holes in manhole walls.

921.4.6.2 Approved manhole steps of only one manufacturer model shall be used on any specific project and shall not be intermixed with other approved steps. Approved steps must bear the manufacturer name and model on the exposed surface of the step and shall be one of the following products or approved equals: M.A. Industries, Inc. – Model PS-2-PFS H.Bowen Co. – Bowco, Model 81213 or 93813 Delta Pipe Products – WEDG-LOK, Model W-11

921.4.6.3 The minimum width of step tread shall be 11-inches. Steps will be spaced uniformly in each manhole. Spacing may be between 12-nches to 16-inches on center. Lower step will be 12-inches above manhole shelf or top of main. The upper step shall be 6-inches below the top portion of the eccentric cone or 6 inches below the bottom of the flat cover. Also the steps shall be aligned vertically with the opening of the cone or cover.

921.4.6.4 Steps shall be embedded in the manhole wall a minimum of 3-inches and protrude from the manhole interior surface a minimum of 4 ¾-inches.

921.4.6.5 Holes for step installation shall be drilled or precast per manufacturer’s recommended size, or of sufficient size to allow for step insertion into the wall. Cast-in-plan sockets or tapered holes recommended by the step manufacturer may be used with prior approval of ENGINEER. If the hole has been drilled too large, then the step shall be secured in place by using epoxy grout for the full depth of the drilled hole.

921.4.6.6 Acceptable manhole step installations must be capable of withstanding a 400 pound, horizontal, pull out load applied in accordance with ASTM C 497.

921.4.7 ADJUSTMENT BRICKS:

921.4.7.1 Manhole adjustment bricks shall conform to the requirements for manhole bricks, per ASTM C 32 for Grade MS.

921.4.7.2 Mortar shall be used to lay the bricks, as well as coating the interior and exterior surfaces of the laid brick. Thickness of the mortar coating shall be ½-inch.

921.4.8 MANHOLE FRAME AND COVER: The manhole frame and cover for the storm manholes shall conform to the specifications contained in section 161.

921.5 TESTING OF STORM MANHOLES:

921.5.1 Normally storm manholes need not be tested unless specifically required by the project plans or supplemental technical specifications. However, if in the opinion of the ENGINEER, the workmanship or materials do not appear to be satisfactory, the ENGINEER may require that any storm manhole be tested in a similar manner as that for a sanitary sewer manhole.

921.6 ABANDONMENT OF MANHOLES

921.6.1 Abandonment of manhole, which is part of a storm drain being abandoned, shall entail the following work and materials:

921.6.2 Manhole will not be removed but will be abandoned in place.

921.6.3 All manhole inlet and outlet lines shall be plugged with a 12-inch –thick concrete or concrete mortar plug.

921.6.4 Salvageable material shall be stockpiled on the job site. The CONTRACTOR shall contact Owner to arrange for a representative to inspect the materials for usability. Salvageable materials shall be transported by the CONTRACTOR to the City Yards. CONTRACTOR will receive a receipt for the turned-in materials. Receipts will be submitted to the ENGINEER prior to final acceptance of the Project. Unusable materials will be disposed of by the CONTRACTOR.

921.6.5 Manhole bottom will be pulverized.

921.6.6 The manhole shall be filled with cement treated base (CTB) material to the bottom elevation of the asphalt base course of the pavement or to the ground surface level.

921.6.7 All labor, materials, and equipment necessary to complete this work shall be furnished by the CONTRACTOR.

921.6.8 For historical information the ENGINEER shall have a survey performed which will locate the abandoned manhole, relative to permanent survey markers.

921.7 STORM MANHOLE REHABILITATION IN REPLACEMENT WORK

921.7.1 The work under this item shall be to replace the existing manhole frame and cover and to place a concrete pad around the existing manhole as required per the construction plans. This work will be done only when an existing manhole is encountered in the normal course of the replacement work that has a light-weight, vented, multi-holed manhole cover.

921.7.2 The work and materials shall include the following:

921.7.2.1 Remove any and all existing brick under frame and replace with new Grade MS brick as necessary to bring new frame and cover up to street grade.

921.7.2.2 Remove and replace existing concrete pad, or construct a new pad.

921.7.2.3 Remove existing steps and replace with new steps or if steps are nonexistent, install new steps. Steps will be installed as per Subsection 921.4.6.

921.7.2.4 Remove and replace pavement.

921.7.2.5 Excavation and compaction of backfill as necessary.

921.7.2.6 All materials, labor, and equipment necessary to do the work under this item shall be furnished by the CONTRACTOR.

921.7.2.7 The work and materials under this item shall be done according to the manner set forth in the Standard Detail Drawings and other section of these specifications.

921.7.3 Salvageable material shall be stockpiled on the job site. The CONTRACTOR shall contact Owner to arrange for a representative to inspect the materials for usability. Salvageable materials shall be transported by the CONTRACTOR to the City Yards. CONTRACTOR will receive a receipt for the turned-in materials. Receipts will be submitted to the ENGINEER prior to final acceptance of the Project. Unusable materials will be disposed of by the CONTRACTOR.

921.8 MEASUREMENT AND PAYMENT

921.8.1 NEW MANHOLES:

921.8.1.1 Type “C”, “E”, “F”, or “G” manholes of 4-foot or 6-foot diameters shall be measured per each within the following increments of depth: 3 to 6 feet, 6 to 10 feet, and 10 to 14 feet. Manholes which are greater in depth than 1 foot shall be measured by the vertical foot. Measurements will be made to the nearest foot and will be from the manhole rim elevation to the manhole invert elevation.

921.8.1.2 Payment for manholes 14 feet deep or less will be made on the unit price per manhole diameter per depth increment as specified in the Bid Proposal. Payment for manhole depths which exceed 14 feet will be made on the unit price per manhole diameter per vertical foot. This payment is in addition to the manhole unit price for the portion above the 14 foot depth.

921.8.1.3 Type “A” or Tee-type manholes shall be measured and paid for by the methods described in 921.8.1.1 and 921.8.1.2 above. Measurement will be from

the invert of the main line to the manhole rim. Payment under this item will include the normal manhole costs described below, as well as any additional pipe costs for the precast tee and for the concrete cradle under the tee.

921.8.1.4 Payment for any type diameter or depth of manhole will include excavation, compacted backfilling, shelving, cover or cone, leveling bricks, frame and cover, and concrete pad or collar.

921.8.2 ELEVATION ADJUSTMENTS:

921.8.2.1 When a new manhole is installed, no measurement or payment will be made for rim elevation adjustments to conform to street surface grades.

921.8.2.2 The following measurements and payments for rim elevation adjustments on existing manholes will be made for indicated conditions:

920.8.2.2.1 Unit price per inch of adjustment ring for adjustment to manhole frame by the addition of adjustment ring.

921.8.2.2.2 Unit price per inch of leveling brick adjustment.

921.8.2.2.3 Unit price per manhole diameter per vertical foot of adjustment to cone and/or barrel.

921.8.2.3 As required, the following items will be included in the unit price per appropriate adjustment: pavement removal and replacement, excavation, compacted backfilling, concrete collar or pad, leveling bricks, adjusting rings, and/or frame and cover.

921.8.3 MANHOLE STEPS:
Unless otherwise shown on the Bid Proposal, the cost of manhole steps shall be incidental to the unit prices for construction of manholes of various types and depths.

921.8.4 ABANDONMENT OF MANHOLES:
Measurement and payment for abandonment of a manhole shall be the unit price per manhole for defined work in Subsection 921.6.

921.8.5 MANHOLE REHABILITATION IN REPLACEMENT WORK:
Work under this item shall be measured and paid for by the unit price per manhole for work specified in the Bid Proposal.

921.8.6 TESTING:
There will be no payment for required testing of storm manholes.

SECTION 925

VACUUM SEWER COLLECTOR, INTERCEPTOR AND FORCE MAIN FACILITIES

925.1 GENERAL:
The construction items specified in this section are common to vacuum sewer facilities.

925.2 REFERENCES

925.2.1 American Society for Testing and Materials (ASTM) Standard Specifications, Latest Edition

C 478 Standard Specification for Precast Reinforced Concrete Manhole Sections

D 1557 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort

D 1784 Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds

D 2241 Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series)

D 2564 Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems

D 2665 Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings

D 2672 Standard Specification for Joints for IPS PVC Pipe Using Solvent Cement

D 3139 Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals

925.2.1 This Publication, Latest Edition

SECTION 101 PORTLAND CEMENT CONCRETE

SECTION 102 STEEL REINFORCEMENT

SECTION 105 CONCRETE CURING COMPOUND

SECTION 121 PLASTIC PIPE

SECTION 161 GRAY IRON CASTINGS

SECTION 163 DUCTILE IRON CASTINGS

SECTION 170 ELECTRONIC MARKER DEVICES

SECTION 701 TRENCHING, EXCAVATION AND BACKFILL

SECTION 710 BORING, DRILLING AND JACKING

SECTION 801 INSTALLATION OF WATER TRANSMISSION, COLLECTOR, AND DISTRIBUTION LINES

SECTION 920 SANITARY AND STORM SEWER MANHOLES

925.3 MATERIALS

925.3.1 PIPE:
All buried vacuum collector lines, branch lines, force mains, vacuum service laterals, and gravity service stubs shall be PVC C900 SDR21 (or Class 200) rated PVC pipe, green in color and conforming to ASTM D 2241, ASTM D 1784 Cell Classification 12454-B. Pipe and appurtenances shall be new and unused.

925.3.2 JOINTS:
All joints shall conform to ASTM D 2672, using solvent cement; or ASTM D 3139 using elastomeric seals. This pipe must be certified by the manufacturer that pipe and seal will operate at 22 inches of mercury vacuum with a maximum loss of 1% of initial vacuum per hour for a 4 hour period.

925.3.3 FITTINGS

925.3.3.1 Fittings shall be Schedule 80 solvent weld drain, waste and vent pipe per ASTM D 2665.

925.3.3.2 Wye fittings and 45-degree ells shall be used throughout; except that a long radius 3” 90-degree ell may be used on the 3” suction line entering the vacuum valve and at the wye connection of the vacuum service lateral to the vacuum main. Tee fittings and short radius ells are prohibited exclusively.

925.3.4 SOLVENT CEMENT:
Shall conform to ASTM D 2564: primer and cement shall not be of same color. Cement shall be gray in color.

925.3.5 MANHOLE SECTIONS:
Manhole sections used for buffer tanks, vacuum isolation valve vaults, pig launchers, and air release valves shall be reinforced precast concrete manhole sections, 48” nominal diameter, conforming to the requirements of ASTM C478 and Section 101 Table 101.C.

925.3.6 MANHOLE JOINTS:
Tongue and groove in precast wall; shall conform to Section 920.4.2 PRECAST CONCRETE MANHOLES.

925.3.7 MANHOLE FRAMES AND COVERS:
Frames and covers for sanitary sewer applications such as manholes used for buffer tanks, vacuum isolation valve boxes or vaults, pig launchers, and air release valves shall conform to this Publication, Section 161 Gray Iron Castings, Section 163 Ductile Iron Castings and the Standard Detail Drawings.

925.3.8 CAST-IN-PLACE CONCRETE:
Cast-in-place concrete used for footings, anti-flotation collars, grade-level pads, mass concrete for buffer tanks, and other installations not otherwise addressed shall be air-entrained concrete in accordance with Sections 101, 102, and 105 of this Publication.

925.3.9 VALVES: Valves used for pig launchers and vacuum isolation valves shall be mechanical joint gate valves conforming to Sections 801.3.3 of this Publication. Vacuum isolation valves shall be equipped with five-sided nuts per Standard Detail Drawing 2169. Only valves specified on the Water Approved Product List shall be used.

925.3.10 AIR RELEASE VALVES:
Only air release valves specified on the Water Authority Approved Product List shall be used.

925.3.11 VACUUM VALVES AND APPURTENANCES:
Vacuum valves shall be those listed on the Water Authority Approved Product List. Furnish all mechanical appurtenances required for a complete installation per manufacturer specifications. Vacuum valves and appurtenances are to be delivered to the Water Authority's Water Reclamation warehouse, unloaded, and stored as directed by the ENGINEER in complete packages.

925.3.12 VACUUM VALVE PITS

925.3.12.1 Only deep Vacuum valve pits listed on the Water Authority Approved Product List shall be installed.

925.3.12.2 The deep valve pit shall have a sump 54 inches in depth.

925.3.13 STAINLESS STEEL:
Stainless steel for brackets and fasteners shall be Type 316.

925.4 SUBMITTALS

925.4.1 The following shall be submitted for the ENGINEER'S approval prior to incorporation in the work of the corresponding item:

a) Concrete Mix Design(s)

b) Material and method of sealing pipe penetrations in buffer tank walls

c) Pipe certification for vacuum service

925.4.2 The OWNER/ENGINEER will be supplied with a certificate of compliance for each item or type of material required in the system, as to that item meeting the specifications and/or the reference specifications before that item is installed.

925.4.3 The following records shall be maintained by the CONTRACTOR, shall be kept at all times for inspection by the ENGINEER, and shall be submitted to the ENGINEER upon request or as provided in these Specifications.

925.4.3.1 Vacuum tests shall be performed daily or as otherwise stipulated. These tests shall be recorded on charts provided by the OWNER or in hard-board notebooks as stipulated herein depending on the type of test.

925.4.3.2 Record Drawings markups and related survey notebooks shall be kept current by the CONTRACTOR to record work performed and to reflect any and all revisions made from the original construction drawings.

925.5 INSTALLATION

925.5.1 GENERAL

925.5.1.1 Handle pipe and appurtenances in such a manner as to insure delivery to the trench in sound, undamaged condition. Particular care shall be taken to prevent damage to any coating.

925.5.1.2 Prior to installation, store plastic pipe and protect from prolonged periods of sunlight per Section 121.

925.5.1.3 The interior of the pipe, pits, and all appurtenances shall be thoroughly cleaned of foreign material before being lowered into the trench and shall be kept clean during construction operations.

925.5.1.4 Install a plug in the new system at any point of connection to an existing system. The CONTRACTOR shall not flush or otherwise discharge any flow into an existing system unless approved in writing by the ENGINEER and Water Authority.

925.5.1.4.1 The plug shall remain in place until the ENGINEER or Water Authority authorizes its removal in writing. Under all circumstances, the CONTRACTOR shall be required to remove all plugs prior to acceptance of the work.

925.5.1.4.2 The CONTRACTOR shall certify in writing the completion of the plug removal task. The certification shall include the locations of removed plugs and corresponding date of removal. The Water Authority assumes no liability for damages caused by plugs inadvertently left in the line by the Contractor.

925.5.1.5 Perform trenching, backfilling, and compaction in accordance with Section 701.

925.5.2 PIPE INSTALLATION

925.5.2.1 All vacuum sewers shall be laid to line and grade as shown on the construction drawings. All pipe which has been designed to slope downward shall slope uniformly downward, with a tolerance of no more than 0.01feet per 20 feet of line. Abrupt sags or bellies will not be permitted. The elevation at 100 foot intervals of pipe shall be recorded by the CONTRACTOR in bound field books which shall be submitted to the ENGINEER.

925.5.2.2 All sanitary sewer force mains shall be laid to line and grade as shown on the drawings. Particular care shall be taken to avoid crests in the profile at locations other than those shown on the drawings. Elevations shall be recorded by the CONTRACTOR at 100-foot intervals, and at each change in grade, in bound field books which shall be submitted to the ENGINEER.

925.5.2.3 Handle and install pipe and fittings in accordance with manufacturer's recommendations.

925.5.2.4 Prevent entrance of dirt or foreign matter or damage to pipe lining or coating. Plug the pipe any time work is stopped.

925.5.2.5 No defective pieces are permitted. Defective pieces discovered after use will be removed and replaced with a sound piece.

925.5.2.6 Place bedding, embedment and backfill in accordance with Section 701 unless otherwise indicated on the construction plans. The bedding of the trench shall be graded and prepared to provide a firm and uniform bearing throughout the entire length of the pipe. Suitable excavation shall be made to receive the bell of the pipe and the joint shall not bear upon the bottom of the trench. All adjustments to the line and grade shall be made by scraping away or filling in with pipe zone material under the body of the pipe, but not by wedging or blocking. When connections are to be made to any existing pipe, valve pit, or any other improvement, where the actual elevation or position cannot be determined without excavation, excavate and expose the existing improvement before laying the connecting pipe or conduit. Should existing underground improvements be expected to conflict with the line or grade established for the new sewer line, the ENGINEER shall request the CONTRACTOR to excavate as necessary to expose such potentially conflicting underground improvements prior to laying the new pipe. Any adjustment in line or grade which may be necessary to accomplish the intent of the plans shall be made, and the CONTRACTOR will be paid for any additional work resulting from such change in line or grade in the manner provided for in the GENERAL CONDITIONS.

925.5.2.7 Lay pipe upgrade in a continuous operation from structure to structure, with the socket ends of the pipe upgrade unless otherwise permitted by the ENGINEER.

925.5.2.8 Sanitary sewer mains shall not be constructed under walkways, sidewalks, curbs and gutters, drive pads, or similar concrete structures by tunneling underneath them. The CONTRACTOR will remove the section of the concrete structure to the nearest full expansion joint or edge.

925.5.2.9 Place and hand-tamp fill to 95% of maximum dry density per ASTM D 1557, in entire space between the pipe or fitting and the trench walls.

925.5.2.10 Prior to completely backfilling the sewer excavation, install a green metalized detectable warning tape 12" to 18" below finished grade. The tape shall be detectable with a standard metal pipe locator. The tape shall be a minimum of 2 inches wide and inscribed at 10-foot intervals with the words, "CAUTION BURIED SEWER LINE BELOW". The tape shall be constructed of material that is impervious to alkalis, acids, chemical reagents, and solvents found in the soils.

925.5.2.11 Electronic marker devices shall be installed in the locations specified in Section 170 at the manufacturer's recommended bury depth.

925.5.2.12 Provide pipe through casing with support skids as shown on the construction drawings and/or Standard Detail Drawing 2180 and 2380. Alternate support methods may be acceptable upon ENGINEER'S review and approval.

925.5.2.13 Before the work will be accepted, coordinates accurate to within 0.3 feet horizontally and 0.1 feet vertically shall be provided on the Record Drawings for all fitting locations, runs of mainline at a maximum of 100 foot intervals, and all changes in pipe grade. Coordinates shall be determined by a field survey by a Professional Surveyor licensed in the state of New Mexico. Use the NAD 1983 NM STATE PLANE CENTRAL ZONE for x and y coordinates and NAVD 1988 for z coordinate. A report certified by the licensed Professional Surveyor shall be referenced on the Record Drawings.

925.5.3 ISOLATION VALVE

925.5.3.1 Isolation valves and valve box shall be installed per Standard Detail Drawing 2170.

925.5.3.2 Before the work will be accepted, vacuum isolation valve coordinates, accurate to within 0.3 feet, shall be provided on the Record Drawings. Coordinates shall be determined by a field survey by a Professional Surveyor licensed in the state of New Mexico. Use the NAD 1983 NM STATE PLANE CENTRAL ZONE for x and y coordinates and NAVD 1988 for z coordinate. A report certified by the licensed Professional Surveyor shall be referenced on the Record Drawings.

925.5.4 VACUUM VALVE PIT INSTALLATION

925.5.4.1 Install complete vacuum valve pits in accordance with manufacturer instructions and Standard Detail Drawing 2165. Perform pressure testing on each valve pit assembly per the manufacturer instructions.

925.5.4.2 Stub-outs for the gravity service line from the collection sump should be 4" diameter, extended to the property line unless otherwise indicated. Each stub-out should have a stop glued in place 4" to 6" from the end inserted into the tank, to prevent it being pushed too far into the collection sump. A solvent welded 4" cap should be

fitted and glued to each stub-out to prevent rocks and groundwater entering the sump prior to connection of the house gravity line. Expandable test plugs or rubber caps are not acceptable as temporary covers for gravity stub-outs.

925.5.4.3 Before the work will be accepted, vacuum valve pit coordinates, accurate to within 0.3 feet, shall be provided on the Record Drawings. Coordinates shall be determined by a field survey by a Professional Surveyor licensed in the state of New Mexico. Use the NAD 1983 NM STATE PLANE CENTRAL ZONE for x and y coordinates and NAVD 1988 for z coordinate. A report certified by the licensed Professional Surveyor shall be referenced on the Record Drawings.

925.5.5 SINGLE OR DOUBLE BUFFER TANK INSTALLATION

925.5.5.1 Install single or double buffer tank as shown on the construction drawings and Standard Detail Drawing 2167 (single) or 2168 (double).

925.5.5.2 All pipe penetrations through the buffer tank walls shall be water tight. Submit manufacturer's literature on material and technique for sealing to the ENGINEER.

925.5.5.3 Install suction and sensor pipes as shown on the Standard Detail Drawings. Attach these lines to the buffer tank side walls using Type 304 stainless steel brackets and fasteners. The 3" service lateral is to be stubbed into the buffer tank and capped or otherwise sealed until the vacuum valve is installed.

925.5.5.4 Install breather pipe through buffer tank wall as shown on Standard Detail Drawing 2167 (single) or 2168 (double). This line is to be capped or otherwise sealed to prevent any infiltration of water during construction. It shall be tested in accordance with Breather Test Procedure, Paragraph 925.8.

925.5.5.5 Buffer tanks shall be tested after assembly. The entire buffer tank shall be tested as follows:

925.5.5.5.1 Stub-outs, manhole boots, and pipe plugs shall be permanently secured to prevent movement while the vacuum is drawn.

925.5.5.5.2 Installation and operation of vacuum equipment and indicating devices shall be in accordance with manufacturer's recommendations.

925.5.5.5.3 Using Water Authority-furnished vacuum pump and gage, establish a measured vacuum of 10 inches of mercury in the buffer tank then record the time for the vacuum to drop to nine inches of mercury.

925.5.5.5.4 The maximum allowable leakage rate for a four foot diameter manhole shall be in accordance with the following:

Manhole Depth	Min. Elapsed Time For a Pressure Change of 1" Hg
10' or less	60 seconds
> 10' but < 15'	75 seconds
≥ 15' but < 25'	90 seconds

925.5.5.5.5 If the buffer tank fails the test, necessary repairs shall be made and the vacuum test and repairs shall be repeated until the tank passes the test. The extent and type of repairs that may be allowed shall be subject to the approval of the ENGINEER. Leaks shall be repaired on the outside of the manhole unless otherwise approved by the ENGINEER.

925.5.5.5.6 If the joint mastic in a buffer tank is pulled out during the vacuum test, the manhole shall be disassembled and the mastic replaced.

925.5.5.5.7 Record test results on a calibrated chart recorder as described in Section 925.6, Field Quality Control.

925.5.5.6 Before the work will be accepted, buffer tank coordinates, accurate to within 0.3 feet, shall be provided on the Record Drawings. Coordinates shall be determined by a field survey by a Professional Surveyor licensed in the state of New Mexico. Use the NAD 1983 NM STATE PLANE CENTRAL ZONE for x and y coordinates and NAVD 1988 for z coordinate. A report certified by the licensed Professional Surveyor shall be referenced on the Record Drawings.

925.5.6 INSTALLATION OF CASING FOR SANITARY SEWER VACUUM MAIN OR FORCE MAIN: Casing for sanitary sewer vacuum main or force main shall be per construction drawings, Standard Detail Drawing 2180, Standard Detail Drawing 2380, and per Section 710 of this publication.

925.5.7 AIR RELEASE VALVE INSTALLATION:

925.5.7.1 Air release valves shall be installed per Standard Detail Drawing 2160.

925.5.7.2 Before the work will be accepted, air release valve coordinates, accurate to within 0.3 feet shall be provided on the Record Drawings. Coordinates shall be determined by a field survey by a Professional Surveyor licensed in the state of New Mexico. Use the NAD 1983 NM STATE PLANE CENTRAL ZONE for x and y coordinates and NAVD 1988 for z coordinate. A report certified by the licensed Professional Surveyor shall be referenced on the Record Drawings.

925.6 FIELD QUALITY CONTROL

925.6.1 Provide daily testing of all sewer mains and lateral connections that are laid. Plug all open connections with rubber stoppers or temporary caps, fitted to the pipe by "no-hub" couplings. Using Water Authority-furnished vacuum pump and chart recorder, apply a vacuum to 22 inches of mercury to the pipes with pump running continuously for 15 minutes to allow vacuum to stabilize before proceeding with test. There shall be no loss in excess of 1% of initial vacuum per hour for a two hour test period. As pipe is laid the new section shall be tested in addition to the previously laid pipe on that main.

925.6.2 Leave uncovered the sewer main pipe joints until after the daily vacuum test is complete so that any leaks can be easily located and repaired. Exposed joints shall be adequately restrained.

925.6.3 Two hour Vacuum Line Test Modification Provision: If the CONTRACTOR succeeds in meeting the daily 2-hour test for seven consecutive working days or two thousand feet of pipe, the ENGINEER may amend the procedure to allow the trench to be covered as work progresses rather than the trench being kept open all day as is the norm with the daily 2-hour test. Should a line fail the vacuum test while utilizing this test modification, the CONTRACTOR shall take whatever action is necessary at his cost to pass the test including the excavation of the trench, leak detection and line repair, and additional cleanup as required by the ENGINEER. After the failure, the CONTRACTOR must re-qualify as specified above. Note this test modification is optional, and as such, the CONTRACTOR assumes all liability in its use. Allowance of this modification by the ENGINEER is not considered acceptance of the sewer line or ability to withstand test vacuum pressures.

925.6.4 Installation and operation of vacuum equipment and indicating devices shall be in accordance with manufacturer's recommendations.

925.6.5 Required Final Acceptance Testing on complete system: Provide 48 hour notice (minimum) to ENGINEER prior to test. Ensure all isolation valves are open prior to beginning of test. Subject the entire sewerage system to a vacuum of 22 inches of mercury, and allow the system to stabilize for 15 minutes before proceeding with test. There shall be no loss greater than 1% of initial vacuum per hour over a four hour test period.

925.6.6 All daily testing and Final Acceptance Test shall be recorded on vacuum charts to be provided by the ENGINEER. These charts will not be considered valid unless witnessed by ENGINEER on test equipment at beginning and end of vacuum test period.

925.6.7 The ENGINEER will sign and date charts to verify witness of tests. This signature does not indicate acceptance of the system.

925.7 LINE FLUSHING

925.7.1 After acceptance testing, flush lines to remove debris and foreign materials that accumulated in the lines during construction.

925.7.1.1 Suggested procedure (This procedure requires the use of vacuum valves. Coordination of installation by the Water Authority is the responsibility of the CONTRACTOR):

925.7.1.1.1 Place system under vacuum to 22 inches mercury.

925.7.1.1.2 Add water to valve pits at extreme ends of system and cause vacuum valves to operate and draw water into piping system.

925.7.1.1.3 Utilize system vacuum to transport the water and debris to collection point. Continue procedure until water entering at collection point is free of contamination or debris. If vacuum station collection tank is used as collection point, monitor volume of liquid in tank and pump out as necessary by means other than system sewage pumps. After completion of flushing, clean collection tank of all collected debris.

925.7.1.1.4 Restore vacuum collection tank and collection system to permanent configuration and make ready to place into operation.

925.7.1.2 Alternate flushing procedures are subject to ENGINEER'S review and approval.

925.8 BREATHER TESTING

925.8.1 After entire breather assembly is complete from the above ground flexible extension to the interior of the valve vault or buffer chamber, it shall be pressure tested as follows:

925.8.1.1 Fabricate a test pipe using ¾-inch PVC materials or approved equal; one end to be ¾-inch male pipe thread, the opposite end to terminate with a 1/8-inch tubing connection.

925.8.1.2 Remove breather dome and install the test pipe in its place. Pressurize the breather assembly to a minimum 40-inch water gage as measured with a magnehelic gauge. The assembly shall remain at a constant pressure with no detectable leaks for a minimum of one minute in the presence of the on-site field inspector. A dated record of all testing of breather domes shall be maintained in a bound notebook, which shall be turned over to the ENGINEER upon completion of all work.

925.9 MEASUREMENT AND PAYMENT

925.9.1 SANITARY SEWER FORCE MAIN WITH BEDDING

925.9.1.1 Measurement shall be per linear foot measured horizontally along the centerline of pipeline and fittings from the collection/lift station interface to the point of discharge as shown on the construction drawings. No deduction from the total will be made for intermittent installations such as isolation valves, pig launchers, and associated manholes.

925.9.1.2 Payment will be in accordance with the unit price per linear foot per size and material as defined in the Bid Proposal, and shall include: unclassified excavation in open trench, backfilling, and compaction for all trench zones; hand digging; removing and replacing surface obstructions; discovery and protection of subsurface obstructions; shoring and bracing; hauling excavated material; restoration of disturbed areas not included in other pay items; all fittings, concrete thrust blocking or restrained joints; installation of electronic marking devices and green metalized warning tape; preparation of pipe subgrade; furnishing and placing granular bedding; trench dewatering; temporary connections; jointing and coupling materials; furnishing and installing pipe in open trench; flushing and cleaning the pipe; air and hydrostatic pressure testing; and all other labor, material, and equipment incidental thereto.

925.9.2 SANITARY SEWER FORCE MAIN PIG LAUNCHER

925.9.2.1 Measurement of installed pig launcher shall be per each unit installed as shown on the construction drawings.

925.9.2.2 Payment for the pig launchers will be in accordance with the unit price per each as defined in the Bid Proposal, and shall include: furnishing and installing all fittings, flanges, restraining glands, and harnesses; drilling and preparing precast manhole section for slotted opening including gaskets, sealants, and grout; furnishing and installing resilient seat gate valves; preparing and installing cast-in-place concrete footer and pad on finished ground including trenching, backfilling, and compaction, furnishing and installing reinforcing steel; furnishing and installing precast manhole sections including trenching, backfilling, and compaction, gaskets, electronic marker device, frame and cover; furnishing and installing gravel bed for floor of manhole; and all other labor, material, and equipment incidental thereto.

925.9.3 BORE AND JACK, CASING FOR SANITARY SEWER VACUUM MAIN OR FORCE MAIN

925.9.3.1 Measurement shall be per linear foot, measured horizontally along the centerline of the encasement pipe actually installed for the work accomplished as shown on the Standard Detail Drawings and on the construction drawings.

925.9.3.2 Payment will be in accordance with the unit price per linear foot as defined in the Bid Proposal, and shall include: trenching, unclassified excavation, backfilling, and compaction; furnishing and installing bored steel casing, casing insulators, and casing end seals; repair and replacement of existing roadway, bridge abutments, utilities, or any other structures damaged during boring and jacking operations; removal and disposal of waste material; providing grout for backfilling; inspections or permits; and all other labor, material, and equipment incidental thereto; except that the carrier pipe will be paid for under the appropriate bid item for vacuum main or force main.

925.9.4 SANITARY SEWER AIR RELEASE VALVE

925.9.4.1 Measurement shall be per each air release valve installed as shown on the Standard Detail Drawings and the construction drawings.

925.9.4.2 Payment will be in accordance with the unit price per each as defined in the Bid Proposal, and shall include: furnishing and installing air release valve with all necessary fittings and appurtenances; drilling and preparing precast manhole section for slotted opening including gaskets, sealants, and grout; preparing and installing cast-in-place concrete footer and pad on finished ground including trenching, backfilling, and compaction, furnishing and installing reinforcing steel; furnishing and installing precast manhole sections including trenching, backfilling, and compaction, gaskets, electronic marker device, frame, and cover; furnishing and installing gravel bed for floor of manhole; and all other labor, material, and equipment incidental thereto.

925.9.5 VACUUM SEWER ISOLATION VALVE AND VALVE BOX

925.9.5.1 Measurement shall be per each vacuum sewer isolation valve and valve box installed as shown on the construction drawings and the Standard Detail Drawing.

925.9.5.2 Payment will be in accordance with the unit price per each as defined in the Bid Proposal, and shall include: furnishing and installing resilient seat gate valve with all necessary fittings and appurtenances; furnishing the Water Authority with one 6-foot long T-handle extension bar for every five valves installed; furnishing, drilling, and preparing precast manhole section for slotted opening including gaskets, sealants, and grout; preparing and installing cast-in-place concrete footer and pad on finished ground including trenching, backfilling, and compaction; furnishing and installing reinforcing steel; furnishing and installing precast manhole sections including trenching, backfilling, and compaction, gaskets, electronic marker device, frame, and cover; furnishing and installing gravel bed for floor of manhole; and all other labor, material, and equipment incidental thereto.

925.9.6 VACUUM SEWER BUFFER TANK

925.9.6.1 Measurement shall be per each installed buffer tank (single or double per the respective bid item) as shown on the construction drawings and the Standard Detail Drawings.

925.9.6.2 Payment will be in accordance with the unit price per each as defined in the Bid Proposal, and shall include: furnishing and installing all necessary equipment, including pipe and breather connections, breather vent piping and flexible breather pipe assembly; preparing and installing cast-in-place concrete footer and pad on finished ground including trenching, backfilling, and compaction, furnishing and installing reinforcing steel; furnishing and installing precast manhole sections including trenching, backfilling, and compaction, gaskets, frame, and cover; furnishing and installing all fittings, pipe, and all appurtenances; connection of the new or existing sanitary sewer gravity lines including drilling precast manhole sections, gaskets, sealants, and grout; furnishing and installing concrete grout for shelf; air and vacuum testing as required; and all other labor, material, and equipment incidental thereto.

925.9.7 VACUUM VALVE PIT

925.9.7.1 Measurement shall be per each deep vacuum pit installed as shown on the construction drawings and the Standard Detail Drawings.

925.9.7.2 Payment will be in accordance with the unit price per each as defined in the Bid Proposal, and shall include: furnishing and installing all necessary equipment including unclassified excavation in open trench, backfilling, and compaction for all trench zones; hand digging; removing and replacing surface obstructions including fencing, landscaping, and all other obstructions; discovery and protection of subsurface obstructions; shoring and bracing; hauling excavated material, restoration of disturbed areas not included in other pay items; all fittings and concrete anti-flotation collar; installation of flexible breather pipe assembly and all appurtenances; stub-outs for connection of gravity and vacuum lines; air, vacuum, and all other testing as required; and all other labor, material, and equipment incidental thereto.

925.9.8 VACUUM COLLECTION LINES AND VACUUM SERVICE LATERALS

925.9.8.1 Measurement of vacuum collection lines and vacuum service laterals shall be per linear foot measured horizontally along the centerline of pipeline as shown on the drawings.

925.9.8.2 Payment will be in accordance with the unit price per linear foot per size and material as defined in the Bid Proposal, and shall include: unclassified excavation in open trench, backfilling, and compaction for all trench zones; hand digging; removing and replacing surface obstructions; discovery and protection of subsurface obstructions; shoring and bracing; hauling excavated material, restoration of disturbed areas not included in other pay items; all fittings, concrete thrust blocking or restrained joints; preparation of pipe subgrade; furnishing and placing granular bedding; trench dewatering; temporary connections; jointing and coupling materials; furnishing and installing pipe in open trench; flushing and cleaning the pipe; field quality control testing including daily vacuum testing of lines using Water Authority furnished trailer mounted vacuum pump, breather testing, and all other testing required; making all required submittals; and all other labor, material, and equipment incidental thereto.

925.9.9 VACUUM VALVES AND APPURTENANCES:

Measured and paid for per each as a separate pay item as included in the associated Vacuum Pit or Buffer Tank as specified and provided in the Bid Proposal.

SECTION 2000

STANDARD DETAIL DRAWINGS

2000.1 GENERAL

2000.1.1 This section contains City of Albuquerque Standard Detail Drawings which are related to the construction or installation of City utilities, streets, drainage improvements, paving cuts and repairs, landscaping and certain private facilities within a right-of-way or easement.

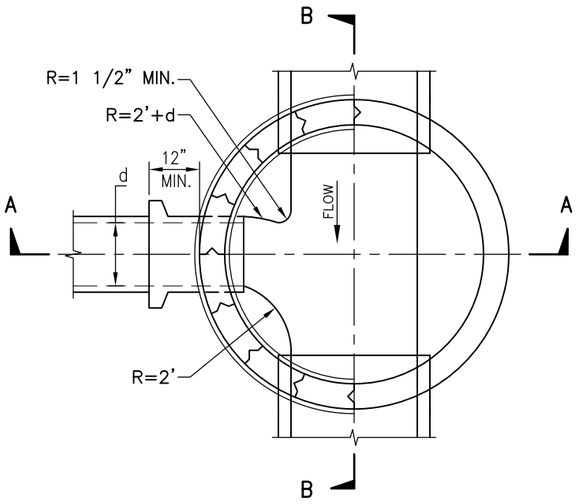
2000.0.2 These details are not required to be included in a project set of construction drawings if the individual details are properly referenced on the plan set. If a particular project design warrants additional details or modifications of these details, they shall be included in the project's construction plans.

2000.2 CONTENTS

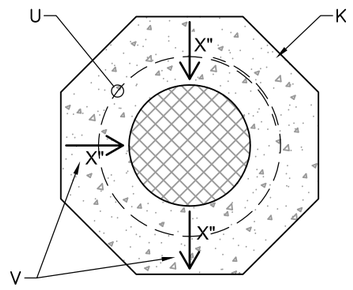
SECTION 2100

STANDARD DETAILS FOR SANITARY SEWER

DWG. NO.	TITLE
2101	SANITARY SEWER MANHOLE TYPE “C”
2102	SANITARY SEWER MANHOLE TYPE “E”
2107	SANITARY SEWER CONCRETE MANHOLE TOP SLAB TYPE “C”
2109	SANITARY SEWER MANHOLE FRAMES AND COVERS
2116	SANITARY SEWER VERTICAL DROP AT MANHOLE
2118	SANITARY SEWER SERVICE LINE CONNECTIONS AT MANHOLE
2125	SANITARY SEWER SERVICE LINE DETAILS
2128	SANITARY SEWER RING AND COVER FOR VALVE BOX
2134	SANITARY SEWER SERVICE REPLACEMENT DETAIL
2135	SANITARY SEWER RISER DETAILS RIGID PIPE MAIN
2136	SANITARY SEWER RISER DETAILS FLEXIBLE PIPE MAIN
2140	SANITARY SEWER ENCASEMENT DETAILS
2145	SANITARY SEWER - SEWER LINE DEAD-END MARKER
2150	SANITARY SEWER SAMPLING AND METERING MANHOLE 6’ x 8’ RECTANGULAR
2160	SANITARY SEWER AIR RELEASE VALVE DETAIL
2162	VACUUM SEWER STANDARD DETAILS
2163	VACUUM SEWER VALVE AND PIT INSTALLATION WITH LIFT IN VACUUM SERVICE LATERAL
2164	VACUUM SEWER TYPICAL VACUUM BRANCH LINE CONNECTION
2165	VACUUM SEWER 3” VALVE AND PIT INSTALLATION WITH INTERNAL BREATHER
2167	VACUUM SEWER SINGLE BUFFER TANK 30 GALLON PER MINUTE MAX. FLOW
2168	VACUUM SEWER DUAL BUFFER TANK 60 GALLON PER MINUTE MAX. FLOW
2169	VACUUM SEWER VALVE STEM NUT AND SOCKET DETAILS
2170	VACUUM SEWER VALVE BOX
2171	VACUUM SEWER VACUUM VALVE PIT
2173	VACUUM SEWER BLOCKING AND SEEPAGE COLLAR DETAILS
2174	VACUUM SEWER SERVICE WYE ON EXISTING VACUUM MAIN
2180	VACUUM SEWER CASING DETAIL FOR BORE AND JACK
2181	FORCEMAIN SEWER VALVE BOX
2182	FORCEMAIN SEWER LOW PRESSURE SANITARY SEWER FLUSHING CONNECTION
2183	FORCEMAIN SEWER CONNECTION TO GRAVITY SEWER AT MANHOLE
2184	FORCEMAIN SEWER TYPICAL FORCEMAIN CONFIGURATION
2185	FORCEMAIN SEWER SERVICE LINE VALVE DETAIL



PLAN AT C–C



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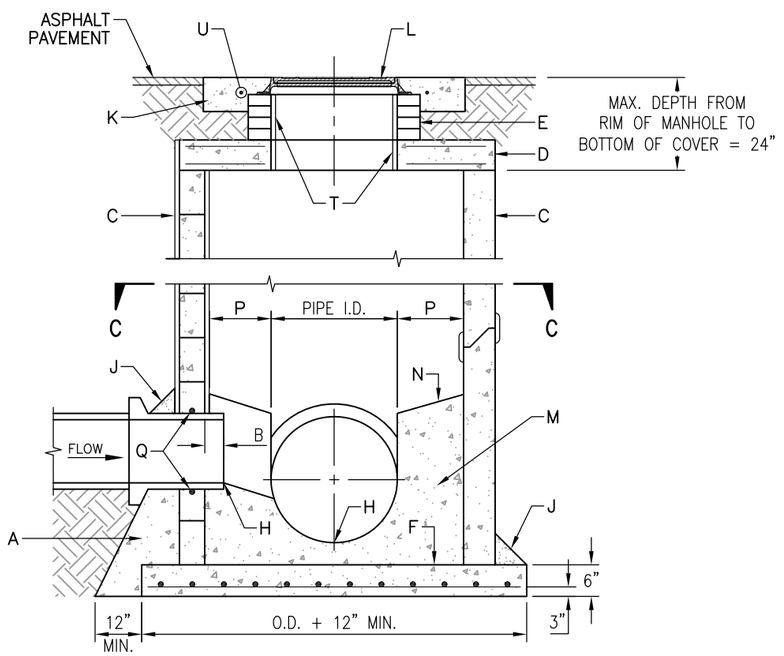
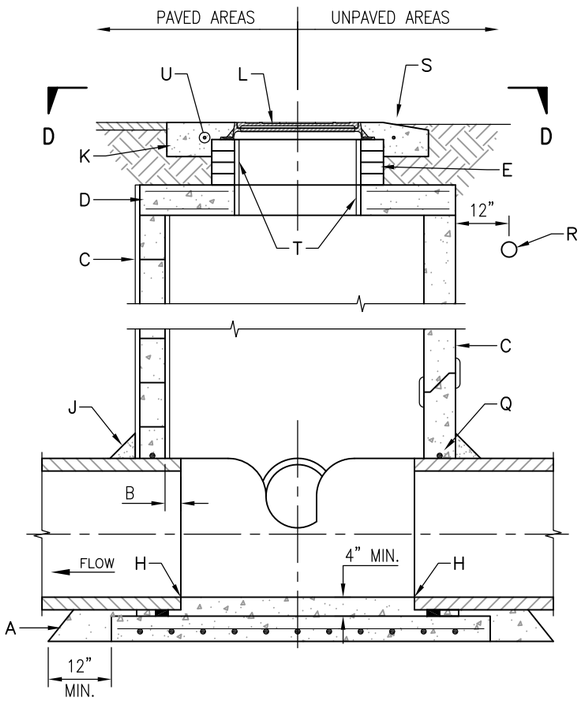


CROSS SECTION A–A



CROSS SECTION B–B

GENERAL NOTES

1. USE TYPE "C" MANHOLE FOR DEPTHS OF <6' MEASURED FROM INVERT TO RIM.
2. CONTRACTOR HAS OPTION TO CONSTRUCT TYPE "C" MANHOLE IN LIEU OF TYPE "E" MANHOLE FOR DEPTHS ≥6'.
3. MANHOLES >18' IN DEPTH SHALL BE CONSTRUCTED OF PRECAST CONCRETE SECTIONS ONLY.
4. DESIGN APPLIES TO 4' TO 6' I.D. MANHOLES.
5. COMPACT ALL BACKFILL AROUND MANHOLE TO 95% (ASTM).
6. USE NON–SHRINK GROUT FOR JOINTS, FILLETS AND PIPE PENETRATIONS.
7. APPLY WATERPROOFING COATING TO EXTERIOR OF MANHOLE IN AREAS WHERE GROUNDWATER IS PRESENT.
8. AN INTERIOR COATING, WITH A WATER AUTHORITY APPROVED EPOXY RESIN–TYPE MATERIAL, SHALL BE APPLIED TO MANHOLES ON MAINS LARGER THAN 24" IN DIAMETER.
9. POSITION MANHOLE OPENING OVER THE CENTER OF MANHOLE.

CONSTRUCTION NOTES

A. CONCRETE PIPE SUPPORTS SHALL EXTEND OUTSIDE OF MANHOLE TO BELL OF FIRST JOINT AND SHALL CRADLE PIPE TO SPRING LINE. NOT APPLICABLE FOR FLEXIBLE PIPE.

B. PIPE PENETRATION INTO MANHOLE SHALL BE FLUSH TO 2" MAX., MEASURED AT SPRINGLINE OF PIPE.

C. MANHOLE MAY BE CONSTRUCTED OF CONCRETE BLOCK, POURED CONCRETE, OR PRECAST REINFORCED CONCRETE. IF PRECAST CONCRETE IS USED, USE MASTIC GASKETS AND APPLY NON–SHRINK GROUT TO EXTERIOR AND INTERIOR OF EXPANSION JOINTS. IF BLOCK IS USED, APPLY 1/2" THICK MORTAR COATING TO EXTERIOR AND INTERIOR OF MANHOLE.

D. PRECAST CONCRETE TOP SLAB, SEE STANDARD DRAWING 2107.

E. USE MAX. 4 COURSES GRADE MS BRICK ON UNPAVED STREET FOR FUTURE ADJUSTMENT OF MANHOLE FRAME TO PAVEMENT GRADE.

F. CONCRETE BASE TO BE POURED IN PLACE USING NO. 4 BARS AT 6" O.C. EA. WAY FOR MANHOLE DEPTH OF ≥16'. NO. 4 BARS AT 12" O.C. EA. WAY FOR MANHOLE DEPTH OF <16'.

H. INVERT ELEVATION OF STUB OR LATERAL AS SHOWN ON PLANS.

J. 6" GROUT FILLET ON UPPER HALF OF PIPE AND AROUND BASE.

K. OCTAGONAL CONCRETE PAD, SEE STANDARD DWG. 2461 FOR REFERENCE.

L. MANHOLE FRAME AND COVER, SEE DRAWING 2109. INSTALL A 24" COVER FOR SEWER LINE ≤24", AND A 32" COVER FOR SEWER LINE >24".

M. CONCRETE, SEE SPECIFICATION SECTION 101.

N. SLOPE 1" PER FT. FROM PIPE CROWN.

P. SHELF TO BE 9" WIDE MIN.

Q. APPROVED WATERSTOP TO BE COMPATIBLE WITH TYPE OF PIPE.

R. ELECTRONIC MARKER DEVICE (EMD). SEE STANDARD SPECIFICATION SECTION 170.

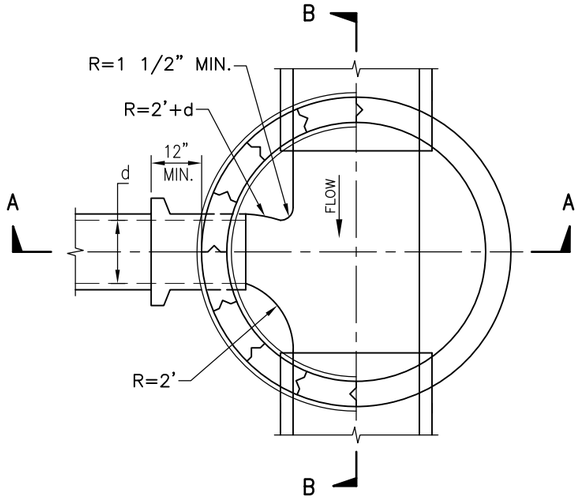
S. CONCRETE COLLAR IN UNPAVED AREAS, SEE STANDARD DRAWING 2461.

T. APPLY 1/2" THICK MORTAR COATING TO INTERIOR OF OPENING.

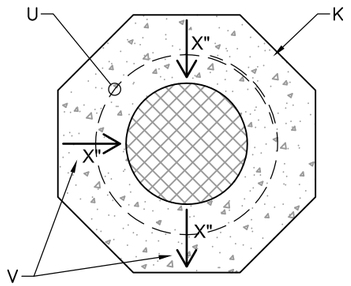
U. #4 REBAR PER STANDARD DRAWING 2461.

V. TOP OF CONCRETE COLLAR SHALL BE STAMPED WITH LINE SIZE AND FLOW DIRECTION ARROWS. MINIMUM LETTER SIZE SHALL BE 3" IN HEIGHT.

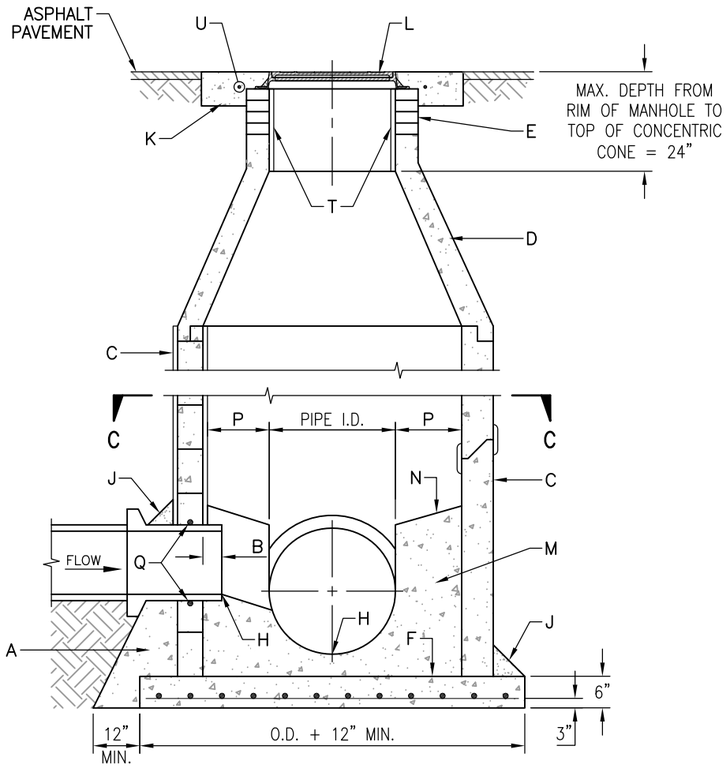
REVISIONS	WATER AUTHORITY
	SANITARY SEWER MANHOLE TYPE "C"
	DWG. 2101 JAN. 2013



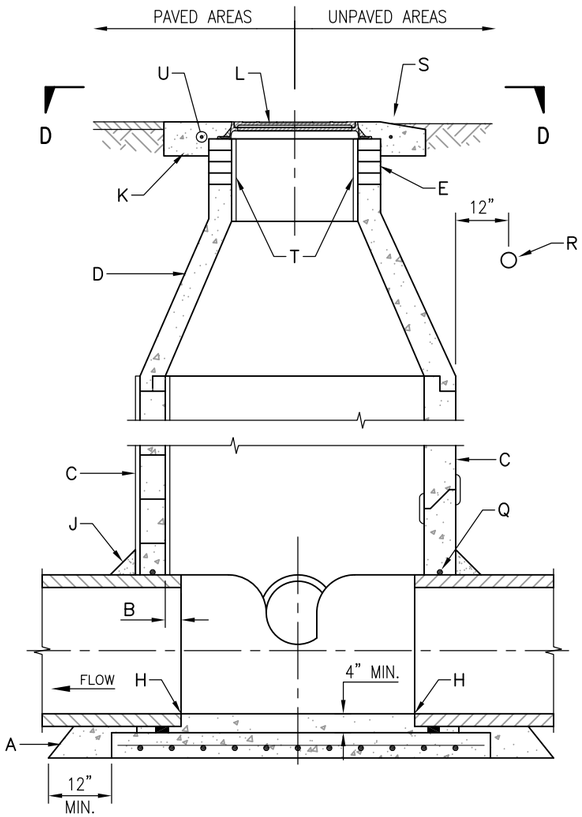
PLAN AT C–C



PLAN AT D–D



CROSS SECTION A–A



CROSS SECTION B–B

GENERAL NOTES

1. USE TYPE "E" MANHOLE FOR DEPTHS OF ≥6' MEASURED FROM INVERT TO RIM.
2. CONTRACTOR HAS OPTION TO CONSTRUCT TYPE "C" MANHOLE IN LIEU OF TYPE "E" MANHOLE FOR DEPTHS ≥6'.
3. MANHOLES >18' IN DEPTH SHALL BE CONSTRUCTED OF PRECAST CONCRETE SECTIONS ONLY.
4. DESIGN APPLIES TO 4' TO 6' I.D. MANHOLES.
5. COMPACT ALL BACKFILL AROUND MANHOLE TO 95% (ASTM).
6. USE NON–SHRINK GROUT FOR JOINTS, FILLETS AND PIPE PENETRATIONS.
7. APPLY WATERPROOFING COATING TO EXTERIOR OF MANHOLE IN AREAS WHERE GROUNDWATER IS PRESENT.
8. AN INTERIOR COATING, WITH A WATER AUTHORITY APPROVED EPOXY RESIN–TYPE MATERIAL, SHALL BE APPLIED TO MANHOLES ON MAINS LARGER THAN 24" IN DIAMETER.
9. POSITION MANHOLE OPENING OVER THE CENTER OF MANHOLE.

CONSTRUCTION NOTES

A. CONCRETE PIPE SUPPORTS SHALL EXTEND OUTSIDE OF MANHOLE TO BELL OF FIRST JOINT AND SHALL CRADLE PIPE TO SPRING LINE. NOT APPLICABLE FOR FLEXIBLE PIPE.

B. PIPE PENETRATION INTO MANHOLE SHALL BE FLUSH TO 2" MAX., MEASURED AT SPRINGLINE OF PIPE.

C. MANHOLE MAY BE CONSTRUCTED OF CONCRETE BLOCK, POURED CONCRETE, OR PRECAST REINFORCED CONCRETE. IF PRECAST CONCRETE IS USED, USE MASTIC GASKETS AND APPLY NON–SHRINK GROUT TO EXTERIOR AND INTERIOR OF EXPANSION JOINTS. IF BLOCK IS USED, APPLY 1/2" THICK MORTAR COATING TO EXTERIOR AND INTERIOR OF MANHOLE.

D. PRECAST REINFORCED CONCRETE CONCENTRIC CONE. THE CONTRACTOR SHALL PROVIDE SHOP DRAWINGS FOR APPROVAL.

E. USE MAX. 4 COURSES GRADE MS BRICK ON UNPAVED STREET FOR FUTURE ADJUSTMENT OF MANHOLE FRAME TO PAVEMENT GRADE.

F. CONCRETE BASE TO BE POURED IN PLACE USING NO. 4 BARS AT 6" O.C. EA. WAY FOR MANHOLE DEPTH OF ≥16'. NO. 4 BARS AT 12" O.C. EA. WAY FOR MANHOLE DEPTH OF <16'.

H. INVERT ELEVATION OF STUB OR LATERAL AS SHOWN ON PLANS.

J. 6" GROUT FILLET ON UPPER HALF OF PIPE AND AROUND BASE.

K. OCTAGONAL CONCRETE PAD, SEE STANDARD DWG. 2461 FOR REFERENCE.

L. MANHOLE FRAME AND COVER, SEE DRAWING 2109. INSTALL A 24" COVER FOR SEWER LINE ≤24", AND A 32" COVER FOR SEWER LINE >24".

M. CONCRETE, SEE SPECIFICATION SECTION 101.

N. SLOPE 1" PER FT. FROM PIPE CROWN.

P. SHELF TO BE 9" WIDE MIN.

Q. APPROVED WATERSTOP TO BE COMPATIBLE WITH TYPE OF PIPE.

R. ELECTRONIC MARKER DEVICE (EMD). SEE STANDARD SPECIFICATION SECTION 170.

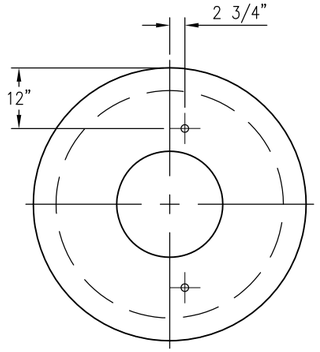
S. CONCRETE COLLAR IN UNPAVED AREAS, SEE STANDARD DRAWING 2461.

T. APPLY 1/2" THICK MORTAR COATING TO INTERIOR OF OPENING.

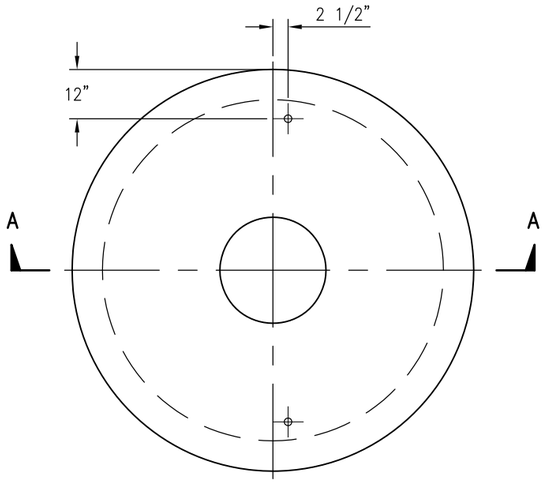
U. #4 REBAR PER STANDARD DRAWING 2461.

V. TOP OF CONCRETE COLLAR SHALL BE STAMPED WITH LINE SIZE AND FLOW DIRECTION ARROWS. MINIMUM LETTER SIZE SHALL BE 3" IN HEIGHT.

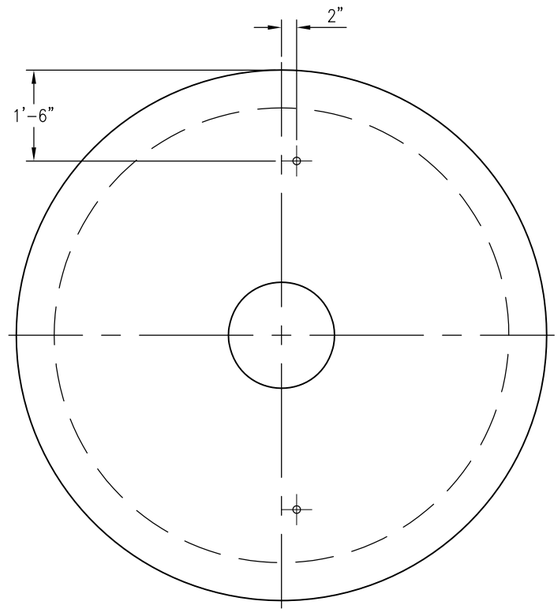
REVISIONS	WATER AUTHORITY
	SANITARY SEWER MANHOLE TYPE "E"
	DWG. 2102 JAN. 2013



4' I.D. MH



6' I.D. MH



8' I.D. MH

PLAN

GENERAL NOTES

1. ALL MANHOLES ≥20' IN DEPTH WILL REQUIRE AN INTERMEDIATE LANDING IN THE MANHOLE BARREL. TYPE "C" MANHOLE TOP SLABS SHALL BE USED AS INTERMEDIATE LANDINGS.
2. INTERMEDIATE LANDINGS SHALL BE LOCATED AT THE MID POINT ±2' OF THE HEIGHT OF THE MANHOLE. AT NO TIME SHALL AN INTERMEDIATE LANDING OR A SIZE ADJUSTMENT TOP BE INSTALLED CLOSER THAN 8' UP FROM THE INVERT OF THE MANHOLE.

CONSTRUCTION NOTES

A. PRECAST REINFORCED CONCRETE MANHOLE TOP SLAB.

B. ALL BARS TO HAVE 1 1/2" MIN. COVER.

C. 1" PIPE SLEEVE VERTICALLY THROUGH TOP SLAB.

D. TOP MAT NO. 4 BARS 6" O.C. EACH WAY FOR 4', 6' AND 8' I.D. MANHOLES.

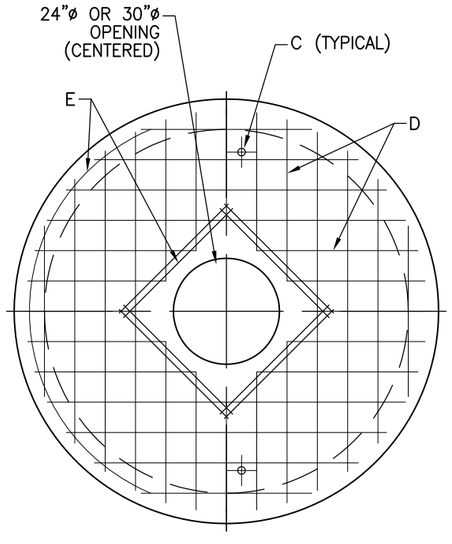
E. NO. 4 BARS

F. BOTTOM MAT NO. 4 BARS 6" O.C. EACH WAY FOR 4' AND 6' I.D. MANHOLES, NO. 8 BARS 8" O.C. EACH WAY FOR 8' I.D. MANHOLES.

G. NO. 4 BARS FOR 4' AND 6' I.D. MANHOLES.

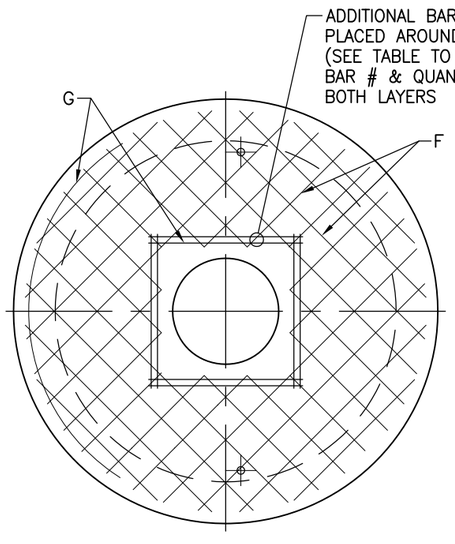
H. WHEN PRECAST MANHOLE SECTIONS ARE USED, TOP SLAB SHALL BE MODIFIED TO SHAPE OF APPROPRIATE SIZE TONGUE AND GROOVE JOINT.

J. CONCRETE, SEE SECTION 101.



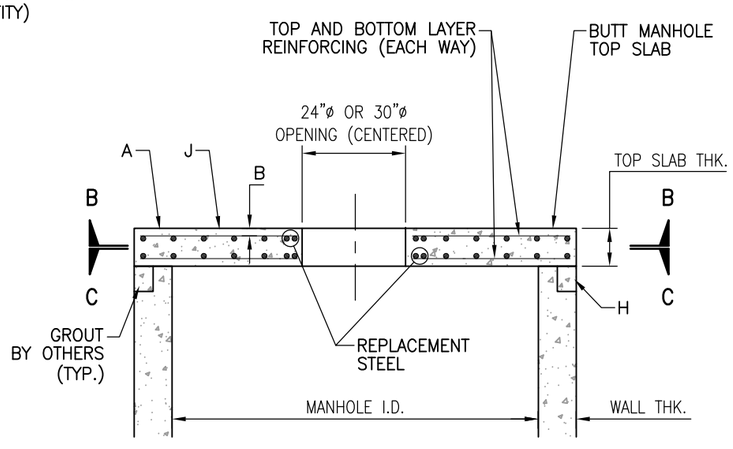
SECTION B–B

TOP MAT



SECTION C–C

BOTTOM MAT



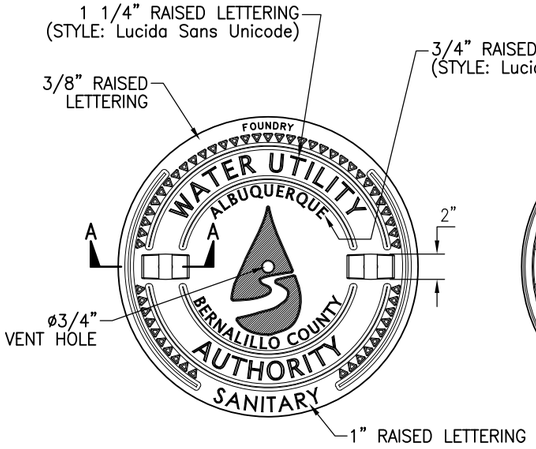
SECTION A–A

FLAT TOP SLAB REINFORCEMENT DETAIL

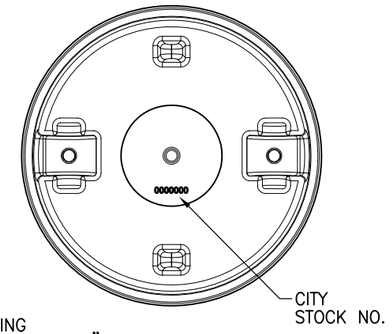
MANHOLE I.D.	48"	60"	72"	96"	120"
TOP SLAB THK.	8"	8"	8"	10"	10"
WALL THK.	5"	6"	7"	9"	11"
TOP LAYER STEEL (IN^2/FT)	0.40	0.40	0.40	0.40	0.40
BTM LAYER STEEL (IN^2/FT)	0.40	0.43	0.50	1.19	1.19
REPLACEMENT STEEL (BAR #)	(8)#5's	(8)#5's	(8)#6's	(8)#8's	(8)#8's
APPROX. WEIGHT (LBS.)	1,521	2,513	3,720	8,468	13,355

NOTES:
1) f'c = 4000 psi (MIN.)
2) fy = 60,000 (MIN.)
3) 1 1/2" MINIMUM CLEAR CONCRETE COVER OVER REINFORCEMENT
4) HS–20 LIVE LOAD
5) SEE TABLE FOR APPROXIMATE WEIGHT

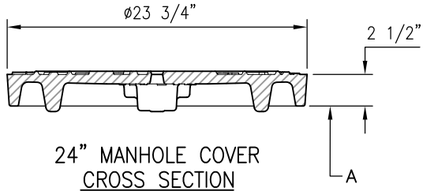
REVISIONS	WATER AUTHORITY
	SANITARY SEWER CONCRETE MANHOLE TOP SLAB TYPE "C"
	DWG. 2107 JAN. 2013



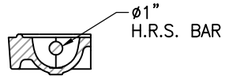
24" MANHOLE COVER
PLAN VIEW



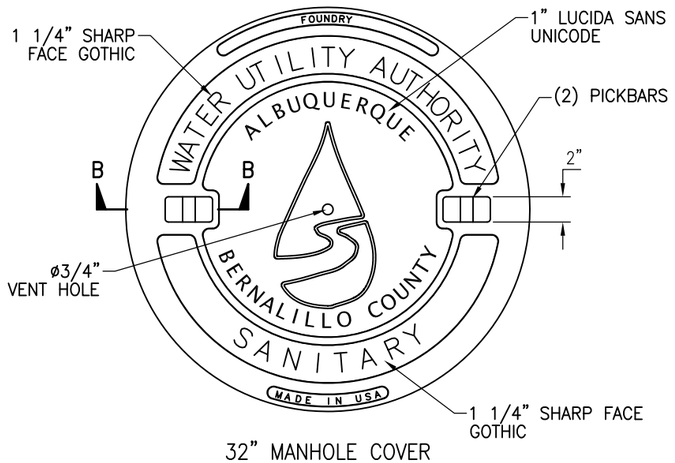
24" MANHOLE COVER
BOTTOM VIEW



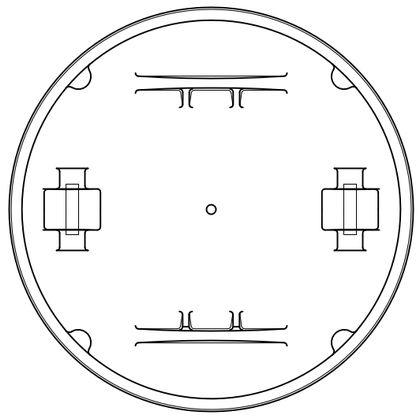
24" MANHOLE COVER
CROSS SECTION



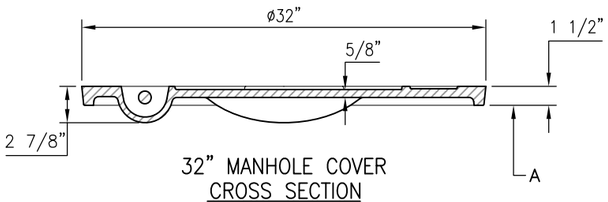
SECTION A–A



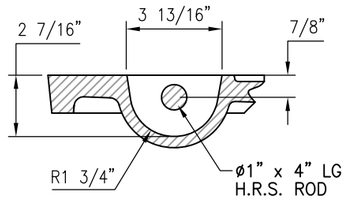
32" MANHOLE COVER
PLAN VIEW



32" MANHOLE COVER
BOTTOM VIEW



32" MANHOLE COVER
CROSS SECTION



SECTION B–B

GENERAL NOTES

1. REFERENCE SPECIFICATION SECTIONS 161 AND 163.
2. ONLY PRODUCTS CAST IN THE USA WILL BE ACCEPTABLE.

24" GENERAL NOTES

1. STANDARD 24" GRAY IRON MANHOLE FRAME AND DUCTILE IRON COVER.
   APPROXIMATE WEIGHTS:
   COVER=127 LBS., FRAME=150 LBS.
   TOTAL=277 LBS. (TOLERANCE= ±5%)

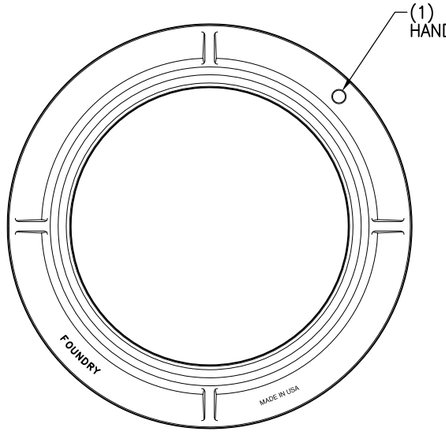
32" GENERAL NOTES

1. STANDARD 32" GRAY IRON MANHOLE FRAME AND DUCTILE IRON COVER.
   APPROXIMATE WEIGHTS:
   COVER=187 LBS., FRAME=125 LBS.
   TOTAL=312 LBS. (TOLERANCE= ±5%)

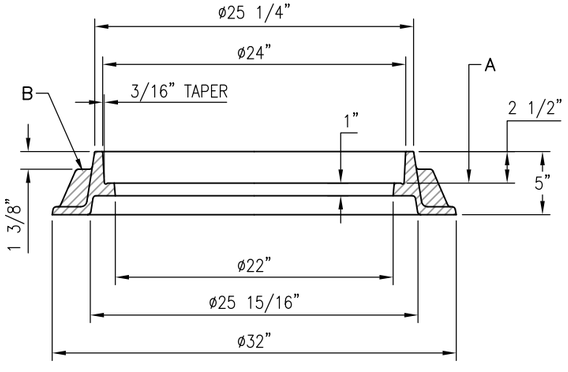
CONSTRUCTION NOTES

A. MACHINED SURFACE.

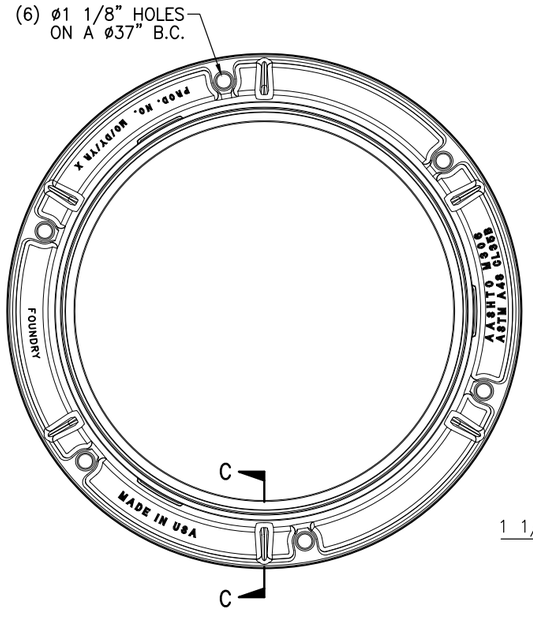
B. GUSSETS OPTIONAL IF REQUIRED BY MANUFACTURER.



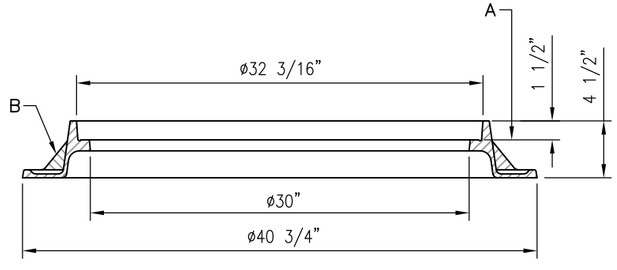
24" MANHOLE FRAME
PLAN VIEW



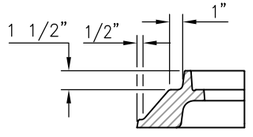
24" MANHOLE FRAME
CROSS SECTION



32" MANHOLE FRAME
PLAN VIEW

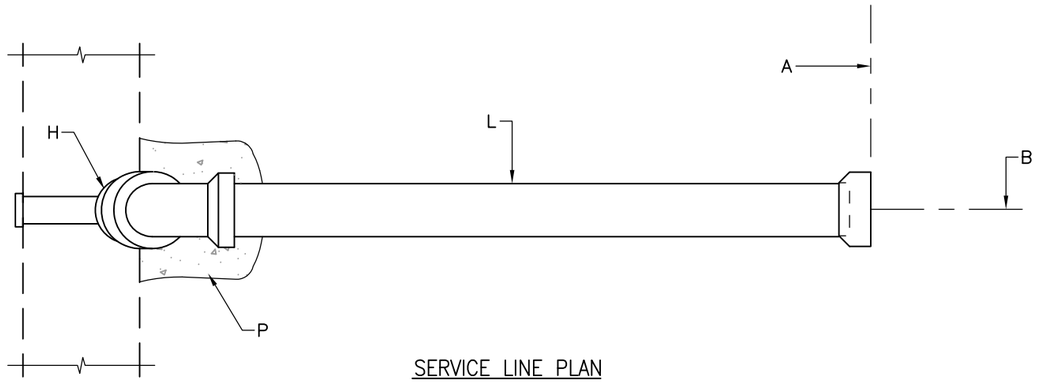


32" MANHOLE FRAME
CROSS SECTION

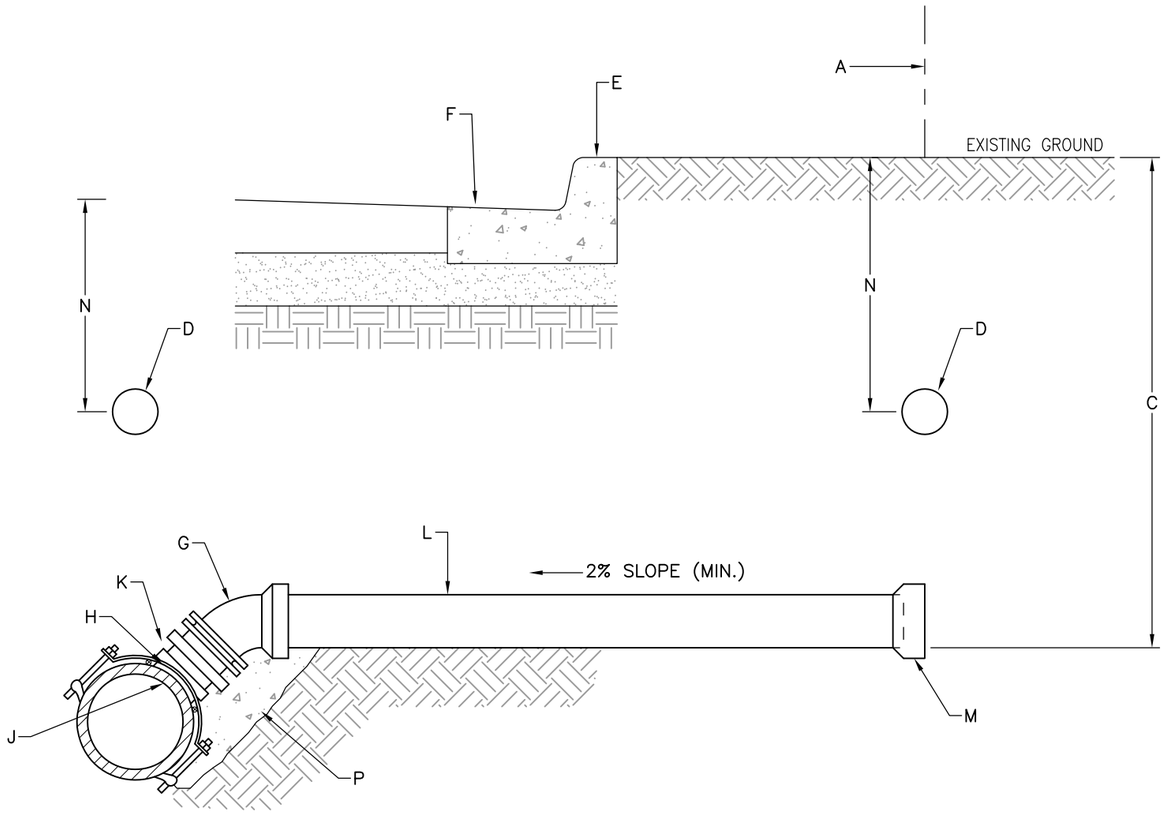


SECTION C–C
(TYPICAL RIB)

REVISIONS	WATER AUTHORITY
	SANITARY SEWER MANHOLE FRAMES AND COVERS
	DWG. 2109 JAN. 2013



SERVICE LINE PLAN



CROSS SECTION

GENERAL NOTES

1. ALL SERVICE LINES SHALL CONFORM TO THE PLUMBING CODE OF THE CITY OF ALBUQUERQUE.
2. THE SANITARY SEWER SERVICE LATERAL IS CONSIDERED 'PRIVATE' FROM THE MAIN LINE, INCLUDING THE SERVICE TEE TO THE PROPERTY LINE AND BEYOND. ALL MAINTENANCE AND/OR REPLACEMENT IS THE RESPONSIBILITY OF THE PROPERTY OWNER FOR WHICH IT IS PROVIDING THE SERVICE.

CONSTRUCTION NOTES

A. RIGHT–OF–WAY LINE.

B. CENTER LINE OF SERVICE LINE.

C. MINIMUM OF 4' TO 6' FROM INVERT TO TOP OF CURB AT RIGHT–OF–WAY LINE. MINIMUM DEPTH WILL DEPEND ON THE DEPTH OF THE MAIN SEWER LINE, THE MINIMUM SERVICE LINE SLOPE, THE DEPTH OF THE LOT BEING SERVED, LOCATION OF THE HOUSE ON THE LOT, AND THE GRADE OF THE LOT.

D. ELECTRONIC MARKER DEVICE (EMD). SEE STANDARD SPECIFICATION SECTION 170.

E. STAMP OR CHISEL 3" SIZE, "S" ON TOP OF CURB OVER LOCATION OF SERVICE LINE, MINIMUM 1/4" DEEP.

F. CURB & GUTTER.

G. 22.5° OR 45° BEND.

H. CORE DRILL.

J. SERVICE LINE SHALL NOT PROTRUDE INTO SEWER MAIN.

K. SANITARY SEWER TAPPING TEE PER WATER AUTHORITY APPROVED PRODUCTS LIST. DO NOT OVER TIGHTEN SADDLE BOLTS WHICH WOULD PREVENT FREE PASSAGE OF REQUIRED MANDREL.

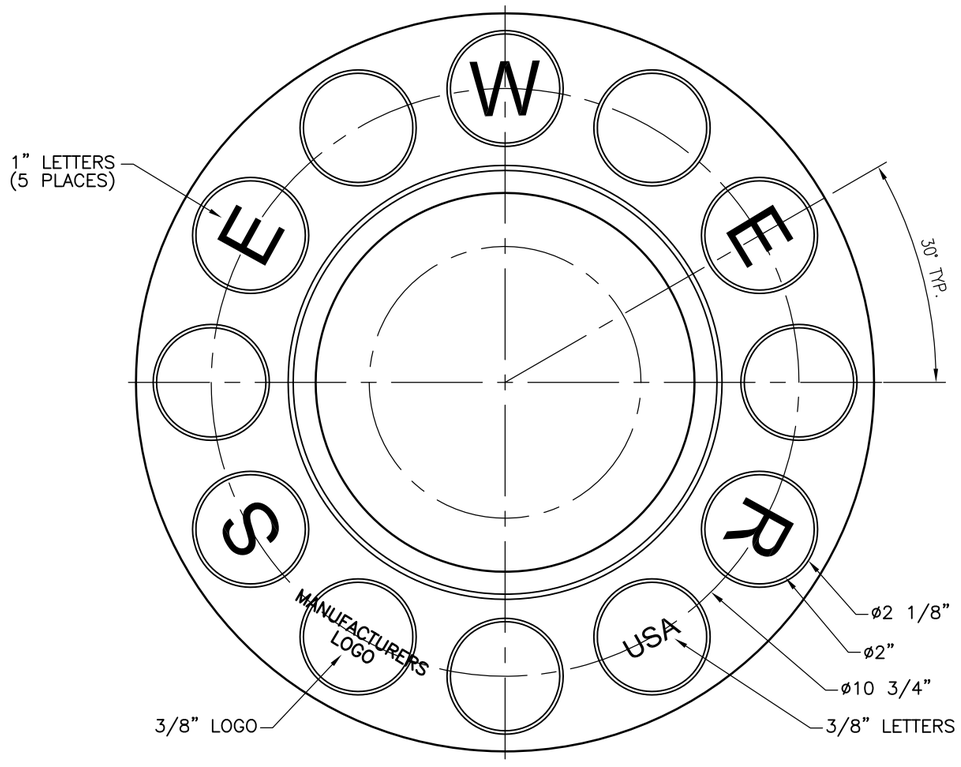
L. SERVICE LINE.

M. PLUG OR CAP UNTIL LATERAL IS PLACED IN SERVICE.

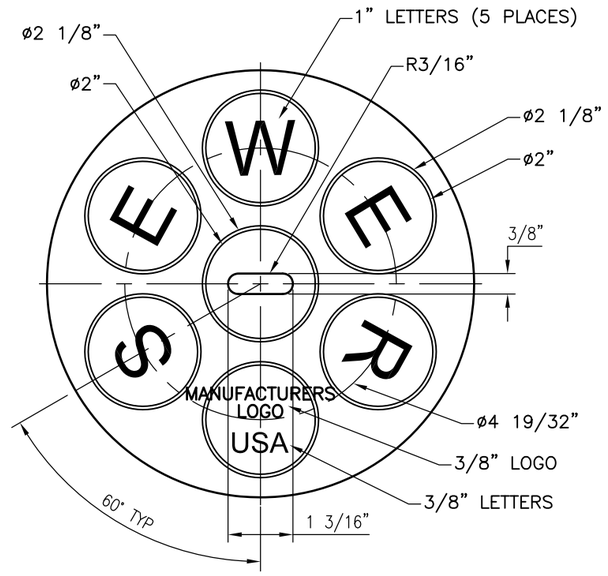
N. DEPTH PLACEMENT PER MANUFACTURER'S RECOMMENDATIONS.

P. BACKFILL UNDER SERVICE WITH MINIMUM 1 CUBIC FOOT OF CONCRETE.

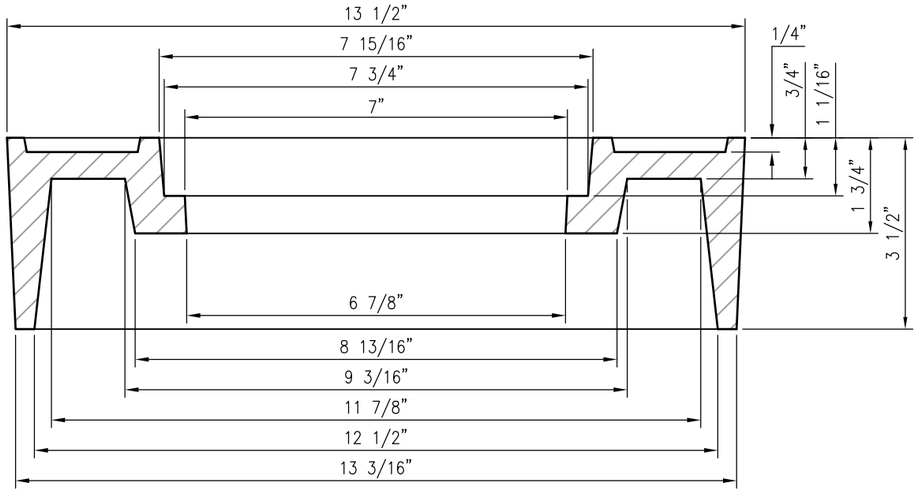
REVISIONS	WATER AUTHORITY
	SANITARY SEWER SERVICE LINE DETAILS
	DWG. 2125 JAN. 2013



PLAN VIEW

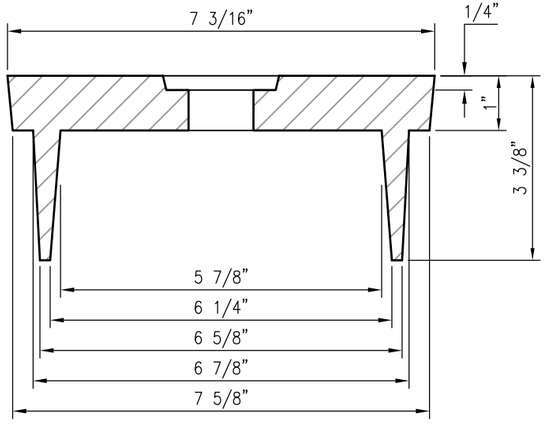


PLAN VIEW



SECTION

VALVE BOX RING



SECTION

VALVE BOX COVER

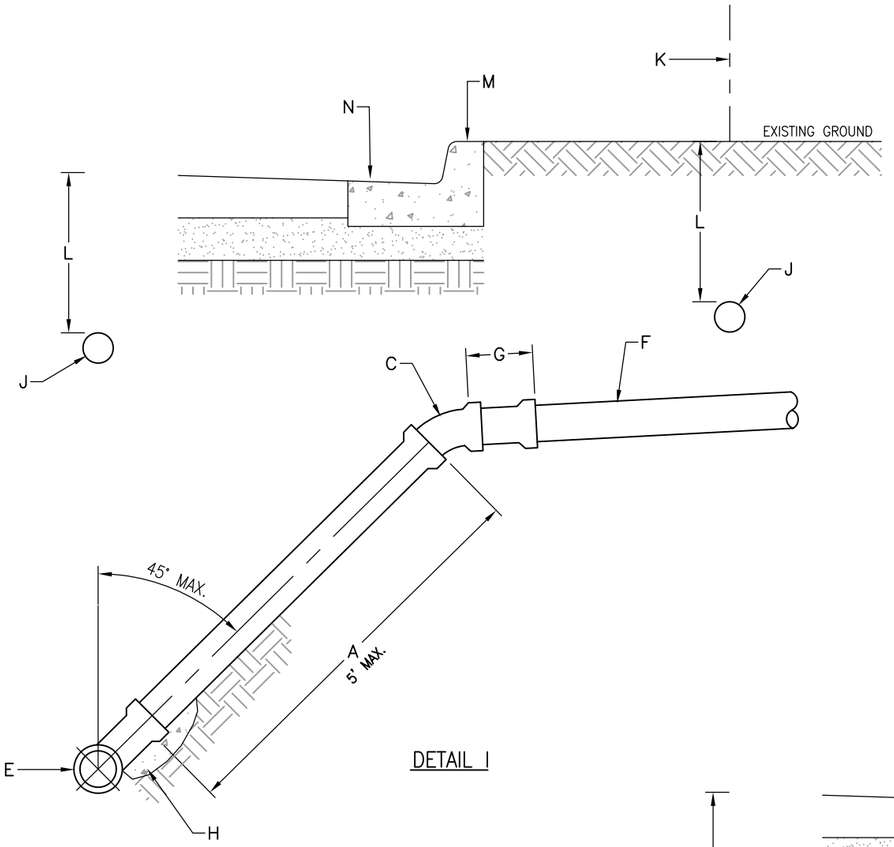
GENERAL NOTES – RING

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. ONLY PRODUCTS CAST IN THE USA WILL BE ACCEPTABLE.

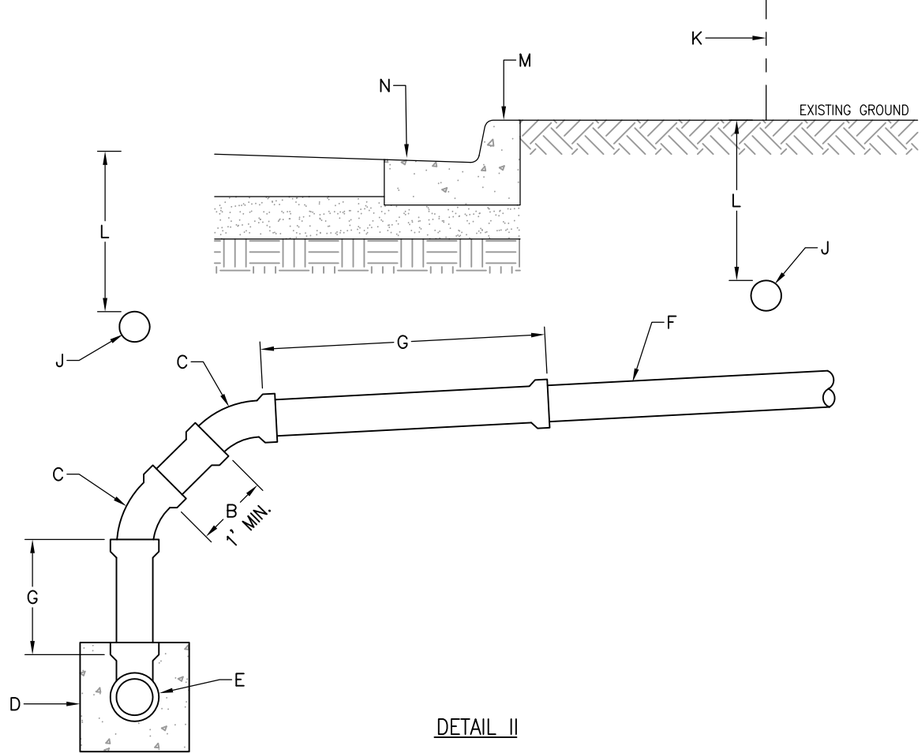
GENERAL NOTES – COVER

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
	SANITARY SEWER RING AND COVER FOR VALVE BOX
	DWG. 2128 JAN. 2013



DETAIL I



DETAIL II

GENERAL NOTES

1. IF DISTANCE 'A' IS 5' OR LESS, ROTATE MAIN SERVICE TEE AND RECONNECT SERVICE AS PER DETAIL I. IF DISTANCE 'A' IS GREATER THAN 5', INSTALL RISER AS PER DETAIL II.
2. WHERE DEPTH IS INSUFFICIENT TO ALLOW RECONNECTION AS SHOWN IN DETAIL I OR II, RECONNECT SERVICE AS DIRECTED BY ENGINEER.
3. THE SANITARY SEWER SERVICE LATERAL IS CONSIDERED 'PRIVATE' FROM THE MAIN LINE, INCLUDING THE SERVICE TEE TO THE PROPERTY LINE AND BEYOND. ALL MAINTENANCE AND/OR REPLACEMENT IS THE RESPONSIBILITY OF THE PROPERTY OWNER FOR WHICH IT IS PROVIDING THE SERVICE.

CONSTRUCTION NOTES

A. VARIABLE WITH A MAX. OF 5'.

B. 1' MIN., 1.5' MAX.

C. ELBOWS, 45° DEFLECTION MAX.

D. INSTALL CONCRETE CRADLE ON TEE AS PER DWG. 2135, RIGID PIPE ONLY.

E. SERVICE TEE.

F. SERVICE LINE.

G. VARIABLE LENGTH.

H. BACKFILL UNDER SERVICE WITH MIN. 1 CUBIC FOOT OF CONCRETE.

J. ELECTRONIC MARKER DEVICE (EMD). SEE STANDARD SPECIFICATION SECTION 170.

K. RIGHT-OF-WAY LINE.

L. DEPTH PLACEMENT PER MANUFACTURER'S RECOMMENDATIONS.

M. STAMP OR CHISEL 3" SIZE, "S" ON TOP OF CURB OVER LOCATION OF SERVICE LINE, MINIMUM 1/4" DEEP.

N. CURB & GUTTER.

REVISIONS	WATER AUTHORITY
	SANITARY SEWER SERVICE REPLACEMENT DETAIL
	DWG. 2134 JAN. 2013

GENERAL NOTES

1. PRIOR TO BACKFILLING, INVERT ELEVATION AND LOCATION WILL BE MEASURED. THIS INFORMATION WILL BE RECORDED ON AS–BUILT DRAWINGS.

CONSTRUCTION NOTES

A. EXISTING GROUND

B. NEW PAVING

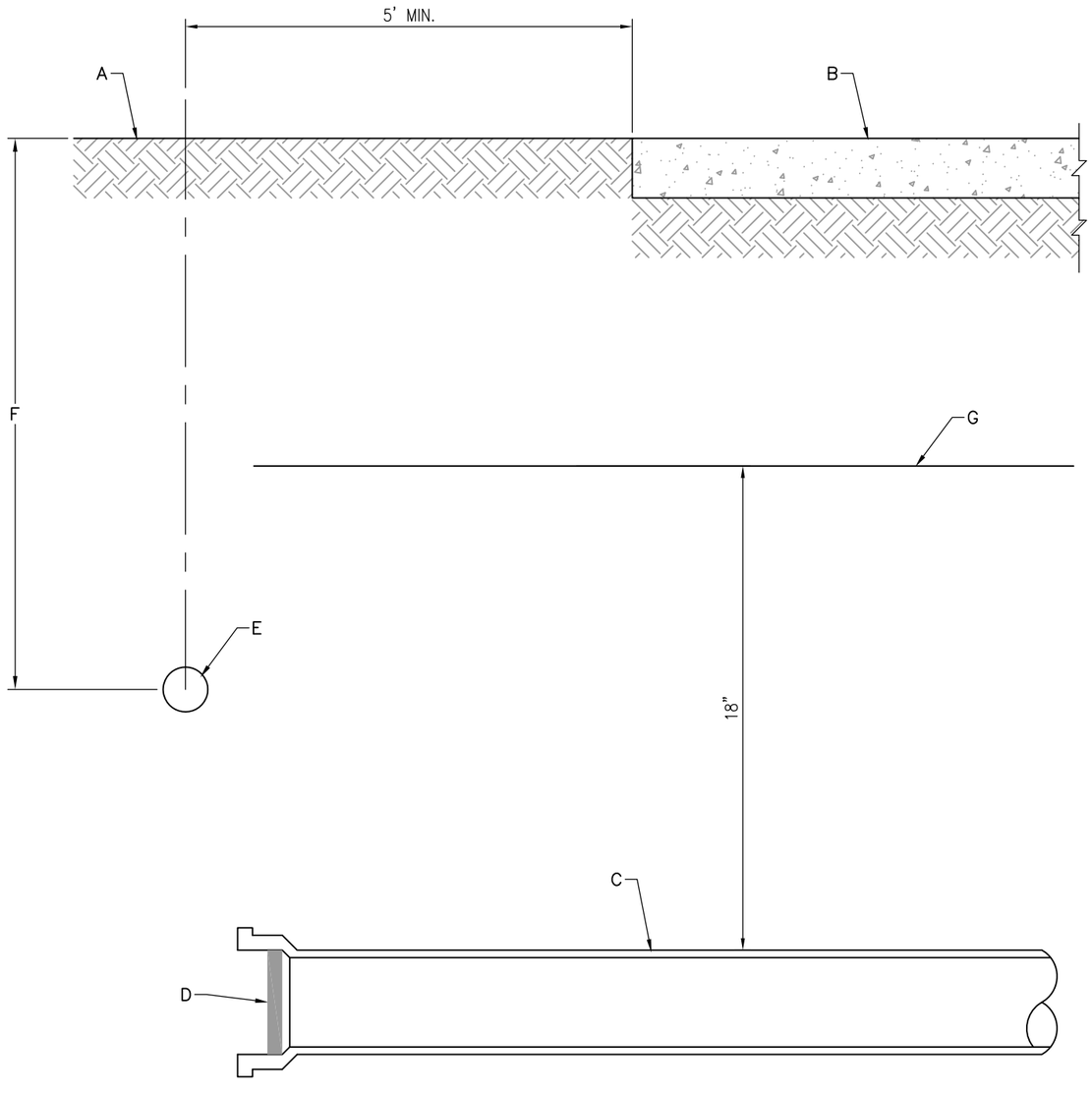
C. SEWER LINE

D. PLUG

E. ELECTRONIC MARKER DEVICE (EMD). SEE STANDARD SPECIFICATION SECTION 170.

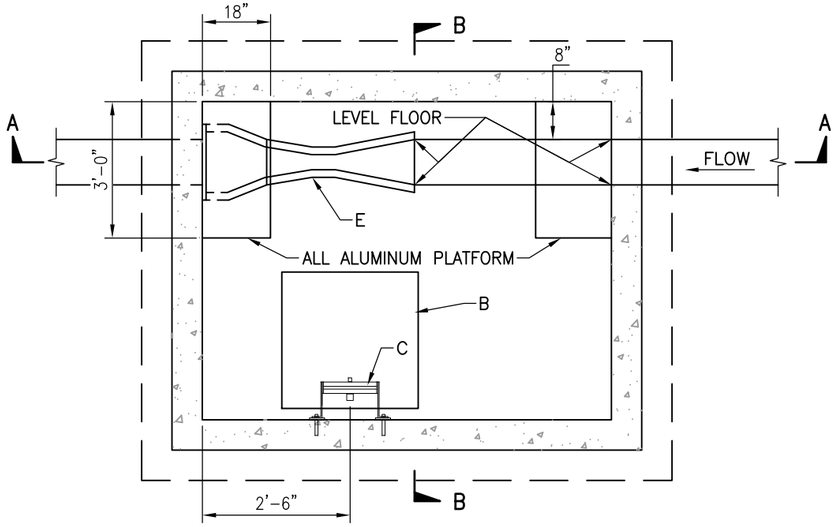
F. DEPTH PLACEMENT PER MANUFACTURER'S RECOMMENDATIONS.

G. WARNING TAPE TO BE INSTALLED ON ALL SANITARY SEWER LINES.



ELEVATION

REVISIONS	WATER AUTHORITY
	SANITARY SEWER SEWER LINE DEAD–END MARKER
	DWG. 2145 JAN. 2013

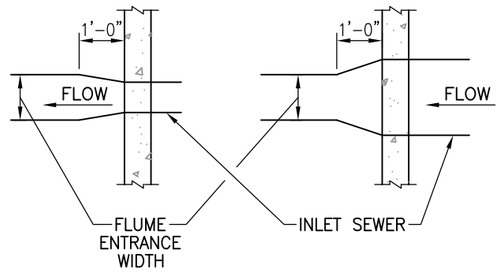


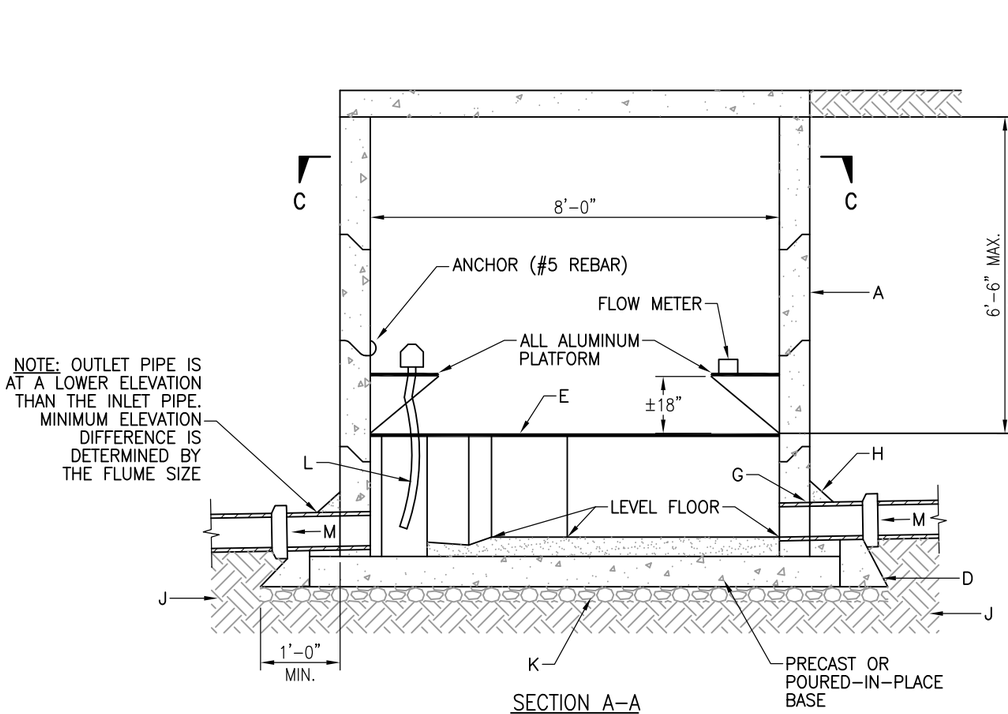
PLAN AT C-C

TABLE 1

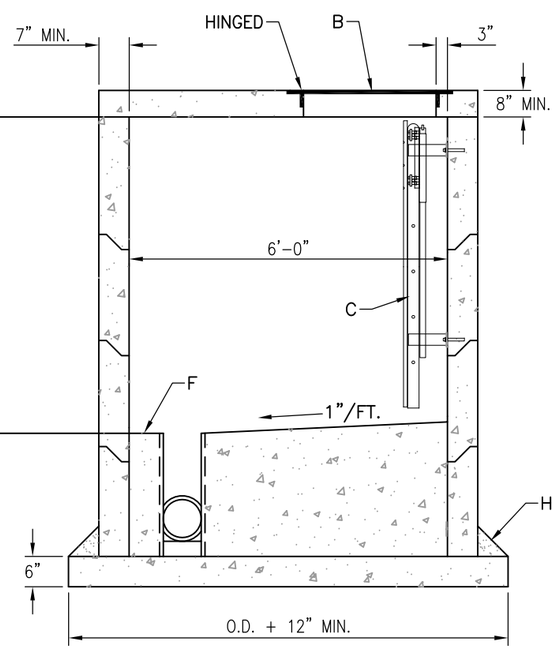
PIPE SIZE (IN)	REQUIRED INLET SLOPE (FT/FT)
4	0.0060
6	0.0050
8	0.0040
10	0.0028
12	0.0022
15	0.0015
18	0.0012

NOTE: WHEN THE INLET SEWER IS SMALLER OR LARGER, IN DIAMETER THAN THE FLUME ENTRANCE WIDTH, A SMOOTH TRANSITION SHALL BE PROVIDED CHANGING FROM THE INLET SEWER DIAMETER TO THE FLUME ENTRANCE CHANNEL WIDTH OVER THE FIRST FOOT INSIDE THE MH.





SECTION A-A



SECTION B-B

GENERAL NOTES

1. THIS DESIGN IS APPLICABLE FOR MANHOLES ≤6.5' IN DEPTH MEASURED FROM FLOOR TO CONCRETE COVER. DEPTHS >6.5' WILL REQUIRE DESIGN BY A REGISTERED ENGINEER IN NM.
2. INDUSTRIAL MANHOLE SHALL BE LOCATED ON PRIVATE PROPERTY OUTSIDE OF CITY RIGHT-OF-WAY. THE WATER AUTHORITY SHALL HAVE ACCESS TO THE MANHOLE AT ALL TIMES OF THE DAY OR NIGHT.
3. NOT ALL INSTALLATIONS WILL REQUIRE THE ALUMINUM PLATFORMS. SAMPLER AND FLOW METERING APPARATUS TO BE PROVIDED BY THE INDUSTRIAL USER. FINAL DECISIONS RELATIVE TO THE REQUIREMENT FOR MONITORING EQUIPMENT AND THE SPECIFIC TYPE OF FLUME WILL BE MADE BY THE WATER AUTHORITY FOR EACH INDIVIDUAL CASE.
4. A PARSHALL FLUME OR PALMER BOWLUS FLUME SHALL BE FURNISHED AND INSTALLED IN ACCORDANCE WITH THIS DETAIL. THE FLUME MUST BE SIZED TO ACCURATELY MEASURE ALL ANTICIPATED FLOW LEVELS. PRIOR TO INSTALLATION, THE FLUME SIZE AND TYPE MUST BE APPROVED BY THE WATER AUTHORITY.
5. IN ORDER TO CONTROL VELOCITIES AT A LEVEL THAT ALLOWS FOR ACCURATE FLOW MEASUREMENT, SLOPES ON THE INLET SEWER LINES FOR 20' OUTSIDE OF THE MANHOLE MUST BE AS SPECIFIED IN TABLE 1 FOR THE VARIOUS SIZE LINES. OUTLET SEWER LINES MUST BE DESIGNED TO CONVEY THE MAXIMUM DESIGN FLOWS WITHOUT CREATING A SURCHARGED CONDITION IN THE FLUME.

CONSTRUCTION NOTES

A. ALL MANHOLE BASES, RISERS SECTIONS AND FLAT SLAB TOP SECTIONS SHALL BE PRECAST REINFORCED CONCRETE.

B. 3'-0" SQ. ALUMINUM FLOOR DOOR WITH RECESSED HASP COVERED BY A HINGED LID FLUSH WITH TOP SURFACE. HARDWARE AND HINGES SHALL BE 316 STAINLESS STEEL. BILCO TYPE J, OR EQUAL. HS-20 LIVE LOAD RATED WHERE APPLICABLE.

C. LADDER PER STANDARD DRAWING 2335.

D. CONCRETE PIPE SUPPORTS SHALL EXTEND OUTSIDE THE MANHOLE TO BELL OF FIRST JOINT AND SHALL CRADLE PIPE TO THE SPRING LINE.

E. PREFABRICATED MONITORING FLUME TO BE INSTALLED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS. A PARSHALL FLUME OR A PALMER BOWLUS FLUME SHALL BE INSTALLED AS DIRECTED BY THE WATER AUTHORITY.

F. CONCRETE FILLETS. FILLETS TO MATCH TOP OF FLUME AND SLOPE ONE INCH PER FOOT.

G. MANHOLE PIPE CONNECTIONS TO BE PER ASTM C-923; STANDARD SPEC. FOR RESILIENT CONNECTORS BETWEEN REINFORCED CONCRETE MANHOLE STRUCTURES AND PIPES.

H. 6" GROUT FILLET ON UPPER HALF OF PIPE AND AROUND BASE.

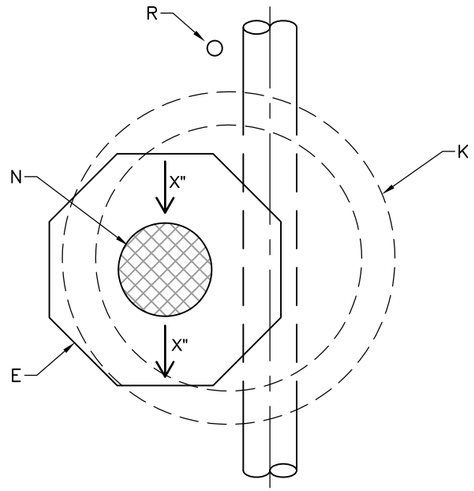
J. BACKFILL PER SECTION 501.

K. 2" GRAVEL CRUSHED STONE LEVELING COURSE.

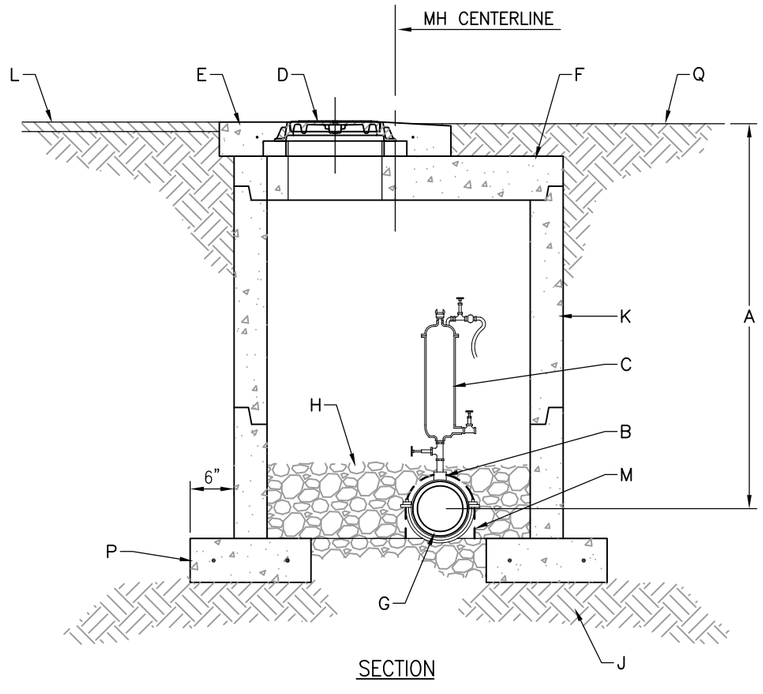
L. FLUME OUTLET END ADAPTER.

M. SLOPE PER TABLE 1.

REVISIONS	WATER AUTHORITY
	SANITARY SEWER SAMPLING AND METERING MANHOLE 6'x8' RECTANGULAR
	DWG. 2150 JAN. 2013



PLAN



SECTION

GENERAL NOTES

1. ALL COMPACTION FOR INSTALLATION OF ARV MANHOLE TO BE 95% OF MAXIMUM DRY DENSITY PER ASTM D 1557.
2. INTERIOR OF MANHOLE SHALL BE COATED IN ACCORDANCE WITH SECTION 920.4.6.2 OF THE SPECIFICATIONS.

CONSTRUCTION NOTES

A. SEE CONSTRUCTION PLANS FOR DEPTH REQUIRED.

B. 2" TAPPING SADDLE

C. SEWAGE AIR RELEASE VALVE PER APPROVED PRODUCTS LIST AND CONSTRUCTION PLANS AND SPECIFICATIONS.

D. CAST IRON MANHOLE FRAME AND COVER. SEE STANDARD DRAWING 2109.

E. CONCRETE COLLAR PER STANDARD DRAWINGS 2101 AND 2461.

F. PRECAST CONCRETE TOP SLAB FOR MANHOLE WITH 2'–0" DIA. OPENING PER STANDARD DRAWING 2107.

G. FORCE MAIN

H. 12" DEEP 3/4" GRAVEL, ASTM C33, NO. 57 GRAVEL

J. COMPACTED SUBGRADE, OVEREXCAVATED TO 12" BELOW FOUNDATION.

K. USE 4'–0" I.D. CONCRETE MANHOLE SECTIONS (PER SECTION 101, SAS CONCRETE. f'c=400 psi AT 28 DAYS). ADDITIONAL SECTIONS MAY BE ADDED.

L. FINISH GRADE IN PAVED AREAS

M. SLOTTED OPENING 1" LARGER THAN FORCE MAIN WITH APPROVED GASKET. GROUT INTERIOR AND EXTERIOR OF OPENING.

N. LOCATION OF LID

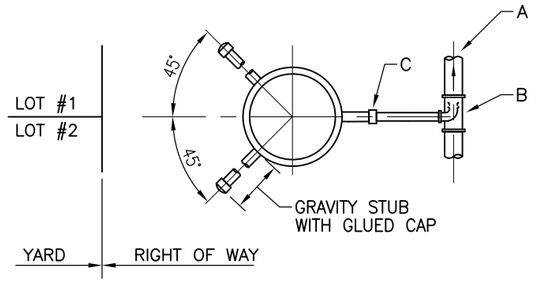
P. 2~CONCRETE ANTI–FLOATATION COLLAR HALVES. SEE STANDARD DRAWING 2171, OR CAST–IN–PLACE CONCRETE OF SIMILAR DESIGN

Q. FINISH GRADE IN UNPAVED AREAS

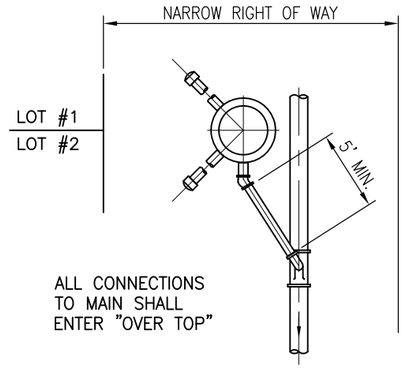
R. ELECTRONIC MARKER DEVICE (EMD). SEE STANDARD SPECIFICATION SECTION 170.

REVISIONS	WATER AUTHORITY
	SANITARY SEWER AIR RELEASE VALVE DETAIL
	DWG. 2160 JAN. 2013

NOTE:
EACH HOUSE GRAVITY LATERAL MUST BE DIRECTLY CONNECTED TO HOLDING TANK.



PLAN SHOWING HOLDING TANK
WITH TWO HOUSE CONNECTIONS



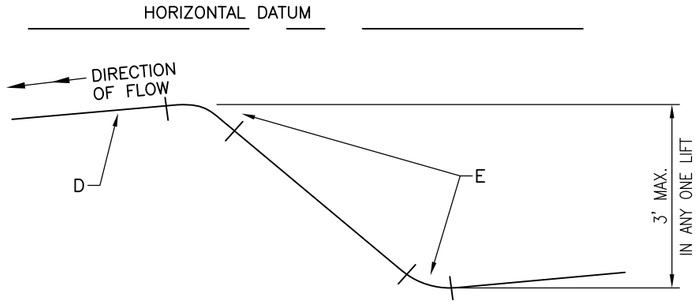
VALVE PIT INSTALLATION
IN NARROW RIGHT OF WAY

GENERAL NOTES

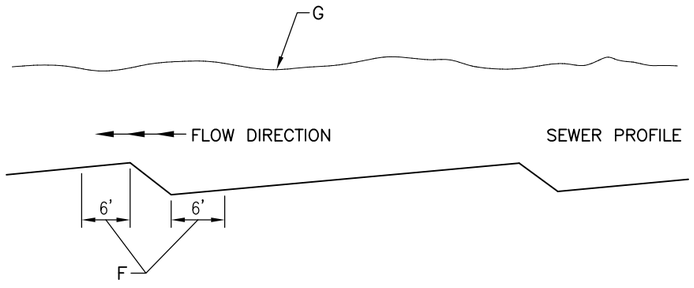
1. ONLY HOMES AND APARTMENTS WHOSE LOWER FLOOR ELEVATION ARE THE SAME SHOULD BE CONNECTED TO A COMMON VACUUM VALVE PIT INSTALLATION. WITH MULTIPLE FLOOR APARTMENTS EACH FLOOR SHOULD BE SERVICED BY ITS OWN VACUUM VALVE PIT INSTALLATION.
2. NOT LESS THAN 20' BETWEEN SUCCESSIVE LIFTS.
3. LOWER PORTION OF VALVE PIT IS A WASTE HOLDING TANK.

CONSTRUCTION NOTES

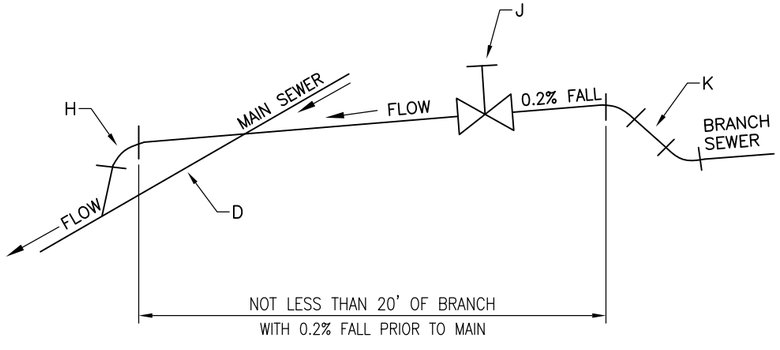
A. 4", 6", 8" OR 10" VACUUM SEWER
B. 10"x10"x3" OR 8"x8"x3" OR 6"x6"x3" OR 4"x4"x3" D.W.V. WYE
C. 3" SCHEDULE 40 PVC
D. SLOPE: CONSULT DESIGN MANUAL
E. LONG TURN 45° BENDS IN TWO POSITIONS.
F. DO NOT MAKE ANY INLET CONNECTIONS IN THIS AREA
G. GRADE
H. ELL 90° AND WYE. IMPORTANT: WYE SHALL BE IN VERTICAL POSITION.
J. ISOLATION VALVE
K. LIFT
L. WYE AND ST. 45° IN VERTICAL POSITION.



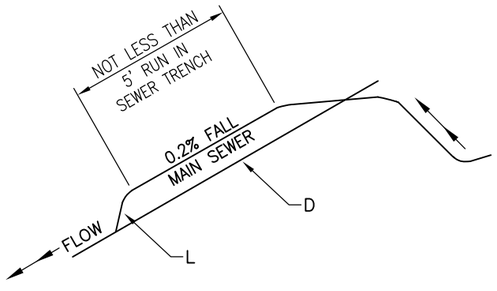
LIFT DETAILS



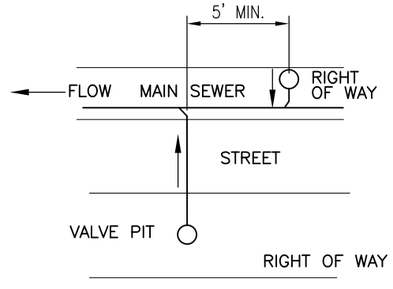
RECOMMENDED POSITIONS FOR CONNECTIONS TO MAIN



DIAGRAMMATIC OF BRANCH
CONNECTION TO MAIN

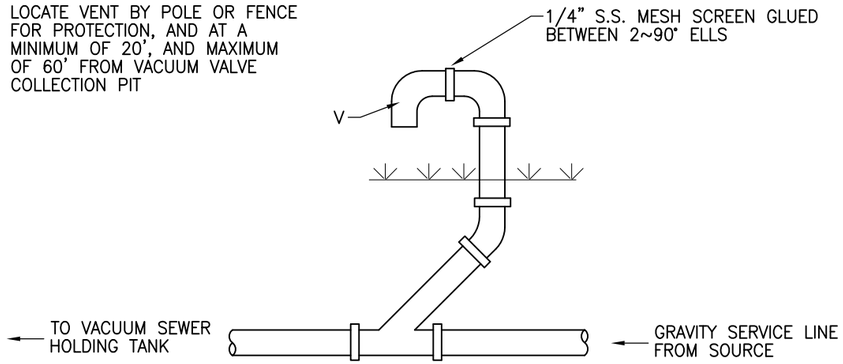


ALTERNATE METHOD OF CONNECTING
BRANCH OR VACUUM SERVICE LATERAL TO MAIN



SKETCH SHOWING MINIMUM
SPACING OF VACUUM SERVICE LATERALS

REVISIONS	WATER AUTHORITY
	VACUUM SEWER STANDARD DETAILS
	DWG. 2162 JAN. 2013



VENT INLET DETAIL

GENERAL NOTES

1. GRAVITY LINES: IN ALL INSTALLATIONS, SEWAGE SHALL FLOW BY GRAVITY TO THE HOLDING TANK.
2. INSTALL GRAVITY LINES IN ACCORDANCE WITH WATER AUTHORITY STANDARDS AND LOCAL CODES.
3. PRIVATE GRAVITY SERVICE LINE MUST INCLUDE A VENT AT A MINIMUM OF 20', AND A MAXIMUM OF 60' FROM THE VACUUM VALVE COLLECTION PIT. VENT PIPING SHALL BE THE SAME DIAMETER OF THE PRIVATE GRAVITY SERVICE LINE.

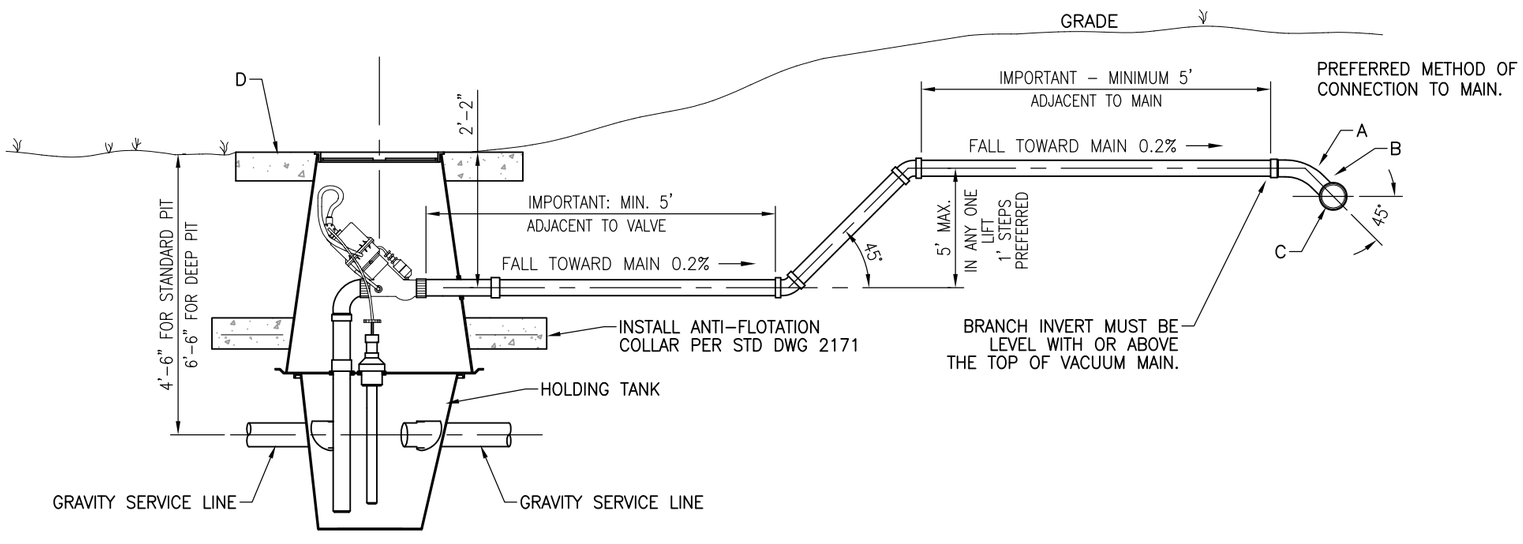
CONSTRUCTION NOTES

A. 45° ELL

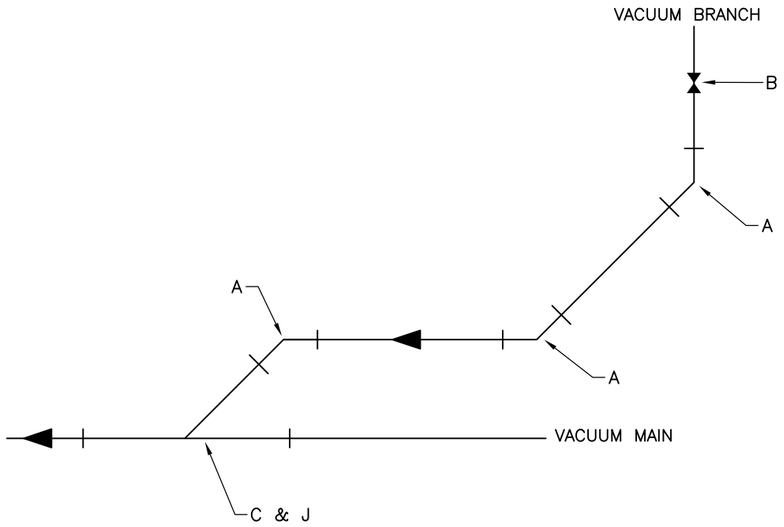
B. WYE IN VERTICAL POSITION

C. VACUUM SEWER MAIN

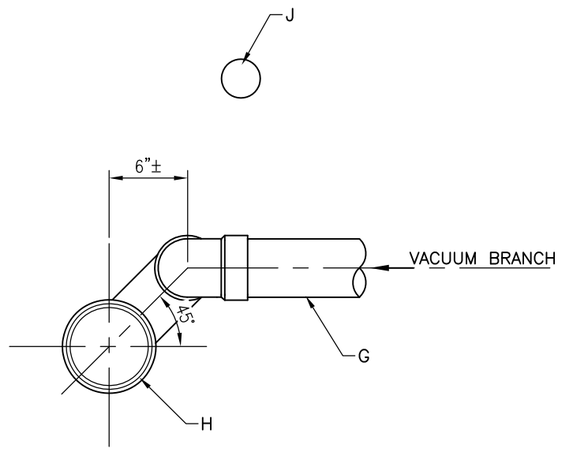
D. CONCRETE COLLAR PER STANDARD DRAWING 2461.



REVISIONS	WATER AUTHORITY
	VACUUM SEWER VALVE AND PIT INSTALLATION WITH LIFT IN VACUUM SERVICE LATERAL DWG. 2163 JAN. 2013



ALTERNATE "A"



GENERAL NOTES

1. UNLESS SHOWN ON CONSTRUCTION DRAWINGS, DIVISION VALVES WILL NOT BE INSTALLED FOR SERVICE CONNECTIONS.

CONSTRUCTION NOTES

A. 45° ELBOW

B. DIVISION VALVE AS SHOWN ON CONSTRUCTION DRAWINGS

C. REDUCTION WYE AT 45°

D. 22 1/2° ELBOW

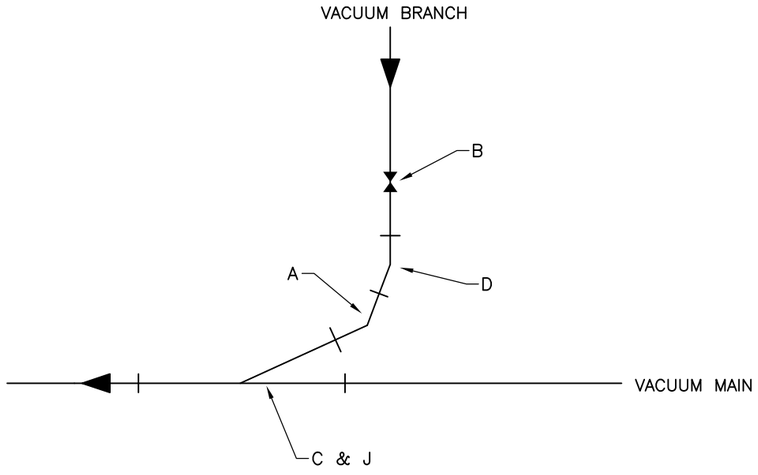
E. MAIN LINE WYE AT 45°

F. BOTTOM OF BRANCH IS AT TOP OF MAIN

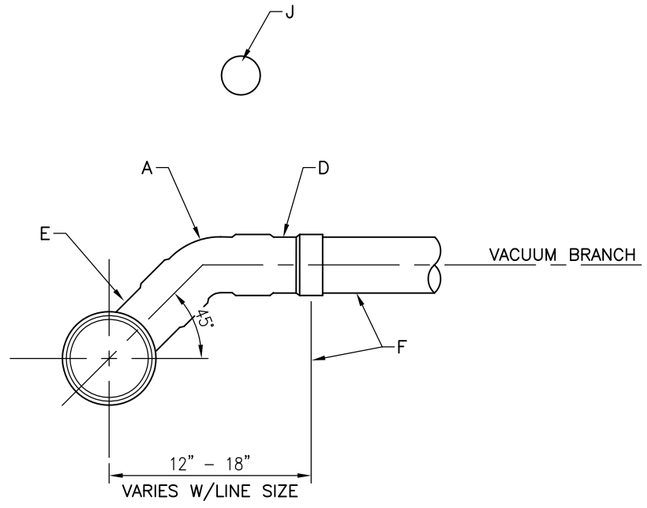
G. BOTTOM OF BRANCH IS 1" TO 2" ABOVE TOP OF MAIN

H. VACUUM MAIN

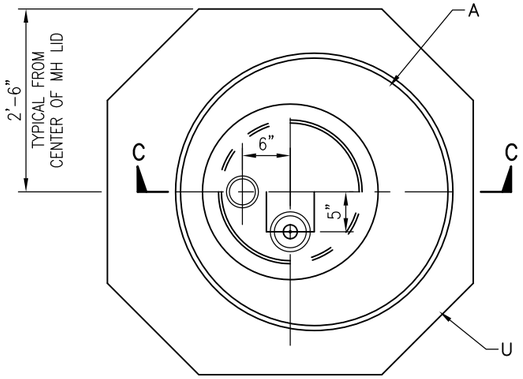
J. ELECTRONIC MARKER DEVICE (EMD). SEE STANDARD SPECIFICATION SECTION 170.



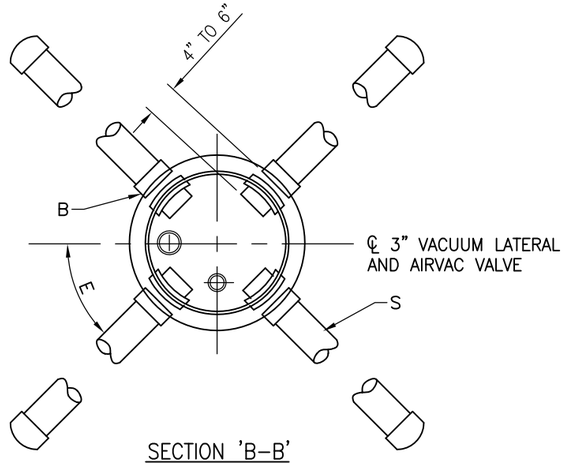
ALTERNATE "B"



REVISIONS	WATER AUTHORITY
	VACUUM SEWER TYPICAL VACUUM BRANCH LINE CONNECTION DWG. 2164 JAN. 2013

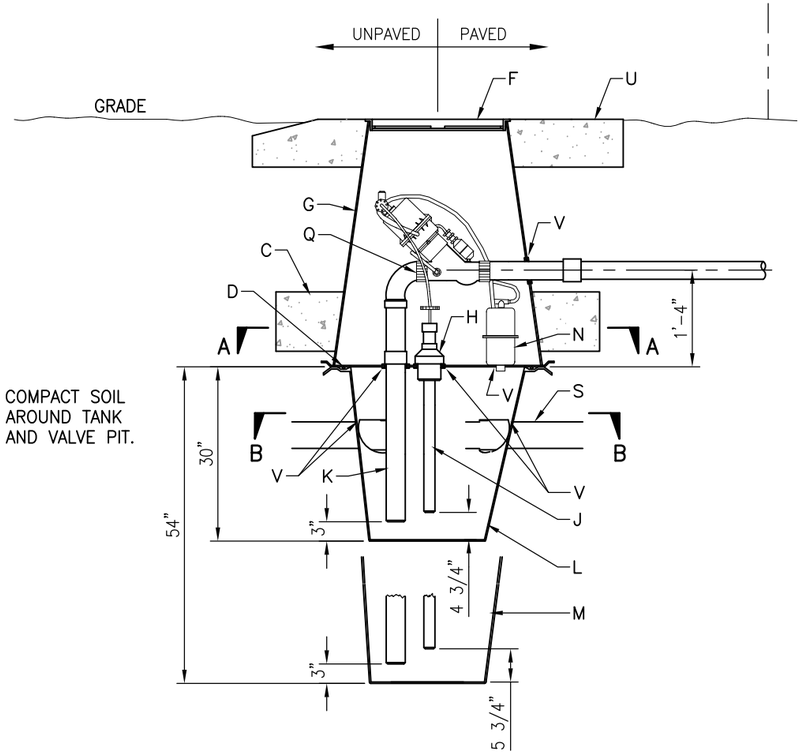


SECTION 'A-A'

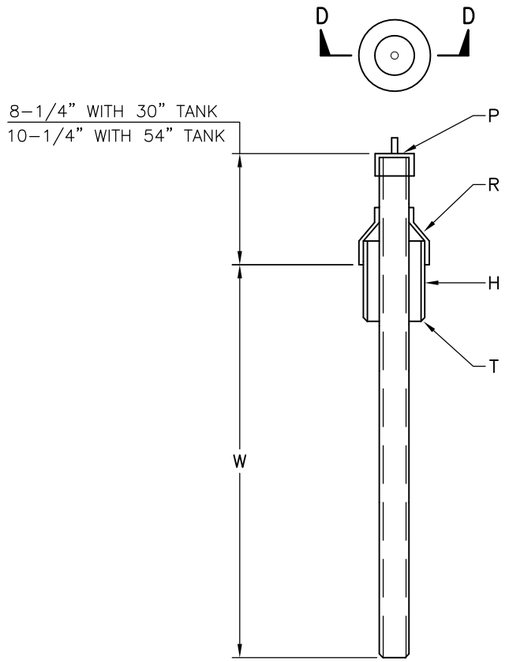


SECTION 'B-B'

SHOWING UP TO 4
GRAVITY CONNECTIONS
TO SUMP



SECTION 'C-C'



SECTION 'D-D'

COMBINATION CLEAN OUT-SENSOR PIPE DETAIL

GENERAL NOTES

1. THE FOLLOWING HOLES IN VALVE PIT AND SUMP TO BE FIELD CUT: 5" GRAVITY (SUMP)
2. ONLY HOMES OR APARTMENTS WHOSE LOWER FLOOR ELEVATIONS ARE THE SAME SHOULD BE CONNECTED TO A COMMON VACUUM VALVE PIT INSTALLATION. WITH MULTIPLE FLOOR APARTMENTS, EACH FLOOR SHOULD BE SERVICED BY ITS OWN VACUUM VALVE PIT PACKAGE.
3. FOR ANTI-FLOATATION RING, GRADE-LEVEL PAD, PIPING FROM VALVE PIT TO VACUUM MAIN AND GRAVITY SERVICE STUBS. VALVE TO BE INSTALLED BY OWNER. ALL OTHER INSTALLATION AND TESTING BY CONTRACTOR.

CONSTRUCTION NOTES

A. RTM MOLDED FIBERGLASS VALVE PIT BOTTOM WITH HOLES FACTORY CUT.

B. GLUE HALF OF A SLIP COUPLING IN PLACE AT 4" TO 6" FROM END OF GRAVITY LINE TO ACT AS A STOP.

C. ANTI-FLOTATION RING (TYP), SEE STANDARD DRAWING 2171.

D. JOINT SEALED WITH NEOPRENE RUBBER O-RING. HOLDING TANK BOLTED TO VALVE PIT BOTTOM WITH 6 S.S. NUTS, BOLTS AND WASHERS.

E. OFFSET 45° TO AVOID CONFLICT BETWEEN PIPES.

F. CAST IRON MANHOLE FRAME AND COVER RATED FOR H20 LOADING.

G. SPIRAL WOUND, H20 LOADING RATED, FIBERGLASS VALVE PIT. 27" I.D. AT TOP, 36" I.D. AT BOTTOM.

H. 4" CLEANOUT/SENSOR ASSEMBLY

J. 2" SENSOR LINE

K. 3" SUCTION LINE

L. FIBERGLASS SUMP 30" DEEP. SUMP 30" I.D. AT TOP, 16" I.D. AT BOTTOM.

M. FIBERGLASS SUMP 54" DEEP TO ALLOW CONNECTION OF DEEP GRAVITY LINES. DIAMETERS SAME AS 30" SUMP.

N. SUMP BREATHER ASSEMBLY

P. 2" AIRVAC PVC SENSOR CAP

Q. 3" NO-HUB COUPLINGS

R. 2"x4" REDUCER COUPLING W/INDEX REMOVED. (GLUE JOINTS)

S. 4" PVC GRAVITY STUB. EXTEND TO PROPERTY LINE UNLESS OTHERWISE DIRECTED AND GLUE CAP.

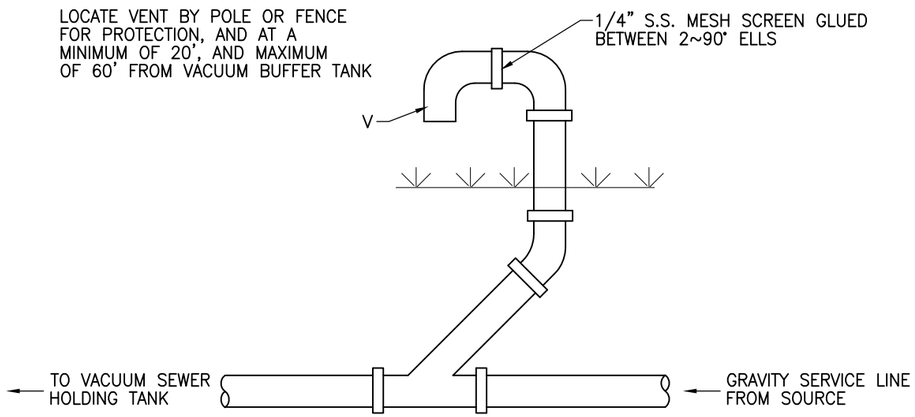
T. END BEVELED

U. CONCRETE COLLAR PER STANDARD DRAWING 2461.

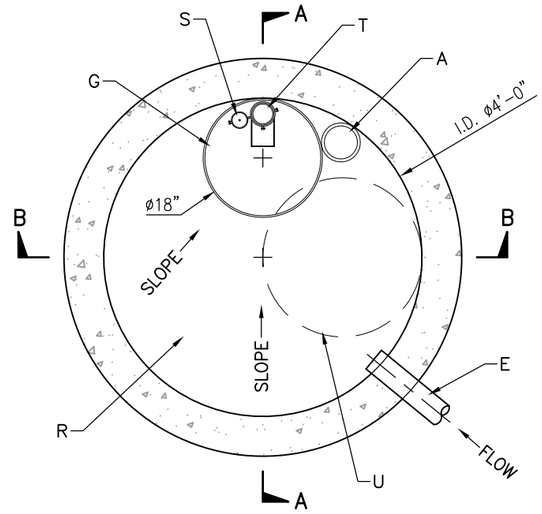
V. GROMMET

W. 26" LONG, WITH 30" DEEP HOLDING TANK OR 49" LONG, WITH 54" DEEP HOLDING TANK. FULLY INSERT THROUGH PIT BOTTOM TO STOP.

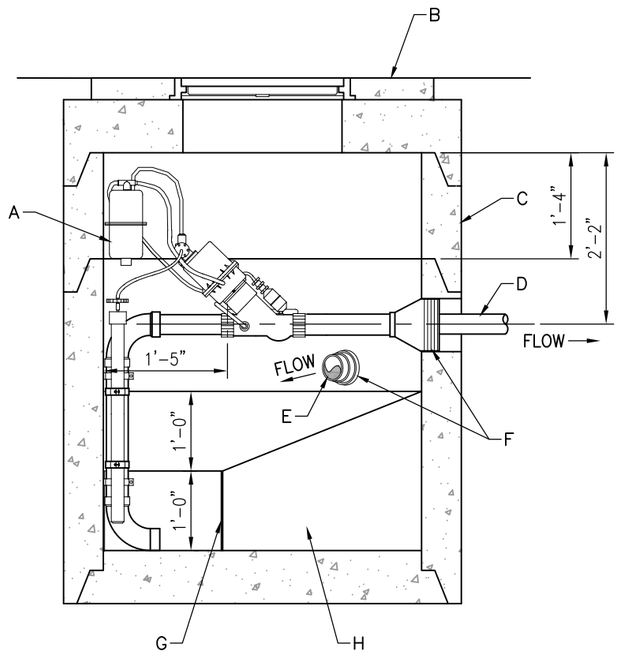
REVISIONS	WATER AUTHORITY
	VACUUM SEWER 3" VALVE AND PIT INSTALLATION WITH INTERNAL BREATHER DWG. 2165 JAN. 2013



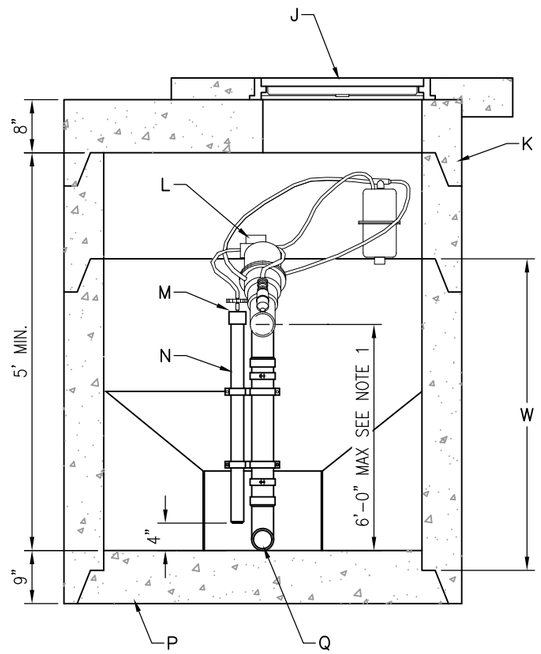
VENT INLET DETAIL



PLAN



SECTION A–A



SECTION B–B

GENERAL NOTES

1. ANY LIFT EXCEEDING 6' MUST BE ADDED TO HEAD LOSSES ON VACUUM MAIN AND SERVICE LINE TO DETERMINE IF SUFFICIENT VACUUM HEAD IS AVAILABLE.
2. ALL MATERIALS AND HARDWARE FOR INSTALLING VALVE TO BE FURNISHED BY CONTRACTOR. ALL INSTALLATION AND TESTING BY CONTRACTOR, EXCEPT VALVE, TO BE INSTALLED BY OWNER. ALL PVC FITTINGS TO BE GLUED EXCEPT WHERE NOTED. DRILL HOLE IN WALL FOR MOUNTING SCREW FOR SUMP BREATHER.

CONSTRUCTION NOTES

A. SUMP BREATHER ASSEMBLY

B. CONCRETE COLLAR, SEE STANDARD DRAWING 2461.

C. CONCRETE MANHOLE SECTION

D. 3" VACUUM SERVICE LINE

E. GRAVITY INLET MUST BE LOCATED BETWEEN THE VACUUM SERVICE LINE AND THE START OF SLOPE TO SUMP. MIN. 4" GRAVITY SEWER WITH MATCHING DIAMETER VENT, MIN. 20', MAX. 60' FROM VACUUM BUFFER TANK.

F. STANDARD FLEXIBLE CONNECTIONS. ALL CONNECTIONS TO BUFFER TANK MUST BE WATER TIGHT.

G. 1 FT LONG, 18" I.D. PVC PIPE MAY BE USED TO FORM SUMP AREA.

H. MASS CONCRETE

J. SEWER FRAME & COVER PER STANDARD DRAWING 2109.

K. PRECAST CONCRETE FLAT TOP FOR MANHOLE WITH 2'–0" DIA. OPENING.

L. 3" MODEL "D" VALVE BY AIRVAC OR EQUAL.

M. 2" PVC SENSOR CAP SUPPLIED WITH VALVE

N. 2" PVC SENSOR PIPE

P. PRECAST CONCRETE BOTTOM IN MANHOLE SECTION.

Q. 3" STREET ELL TOUCHING BASE OF SUMP WITH PLAIN END. NO CONNECTION.

R. VALVE AND PIPING REMOVED FOR CLARITY.

S. SENSOR PIPE

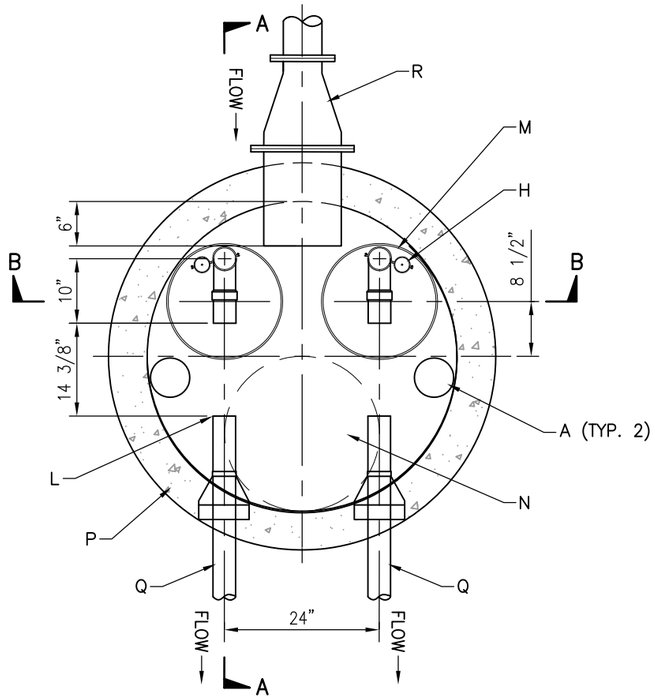
T. VALVE CONNECTION

U. LOCATION OF LID

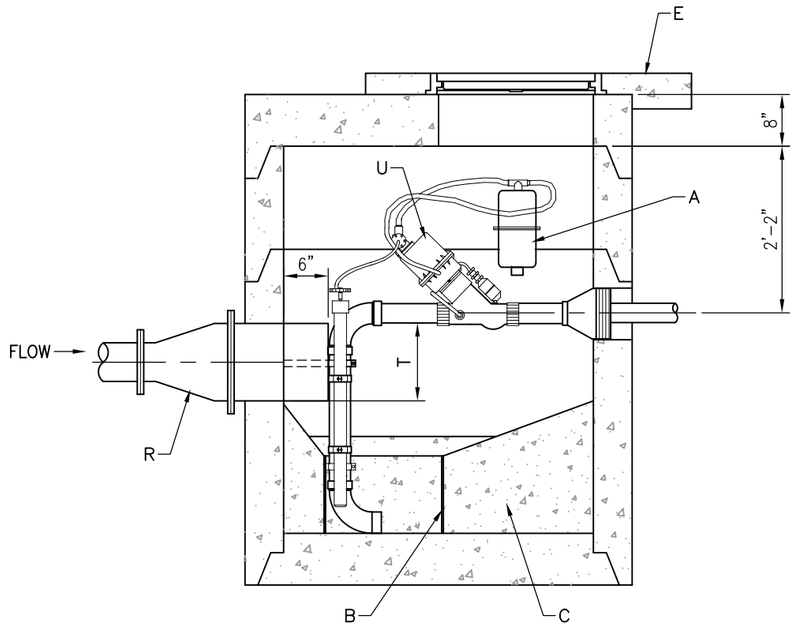
V. VENT FABRICATED WITH 90° ELLS.; HEIGHT MUST BE ABOVE FLOOD WATER LEVEL, BUT BELOW FINISHED FLOOR LEVEL OF LOWEST RESIDENCE SERVED.

W. USE 4'–0" I.D. CONCRETE MANHOLE SECTIONS. ADDITIONAL SECTIONS MAY BE ADDED TO ALLOW CONNECTION OF DEEP GRAVITY LINES OR FOR ADDED STORAGE CAPACITY.

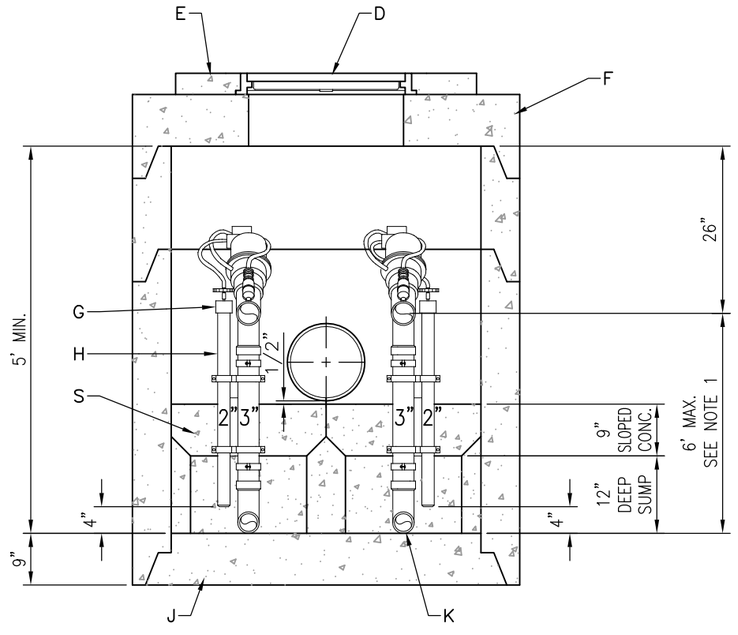
REVISIONS	WATER AUTHORITY
	VACUUM SEWER SINGLE BUFFER TANK 30 GAL./MINUTE MAX. FLOW DWG. 2167 JAN. 2013



PLAN



SECTION A–A



SECTION B–B

GENERAL NOTES

1. ANY LIFT EXCEEDING 6' MUST BE ADDED TO HEAD LOSSES ON VACUUM MAIN AND SERVICE LINE TO DETERMINE IF SUFFICIENT VACUUM HEAD IS AVAILABLE.
2. ALL MATERIALS AND HARDWARE FOR INSTALLING VALVE, TO BE FURNISHED BY CONTRACTOR. ALL INSTALLATION AND TESTING BY CONTRACTOR, EXCEPT VALVE TO BE INSTALLED BY OWNER. ALL PVC FITTINGS TO BE GLUED EXCEPT WHERE NOTED. DRILL HOLE IN WALL FOR MOUNTING SCREW FOR SUMP BREATHER.

CONSTRUCTION NOTES

A. SUMP BREATHER ASSEMBLY (ONE PER VALVE).

B. 1 FT LONG, 18" I.D. PVC PIPE MAY BE USED TO FORM SUMP AREAS.

C. MASS CONCRETE CENTER DIVIDER WALL

D. SEWER MANHOLE FRAME & COVER PER STANDARD DRAWING 2109.

E. CONCRETE COLLAR PER STANDARD DRAWING 2461.

F. PRECAST CONCRETE FLAT TOP FOR MANHOLE WITH 2'–0" DIA. OPENING.

G. 2" PVC SENSOR CAP SUPPLIED WITH VALVE.

H. 2" PVC SENSOR PIPE

J. PRECAST CONCRETE BOTTOM IN MANHOLE SECTION

K. 3" STREET ELL TOUCHING BASE OF SUMP WITH PLAIN END. NO CONNECTION.

L. VALVE AND PIPING REMOVED FOR CLARITY

M. 18" DIAMETER SUMP (2)

N. LOCATION OF LID

P. USE 4'–0" I.D. CONCRETE MANHOLE SECTIONS. ADDITIONAL SECTIONS MAY BE ADDED TO ALLOW CONNECTION OF DEEP GRAVITY LINES OR FOR ADDED STORAGE CAPACITY.

Q. 3" VACUUM SERVICE LINES MUST (EACH) CONNECT DIRECTLY TO A 6" MINIMUM SEPARATION AT MAIN. SERVICE LINES FITTED WITH STANDARD FLEXIBLE CONNECTORS AT THE HOLE IN THE MANHOLE SECTION TO INSURE THAT THE BUFFER TANK IS WATER TIGHT.

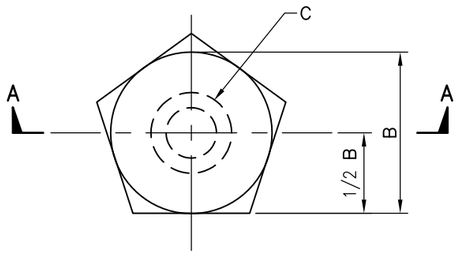
R. MINIMUM 6" GRAVITY LINE WITH MATCHING DIAMETER VENT, MIN. 20', MAX. 60' FROM BUFFER TANK. CONNECT 6" LINE TO 12" x 6" REDUCER. CONNECT REDUCER TO 12" PIPE ENTERING MANHOLE. CENTER 12" PIPE OVER CENTER DIVIDER WALL 'C'. 12" LINE SHALL BE FITTED WITH STANDARD FLEXIBLE CONNECTORS AT THE HOLE TO INSURE THAT BUFFER TANK IS WATERTIGHT.

S. SHAPE SLOPED CONCRETE TO DISTRIBUTE FLOW EVENLY BETWEEN SUMPS.

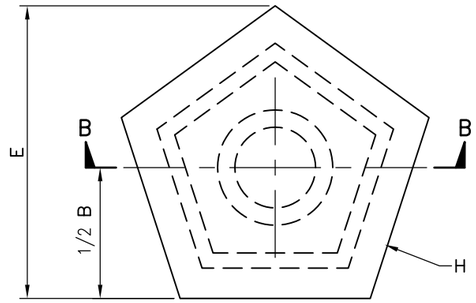
T. GRAVITY INLET MUST BE LOCATED BETWEEN THE VACUUM SERVICE LINE AND THE START OF SLOPE TO SUMP.

U. 3" MODEL "D" VALVE, BY AIRVAC OR EQUAL, TO BE INSTALLED BY OWNER.

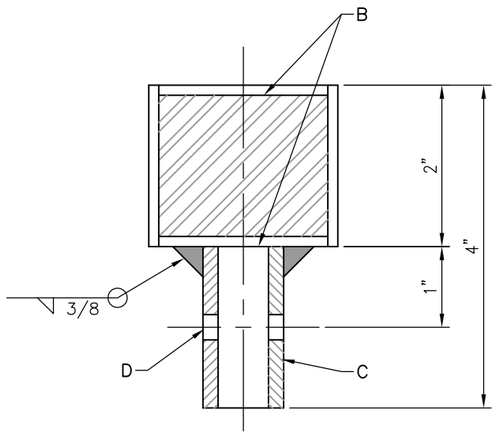
REVISIONS	WATER AUTHORITY
	VACUUM SEWER DUAL BUFFER TANK 60 GAL./MINUTE MAX. FLOW DWG. 2168 JAN. 2013



PLAN

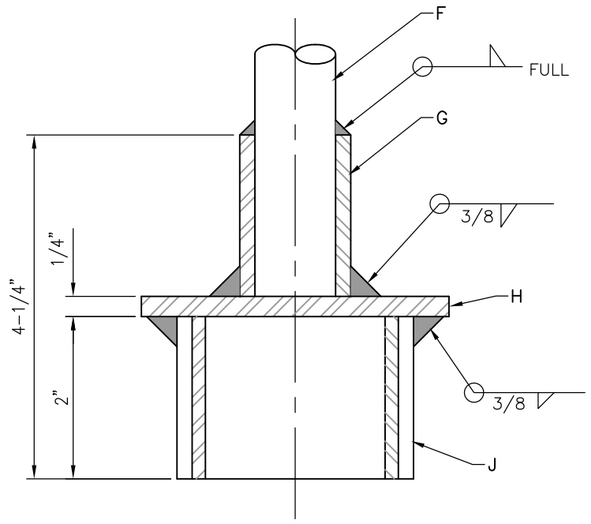


PLAN



SECTION A–A

EXTENSION NUT



SECTION B–B

EXTENSION SOCKET

GENERAL NOTES

1. THESE NUTS AND SOCKETS ARE A PART OF THE VALVE STEM EXTENSION, SEE VACUUM SEWER VALVE BOX DWG. 2170.

CONSTRUCTION NOTES

A. 2" LONG H.R. STEEL BAR, 2" x 2"

B. 2" DIA. STEEL CIRCLE WITH PENTAGON CIRCUMSCRIBED ABOUT CIRCLE

C. 1" DIA. SCHEDULE 40 PIPE x 2" (1.315 O.D. x 1.049 I.D.)

D. DRILL 0.312 DIAMETER HOLE THROUGH PIPE FOR 0.31 DIAMETER CLEVIS PIN/COTTER PIN.

E. 3 1/4"

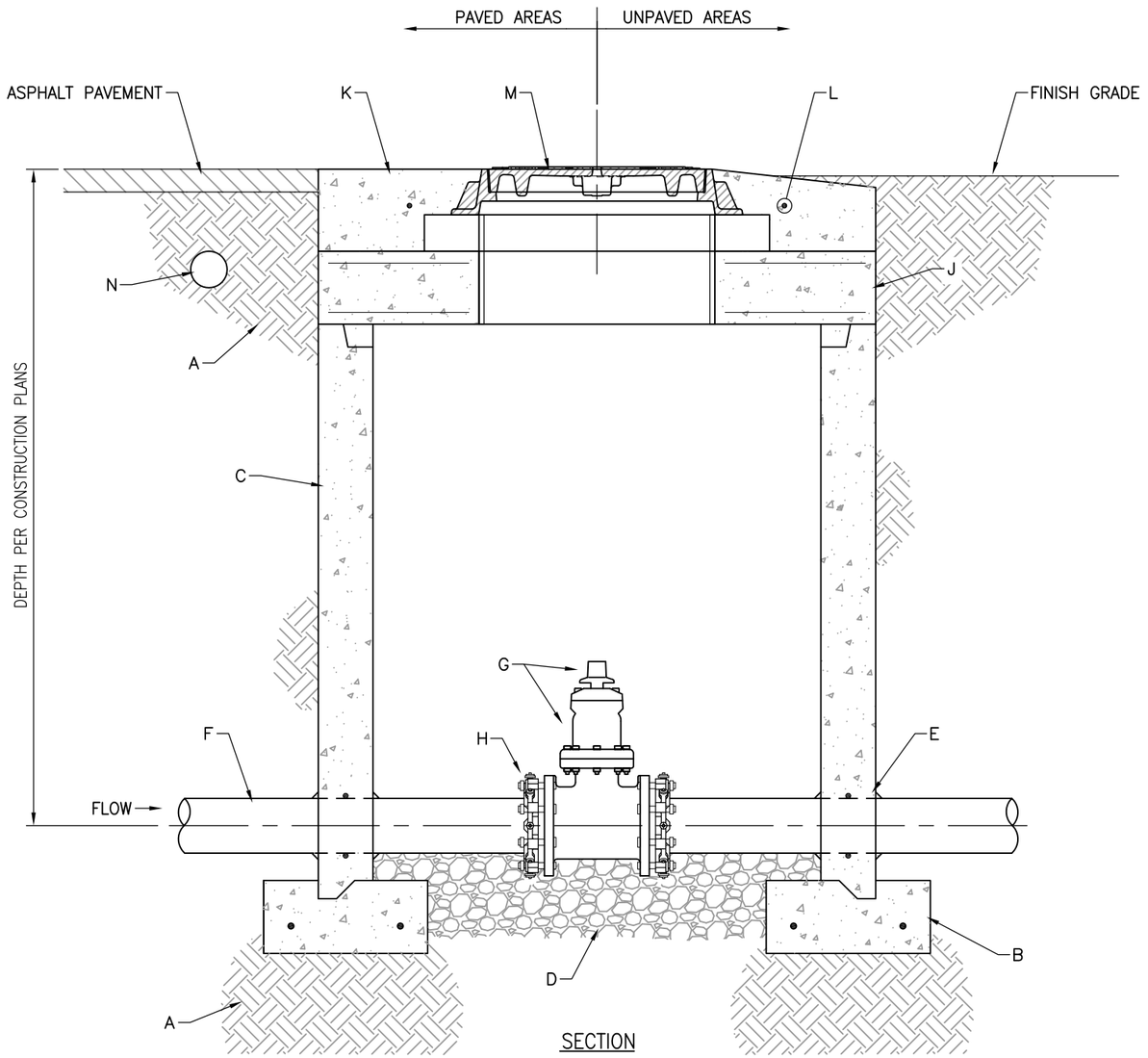
F. 1" DIAMETER EXTENSION BAR, 6 FEET LONG. WITH T HANDLE.

G. 1" DIAMETER, SCH 40 x 2" (1.315 O.D. x 1.049 I.D.)

H. PENTAGONAL SHAPED x 1/4" H.R. STEEL PLATE 1/2" LARGER THAN TUBULAR SECTION BELOW

J. 2" LONG H.R. STEEL PENTAGONAL SHAPED TUBULAR SECTION x 0.1875 WALL WITH 1/8" TOTAL CLEARANCE TO EXTENSION NUT.

REVISIONS	WATER AUTHORITY
	VACUUM SEWER VALVE STEM NUT AND SOCKET DETAILS
	DWG. 2169 JAN. 2013



SECTION

GENERAL NOTE

1. LABEL REQUIREMENTS: BEFORE THE WORK WILL BE ACCEPTED, SEWER 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. COMPACTED SUBGRADE (95% COMPACTION) SEE SECTION 701. OVEREXCAVATE TO 12" BELOW FOUNDATION.

B. 8" x 18" CONCRETE FOUNDATION WITH 2~ #5 BARS SPACED 3" FROM SIDES AND BOTTOM.

C. 4 FT I.D. PRECAST CONCRETE MANHOLE SECTIONS.

D. 6" DEEP, 3/4" GRAVEL

E. SLOTTED OPENING 1" LARGER THAN VACUUM MAIN WITH APPROVED WATERSTOP. GROUT INTERIOR AND EXTERIOR OF OPENING.

F. VACUUM MAIN LINE

G. RESILIENT COATED WEDGE GATE VALVE PER APPROVED PRODUCTS LIST. PROVIDE 2" x 5 SIDED NUT PER STANDARD DRAWING 2169.

H. MEGALUG, OR EQUAL, RESTRAINING GLAND

J. PRECAST REINFORCED CONCRETE TOP SLAB WITH 24" DIA. OPENING PER STANDARD DRAWING 2107.

K. OCTAGONAL CONCRETE COLLAR PER STANDARD DRAWING 2461. INSCRIBE CONCRETE SURFACE WITH SIZE OF VACUUM LINE AND DIRECTION OF FLOW PER STANDARD DRAWING 2181. IN PAVED AREAS, INSTALL COLLAR FLUSH WITH PAVEMENT. IN UNPAVED AREAS, SET RING 1" ABOVE GRADE AND SLOPE TOP OF CONCRETE DOWN TO 1" BELOW GRADE.

L. #4 REBAR PER STANDARD DRAWING 2461.

M. 24" MANHOLE FRAME AND COVER PER STANDARD DRAWING 2109.

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

REVISIONS	WATER AUTHORITY
	VACUUM SEWER VALVE BOX
	DWG. 2170 JAN. 2013

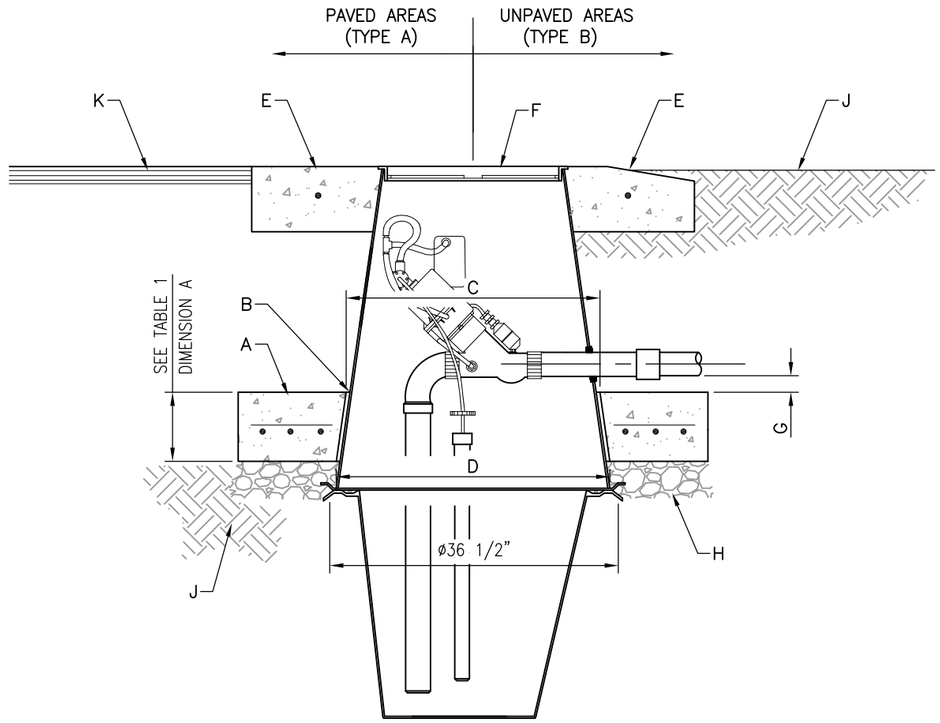


TABLE 1

DESCRIPTION	DIMENSION A
30" SUMP PACKAGE	7 1/2"
54" SUMP PACKAGE	9 1/2"

(SEE STANDARD DRAWING 2165)

GENERAL NOTES

1. ALL COMPACTION OF SUBGRADE AND AND BACKFILL FOR INSTALLATION OF VACUUM VALVE PIT TO BE 95% OF MAXIMUM DRY DENSITY PER ASTM D 1557.
2. AVOID EXCESSIVE EXPOSURE TO SUNLIGHT OF OPEN VACUUM VALVE PITS. CLOSE & COMPLETE WITHIN 3 DAYS TO INSURE INTEGRITY OF RUBBER O-RING.
3. SEE STANDARD DRAWING 2165 FOR ADDITIONAL DETAILS.

CONSTRUCTION NOTES

A. 62" SQUARE CONCRETE ANTI-FLOATATION COLLAR, WITH #4 REBAR AT 6" E.W. 3" FROM EDGE OF CONCRETE. SEE TABLE 1 THIS SHEET FOR THICKNESS. CONCRETE PER SECTION 101, HYDRAULIC STRUCTURAL CONCRETE, f'c=4000 psi AT 28 DAYS.

B. CLEARANCE BETWEEN CONCRETE COLLAR AND FIBERGLASS PIT.

C. 35" DIA. OPENING AT TOP OF SLAB.

D. 35 1/2" DIA. OPENING AT BOTTOM OF SLAB.

E. INSTALL CONCRETE COLLAR PER STANDARD DRAWING 2461.

F. CAST IRON MANHOLE FRAME AND COVER RATED FOR H20 LOADING.

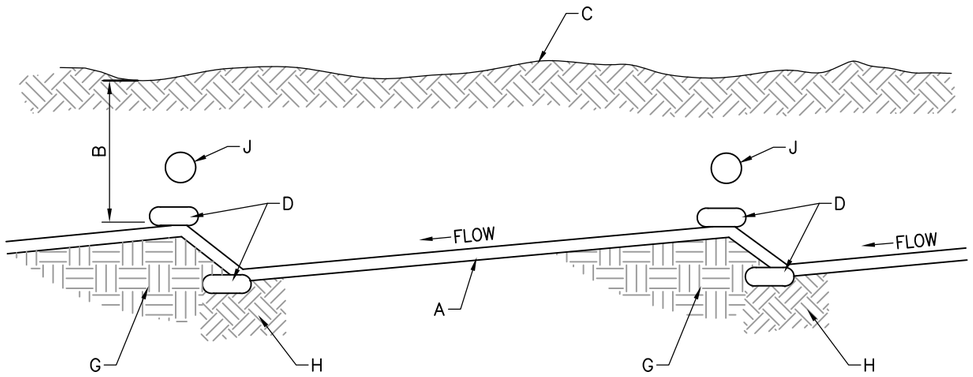
G. 1" CLEARANCE TO BOTTOM OF 3" LATERAL

H. 3" THICK 3/4" GRAVEL, ASTM C33, NO. 57 GRAVEL

J. COMPACTED SUBGRADE

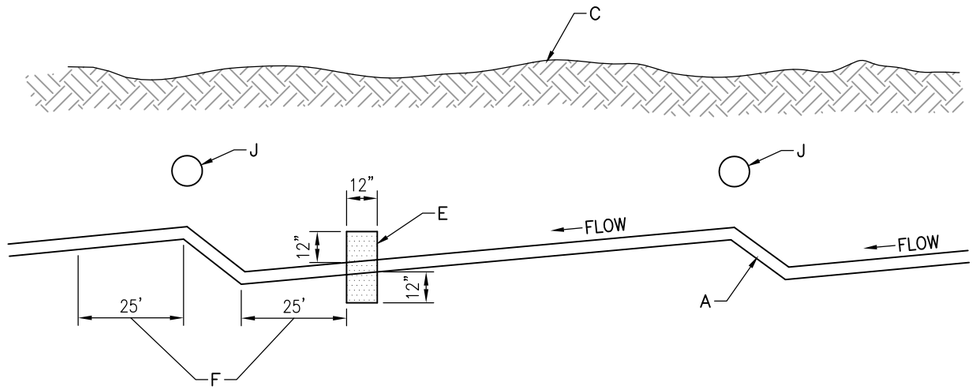
K. FINISH PAVING SURFACE

REVISIONS	WATER AUTHORITY
	VACUUM SEWER VACUUM VALVE PIT
	DWG. 2171 JAN. 2013



BLOCKING DETAIL

SEWER PROFILE



SEEPAGE COLLAR DETAIL

SEWER PROFILE

GENERAL NOTES

1. BENTONITE COLLAR TO BE INSTALLED EVERY 250' ALONG VACUUM SEWER RUN AND FORCE MAIN.
2. BENTONITE SEEPAGE COLLARS ARE FOR VACUUM SEWER MAINS AND FORCE MAINS INSTALLED IN MRGCD IRRIGATION RIGHT-OF-WAY OR AS SHOWN ON CONSTRUCTION DRAWINGS.
3. COST OF COLLARS IS INCIDENTAL TO PIPE CONSTRUCTION.

CONSTRUCTION NOTES

A. 4", 6", 8" OR 10" VACUUM SEWER

B. DEPTH PER PLANS

C. FINISH GRADE

D. 80 LB BAG OF REDI-MIX CONCRETE WITH CUT ON TOP.

E. BENTONITE SEEPAGE COLLAR; SEE SPECS. BELOW

F. MIN. DISTANCE FROM 45° BENDS

G. UNDISTURBED EARTH

H. 95% COMPACTED SUBGRADE

J. ELECTRONIC MARKER DEVICE (EMD) 12" ABOVE TOP OF PIPE. SEE STANDARD SPECIFICATION SECTION 170.

BENTONITE SPECIFICATIONS:

HYDROGEL BENTONITE BY WYO-BEN, INC. OR APPROVED EQUAL

BARREL YIELD	92
VISCOMETER READING AT 600 R.P.M.	39 +/- 5
WATER LOSS	13.5 +/- 1
% THRU 200 MESH SCREEN	80 +/- 2
WET SCREEN ANALYSIS RESIDUE ON U.S. SIEVE NO. 200	3.0 +/- .5
% MOISTURE	7 +/- 1
pH	9.1 +/- .1
GEL STRENGTH-10SEC.	18 +/- 2
GEL STRENGTH-10 MIN.	
PLASTIC VISCOSITY	14 +/- 2
YIELD POINT, LB/200 ft.	16 +/- 4

MIX 80 LBS. PER 100 GALLONS OF MAKE-UP WATER.

REVISIONS	WATER AUTHORITY
	VACUUM SEWER BLOCKING AND SEEPAGE COLLAR DETAILS
	DWG. 2173 JAN. 2013

GENERAL NOTES

1. ALL SOIL COMPACTION FOR INSTALLATION OF SERVICE WYE TO BE 95% OF MAXIMUM DRY DENSITY PER ASTM D 1557.

CONSTRUCTION NOTES

A. EXISTING VACUUM SEWER MAIN

B. SCHEDULE 40 PVC PIPE. LENGTH TO BE GREATER THAN COMPRESSION COUPLING.

C. SOLVENT WELD AT SHOP

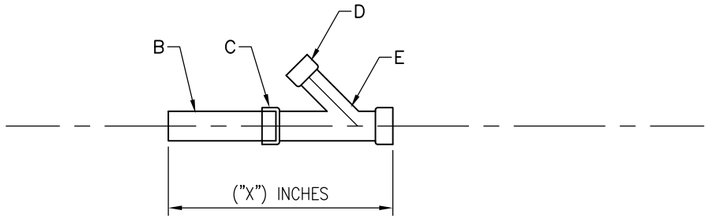
D. SEE STANDARD DRAWING 2163

E. SCHEDULE 40 PVC WYE (P x P x P)
SEE STANDARD DRAWING 2163

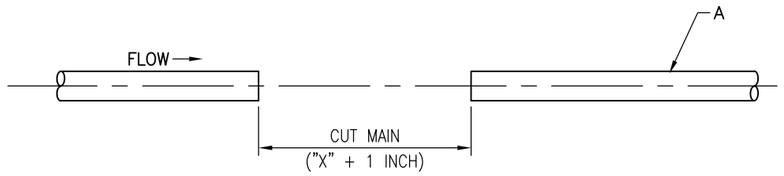
F. COMPRESSION COUPLING AS PER AUTHORITY SPECIFICATION

G. SLIDE COMPRESSION COUPLING ONTO THIS PIECE OF PIPE BEFORE INSERTING IN TRENCH

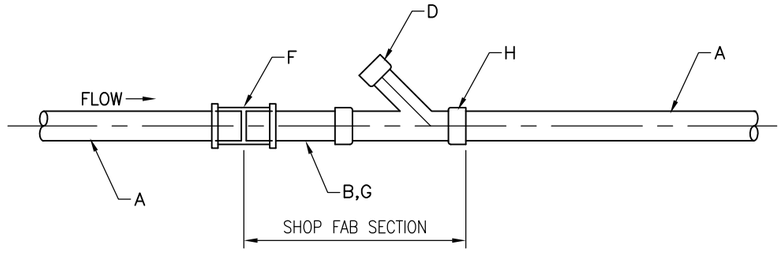
H. SOLVENT WELD IN FIELD



SHOP FAB SECTION



PIPE CUT IN FIELD



COMPLETED INSTALLATION IN FIELD

REVISIONS	WATER AUTHORITY
	VACUUM SEWER SERVICE WYE INSTALLATION ON EXISTING VACUUM MAIN DWG. 2174 JAN. 2013

GENERAL NOTES

1. SEE CONSTRUCTION PLANS AND SPECIFICATIONS FOR SKID TYPE AND SECTION CONFIGURATION (STANDARD, CENTERED AND RESTRAINED) AS SHOWN PER SECTION A–A.

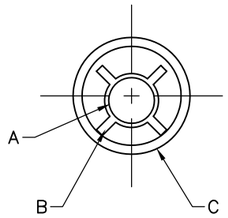
CONSTRUCTION NOTES

A. CARRIER PIPE

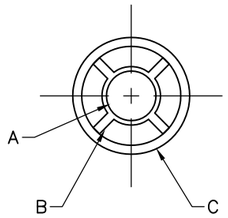
B. PIPELINE SUPPORT SKID (SEE CONSTRUCTION PLANS AND SPECIFICATIONS FOR SIZES AND MODEL NUMBERS).

C. STEEL CASING (SIZE AND THICKNESS PER CONSTRUCTION PLANS AND SPECIFICATIONS).

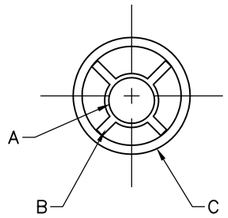
D. CASING END SEAL; (SEE CONSTRUCTION PLANS AND SPECIFICATIONS FOR SIZES AND MODEL NUMBERS).



STANDARD

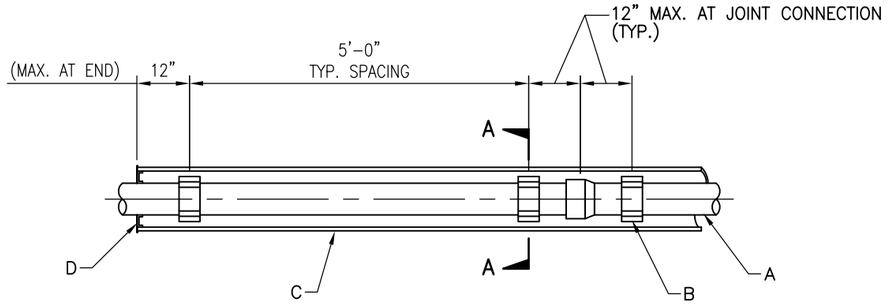


CENTERED



RESTRAINED

SECTION A–A



PLAN

REVISIONS	WATER AUTHORITY
	VACUUM SEWER CASING DETAIL FOR BORE AND JACK
	DWG. 2180 JAN. 2013

GENERAL NOTES

1. LABEL REQUIREMENTS: BEFORE THE WORK WILL BE ACCEPTED, SEWER 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. RING AND COVER FOR VALVE BOX PER STANDARD DRAWING 2128.

B. 12" DIAMETER POLYMER COATED STEEL PIPE CMP

C. GATE VALVE WITH PENTAGONAL OPERATING NUT

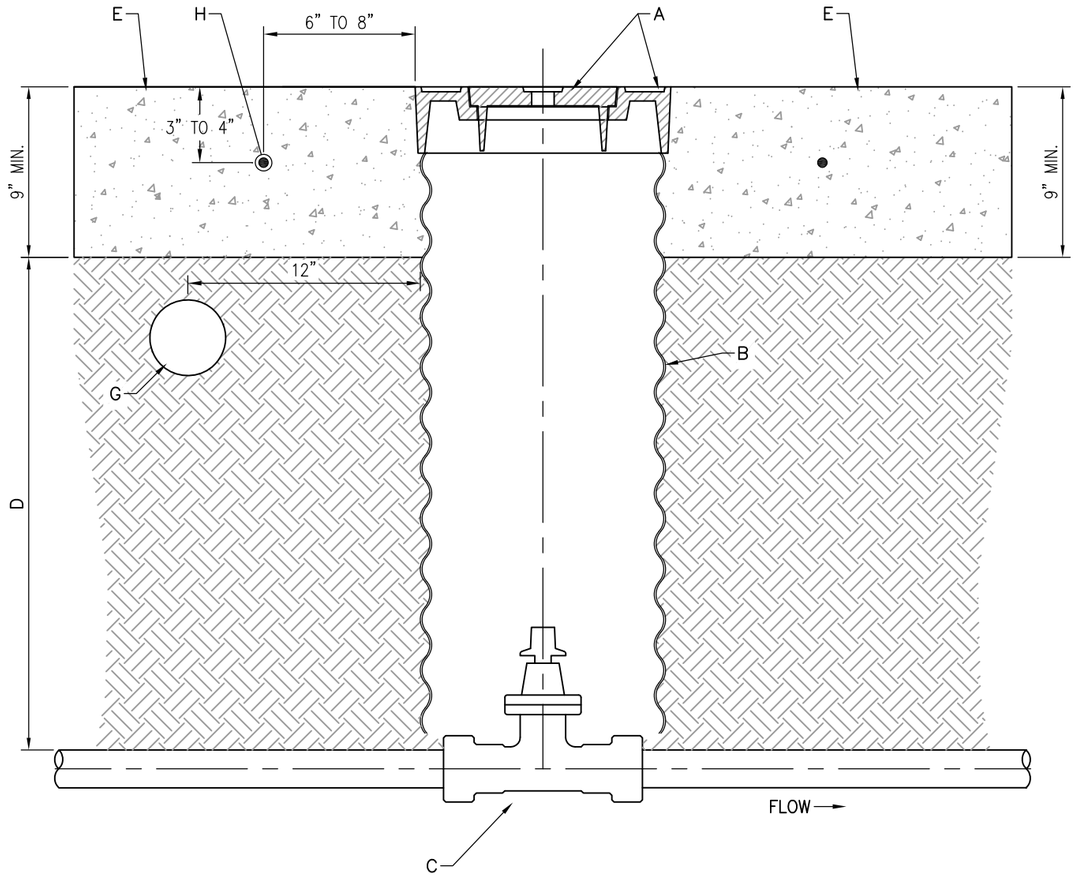
D. COMPACTED BACKFILL. SOIL OR BASE COURSE MATERIAL (95% COMPACTION). SEE SECTION 701

E. CONCRETE COLLAR PER STANDARD DRAWING 2461. f'c = 4000 psi

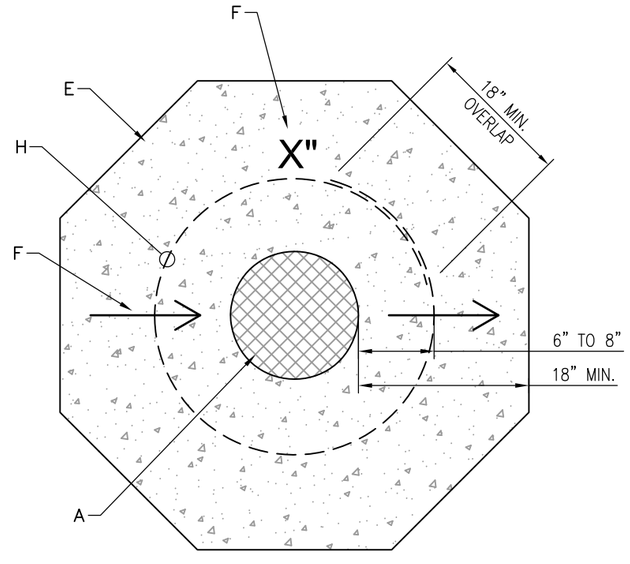
F. TOP OF CONCRETE COLLAR SHALL BE STAMPED WITH LINE SIZE AND FLOW DIRECTION ARROWS. MINIMUM LETTER SIZE SHALL BE 3" IN HEIGHT.

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

H. #4 REBAR, SEE STANDARD DRAWING 2461.

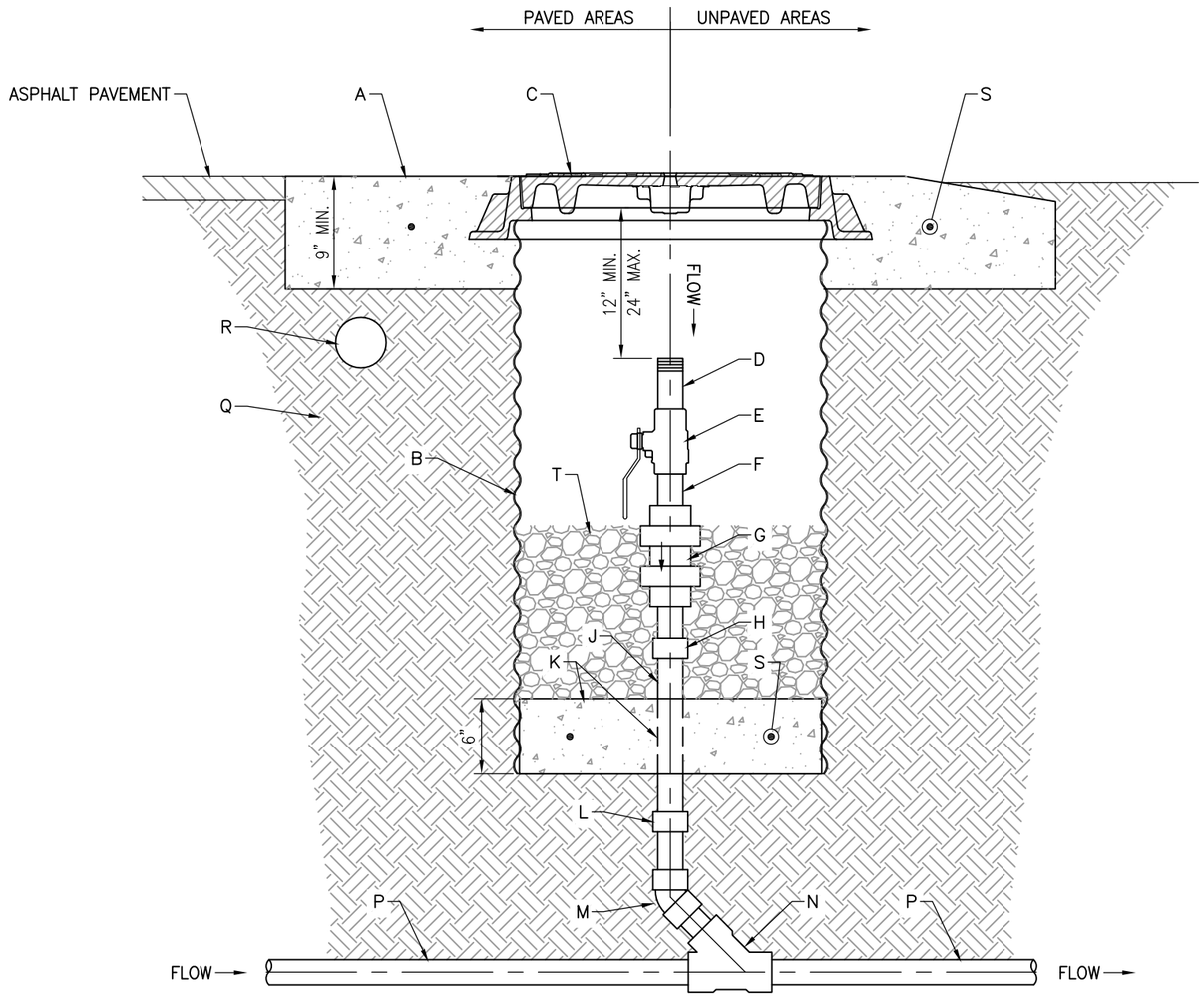


SECTION



PLAN

REVISIONS	WATER AUTHORITY
	FORCEMAIN SEWER VALVE BOX
	DWG. 2181 JAN. 2013



NOTES: 1) SCHEDULE 40 PVC NOT ALLOWED
2) FLUSH POINT ADAPTERS SHOULD MATCH SIZE OF MAIN LINE (2"ø PIPE SHOWN)

FLUSHING CONNECTION
SECTION

GENERAL NOTES

1. LABEL REQUIREMENTS: BEFORE THE WORK WILL BE ACCEPTED, SEWER 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. CONCRETE COLLAR PER STANDARD DRAWING 2461 (f'c=4000 psi). INSCRIBE CONCRETE SURFACE WITH SIZE OF FORCEMAIN LINE AND DIRECTION OF FLOW PER STANDARD DRAWING 2181. IN PAVED AREAS, INSTALL COLLAR FLUSH WITH PAVEMENT. IN UNPAVED AREAS, SET RING 1" ABOVE GRADE AND SLOPE TOP OF CONCRETE DOWN TO 1" BELOW GRADE.

B. 24" DIAMETER POLYMER COATED STEEL PIPE CMP

C. 24" MANHOLE FRAME AND COVER PER STANDARD DRAWING 2109.

D. VACTOR FLUSH POINT (GALVANIZED)

E. BALL VALVE (NORMALLY CLOSED)

F. PIPE ADJUSTMENT FOR LINE DEPTH (PVC)

G. BALL CHECK VALVE

H. THREADED TO GLUED ADAPTER

J. GALVANIZED PIPE

K. 24"x6" CONCRETE COLLAR WITH SAFETY WRAP AROUND PIPE

L. GLUE TO THREADED ADAPTER

M. 45° ELBOW

N. WYE

P. FORCEMAIN SEWER LINE

Q. COMPACTED BACKFILL. SOIL OR BASE COURSE MATERIAL (95% COMPACTION). SEE SECTION 701

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

S. #4 REBAR, SEE STANDARD DRAWING 2461.

T. 1/2" TO 3/4" GRAVEL. FILL BOX TO BELOW VALVE HANDLE IN OPEN POSITION.

REVISIONS	WATER AUTHORITY
	FORCEMAIN SEWER LOW PRESSURE SANITARY SEWER (LPSAS) FLUSHING CONNECTION DWG. 2182 JAN. 2013

CONSTRUCTION NOTES

A. PVC LOW PRESSURE SANITARY SEWER MAIN (LPSAS) SCHEDULE 40 NOT ALLOWED.

B. 45° BEND

C. EXISTING MANHOLE, TYPE "E" SHOWN.

D. 0.10 FT. DROP ACROSS MANHOLE MIN.

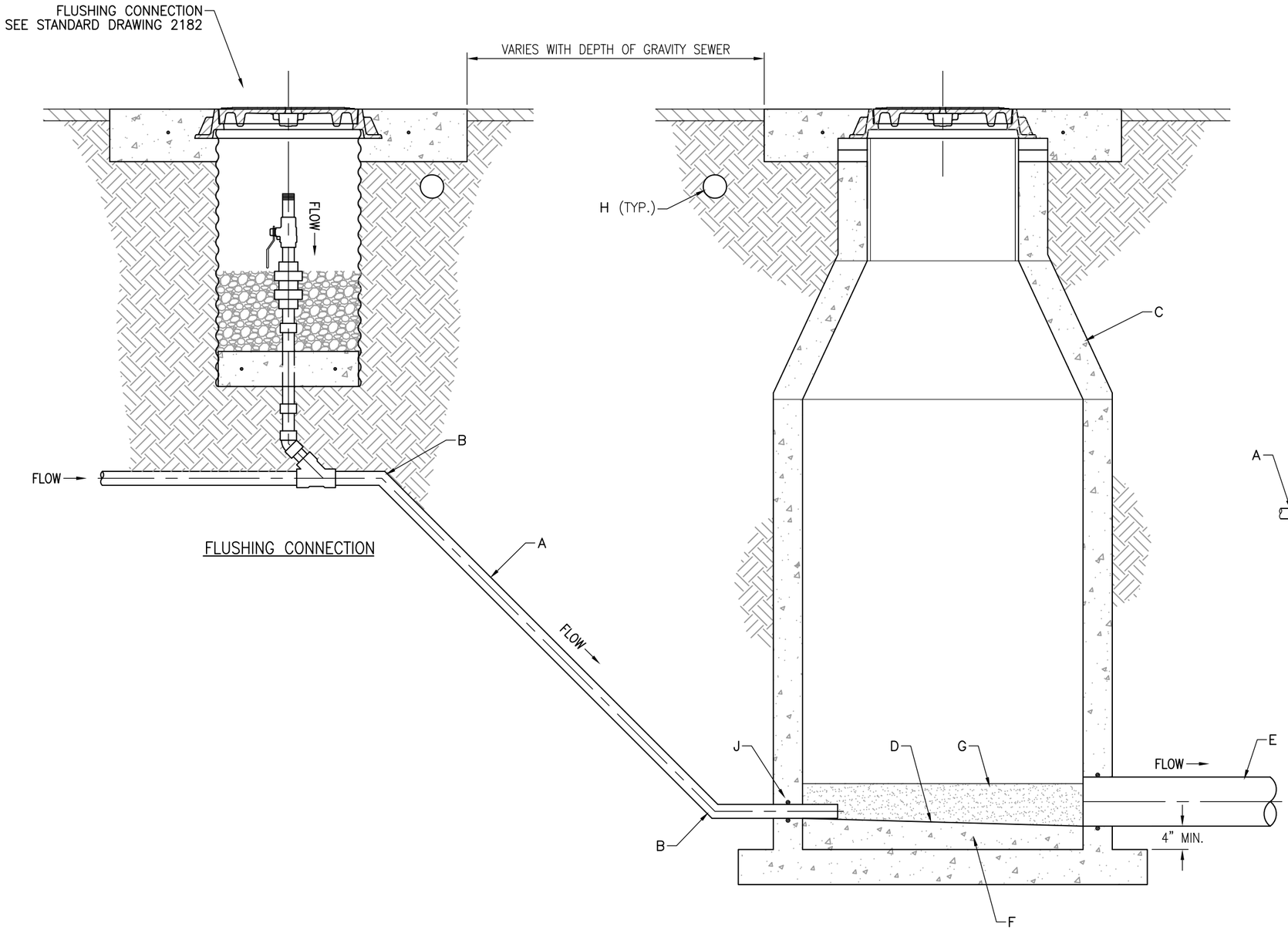
E. 8" GRAVITY SEWER

F. CONCRETE, SEE SECTION 101

G. FORMED GROUT CHANNEL

H. ELECTRONIC MARKER DEVICE (EMD). SEE STANDARD SPECIFICATION SECTION 170. DEPTH PLACEMENT PER MANUFACTURER'S RECOMMENDATIONS.

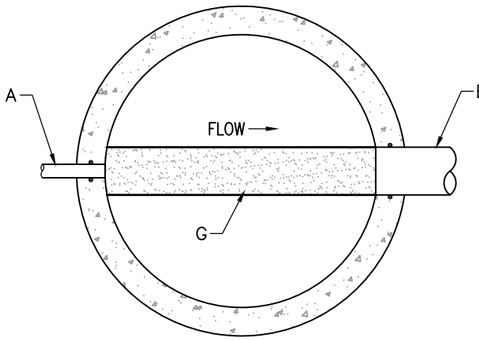
J. APPROVED WATERSTOP TO BE COMPATIBLE WITH TYPE OF PIPE



FLUSHING CONNECTION

EXISTING MANHOLE

SECTION



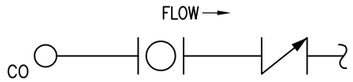
GROUT CHANNEL

PLAN

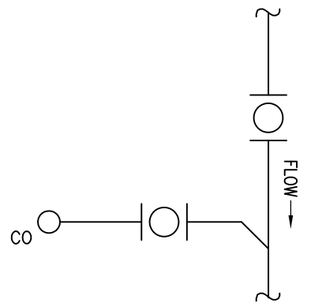
REVISIONS	WATER AUTHORITY
	FORCEMAIN SEWER CONNECTION TO GRAVITY SEWER AT MANHOLE
	DWG. 2183 JAN. 2013

LEGEND

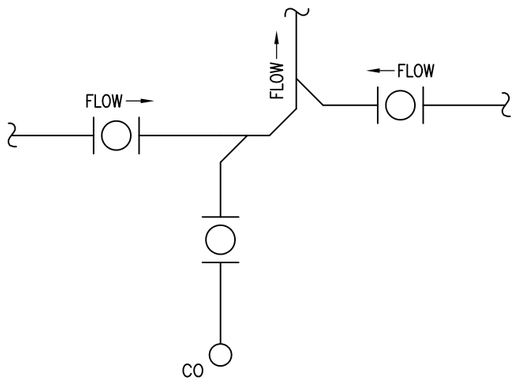
- 2" PVC PIPE
- BALL VALVE
- CO — CLEANOUT
- CHECK VALVE



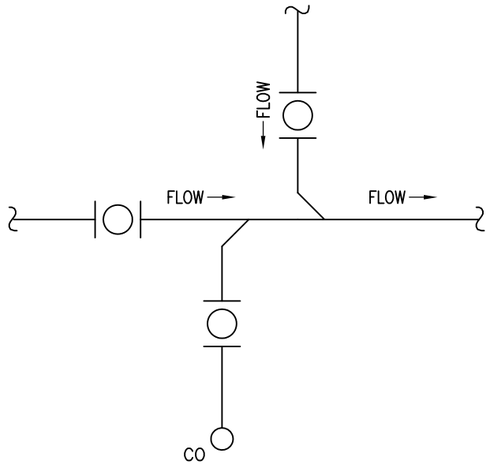
TERMINAL CLEANOUT



INLINE CLEANOUT (TYPE B)



JUNCTION CLEANOUT (TYPE C)



JUNCTION CLEANOUT (TYPE D)

REVISIONS	WATER AUTHORITY
	FORCEMAIN SEWER TYPICAL FORCEMAIN CONFIGURATION DWG. 2184 JAN. 2013

GENERAL NOTE

1. SAS SERVICE LINES SHALL BE CONSTRUCTED USING SCHEDULE 80 PVC PIPE.

CONSTRUCTION NOTES

A. SANITARY SEWER RING AND COVER FOR VALVE BOX PER STANDARD DRAWING 2128.

B. PVC LOW PRESSURE SANITARY SEWER MAIN (LPSAS)

C. PVC WYE

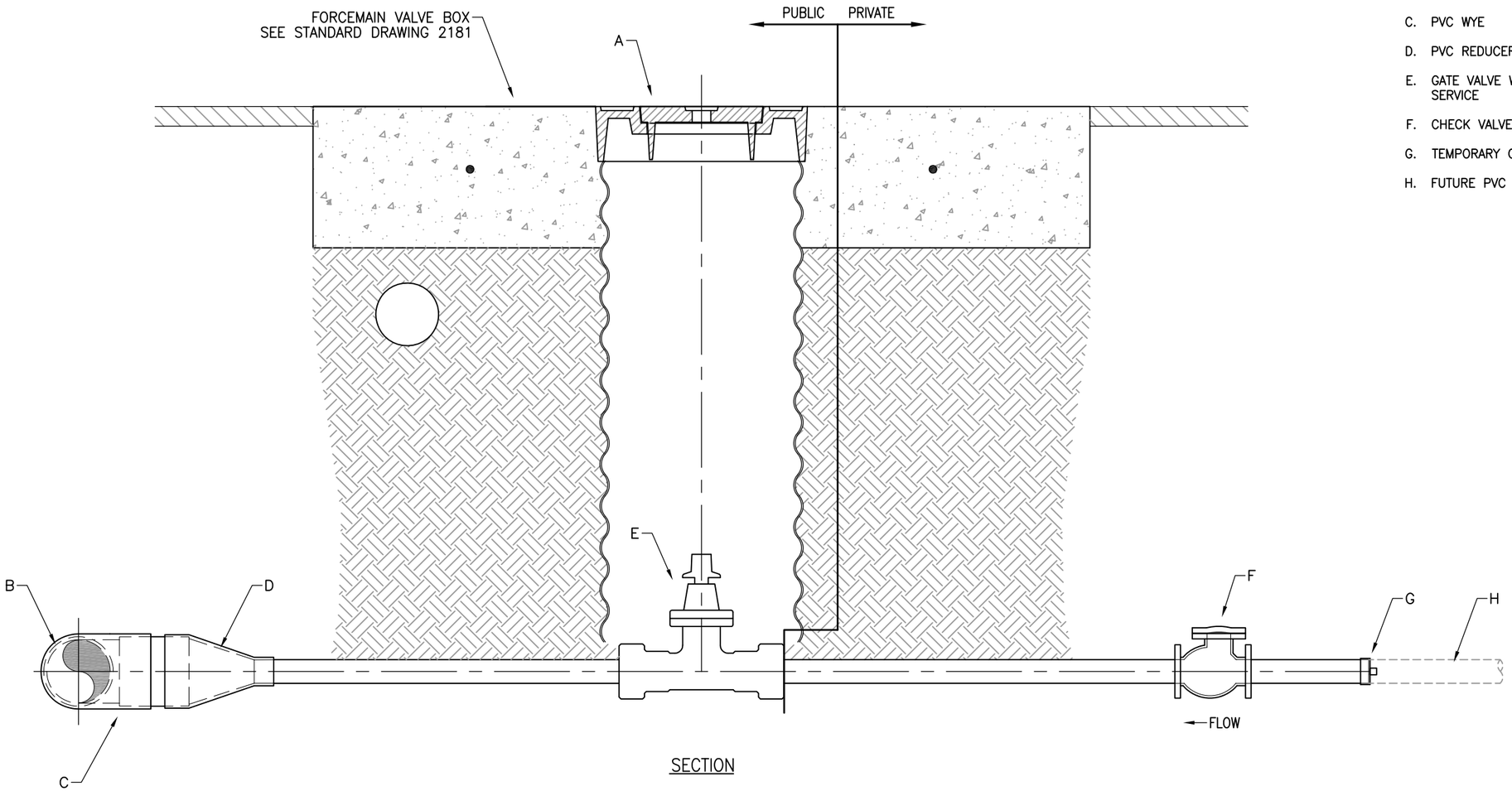
D. PVC REDUCER (AS REQUIRED)

E. GATE VALVE WITH PENTAGONAL OPERATING NUT. SIZE PER SERVICE

F. CHECK VALVE, SIZE PER SERVICE

G. TEMPORARY CAP

H. FUTURE PVC LINE FROM OWNER FURNISHED GRINDER PUMP



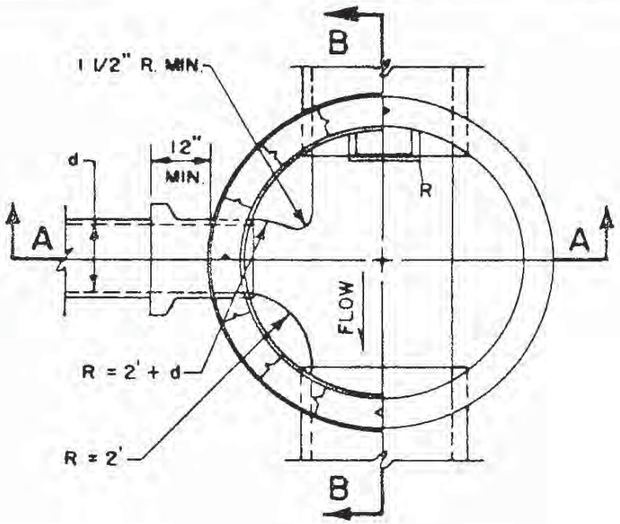
SECTION

REVISIONS	WATER AUTHORITY
	FORCEMAIN SEWER SERVICE LINE VALVE DETAIL
	DWG. 2185 JAN. 2013

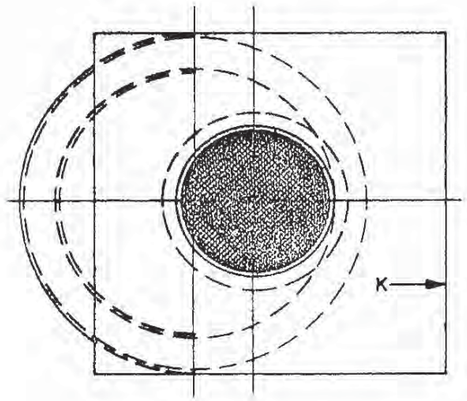
SECTION 2200

STANDARD DETAILS FOR DRAINAGE

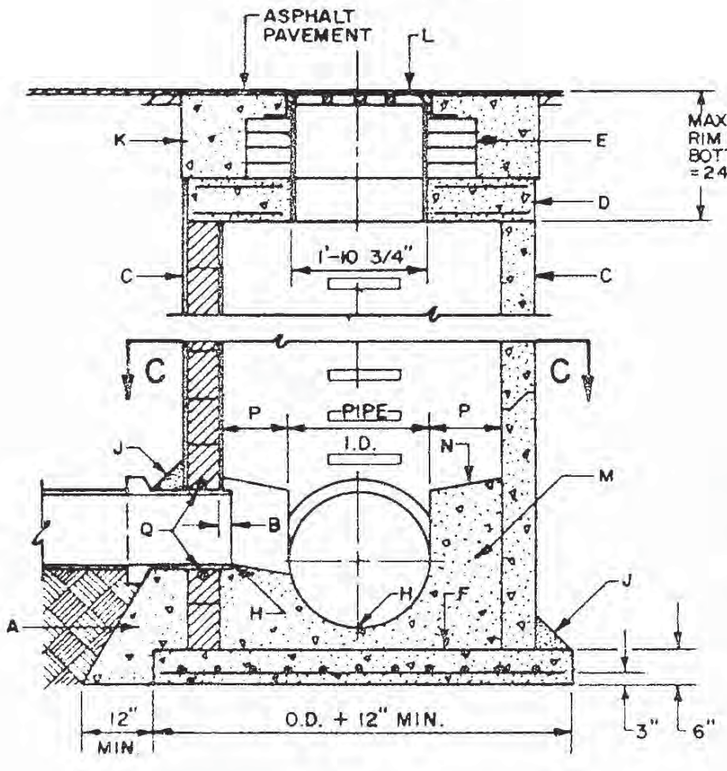
DWG. NO.	TITLE
2201	DRAINAGE STORM INLET TYPE “A” PLAN AND SECTION A-A
2202	DRAINAGE STORM INLET TYPE “A” SECTIONS B-B, C-C, D-D, AND E-E
2203	DRAINAGE STORM INLET TYPE “B”
2205	DRAINAGE STORM INLET DOUBLE “C”
2206	DRAINAGE STORM INLET DOUBLE “D”
2207	DRAINAGE STORM INLET GUTTER TRANSITION
2208	STORM MANHOLE TYPE “C”
2209	STORM MANHOLE TYPE “E”
2210	STORM MANHOLE FRAME AND COVERS
2211	STORM MANHOLE COVER ADJUSTMENT RING
2212	STORM CONCRETE MANHOLE COVER TYPE “C”
2213	STORM VERTICAL DROP AT MANHOLE
2215	DRAINAGE STORM INLET CENTER SUPPORT ASSEMBLY
2216	DRAINAGE STORM INLET FRAME
2220	DRAINAGE STORM INLET ALBUQUERQUE GRATE
2221	DRAINAGE STORM INLET ALTERNATE GRATE
2225	DRAINAGE SLOTTED DRAIN
2229	DRAINAGE STEP DETAILS
2235	DRAINAGE DRAIN LINE THROUGH CURB
2236	DRAINAGE SIDEWALK CULVERT WITH STEEL PLATE TOP
2237	DRAINAGE DRAIN LINE CONNECTION TO EXISTING STORM INLET
2250	DRAINAGE STATIONARY AND REMOVABLE POST DETAILS
2251	DRAINAGE PIPE GATE DETAIL
2252	DRAINAGE STANDARD CHAIN LINK GATE AND FENCE DETAIL
2253	DRAINAGE SQUARE TUBE GATE DETAIL
2260	DRAINAGE TYPICAL LINING FOR DRAINAGE EASEMENTS
2261	DRAINAGE CHANNEL DETAILS
2265	DRAINAGE CHANNEL EXPANSION JOINT WITH SLEEPER
2266	DRAINAGE EXPANSION JOINT CONNECTION TO CONCRETE WALL
2267	DRAINAGE CHANNEL EXPANSION JOINT REPAIR
2268	DRAINAGE SLEEP JOINT PROTECTION PLATE
2270	DRAINAGE WIRE ENCLOSED RIPRAP
2271	DRAINAGE CATTLE GUARD INLET
2272	DRAINAGE CATTLE GUARD INLET
2273	DRAINAGE MEDIAN STORM INLET
2274	DRAINAGE STATIONING AND WATER DEPTH MARKS IN CONCRETE LINED CHANNEL



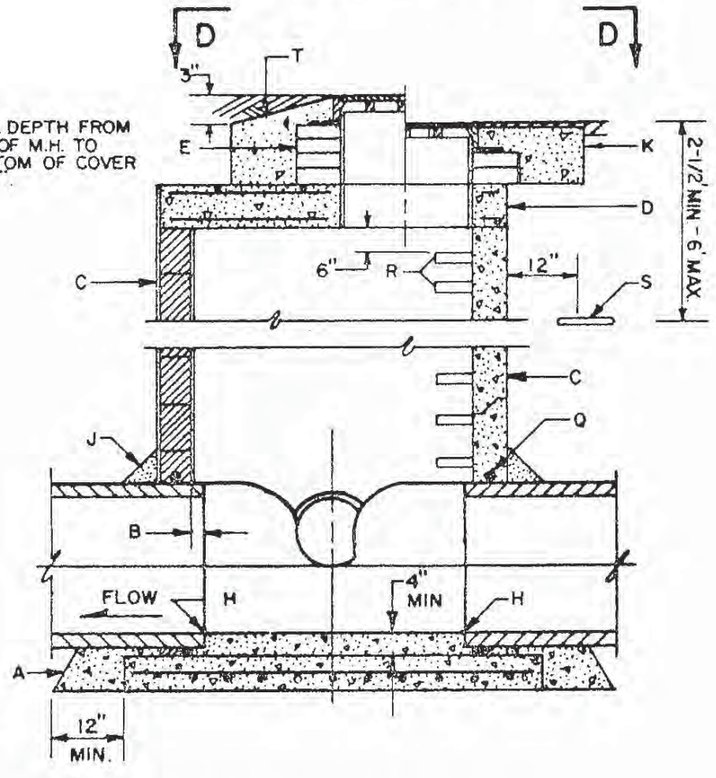
PLAN AT C-C



PLAN AT D-D



CROSS SECTION A - A



CROSS SECTION B - B

GENERAL NOTES

1. USE TYPE "C" MANHOLE FOR DEPTHS OF LESS THAN 6' MEASURED FROM INVERT TO RIM.
2. CONTRACTOR HAS OPTION TO CONSTRUCT TYPE "C" MANHOLE IN LIEU OF TYPE "E" MANHOLE FOR DEPTHS OF 6' OR MORE.
3. DESIGN APPLIES TO 4' TO 6' I.D. MANHOLES.
4. MANHOLE GREATER THAN 18' IN DEPTH SHALL ONLY BE CONSTRUCTION PRECAST CONCRETE SECTIONS.
5. USE NON-SHRINK GROUT FOR JOINTS, FILLETS AND PENETRATIONS.
6. COMPACT ALL BACKFILL AROUND MANHOLE TO 95%.
7. POSITION MANHOLE OPENING OVER THE UPSTREAM SIDE OF MAIN LINE.

CONSTRUCTION NOTES

A. CONCRETE PIPE SUPPORTS SHALL EXTEND OUTSIDE OF MANHOLE TO BELL OF FIRST JOINT AND SHALL CRADLE PIPE TO SPRING LINE NOT APPLICABLE FLEXIBLE PIPE.
B. PIPE PENETRATION INTO MANHOLE SHALL BE FLUSH TO 2" MAX., MEASURED AT SPRINGLINE OF PIPE.
C. 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. 2118 FOR DETAILS.
D. PRECAST CONCRETE COVER, SEE DWG. 2107.
E. USE MAX., 4 COURSES GR. MS BRICK ON UNPAVED STREET FOR FUTURE ADJUSTMENT OF MANHOLE FRAME TO PAVEMENT GRADE PLASTER INSIDE WITH 1/2" MORTAR.
F. CONCRETE BASE TO BE POURED IN PLACE USING NO. 4 BARS AT 6" O.C. EA. WAY FOR MANHOLE DEPTH OF 16' OR GREATER. NO. 4 BARS AT 12" O.C. EA. WAY FOR MANHOLE LESS THAN 16' IN DEPTH.
H. INVERT ELEVATION OF STUB OR LATERAL AS SHOWN ON PLANS.
J. 6" GROUT FILLET ON UPPER HALF OF PIPE AND AROUND BASE.
K. USE A 5' X 5' CONCRETE PAD IN ALL AREAS.
L. FRAME AND COVER, SEE DWG. 2110.
M. CONCRETE, SEE SECTION 101.
N. SLOPE 1" PER FT. FROM PIPE CROWN.
P. SHELF TO BE 9" WIDE MIN.
Q. APPROVED WATERSTOP TO BE COMPATIBLE WITH TYPE OF PIPE.
R. STEPS TO BE INSTALLED AS PER SPEC. SECTION 920.
S. EMD (IN UNPAVED AREAS).
T. IN UNPAVED AREAS SET FRAME TO GRADE AND SLOPE TOP OF PAD.

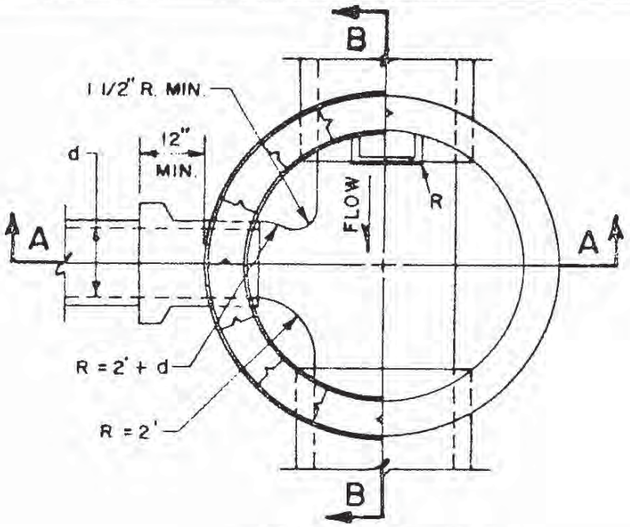
CITY OF ALBUQERQUE

REVISIONS
11-14-91

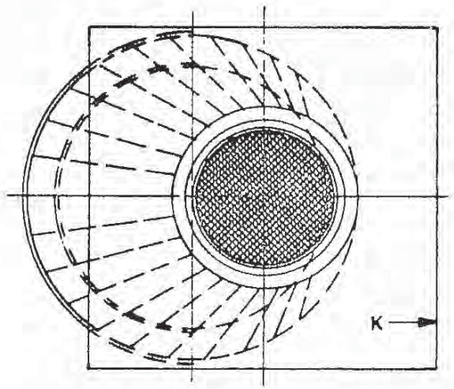
STORM

MANHOLE TYPE "C"

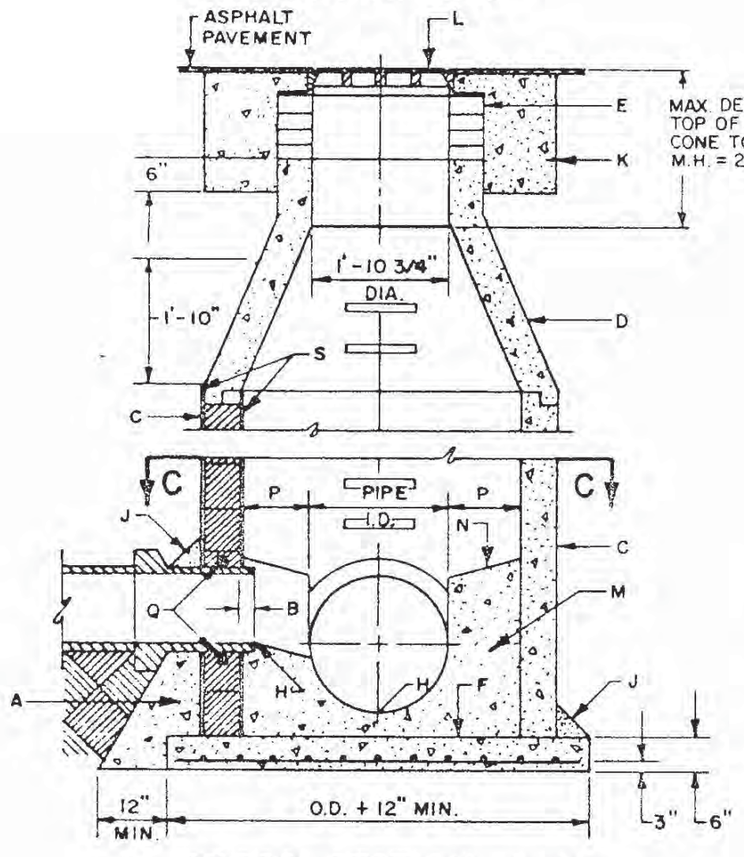
DWG. 2208 AUG. 1986



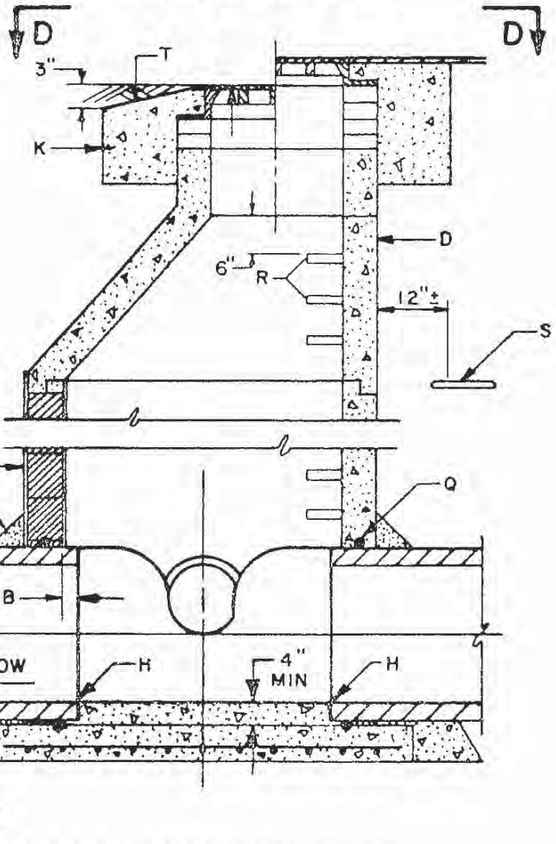
PLAN AT C-C



PLAN AT D-D



CROSS SECTION A-A



CROSS SECTION B-B

GENERAL NOTES

1. TYPE "E" MANHOLE NOT TO BE USED FOR DEPTHS LESS THAN 6' MEASURED FROM INVERT TO RIM.
2. MANHOLE GREATER THAN 18' IN DEPTH SHALL BE OF PRECAST CONCRETE SECTIONS ONLY.
3. DESIGN APPLIES TO 4' AND 6' I.D. MANHOLES.
4. USE NON-SHRINK GROUT FOR JOINTS, FILLETS AND PIPE PENETRATIONS.
5. COMPACT ALL BACKFILL AROUND MANHOLES TO 95%.
6. POSITION MANHOLE OPENING OVER THE UPSTREAM SIDE OF MAIN LINE.

CONSTRUCTION NOTES

A. CONCRETE PIPE SUPPORTS SHALL EXTEND OUTSIDE OF MANHOLE TO BELL OF FIRST JOINT AND SHALL CRADLE PIPE TO SPRING LINE NOT APPLICABLE FLEXIBLE PIPE.
B. PIPE PENETRATION INTO MANHOLE SHALL BE FLUSH TO 2" MAX., MEASURED AT SPRINGLINE OF PIPE.
C. 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. 2118 FOR DETAILS.
D. PRECAST REINFORCED CONCRETE ECCENTRIC CONE. THE CONTRACTOR SHALL PROVIDE SHOP DWGS. FOR APPROVAL.
E. USE MAX., 4 COURSES GR. MS BRICK ON UNPAVED STREET FOR FUTURE ADJ. OF FRAME TO PAVEMENT GRADE PLASTER INSIDE WITH 1/2" MORTAR.
F. BASE TO BE POURED IN PLACE USING NO. 4 BARS AT 6" O.C. EA. WAY FOR MANHOLE DEPTH OF 16' OR GREATER NO. 4 BARS AT 12" O.C. EA. WAY FOR MANHOLE LESS THAN 16' DEEP.
H. INVERT ELEVATION OF STUB OR LATERAL AS SHOWN ON PLANS.
J. 6" GROUT FILLET ON UPPER HALF OF PIPE AND AROUND BASE.
K. USE A 5' X 5' CONCRETE PAD IN ALL AREAS.
L. MANHOLE FRAME AND COVER, SEE DWG. 2110.
M. CONCRETE, SEE SECTION 101.
N. SLOPE 1' PER FT. FROM PIPE CROWN.
P. SHELF TO BE 9" WIDE MIN.
Q. APPROVED WATERSTOP TO BE WITH TYPE OF PIPE.
R. STEPS TO BE INSTALLED AS PER SPEC. SECTION 920.
S. EMD (IN UNPAVED AREAS).
T. IN UNPAVED AREAS SET FRAME TO GRADE AND SLOPE TOP OF PAD.

2-1/2 MIN - 6' MAX

REVISIONS
11-14-91

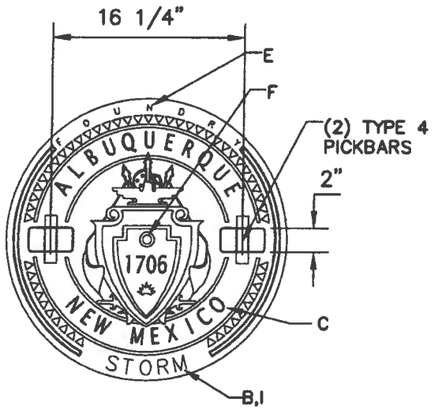
CITY OF ALBUQUERQUE

STORM

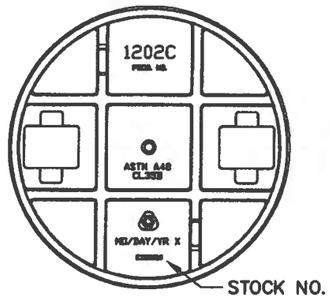
MANHOLE TYPE "E"

DWG. 2209

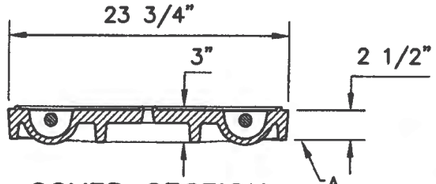
AUG. 1986



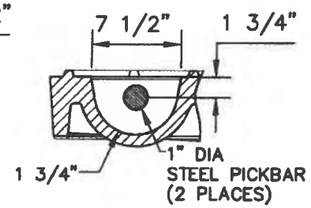
24" MANHOLE
TOP VIEW



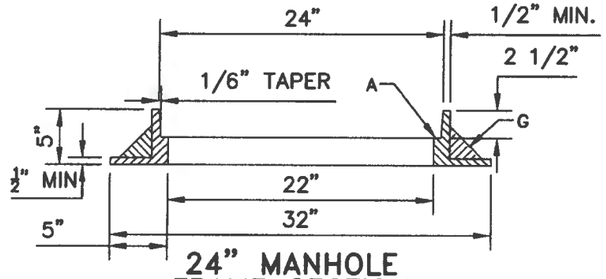
24" MANHOLE
BOTTOM VIEW



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 = ±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 = ±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.

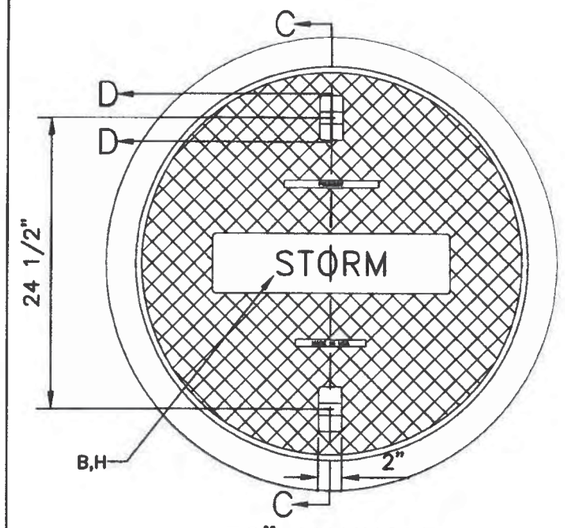
E. LETTER SIZE TO BE 3/8" MIN. IN HEIGHT RAISED LETTERING.

F. 3/4" DIA VENT HOLE REQUIRED.

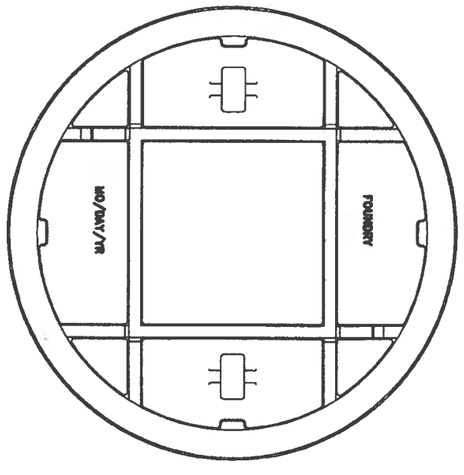
G. GUSSETS OPTIONAL IF REQUIRED BY MANUFACTURER.

H. 2" LETTERS (RECESSED FLUSH).

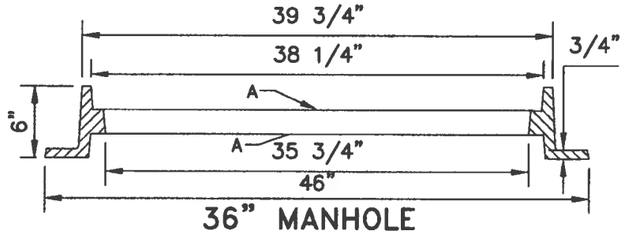
I. LETTER SIZE TO BE 1" IN HEIGHT RAISED LETTERING.



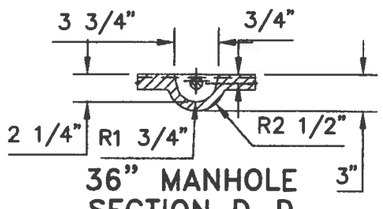
36" MANHOLE
TOP VIEW



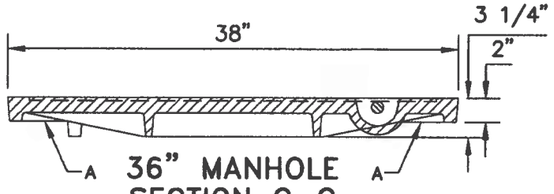
36" MANHOLE
BOTTOM VIEW



36" MANHOLE
FRAME SECTION

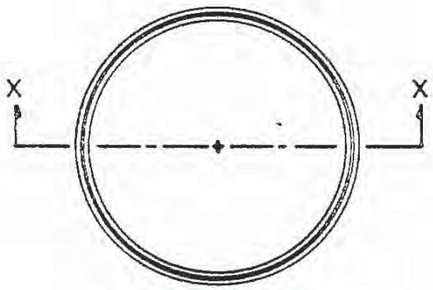


36" MANHOLE
SECTION D-D



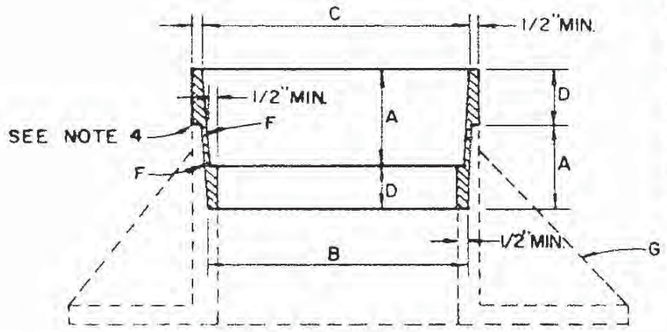
36" MANHOLE
SECTION C-C

REVISIONS	CITY OF ALBUQUERQUE
	STORM
	MANHOLE FRAME AND COVERS
	DWG. 2210 JANUARY 2011



COMMON C.O.A. MH FRAME SIZES

A	B	C	D
$2\frac{3}{8}$	$23\frac{1}{2}$	$23\frac{3}{8}$	
$2\frac{1}{2}$	$23\frac{5}{8}$	$23\frac{3}{4}$	
$2\frac{5}{8}$	$23\frac{5}{8}$	$23\frac{3}{4}$	
2	$23\frac{3}{4}$	$23\frac{7}{8}$	
$2\frac{1}{4}$	$23\frac{3}{4}$	$23\frac{7}{8}$	
$2\frac{3}{8}$	$23\frac{3}{4}$	$23\frac{7}{8}$	
$2\frac{1}{2}$	$23\frac{3}{4}$	$23\frac{7}{8}$	
$2\frac{5}{8}$	$23\frac{3}{4}$	$23\frac{7}{8}$	
$2\frac{3}{4}$	$23\frac{3}{4}$	$23\frac{7}{8}$	
$2\frac{1}{2}$	$23\frac{7}{8}$	24	
1	$24\frac{7}{8}$	25	$1\frac{1}{4}$



SECTION X-X

NOT TO SCALE
VERTICAL SCALE EXAGERATED FOR CLARITY

GENERAL NOTES

1. ADJUSTMENT RING MADE FROM STANDARD ALUMINUM CASTING, ALLOY 319.
2. I.D., O.D. AND DEPTH SHALL BE MACHINED TO REQUIRED DIMENSIONS.
3. DUE TO VARYING EXISTING FRAME AND COVER SIZES, ALL DIMENSIONS MUST BE FIELD VERIFIED PRIOR TO MACHINING.
4. ALL EDGES OF RING SHALL BE LIGHTLY GROUND AFTER MACHINING TO REMOVE SHARPNESS AND BURRS.
5. COAT ALL SURFACES OF RING WITH CLEAR ACRYLIC RESIN AFTER MACHINING.

CONSTRUCTION NOTES

A. DIMENSION=DEPTH OF EXISTING COVER EDGE.

B. DIMENSION=RING O.D.=FRAME ID AT SEAT.

C. DIMENSION=RING I.D.=FRAME O.D. AT RIM.

D. DIMENSION=HEIGHT OF RING ADJUSTMENT.

E. EXISTING FRAME AND COVER SHALL BE CLEANED AND REUSED.

F. TAPER=1/2X(C-B).

G. EXISTING FRAME.

CITY OF ALBUQUERQUE

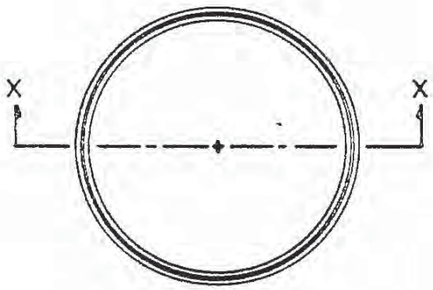
REVISIONS

STORM

MANHOLE COVER ADJUSTMENT RING

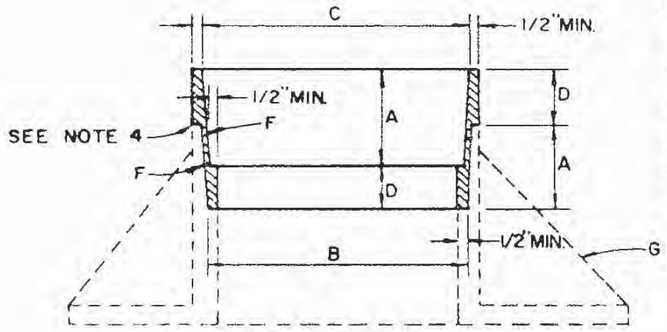
DWG.2211

AUG. 1986



COMMON C.O.A. MH FRAME SIZES

A	B	C	D
$2\frac{3}{8}$	$23\frac{1}{2}$	$23\frac{3}{8}$	
$2\frac{1}{2}$	$23\frac{5}{8}$	$23\frac{3}{4}$	
$2\frac{5}{8}$	$23\frac{5}{8}$	$23\frac{3}{4}$	
2	$23\frac{3}{4}$	$23\frac{7}{8}$	
$2\frac{1}{4}$	$23\frac{3}{4}$	$23\frac{7}{8}$	
$2\frac{3}{8}$	$23\frac{3}{4}$	$23\frac{7}{8}$	
$2\frac{1}{2}$	$23\frac{3}{4}$	$23\frac{7}{8}$	
$2\frac{5}{8}$	$23\frac{3}{4}$	$23\frac{7}{8}$	
$2\frac{3}{4}$	$23\frac{3}{4}$	$23\frac{7}{8}$	
$2\frac{1}{2}$	$23\frac{7}{8}$	24	
1	$24\frac{7}{8}$	25	$1\frac{1}{4}$



SECTION X-X

NOT TO SCALE
VERTICAL SCALE EXAGERATED FOR CLARITY

GENERAL NOTES

1. ADJUSTMENT RING MADE FROM STANDARD ALUMINUM CASTING, ALLOY 319.
2. I.D., O.D. AND DEPTH SHALL BE MACHINED TO REQUIRED DIMENSIONS.
3. DUE TO VARYING EXISTING FRAME AND COVER SIZES, ALL DIMENSIONS MUST BE FIELD VERIFIED PRIOR TO MACHINING.
4. ALL EDGES OF RING SHALL BE LIGHTLY GROUND AFTER MACHINING TO REMOVE SHARPNESS AND BURRS.
5. COAT ALL SURFACES OF RING WITH CLEAR ACRYLIC RESIN AFTER MACHINING.

CONSTRUCTION NOTES

A. DIMENSION=DEPTH OF EXISTING COVER EDGE.

B. DIMENSION=RING O.D.=FRAME ID AT SEAT.

C. DIMENSION=RING I.D.=FRAME O.D. AT RIM.

D. DIMENSION=HEIGHT OF RING ADJUSTMENT.

E. EXISTING FRAME AND COVER SHALL BE CLEANED AND REUSED.

F. TAPER=1/2X(C-B).

G. EXISTING FRAME.

CITY OF ALBUQUERQUE

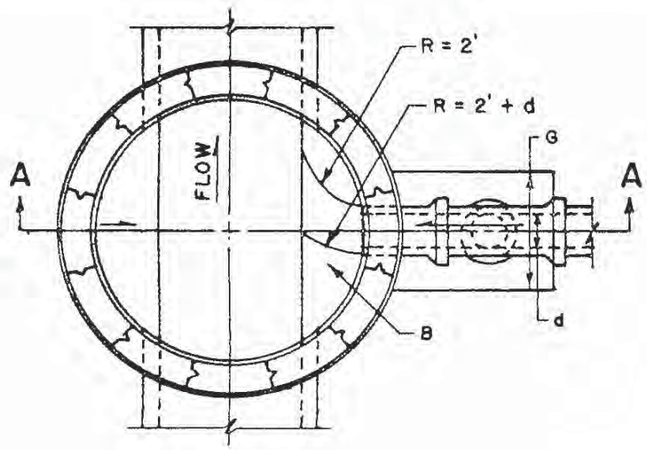
REVISIONS

STORM

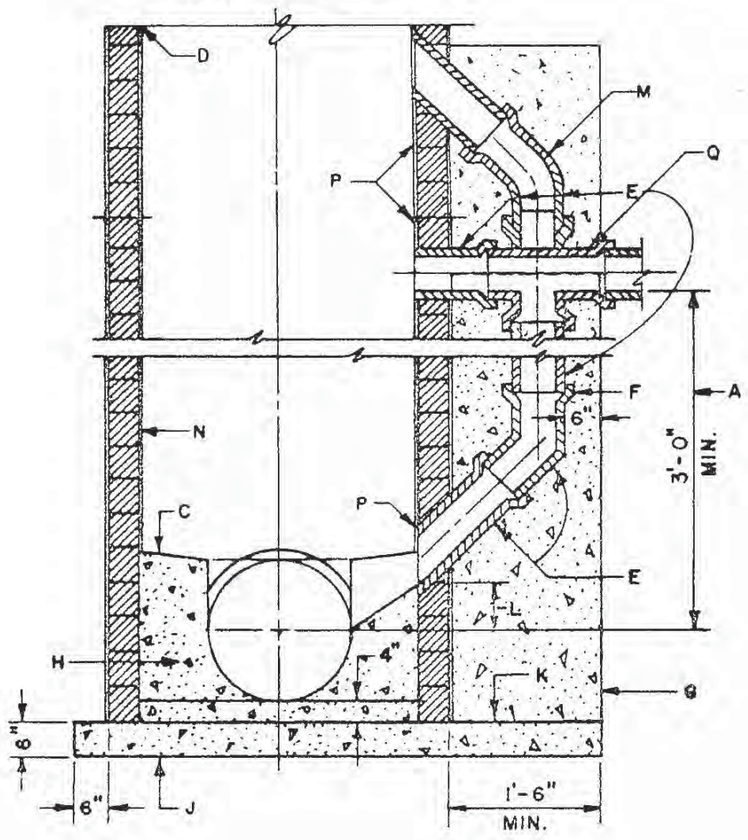
MANHOLE COVER ADJUSTMENT RING

DWG.2211

AUG. 1986



FLOOR PLAN



SECTION A-A

CONSTRUCTION NOTES

A. VERTICAL DROP.
B. FORM THE INVERT IN SHELF.
C. SLOPE, 1' PER FT.
D. MANHOLE TYPE FOR UPPER PORTION WILL BE SPECIFIED ON DESIGN PROFILE.
E. USE I.D. OR P.V.C. (SDR 35) PIPE THROUGHOUT DROP.
F. USE BELL AND SPIGOT 45° SHORT OR LONG RADIUS BEND
G. CONCRETE SUPPORT WIDTH EQUALS PIPE O.D. PLUS 6" MIN EACH SIDE.
H. CONCRETE, SEE SECTION 101.
J. REINFORCED CONCRETE BASE. SEE CONSTRUCTION NOTE F. OF DWG. 2101, 2102.
K. FOR NEW DROP ON EXISTING MANHOLE CONSTRUCT 3 X 3 CONCRETE BASE BEFORE CONSTRUCTING DROP SUPPORT.
L. 4" ABOVE SPRING LINE OR AS SHOWN ON PLAN.
M. 8" MIN. DIAMETER. 2-22 1/2° OR 1-45° ELBOW.
N. INTERIOR OR DROP MANHOLE MUST BE COATED WITH APPROVED SEALER IN ACCORDANCE WITH SPEC. SECTION 920.4.
P. CORE DRILL FOR ALL WALL PENETRATIONS ON EXISTING MANHOLES.
Q. CROSS OR TEE. A TEE MAY BE USED ONLY WHEN THE VERTICAL HIGH IS INSUFFICIENT FOR THE VERTICAL PIPING ABOVE THE SEWER LINE TO ENTER THE BARREL OF THE MANHOLE.

REVISIONS
11-14-91

CITY OF ALBUQUERQUE

STORM

VERTICAL DROP AT MH

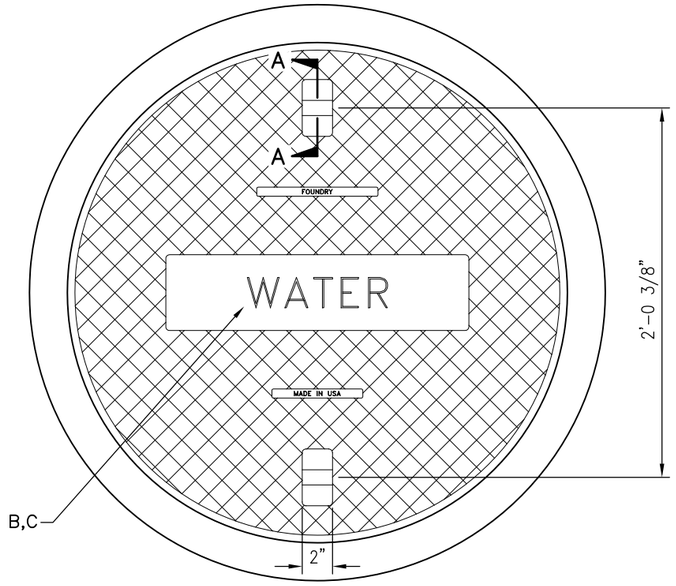
DWG. 2213

AUG. 1986

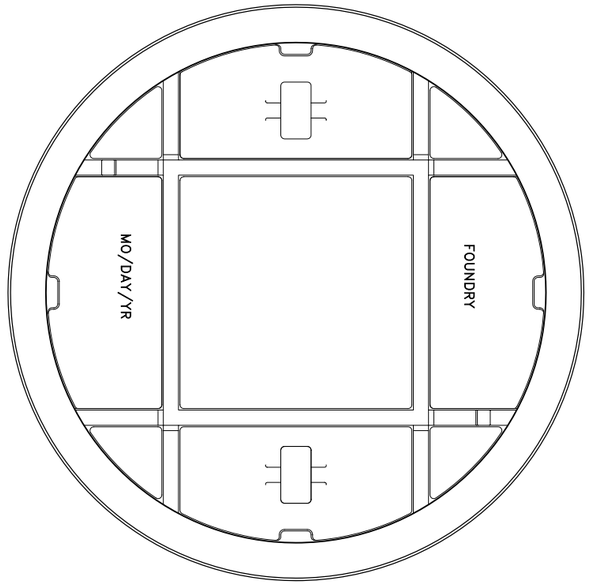
SECTION 2300

STANDARD DETAILS FOR WATER

DWG. NO.	TITLE
2301	WATERLINE CONNECTION DETAILS
2305	WATER CONCRETE CYLINDER PIPE RIGID JOINT DETAIL
2310	WATER MANHOLE FRAME AND COVERS
2315	WATER PIPE TRENCH TERMINOLOGY
2320	WATER CONCRETE BLOCKING DESIGN
2321	WATER CONCRETE ENCASEMENT DETAILS
2322	WATER STATIONARY POST DETAIL
2326	WATER VALVE BOX
2328	WATER RING & COVER FOR VALVE BOX
2329	FIRE LINE RING AND COVER FOR VALVE BOX
2333	WATER VALVE INSERTION ANCHORAGE
2334	WATER LARGE DIAMETER VALVE VAULT
2335	WATER LADDER DETAIL
2340	WATER FIRE HYDRANT INSTALLATION
2341	WATER SAMPLING STATION
2344	WATER AIR RELEASE FIRE HYDRANT CONNECTION
2347	WATER DETAILS ON TYPICAL FIRE HYDRANT LOCATIONS
2350	WATER AIR / VACUUM RELEASE VALVE
2351	WATER CONC. CYL. BUTTERFLY VALVE IN VAULT INSTALLATION
2352	WATER DUCTILE IRON BUTTERFLY VALVE IN VAULT INSTALLATION DETAILS
2353	WATER SURGE RELIEF VALVE STATION
2354	WATER STANDARD PRV STATION, NO METER
2355	WATER STANDARD PRV STATION WITH PROPELLER METER
2356	WATER STANDARD PRV STATION WITH POWER/TELEMETRY
2357	WATER STANDARD PRV STATION STRUCTURAL DETAILS
2358	WATER THRUST TIE DETAILS
2359	WATER DUCTILE IRON BUTTERFLY VALVE DIRECT BURY INSTALLATION DETAILS
2360	WATER DUCTILE IRON BUTTERFLY VALVE DIRECT BURY INSTALLATION
2361	WATER TYPICAL METER BOX INSTALLATIONS
2362	WATER 3/4” TO 1” METER SERVICE LINE INSTALLATION
2363	WATER 1 1/2” TO 2” METERED SERVICE LINE INSTALLATION
2366	WATER METER BOX FOR 3/4” TO 1” METERS
2367	WATER METER BOX COVER AND LID FOR 1 1/2” TO 2” METERS
2368	WATER METER BOX COVER AND LID FOR 3/4” TO 1” METERS
2370	WATER LARGE DIAMETER METER VAULT FOR 3” TO 6” SERVICE
2371	WATER LARGE DIAMETER METER VAULT FOR 8” TO 12” SERVICE
2372	WATER 6” PRV ASSEMBLY DETAILS
2373	WATER 8” PRV ASSEMBLY DETAILS
2374	WATER 10” PRV ASSEMBLY DETAILS
2375	WATER STANDARD PRV STATION STRUCTURAL DETAILS
2380	WATER BORING INSTALLATION
2381	WATER TYPICAL LINE RELOCATION
2385	WATER REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION ASSEMBLY (RPBA)
2386	WATER DOUBLE CHECK VALVE ASSEMBLY (DCVA)
2387	WATER DOUBLE CHECK – DETECTOR CHECK ASSEMBLY (DCDA)
2388	LANDSCAPE PRESSURE VACUUM BREAKER (PVB)
2389	WATER ENCLOSURES
2390	WATER INSTALLATION FOR CONTINUOUS SERVICE
2394	WATER RESIDENTIAL WATER PRIVATE FIRE PROTECTION SYSTEMS
2395	WATER APPROVED METHODS FOR FILLING TANKS
2396	WATER CORROSION MONITORING DETAILS – 1
2397	WATER CORROSION MONITORING DETAILS – 2
2398	WATER CORROSION MONITORING DETAILS – 3



36" MANHOLE COVER
PLAN VIEW



36" MANHOLE COVER
BOTTOM VIEW

GENERAL NOTES

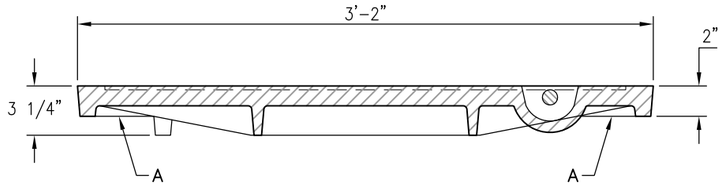
1. STANDARD 36" CAST IRON M.H. FRAME AND COVER. WEIGHTS: COVER = 355 LBS., FRAME = 315 LBS. TOTAL = 670 LBS. (TOLERANCE = ±5%)
2. REFERENCE SPEC. SECTION 130.
3. ONLY PRODUCTS CAST IN THE USA WILL BE ACCEPTABLE

CONSTRUCTION NOTES

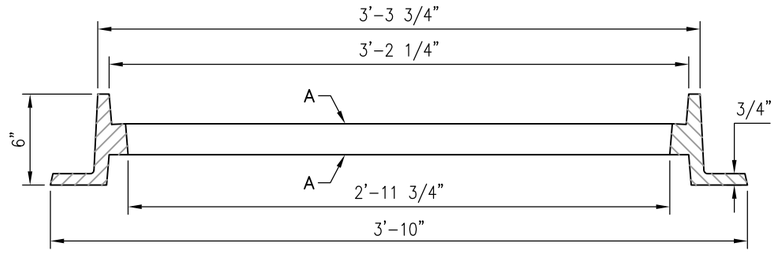
A. MACHINED OR GROUND BEARING SURFACES.

B. "WATER" CAST ON COVER TO IDENTIFY WATERLINE.

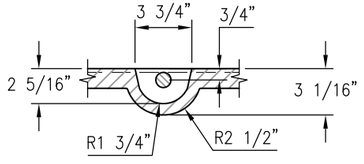
C. 2" LETTERS (RECESSED FLUSH).



36" MANHOLE COVER
CROSS SECTION



36" MANHOLE FRAME
CROSS SECTION

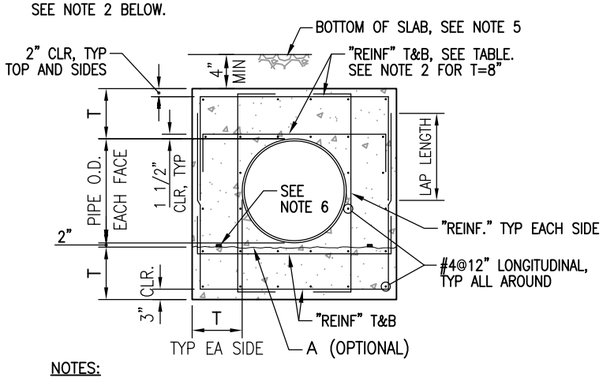


SECTION A-A

REVISIONS	WATER AUTHORITY
	WATER MANHOLE FRAME AND COVER DWG. 2310 JAN. 2013

PIPE ENCASEMENT TABLE								
PIPE DIA (IN.)	H=10 FEET		H=20 FEET		H=30 FEET		H=40 FEET	
	T (in)	REINF	T (in)	REINF	T (in)	REINF	T (in)	REINF
20 THRU 30	8	#5@12"	10	#5@12"	10	#5@12"	10	#6@12"
36 THRU 42	10	#5@12"	10	#6@12"	10	#7@12"	10	#6@6"
48 THRU 54	10	#6@12"	10	#7@12"	10	#7@6"	12	#7@6"
UP TO 60	10	#6@12"	10	#6@6"	14	#7@6"	14	#7@6"

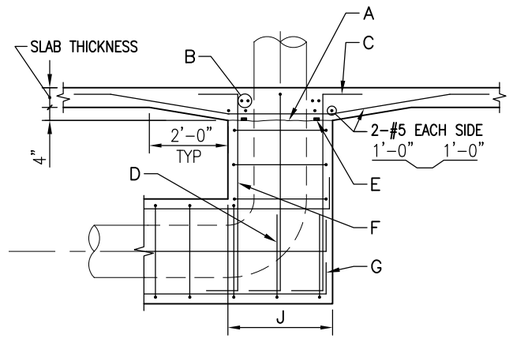
DARK LINE INDICATES BREAK BETWEEN ONE LAYER OF REINFORCING AND TWO. SEE NOTE 2 BELOW.



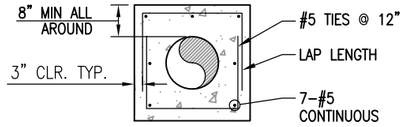
NOTES:

1. THIS DETAIL APPLIES TO PIPE DIAMETERS OF 20" THROUGH 60". FOR ≤18"ø, SEE DETAIL 2.
2. FOR T=8" REINFORCING SHALL BE ONE LAYER AND CENTERED IN SLABS OR WALLS, SEE DETAIL 2.
3. FOR ENCASEMENT AT PIPE RISER, SEE DETAIL 2.
4. "H" IS FILL HEIGHT OR WATER DEPTH OR COMBINATION ABOVE PIPE.
5. WHEN PIPE ENCASEMENT CLOSER THAN 4" TO SLAB ABOVE, TIE SLAB & ENCASEMENT TOGETHER. SEE DETAIL 3.
6. HYDROPHILIC WATERSTOP CONTINUOUS ALL AROUND IN ALL CONSTRUCTION JOINTS.
7. EXTEND PIPE ENCASEMENT BEYOND STRUCTURE PER DETAIL 4.

DETAIL 1
PIPE ENCASEMENT (20"ø–60"ø)



ENCASEMENT RISER

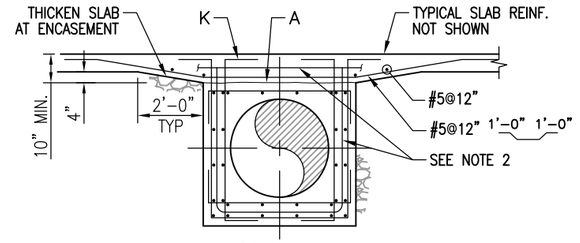


SECTION

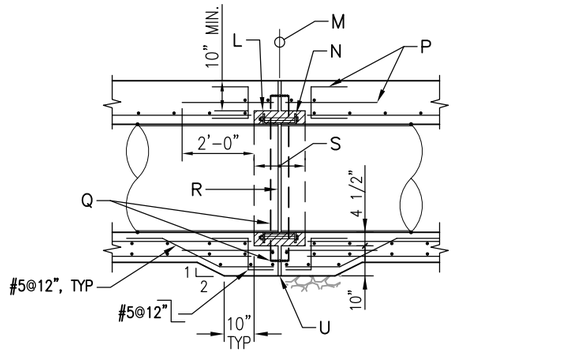
NOTES:

1. SECTION APPLIES TO PIPES ≤18"ø. FOR ≥20"ø, SEE DETAIL 1.
2. WHEN PIPE ENCASEMENT IS CLOSER THAN 4" TO SLAB ABOVE, TIE SLAB AND ENCASEMENT TOGETHER. SEE DETAIL 3.
3. EXTEND PIPE ENCASEMENT BEYOND STRUCTURE PER DETAIL 4.

DETAIL 2
PIPE ENCASEMENT (≤18"ø)



SECTION

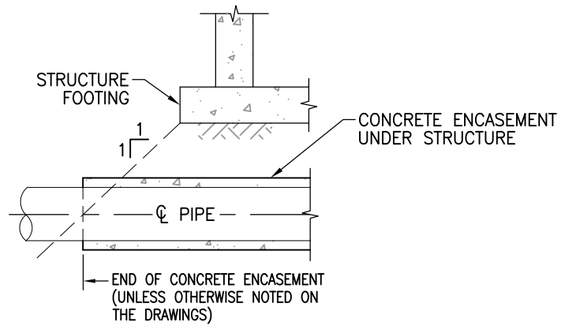


JOINT DETAIL

NOTES:

1. TIE PIPE ENCASEMENT TO SLAB AS SHOWN WHEN DISTANCE BETWEEN PIPE ENCASEMENT AND BOTTOM OF SLAB IS LESS THAN 4".
2. 6" PLASTIC WS IN ENCASEMENT JOINTS. WELD TO WS IN SLAB JOINTS.
3. EXTEND PIPE ENCASEMENT BEYOND STRUCTURE PER DETAIL 4.

DETAIL 3
PIPE ENCASEMENT AT SLAB



DETAIL 4
END OF PIPE ENCASEMENT UNDER STRUCTURES

CONSTRUCTION NOTES

A. CONSTRUCTION JOINT
B. TYPICAL OPENING REINF. AROUND PIPE
C. EXTEND ENCASEMENT VERTS. AND BEND 1'–0" INTO TOP OF SLAB
D. BOTTOM "U" SECTION OF TIES CONT. TO END OF ENCASEMENT
E. HYDROPHILIC WATERSTOP CONTINUOUS ALL AROUND IN ALL CONSTRUCTION JOINTS.
F. TYPICAL PIPE ENCASEMENT REINF.
G. BEND & LAP PIPE ENCASEMENT REINF. 1'–0", TYP
J. PROVIDE LEVEL BEARING AREA BELOW VERT. PIPE RISER EQUAL TO ENCASEMENT GROSS END AREA
K. PIPE ENCASEMENT REINF. SEE DETAILS 1 AND 2. EXTEND VERTS. AND BEND 1'–0" INTO TOP OF SLAB ABOVE.
L. CLOSED CELLULAR SPONGE RUBBER ALL AROUND COUPLING TO ALLOW JT MOVEMENT (1" MIN)
M. CL SLAB EXP, CONTRACTION OR CONTROL JT, SEE PLANS FOR LOCATION & JT TYPE
N. LOCATE PIPE FLEX COUPLING (WITHOUT THRUST TIES) AT ALL SLAB EXPANSION & CONTROL JOINTS
P. #5@12" TYPICAL ENCASEMENT REINF. DISCONTINUOUS AT JOINT
Q. 6" PLASTIC WATERSTOP IN ENCASEMENT JOINT. WELD TO WATERSTOP IN SLAB JOINT FOR CONTINUOUS SEAL
R. PIPE JOINT CENTERED ON SLAB JOINT
S. COUPLING LENGTH +6"
U. ENCASEMENT JOINT TYPE SAME AS SLAB JOINT, SEE SLAB JOINT DETAILS

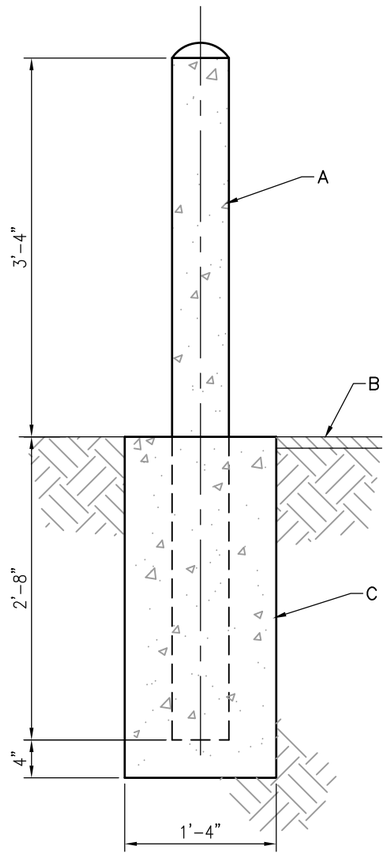
REVISIONS	WATER AUTHORITY
	WATER CONCRETE ENCASEMENT DETAILS DWG. 2321 JAN. 2013

CONSTRUCTION NOTES

A. 6"ø SCHEDULE 40 GALVANIZED STEEL PIPE. 6' LONG, FILLED WITH CONCRETE. EXPOSED STEEL SHALL BE PAINTED WITH AN OIL BASE ALKYD PRIMER AND AN OIL BASE ALKYD ENAMEL TOP COAT. COLOR SHALL BE "SAFETY YELLOW".

B. PAVEMENT, OR FINISHED GRADE.

C. 16"ø CONCRETE FOOTING, 3000 PSI AT 28 DAYS, WITH SMOOTH OR BROOM FINISH WHEN ADJACENT TO PAVEMENT.



SECTION

REVISIONS	WATER AUTHORITY
	WATER STATIONARY POST DETAIL DWG. 2322 JAN. 2013

GENERAL NOTES

1. LABEL REQUIREMENTS: 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. RING AND COVER FOR VALVE BOX PER STANDARD DRAWING 2328. INSTALL FIRE LINE RING AND COVER ON FIRE LINES PER STANDARD DRAWING 2329.

B. 12" DIAMETER POLYMER COATED STEEL PIPE CMP

C. NEW OR EXISTING VALVE

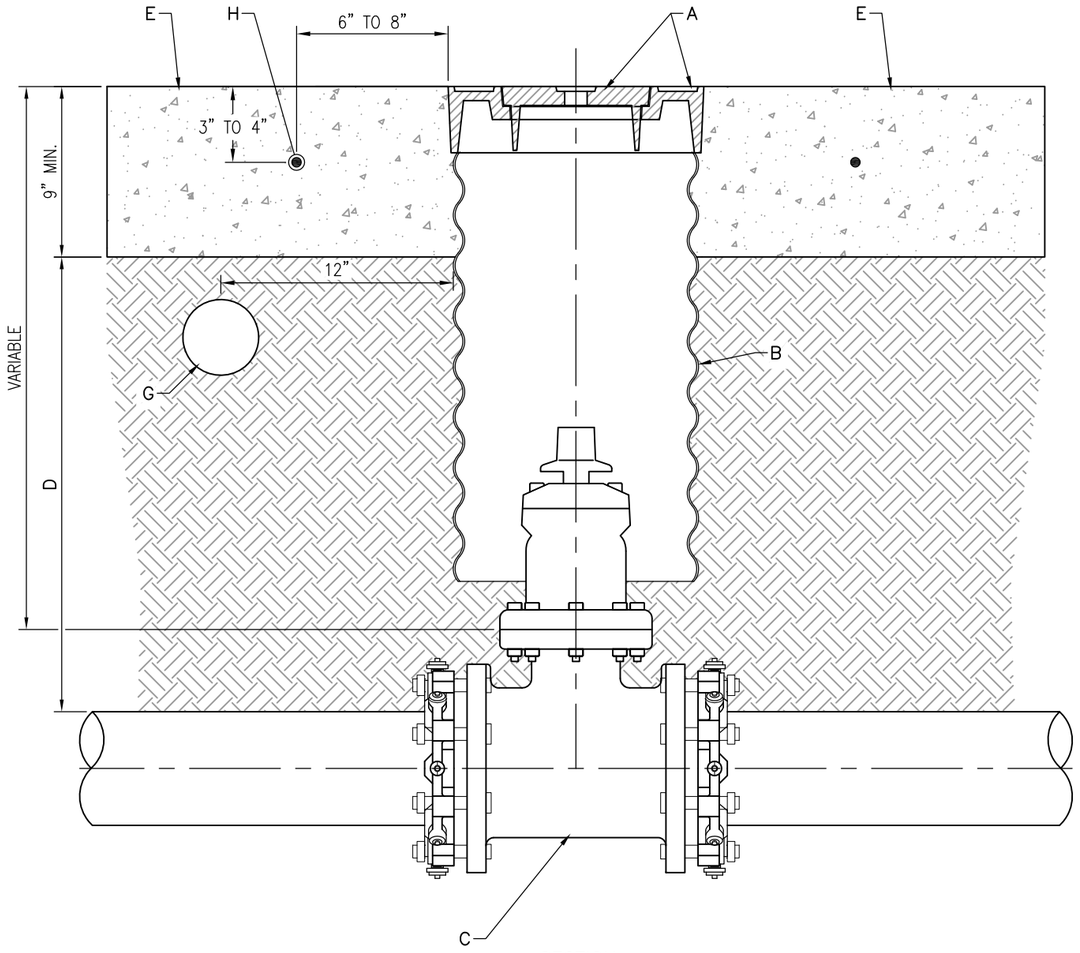
D. COMPACTED BACKFILL. SOIL OR BASE COURSE MATERIAL (95% COMPACTION). SEE SECTION 701

E. CONCRETE COLLAR PER STANDARD DRAWING 2461. f'c = 4000 psi

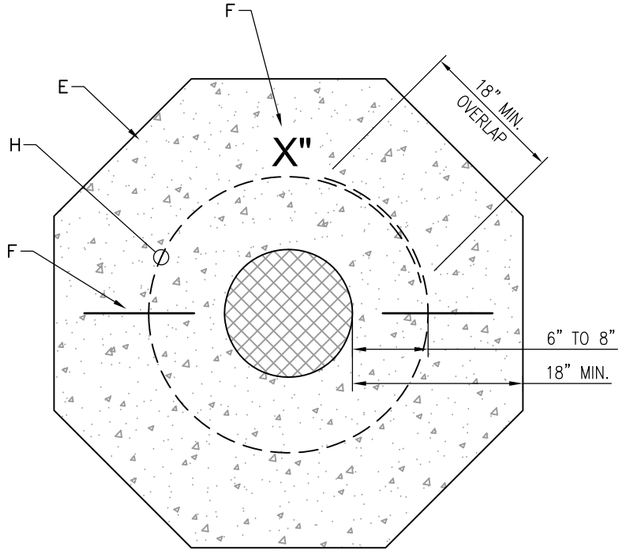
F. TOP OF CONCRETE COLLAR SHALL BE STAMPED WITH LINE SIZE AND DIRECTION. MINIMUM LETTER SIZE SHALL BE 3" IN HEIGHT.

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

H. #4 REBAR PER STANDARD DRAWING 2461.

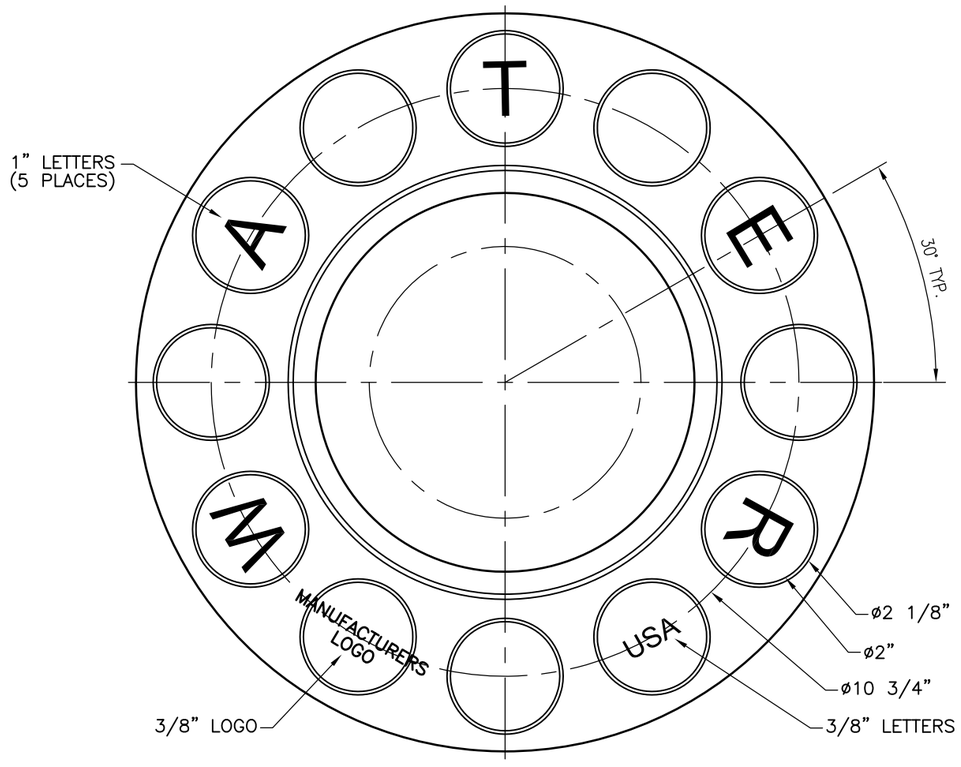


SECTION

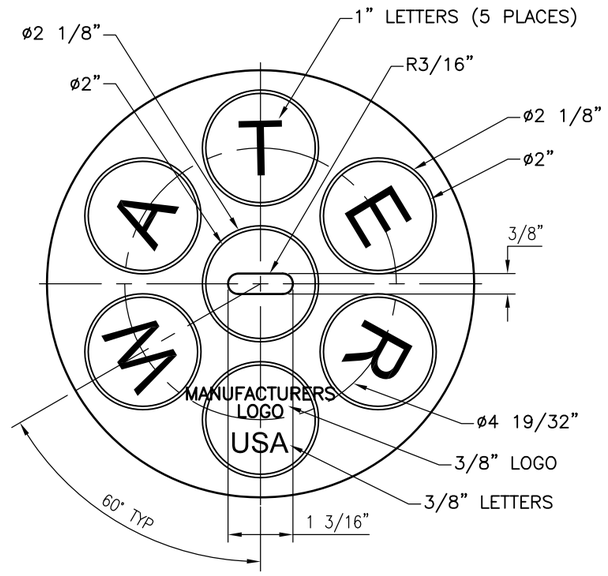


PLAN

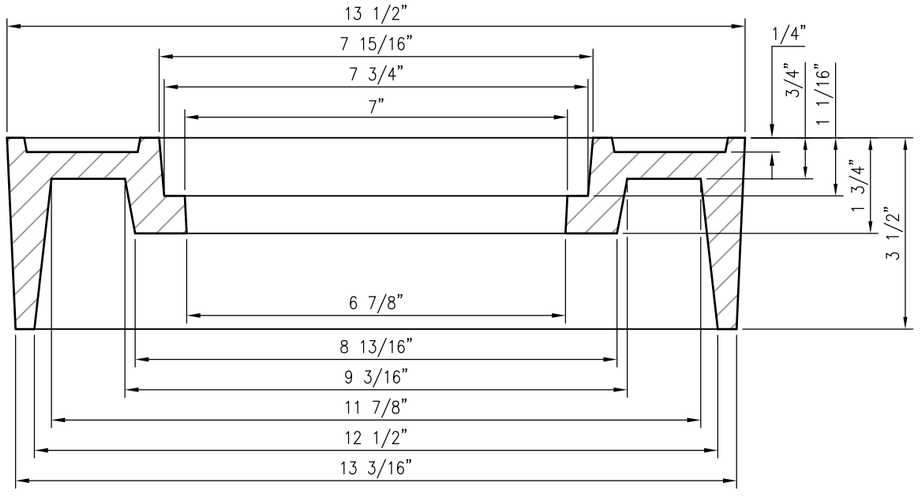
REVISIONS	WATER AUTHORITY
	WATER VALVE BOX
	DWG. 2326 JAN. 2013



PLAN VIEW

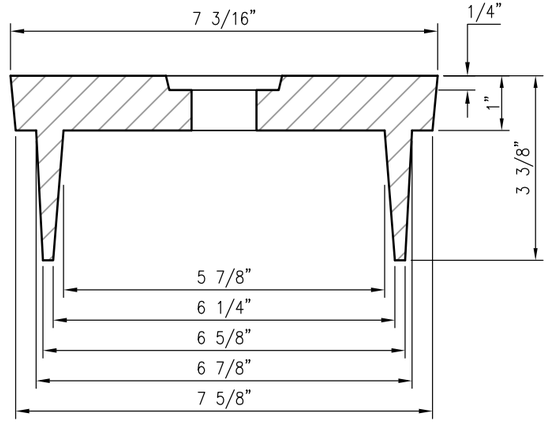


PLAN VIEW



SECTION

VALVE BOX RING



SECTION

VALVE BOX COVER

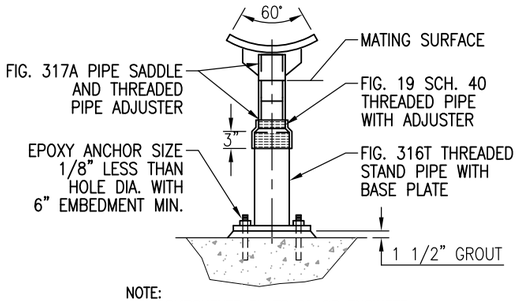
GENERAL NOTES – RING

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.

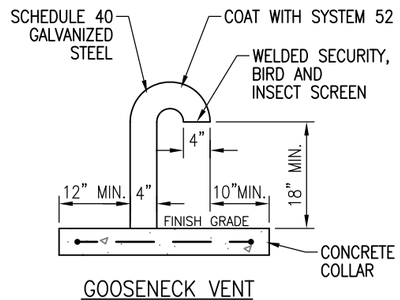
REVISIONS	WATER AUTHORITY
	WATER RING AND COVER FOR VALVE BOX
	DWG. 2328 JAN. 2013



NOTE:
ALL COMPONENTS BY TOLCO OR ENGINEER APPROVED EQUAL. GALVANIZE AFTER FABRICATION. DESIGN TO MATCH PIPE OR VALVE DIAMETER. PROVIDE SHOP DRAWINGS SPECIFIC TO EACH VALVE AND PIPE SIZE.

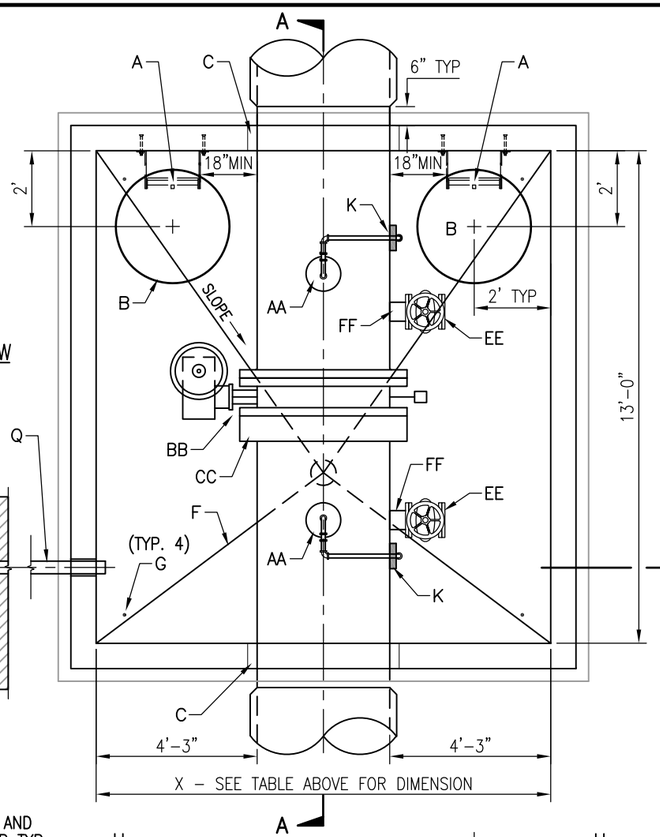
PIPE SUPPORT

PRECAST VAULT DESIGN CRITERIA
MATERIAL:
STRUCTURAL CONCRETE f'c = 4000 psi
REINFORCING SHALL BE ASTM 615 GRADE 60
CONCRETE SHALL MEET SPECIFICATION SEC. 512 AND SEC. 101
LOADING:
VAULT LID = HS25 LIVE LOAD PLUS 1.3 IMPACT PLUS DEAD LOADS
VAULT WALLS EQUIVALENT FLUID PRESSURE = 60 psf
SURCHARGE (VEHICLE) = 2 FEET
VAULT BASE SLAB ALLOWABLE BEARING PRESSURE = 1500 psf

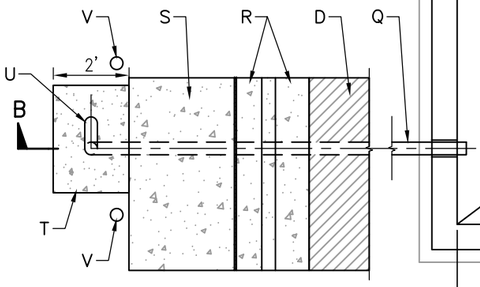


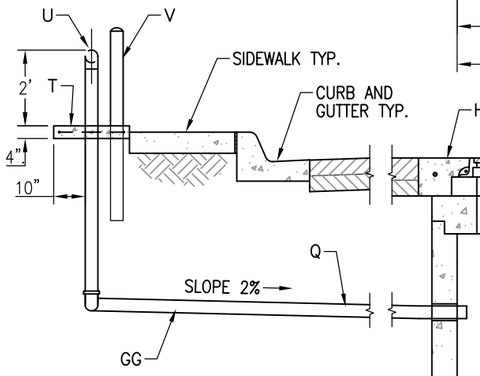
GOOSENECK VENT

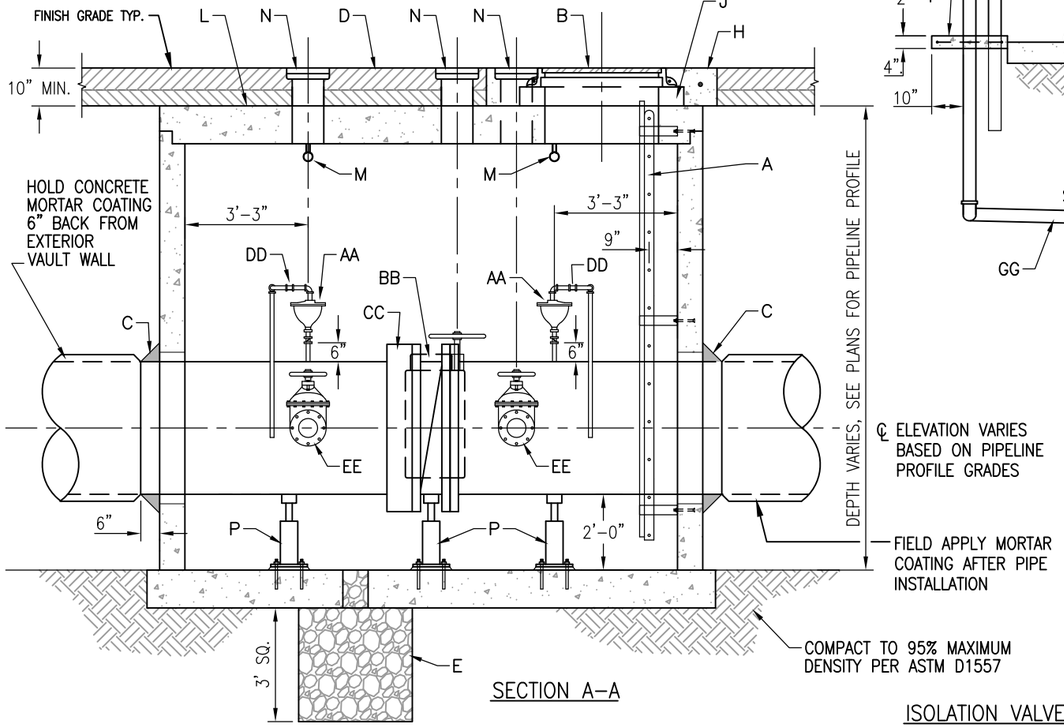
ø	X
24"	10'-6"
30"	11'-0"
36"	11'-6"
42"	12'-0"
48"	12'-6"



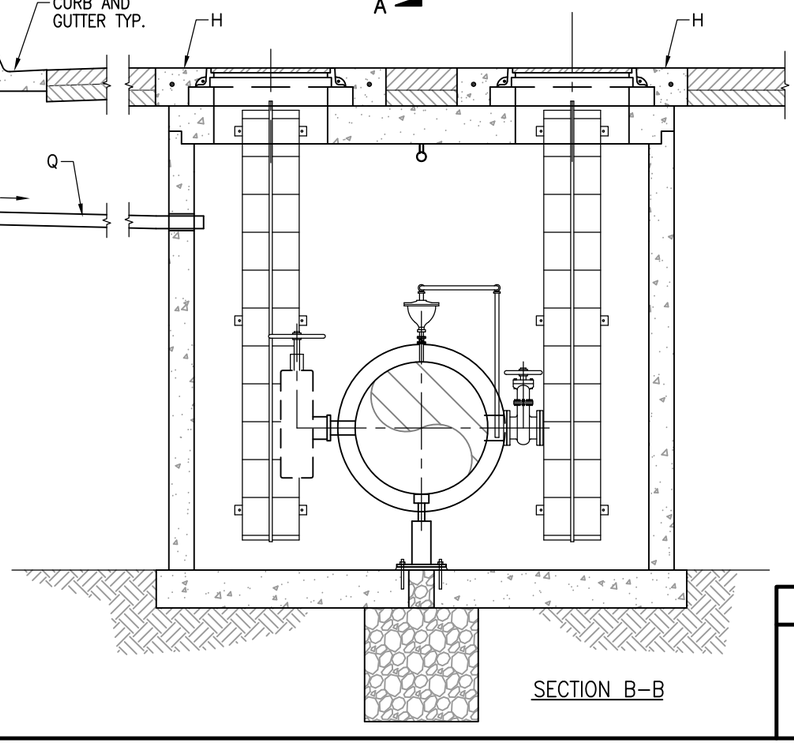
PLAN VIEW







SECTION A–A



SECTION B–B

ISOLATION VALVE VAULT

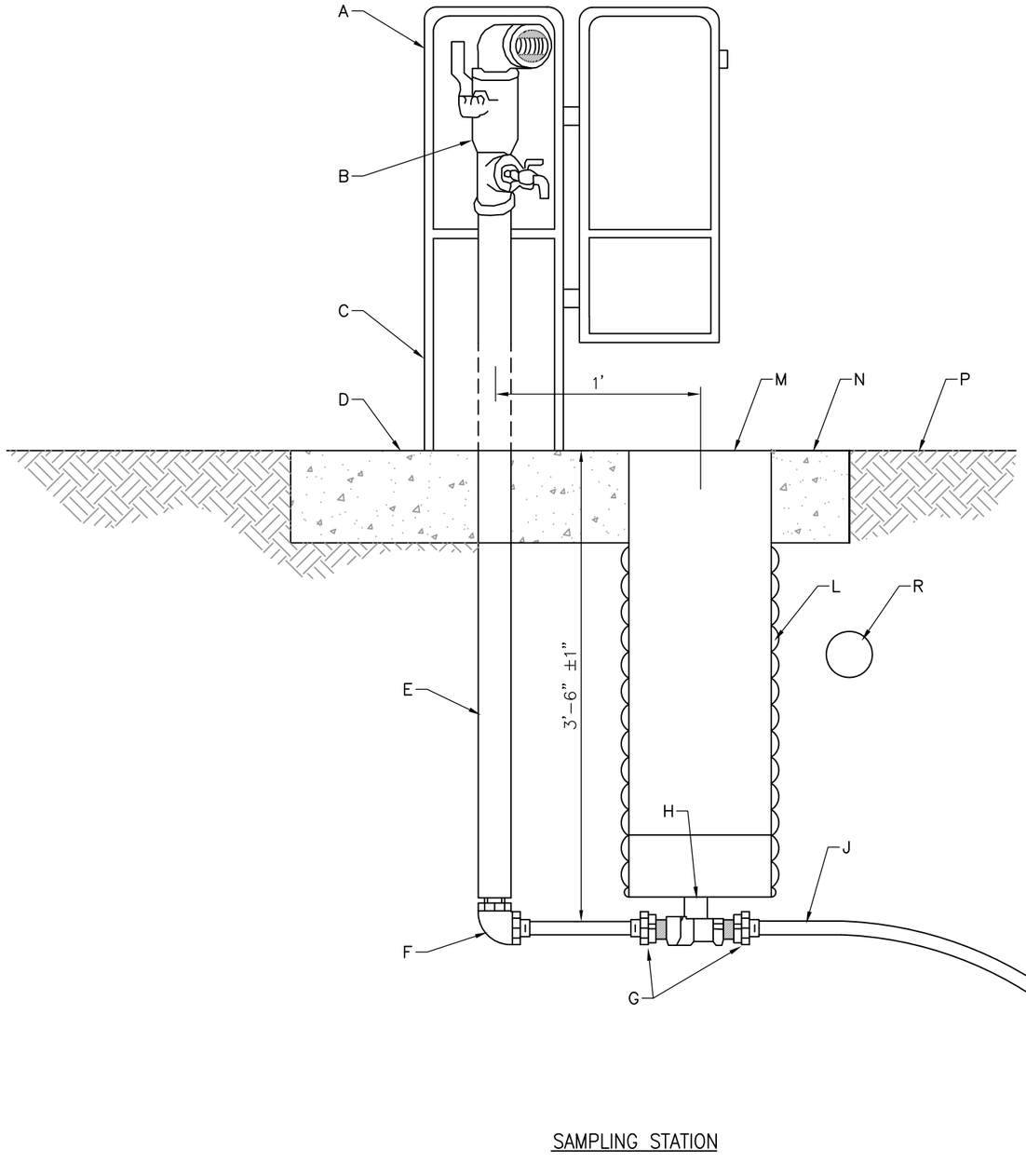
GENERAL NOTES

1. VALVE VAULT SHALL NOT BE USED IN GROUND WATER CONDITIONS OR IN CLAY SOILS.
2. BACKFILL MATERIAL SHALL BE CLASS II OR CLASS III IN ACCORDANCE WITH SPECIFICATION SEC. 501.
3. PIPE DIA. VARIES FROM 24" DIA. TO 48" DIA.
4. HOLD CENTERLINE OF TAP LOCATIONS AND CENTER OF BUTTERFLY VALVE.
5. INTERIOR PIPING SHALL BE STEEL PIPE, DUCTILE IRON PIPE, OR CCP.
6. CONCRETE VAULT SHALL BE PRECAST WITH REMOVABLE CONCRETE LID.
7. LOCATE ACCESS MANHOLE FRAME, ADJUSTMENT RINGS AND COVER ON REMOVABLE CONCRETE LID TO ALLOW LID REMOVAL WITH THESE APPURTENANCES IN PLACE.
8. SUBMIT SHOP DRAWINGS OF VAULT, PIPING, AND AIR AND VACUUM VALVE ASSEMBLY PRIOR TO VAULT FABRICATION AND PIPE INSTALLATION.
9. OWNER WILL SELECT PAINT COLORS FOR PIPING AND APPURTENANCES INSIDE VALVE VAULTS.
10. ENGINEER SHALL SUBMIT A PROJECT SPECIFIC DETAIL AND A FLOOR AND PIPING PLAN.

CONSTRUCTION NOTES

A. 1'-4" ALUMINUM LADDER. INSTALL LADDER-UP SAFETY POST MODEL LU-4 BY BILCO.
B. 36" DIAMETER MANHOLE FRAME AND COVER MARKED "WATER" PER STANDARD DRAWING 2110.
C. LINK SEAL, GROUT PENETRATION AROUND EXTERIOR CIRCUMFERENCE.
D. REMOVE AND REPLACE PAVEMENT.
E. 4" DIAMETER DRAIN WITH 3'x3'x3' GRAVEL DRAIN POCKET WITH CLEAN GRAVEL, ASTM C33, NO. 57. LINE DRAIN POCKET WITH GEOTEXTILE FABRIC, CLASS 3.
F. SLOPE VAULT FLOOR TO DRAIN TYPICAL.
G. RECESSED LIFTING EYE, 4 REQUIRED. FLUSH W/TOP OF CONCRETE LID.
H. CONCRETE COLLAR PER STANDARD DRAWING 2461.
J. ADJUSTMENT RINGS PER STANDARD DRAWINGS 2461 AND 2111.
K. UNISTRUT PIPE BRACKET TYPICAL FOR COMBINATION AIR VALVE VENT. (2 EACH TYPICAL)
L. TACK COAT.
M. 1 1/4" STAINLESS STEEL THREADED EYEBOLT, CENTERED ON COMBINATION AIR VALVE ASSEMBLY. 1300 POUNDS LIFT CAPACITY.
N. RING AND COVER FOR VALVE BOX PER STANDARD DRAWING 2328.
P. PIPE SUPPORT, SEE DETAIL THIS SHEET.
Q. COORDINATE VENT PIPE ORIENTATION DURING SHOP DRAWING SUBMITTAL.
R. REMOVE AND REPLACE CURB AND GUTTER PER STANDARD DRAWING 2415A.
S. REMOVE AND REPLACE SIDEWALK PER STANDARD DRAWING 2430.
T. CONCRETE COLLAR WITH 1~#4 REBAR EACH WAY CENTERED. SEE GOOSENECK VENT DETAIL, THIS SHEET.
U. 4" DIA GOOSENECK VENT. SCHEDULE 40 GALVANIZED STEEL, SEE DETAIL THIS SHEET.
V. STATIONARY PIPE BOLLARD, SEE STANDARD DRAWING 2250.
AA. COMBINATION AIR VALVE ASSEMBLY (FL). SIZE PER PLANS. ROUTE AIR RELEASE VENT PIPING AS SHOWN AND SUPPORT WITH UNISTRUT. TERMINATE 3.5' ABOVE FF.
BB. AWWA C504 BUTTERFLY VALVE (FLxFL) WITH 3" OPERATING NUT AND HANDWHEEL. ORIENT SHAFT HORIZONTAL. VERIFY VALVE ACTUATOR ORIENTATION AND CLEARANCES PRIOR TO PIPE AND VAULT FABRICATION.
CC. MEGAFLANGE
DD. UNION TYPICAL, ALL AIR AND VACUUM RELEASE VALVES
EE. 6" GATE VALVE WITH HANDWHEEL (FLxFL), 2" WELDED OPERATING NUT AND BLIND FLANGE (24" TO 30" PIPING). 8" GATE VALVE WITH HANDWHEEL (FLxFL), 2" WELDED OPERATING NUT AND BLIND FLANGE (36" TO 48" PIPING).
FF. TAPPING SADDLE OR FLANGED OUTLET
GG. 4" DIA SCHEDULE 40 GALVANIZED STEEL FOR VAULT VENT. ROUTE TO BACK OF SIDEWALK, SEE SECTION B-B, THIS SHEET.

REVISIONS	WATER AUTHORITY
	WATER LARGE DIAMETER ISOLATION VALVE VAULT DWG. 2334 JAN. 2013



SAMPLING STATION

GENERAL NOTES

1. SAMPLING STATIONS SHALL BE BURIED TO A DEPTH OF 3'–6" ±1", WITH A 1" MIP INLET, AND A 1" FIP DISCHARGE.
2. ALL STATIONS SHALL BE ENCLOSED IN A LOCKABLE, NON–REMOVABLE, ALUMINUM–CAST HOUSING.
3. ALL WORKING PARTS SHALL BE BRASS AND BE REMOVABLE FROM ABOVE GROUND WITH NO DIGGING.

CONSTRUCTION NOTES

A. ALUMINUM HOUSING (SHOWN OPEN)

B. ECLIPSE 88 SAMPLING STATION, OR WATER AUTHORITY APPROVED EQUAL.

C. ALUMINUM BASE

D. 2'x2'x6" CONCRETE PAD. f'c = 3000 psi

E. 1" BRASS STANDPIPE

F. 3/4" COPPER x 1" FIP ELBOW

G. 3/4" MIPT x COPPER FLARE FORD C28–33, OR WATER AUTHORITY APPROVED EQUAL.

H. CURBSTOP PER WATER AUTHORITY APPROVED PRODUCTS LIST.

J. 3/4" DOMESTIC COPPER K–TYPE, OR WATER AUTHORITY APPROVED EQUAL.

K. CORPORATION STOP PER WATER AUTHORITY APPROVED PRODUCTS LIST.

L. VALVE BOX PER STANDARD DRAWING 2326.

M. RING AND COVER FOR VALVE BOX PER STANDARD DRAWING 2328.

N. CONCRETE COLLAR PER STANDARD DRAWING 2461.

P. EXISTING GROUND

Q. CONNECT TO MAIN

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

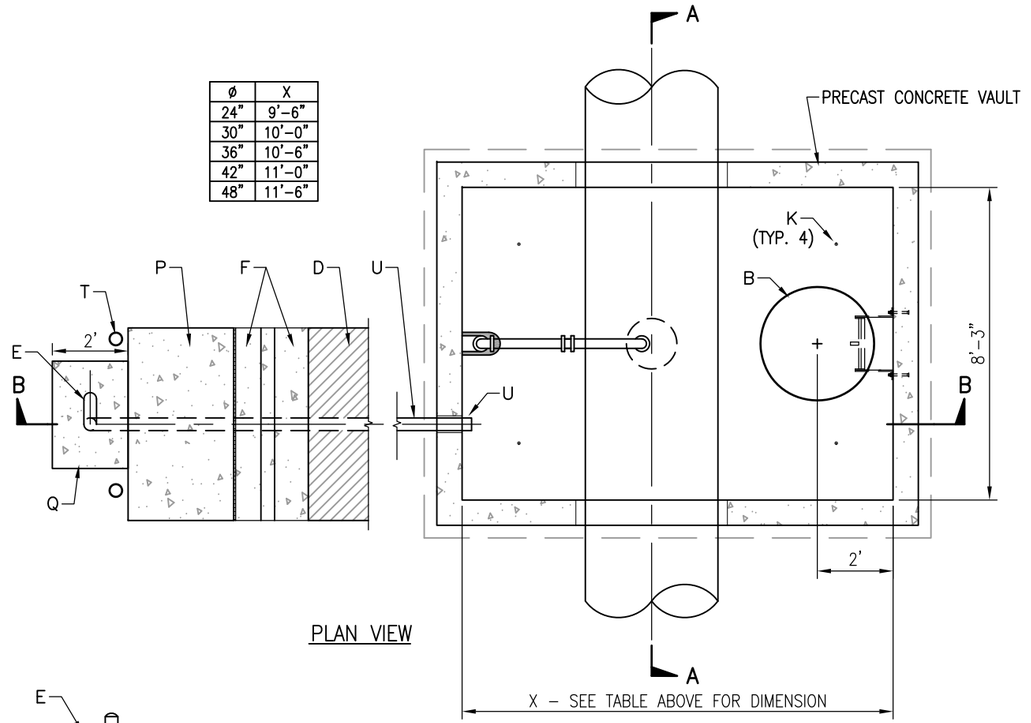
REVISIONS	WATER AUTHORITY
	WATER SAMPLING STATION
	DWG. 2341 JAN. 2013

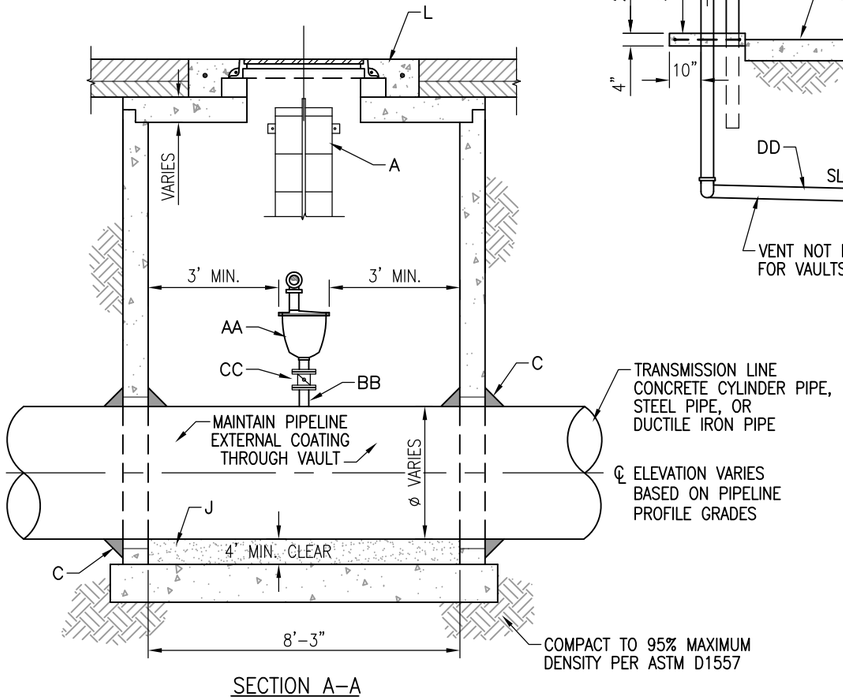
PRECAST VAULT DESIGN CRITERIA

MATERIAL:
STRUCTURAL CONCRETE f'c = 4000 psi
REINFORCING SHALL BE ASTM 615 GRADE 60
CONCRETE SHALL MEET SPECIFICATION SEC. 512 AND SEC. 101

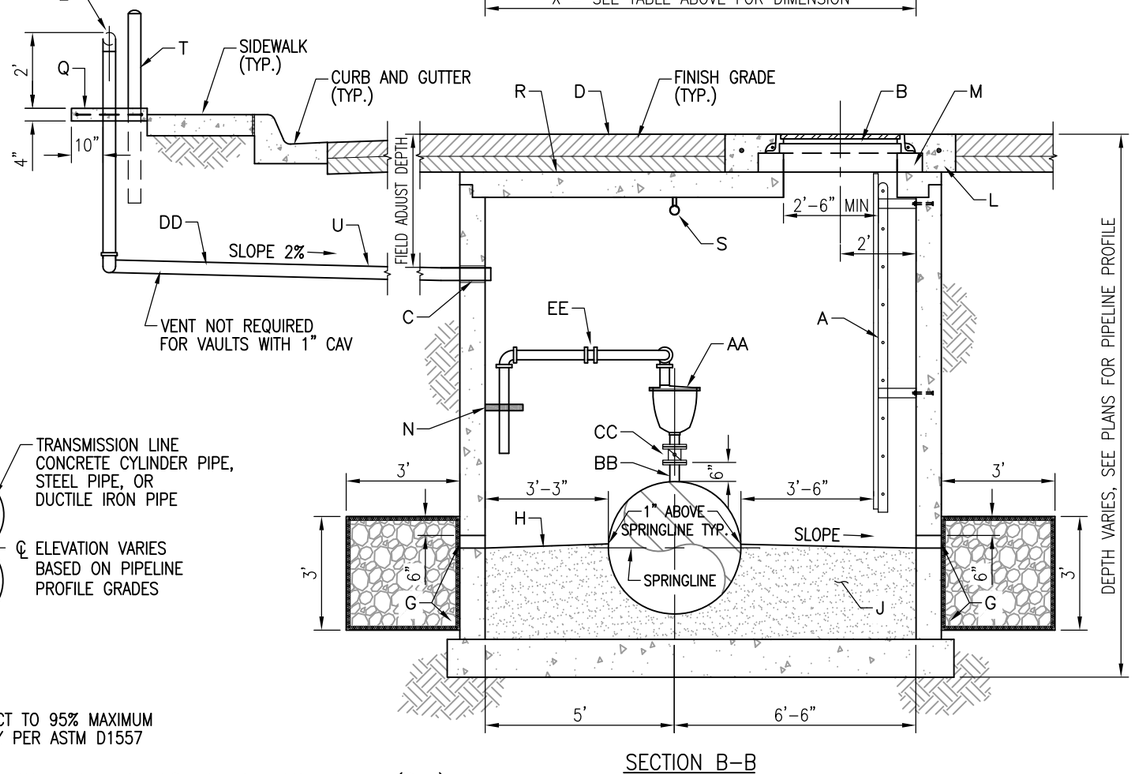
LOADING:
VAULT LID = HS25 LIVE LOAD PLUS 1.3 IMPACT PLUS DEAD LOADS
VAULT WALLS EQUIVALENT FLUID PRESSURE = 60 psf
SURCHARGE (VEHICLE) = 2 FEET
VAULT BASE SLAB ALLOWABLE BEARING PRESSURE = 1500 psf

ø	X
24"	9'-6"
30"	10'-0"
36"	10'-6"
42"	11'-0"
48"	11'-6"





SECTION A–A



SECTION B–B

COMBINATION AIR AND VACUUM RELEASE VALVE (CAV) VAULT

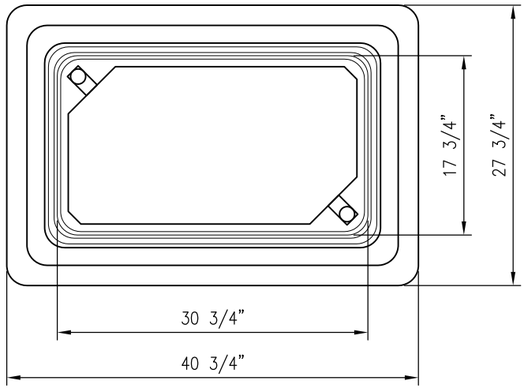
GENERAL NOTES

1. INTERIOR PIPING SHALL BE STEEL PIPE, DUCTILE IRON PIPE, OR CONCRETE CYLINDER PIPE. ALL CAV PIPING AND FITTINGS SHALL BE SCHEDULE 40 THREADED GALVANIZED STEEL.
2. CONCRETE VAULT SHALL BE PRECAST WITH REMOVABLE CONCRETE LID.
3. LOCATE ACCESS MANHOLE FRAME, ADJUSTMENT RINGS AND COVER ON REMOVABLE CONCRETE LID TO ALLOW LID REMOVAL WITH THESE APPURTENANCES IN PLACE.
4. SUBMIT SHOP DRAWINGS OF VAULT AND PIPING, AIR AND VACUUM VALVE ASSEMBLY PRIOR TO VAULT FABRICATION AND PIPE INSTALLATION.
5. OWNER WILL SELECT PAINT COLORS FOR PIPING AND APPURTENANCES INSIDE VALVE VAULTS.
6. BACKFILL MATERIAL SHALL BE CLASS II OR CLASS III IN ACCORDANCE WITH SPECIFICATION SEC. 501.
7. ENGINEER SHALL SUBMIT A PROJECT SPECIFIC DETAIL AND A FLOOR AND PIPING PLAN.

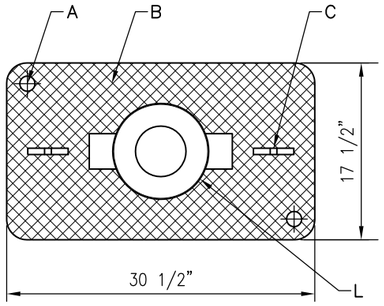
CONSTRUCTION NOTES

A. 1'–4" ALUMINUM LADDER. PROVIDE AND INSTALL LADDER–UP SAFETY POST MODEL LU–4 BY BILCO.
B. 36" DIAMETER MANHOLE FRAME AND COVER MARKED "WATER" PER STD DWG 2310.
C. LINK SEAL. GROUT PENETRATION AROUND EXTERIOR CIRCUMFERENCE.
D. REMOVE AND REPLACE PAVEMENT.
E. GOOSENECK VENT, 4"ø SCHEDULE 40 GALVANIZED STEEL. SEE STANDARD DWG 2334
F. REMOVE AND REPLACE CURB AND GUTTER PER STANDARD DRAWING 2415A.
G. 4" DIAMETER DRAIN WITH 3'x3'x3' GRAVEL DRAIN POCKET WITH CLEAN GRAVEL, ASTM C33, NO. 57. LINE DRAIN POCKET WITH GEOTEXTILE FABRIC NMDOT CLASS 3.
H. SLOPE VAULT FLOOR TO DRAIN TYPICAL.
J. CAST IN PLACE CONCRETE FILL.
K. RECESSED LIFTING EYE, 4 REQUIRED. FLUSH W/TOP OF CONCRETE LID.
L. CONCRETE COLLAR PER STD DWG 2461.
M. ADJUSTMENT RINGS (IF NEEDED) PER STANDARD DRAWINGS 2461 AND 2111.
N. UNISTRUT PIPE BRACKET TYPICAL FOR COMBINATION AIR VALVE VENT.
P. REMOVE AND REPLACE SIDEWALK PER STD DWG 2430.
Q. CONCRETE COLLAR WITH 1~#4 REBAR EACH WAY CENTERED. SEE STD DWG 2334
R. TACK COAT.
S. 1 1/4" STAINLESS STEEL THREADED EYEBOLT, CENTERED ON COMBINATION AIR VALVE ASSEMBLY. 1300 POUNDS LIFT CAPACITY.
T. STATIONARY PIPE BOLLARD, SEE STD DWG 2250.
U. COORDINATE VENT PIPE ORIENTATION FOR EACH VAULT LOCATION DURING SHOP DRAWING SUBMITTAL.
AA. COMBINATION AIR VALVE ASSEMBLY, SIZE PER PLANS.
BB. TAPPING SADDLE OR FLANGED OUTLET.
CC. GATE VALVE. SIZE THE SAME AS COMBINATION AIR AND VACUUM RELEASE VALVE.
DD. 4" SCHEDULE 40 GALVANIZED STEEL PIPE FOR VAULT VENT. ROUTE TO BACK OF SIDEWALK. FIELD ADJUST DEPTH AND ROUTING TO AVOID EXISTING UTILITIES.
EE. UNION TYPICAL, ALL AIR AND VACUUM RELEASE VALVES.

REVISIONS	WATER AUTHORITY
	COMBINATION AIR AND VACUUM RELEASE VALVE VAULT
	DWG. 2350 JAN. 2013



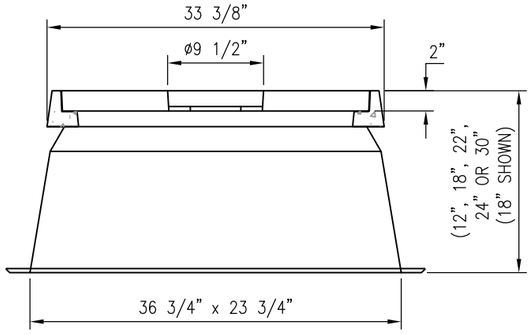
TOP VIEW



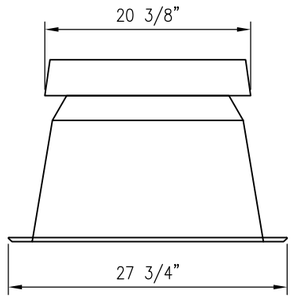
COVER

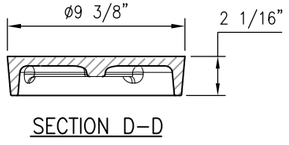
METER LID PLAN

BOTTOM VIEW

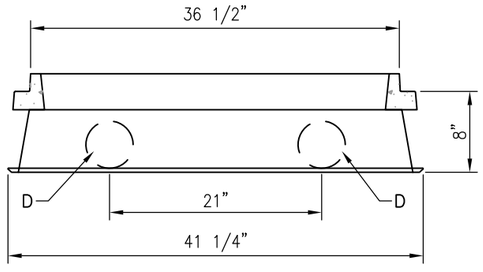


BOX & COVER SECTION

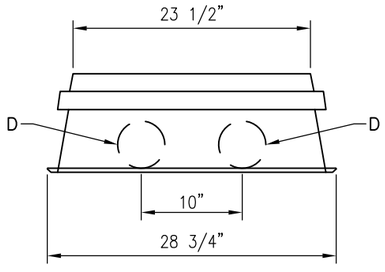




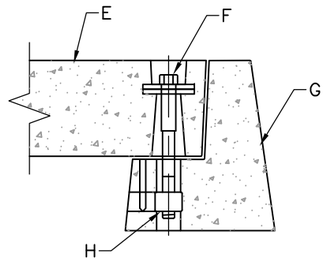
SECTION D–D



EXTENSION SECTION



END VIEWS



COVER BOLTDOWN OPTION

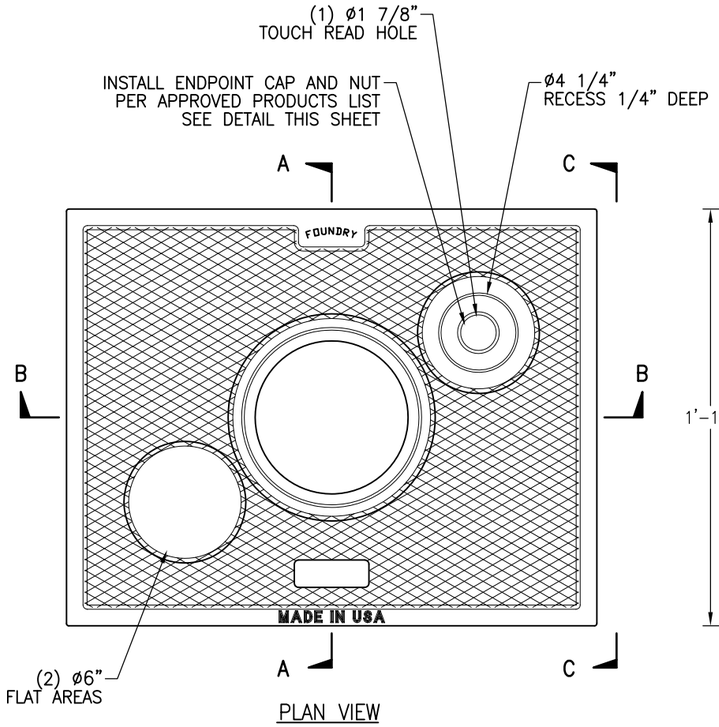
GENERAL NOTES

1. BOX AND COVER MATERIAL: FIBERGLASS REINFORCED POLYMER CONCRETE AND FIBERGLASS REINFORCED POLYMER. LID MATERIAL: DUCTILE IRON
2. STANDARD COLOR: CONCRETE GRAY (OPTIONAL COLORS ARE AVAILABLE FOR COVER AND COLLAR).
3. FLARED WALL BOXES ARE NESTABLE.

CONSTRUCTION NOTES

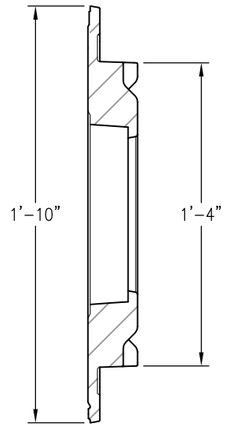
A. COVER BOLTDOWN OPTION
B. SKID RESISTANT SURFACE
C. 5/8" x 4" LIFTING SLOTS
D. OPTIONAL KNOCKOUTS OR TERMINATORS
E. COVER
F. STAINLESS STEEL CAPTIVE BOLT
G. BOX
H. SELF–CENTERING CORROSION RESISTANT NUT
J. METER LID KEYHOLE
K. 1/2" RAISED LETTERING (FLUSH)
L. LID

REVISIONS	WATER AUTHORITY
	WATER METER BOX, COVER AND LID FOR 1 1/2" TO 2" METERS DWG. 2367 JAN. 2013

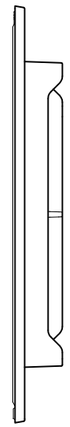


PLAN VIEW

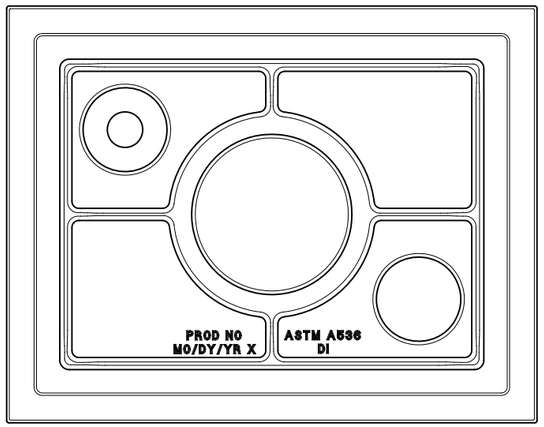
BOX COVER FOR 3/4" TO 1" METERS



SECTION A–A



SECTION C–C



BOTTOM VIEW

GENERAL NOTES

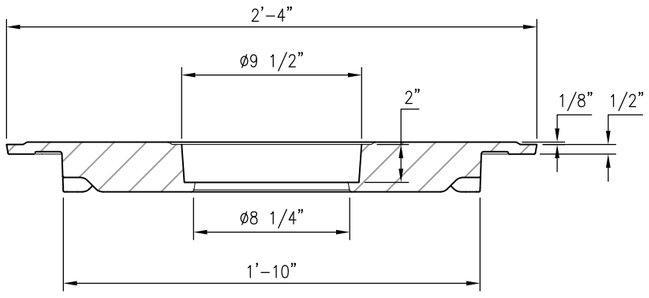
1. TO BE USED IN SIDEWALKS, MOUNTABLE CURB OR IN UNPAVED AREAS.

COVER

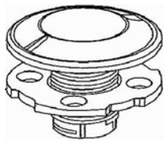
2. MATERIAL: DUCTILE IRON.
3. ROUND ALL EDGES.
4. TOP OF COVER SHALL HAVE AN INTEGRATED CORRUGATED DESIGN TO PREVENT SLIPPING.

LID

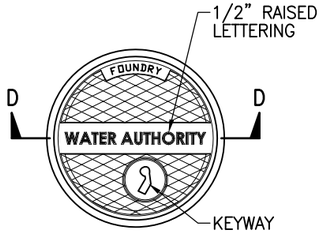
5. MATERIAL: DUCTILE IRON.
6. ROUND ALL EDGES.
7. TOP OF LID SHALL HAVE INTEGRATED CORRUGATED DESIGN TO PREVENT SLIPPING.
8. TOP OF LID SHALL HAVE INTEGRATED WORDS "WATER AUTHORITY".
9. LID SHALL NOT ROCK ON COVER AND SHALL BE EASILY OPENED.
10. THE TOP SURFACE OF THE LID SHALL BE FLUSH WITH THE TOP OF COVER.



SECTION B–B

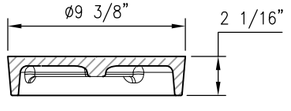


ENDPOINT CAP AND NUT



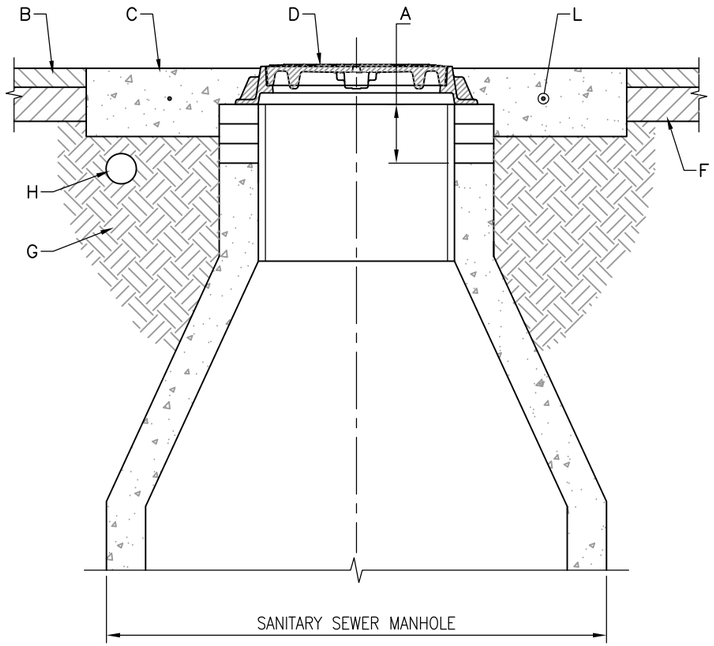
METER LID PLAN

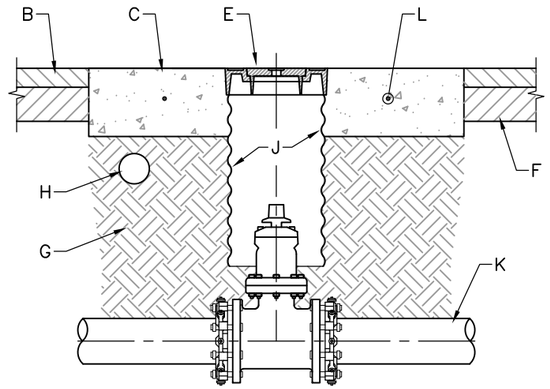
BOTTOM VIEW



SECTION D–D

REVISIONS	WATER AUTHORITY
	WATER METER BOX COVER AND LID FOR 3/4" TO 1" METERS DWG. 2368 JAN. 2013





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 OR CITY APPROVED PRODUCTS LISTS.

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. 2210 – 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 DRAIN MANHOLES – EMD'S ARE NOT REQUIRED AND SHALL NOT BE PLACED AT STORM DRAIN MANHOLES.

CONSTRUCTION NOTES

A. BRICKS OR ADJUSTMENT RINGS, 24" MAXIMUM

B. OVERLAY

C. NEW PORTLAND CEMENT CONCRETE COLLAR (f'c= 4000 PSI) PER STANDARD DRAWING 2461. 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 2101, 2102, 2181, 2326, AND 2461 FOR PROPER LINE IDENTIFICATION ON THE COLLAR.

D. MANHOLE FRAME AND COVER PER STANDARD DRAWINGS 2109, 2210 AND 2310

E. RING AND COVER FOR VALVE BOX. REFER TO STANDARD DRAWINGS 2128, 2328 AND 2329.

F. EXISTING PAVING SECTION

G. SUBGRADE SHALL BE COMPACTED TO 95% (ASTM)

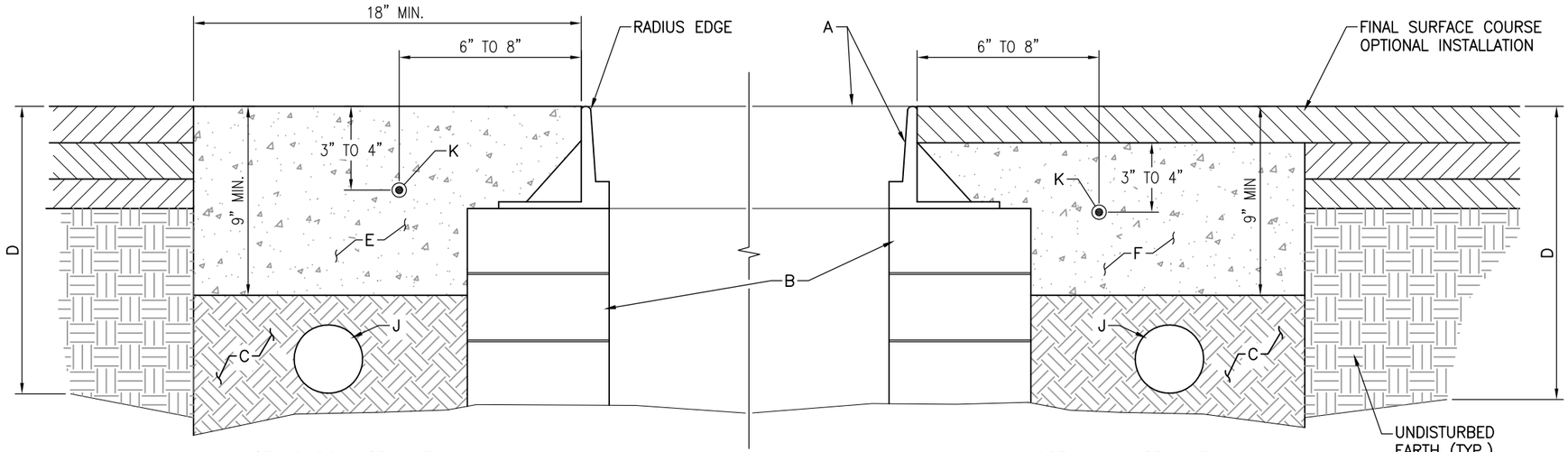
H. ELECTRONIC MARKER DEVICE (EMD), SEE STANDARD SPECIFICATION SECTION 170. EMD'S ARE REQUIRED ON ALL WATER AND SANITARY SEWER ADJUSTMENT, THEY ARE NOT TO BE INSTALLED ON STORM DRAIN MANHOLES.

J. POLYMER COATED STEEL PIPE CMP

K. WATER OR SEWER LINE

L. #4 REBAR PER STANDARD DWG. 2461

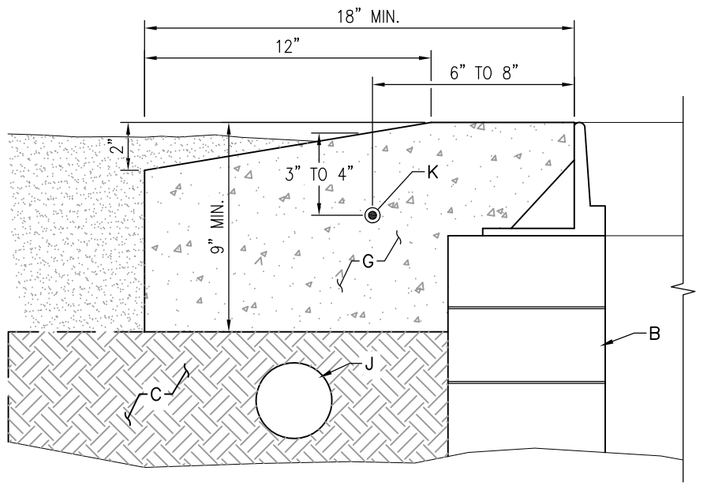
REVISIONS	CITY OF ALBUQUERQUE
	PAVING MANHOLE AND VALVE BOX REGRADING
	DWG. 2460 JAN. 2013



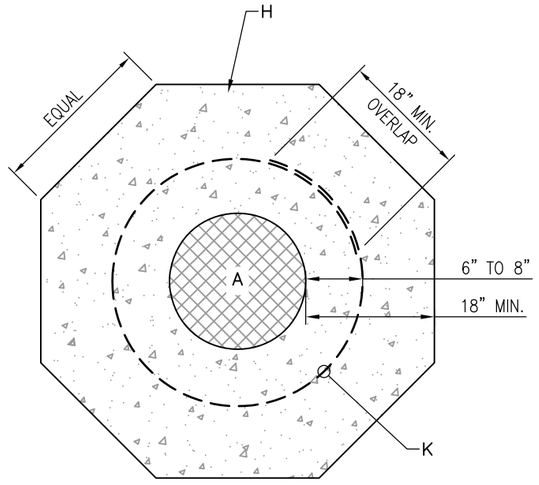
STANDARD INSTALLATION

OPTIONAL INSTALLATION

PAVED AREAS
SECTION



STANDARD INSTALLATION
UNPAVED AREAS
SECTION



PLAN

GENERAL NOTES

1. ALL MATERIALS MUST COMPLY WITH THE CURRENT WATER AUTHORITY OR CITY APPROVED PRODUCTS LISTS.
2. CONCRETE COLLAR SHALL BE PORTLAND CEMENT CONCRETE (f'c= 4000 PSI)

CONSTRUCTION NOTES

A. MANHOLE, OR RING AND COVER FOR VALVE BOX PER WATER AUTHORITY STANDARDS.

B. MANHOLE CONE/EXTENSION OR CMP.

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 UNPAVED AREAS. SET RING 1" ABOVE GRADE AND SLOPE CONCRETE DOWN AS SHOWN TO 1" BELOW GRADE.

H. SANITARY SEWER MANHOLE INSTALLATIONS SHALL HAVE CONCRETE COLLAR STAMPED WITH LINE SIZE AND FLOW DIRECTION ARROWS PER STANDARD DRAWINGS 2101 AND 2102. SEE STANDARD DRAWING 2181 FOR FORCEMAIN SEWER VALVE INSTALLATIONS, AND STANDARD DRAWING 2326 FOR WATER VALVE INSTALLATIONS.

J. ELECTRONIC MARKER DEVICE (EMD) REQUIRED FOR ALL SANITARY SEWER VALVES AND MANHOLES, AND WATER VALVES. SEE STANDARD SPECIFICATION SECTION 170.

K. #4 REBAR FORMED INTO RING. EMBED 3" TO 4" IN CONCRETE, AND INSTALL 6" TO 8" FROM EDGE OF MANHOLE FRAME OR VALVE BOX RING. PROVIDE 18" MIN. OVERLAP AS SHOWN.

REVISIONS	CITY OF ALBUQUERQUE
	MANHOLE/VALVE CONCRETE COLLAR DETAIL
	DWG. 2461 JAN. 2013