



# Standards and Design Guidelines for Developer Utilities

(Updated March 09, 2018)

The following standards are for the design of developer utilities to be dedicated to GBRA and/or operated by GBRA. Please review the following guidelines carefully and contact GBRA for a consultation meeting to address any related variances or other construction related matters.

For Owner or Developer information, or for information on provision of services by GBRA and/or to set an initial meeting, please contact:

Alvin Schuerg  
Senior Advisor to the General Manager  
Guadalupe-Blanco River Authority  
933 East Court Street  
Seguin, TX 78155  
Phone: 830-379-5822 Ext. 233  
Fax: 830-379-9718  
Email: [aschuerg@gbra.org](mailto:aschuerg@gbra.org)

Teresa Van Booven  
Project & Community Representative  
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For technical questions, or to request technical information, please contact:

Chris Lewis  
Project Manager  
Guadalupe-Blanco River Authority  
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Canyon Lake, TX 78132  
Phone: 210-825-6472  
Fax: 830-885-2564  
Email: [clewis@gbra.org](mailto:clewis@gbra.org)

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Manager of Project Engineering  
Guadalupe-Blanco River Authority  
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Seguin, TX 78155  
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Email: [chickman@gbra.org](mailto:chickman@gbra.org)

## **Design and Documents**

1. If construction has not commenced within one (1) year of GBRA design approval, that approval is no longer valid.
2. GBRA design approval is reliant upon the adequacy of the work of the engineer of record. All responsibility for the adequacy of the design remains with the engineer of record.
3. Provide complete design submittals for GBRA review and approval prior to bidding. Include master plan, plats, easements, design calculations, specifications, and complete project drawings sets including roads, grading, storm sewer, sanitary sewer, water, dry utilities, etc. Provide six (6) printed and bound half size copies and two (2) CD/PDF electronic copies. Allow 30 calendar days for review.
4. All piping shown on drawings shall be labeled as to the size, type, class, process fluid contained, and flow direction.
5. Submit easements and preliminary and final plats for GBRA review and approval.
  - a. Provide dedicated easements in the name of GBRA. Easements shall not overlap or be within residential lots.
  - b. Where outside of public right-of-way, provide dedicated easements with a minimum width equal to pipe outside diameter, rounded up to the nearest foot, plus 10 feet minimum on each side. For easements with multiple pipes, provide 10 feet minimum horizontal clearance between pipes. Provide additional width for easements that are not located adjacent to public right-of-way.
  - c. Other utilities, structures, grading, drainage, detention/retention ponds, landscaping, trees, roads, parking lots, fences, walls, construction of any type, or any other improvements or obstructions, are not allowed within GBRA easements.
  - d. Designs for any proposed alterations or crossings of GBRA easements must be approved in writing by GBRA and the installation of such must be inspected and approved by GBRA.
  - e. Maintenance of easements is the responsibility of the property owner.
  - f. The property owner must install 16 foot gates in any fences that cross GBRA easements; gates must be centered across GBRA utilities.
  - g. Customer water and wastewater services shall not be installed within fenced areas.
6. Copies of each construction submittal (shop drawings, product data, etc.) shall be provided for GBRA review and approval prior to fabrication. Use clouds, boxes, arrows, etc., to clearly mark all proposed options and part numbers. List any proposed deviations on the submittal cover sheet. Allow 21 calendar days for review.
7. Provide the following materials prior to acceptance of facilities by GBRA. Provide one (1) hard copy and one (1) CD/PDF copy unless noted otherwise:
  - a. Engineer's certification of completion in accordance with approved plans, specifications, and permits.
  - b. Copies of all close-out submittals required by regulatory agencies (city, county, TCEQ, etc.).
  - c. O&M Manuals: Provide three (3) hard copies and three (3) CD/PDF searchable electronic copies of each O&M manual. Hard copies shall be printed duplex 8.5"x11" in color on 24# bond paper with reinforced holes and bound in D-ring binders (maximum 4" binders per volume) with sheet lifters front and back, table of contents,

- and tabbed sections. Drawings and schematics shall be 11"x17" and z-folded. Include test reports and calibration certificates. O&M description, project name, contractor name, and specification section shall be printed on the spine and cover of each binder. All copies shall be manufacturer original quality. Scanned and/or photocopies are not acceptable. Submit electronic preliminary copies for GBRA review and approval prior to printing final copies. Submit at least two (2) weeks prior to operator training.
- d. Waiver of lien by contractor (and subcontractors, as appropriate).
  - e. Warranty certificates, both from contractor and from manufacturer(s), valid for one (1) year from date of project final acceptance. Warranty shall include parts and labor for removal, repair, and replacement.
  - f. Executed operating contract or bill of sale transferring facilities to GBRA.
  - g. As-Built and Record Drawings: Provide complete project drawing sets including dry utilities, roads, grading, storm sewer, sanitary sewer, water, etc. Submit electronic preliminary copies for GBRA review and approval prior to printing final copies.
    - i. Contractor shall provide one (1) printed and bound full size copy of red lined as-built drawings and one (1) CD/PDF electronic copy, each sheet stamped "as-built drawing".
    - ii. Engineer shall prepare corrected CAD drawings, each sheet stamped "record drawing", and submit to GBRA five (5) printed and bound half size copies and five (5) CD/PDF searchable electronic copies of the corrected CAD drawings. Scanned and/or photocopies are not acceptable.
  - h. Recorded plats and easements.
  - i. Title Company review for release of all liens.

## **Design Requirements**

- 1. Design and installation shall be in accordance with TCEQ rules and AWWA standards, and in accordance with GBRA standards as further described in this document (see attachments).
- 2. Noise and odor impacts shall be considered in design.
- 3. The designs of wastewater systems shall be based on minimum 300 GPD/EDU average daily flow, 4.0 peak factor, and 300 GPD/acre inflow and infiltration.
- 4. Piping friction losses shall be calculated with a Hazen-Williams coefficient no greater than 120 for plastic pipe, and no greater than 100 for concrete or metal pipe.
- 5. Potable and reclaimed water distribution systems shall be designed to provide 55 PSI minimum at customer meters.
- 6. Gravity wastewater main depths shall be limited to 20 feet maximum, as measured from pipe invert to finish grade.
- 7. Low pressure sanitary sewer collection systems are not allowed.
- 8. Sanitary tapping saddles are not allowed.
- 9. Manhole internal drops are not allowed.
- 10. Water mains, force mains, valves, hydrants, services, and cleanouts shall be located outside of roadways, pavement, curbs, driveways, etc., unless specifically approved otherwise. Install 4ft minimum behind back of curb.

11. Gravity wastewater mains may be installed within roadways. Center mains in one lane of traffic, not in center of roadway.
12. All piping shall be designed in straight alignment vertically and horizontally. Pipe curvature and/or deflection are not allowed.
13. Utilize primarily double services installed on lot corners. Minimize the use of single services. Water services shall be installed on opposite lot corners from wastewater services. Services shall not be installed within fenced areas.
14. Water and wastewater pipe lengths shall be centered at crossings with all other utilities, including dry utility services. Both pipes shall be centered at water and wastewater crossings, including wastewater service laterals and fire hydrant leads.
15. Maintain a minimum of 10 feet horizontal and 12 inches vertical clearance between water and wastewater and other utilities. Shared trenches are not allowed.
16. Water and wastewater piping (including mains, services, and laterals) shall be sleeved if located under concrete channels, box culverts, or multiple barrel storm sewer crossings regardless of size and single barrels 30" or larger.
17. Provide overall utilities plan sheets.
18. Profile all water, wastewater, and storm piping regardless of size. Show all utility crossings in all profiles. Show wastewater service laterals in storm and water piping profiles. In a lighter shade, show/overlay water and storm profiles onto wastewater piping profiles. Show all utilities, including dry utility mains and services, on all utility plan sheets.
19. Drains shall be provided for all water mains regardless of main size.
20. Air release valves shall be provided for all water and force mains regardless of main size.
21. Services are not allowed on water transmission lines. No exceptions.

## **Materials**

1. Buried water piping shall be C900 DR14, blue color for potable, purple color for reclaimed. Fittings shall be cement lined AWWA C153 compact mechanical joint ductile iron with Ford Uni-Flange Series 1500 restraints. Pipe bell joint restraints shall be Ford Uni-Flange Series 1300. Fittings for projects near or east of Interstate 35 shall be fusion bonded epoxy coated.
2. Exposed water piping and fittings shall be cement lined flanged ductile iron with field paint coatings as specified herein.
3. Gravity wastewater pipe and fittings shall be green color gasketed ASTM D3034 SDR26. At water crossings including fire hydrant leads, white color gasketed ASTM D2241 SDR26 pipe and fittings shall be used for mains and laterals. Sanitary tapping saddles are not allowed.
4. Force main piping shall be green color C900 DR18 minimum. Fittings shall be epoxy lined AWWA C153 compact mechanical joint ductile iron with Ford Uni-Flange Series 1500 restraints. Pipe bell joint restraints shall be Ford Uni-Flange Series 1300. Fittings for projects near or east of Interstate 35 shall be fusion bonded epoxy coated.

5. MJ tee bolts and nuts for buried locations shall be Corten, except for projects near or east of Interstate 35 use Type 304 stainless steel. Field apply nickel anti-seize compound to threads prior to assembly.
6. All other fasteners shall be Type 304 stainless steel (e.g. hardware, screws, anchor bolts, rods, bolts, nuts, etc. for piping, valves, pumps, motors, equipment, etc.) including those for factory assembly of components. All bolts and nuts shall be heavy hex. Anchor bolts installed within hydraulic structures shall be epoxy type. Field apply nickel anti-seize compound to threads prior to assembly. Stainless steel items shall not be painted.
7. Tapping sleeves 24" and smaller shall be American Flow Control Series 2800. Tapping sleeves 24" and smaller shall be fusion bonded epoxy coated for projects near or east of Interstate 35. Tapping sleeves larger than 24" shall be Smith Blair Model 624. All tapping sleeves shall have stainless steel hardware and split MJ restraints. Field apply nickel anti-seize compound to threads prior to assembly. Tapping sleeves shall be installed 24" minimum from the nearest pipe bell as measured from the edge of the tapping sleeve to taper of bell. Assembly must be successfully disinfected and pressure tested prior to tapping. Perform 100 PSI air test for 10 minutes duration, no allowable leakage. Concrete blocking to undisturbed earth is required under and behind tapping sleeves and valves. Install mechanical restraints 60 LF minimum each way, including on existing piping.
8. All buried metal pipe, fittings, hydrants, and valves shall be wrapped with 8mil poly.
9. Dual pressure reducing valves shall be manufactured by Cla-Val with anti-cavitation trim. Install inside buried H-20 precast concrete vault with lockable aluminum access hatches, aluminum ladder, and floor drain or coarse gravel bottom.
10. Pressure gauge assemblies shall include the following items:
  - a. Stainless steel full port isolation ball valve.
  - b. Pressure diaphragm seal and plain end bibb sampling valve, both stainless steel.
  - c. 4" Pressure gauge, complying with ASME B40.1, Grade 1A, with 1% full scale accuracy, stainless case and stainless steel wetted parts, glycerin filled.
  - d. Gauges shall read in both ftH<sub>2</sub>O and PSI. Select range for normal working pressure to be mid-range.
  - e. The entire assembly shall be Type 316 stainless steel
11. Flange coupling adapters shall be Smith Blair Model 911. Flange adapters are not allowed within hydraulic structures.
12. PVC male adapters are not allowed.
13. Paint shall be white color high-build epoxy with topcoat of polyurethane. Topcoat color shall be safety blue for water, safety green for sewer, safety purple for reclaimed. Do not paint stainless steel, hot dip galvanized, brass, or aluminum items. Install in accordance with manufacturer recommendations.

## **Testing**

1. All other utilities must be complete prior to performing any water or wastewater testing.
2. All testing must be complete prior to paving streets.

3. All testing must be complete prior to performing tie-ins to existing water or wastewater systems.
4. Contractor shall perform pre-testing to verify passing results prior to requesting GBRA inspection. Provide connection point for GBRA digital test gauge.
5. All testing shall be performed by the contractor and witnessed by GBRA.
6. Perform trench backfill density testing at intervals specified by the design engineer, exact locations to be designated by inspector. Schedule GBRA to witness testing. Provide copies of reports to GBRA.
7. Follow AWWA pipe testing procedures and allowable leakage for water lines. Test every valved section (i.e. test against every valve in closed position). Test pressure shall be the maximum rating of material installed. Test duration shall be 2 hours.
8. Follow AWWA procedures for flushing and disinfection of water piping. Flushing and disinfection must be complete prior to performing tie-ins to existing systems.
9. All gravity wastewater piping shall be subject to low pressure air testing in accordance with TCEQ requirements. Infiltration and exfiltration testing are not allowed.
10. Mandrel testing shall be performed for all gravity wastewater mains prior to installation of corrosion resistant manhole lining.
11. All manholes, regardless of vehicular traffic detouring, shall be vacuum tested after completion of backfill, compaction, and final grading of road base but prior to paving streets and prior to corrosion resistant manhole lining. Vacuum testing shall be performed with a plate type test head placed on top of completed manhole metal casting ring which has been installed and encased in concrete at final grade. Manholes shall be tested at 10 inches of mercury for 2 minutes duration. Allowable loss is 1 inch of mercury. Infiltration and exfiltration testing are not allowed.
12. Perform video inspection and golf ball testing of gravity wastewater piping after corrosion resistant manhole lining but prior to paving streets. Pipe and manholes must be cleaned free of dirt, rocks, scale, mud, silt, and any other foreign matter prior to performing video inspection and golf ball testing. Flood system with water immediately prior to performing video inspection. Hang and drag a golf ball in front of camera. Pipe grade is out of tolerance if golf ball becomes fully submerged. Schedule GBRA to witness video inspection. Provide DVD's and written reports to GBRA.
13. Follow TCEQ pipe testing procedures and allowable leakage for force mains. Test every valved section (i.e. test against every valve in closed position). Test pressure shall be the maximum rating of material installed.

## **Construction Notes**

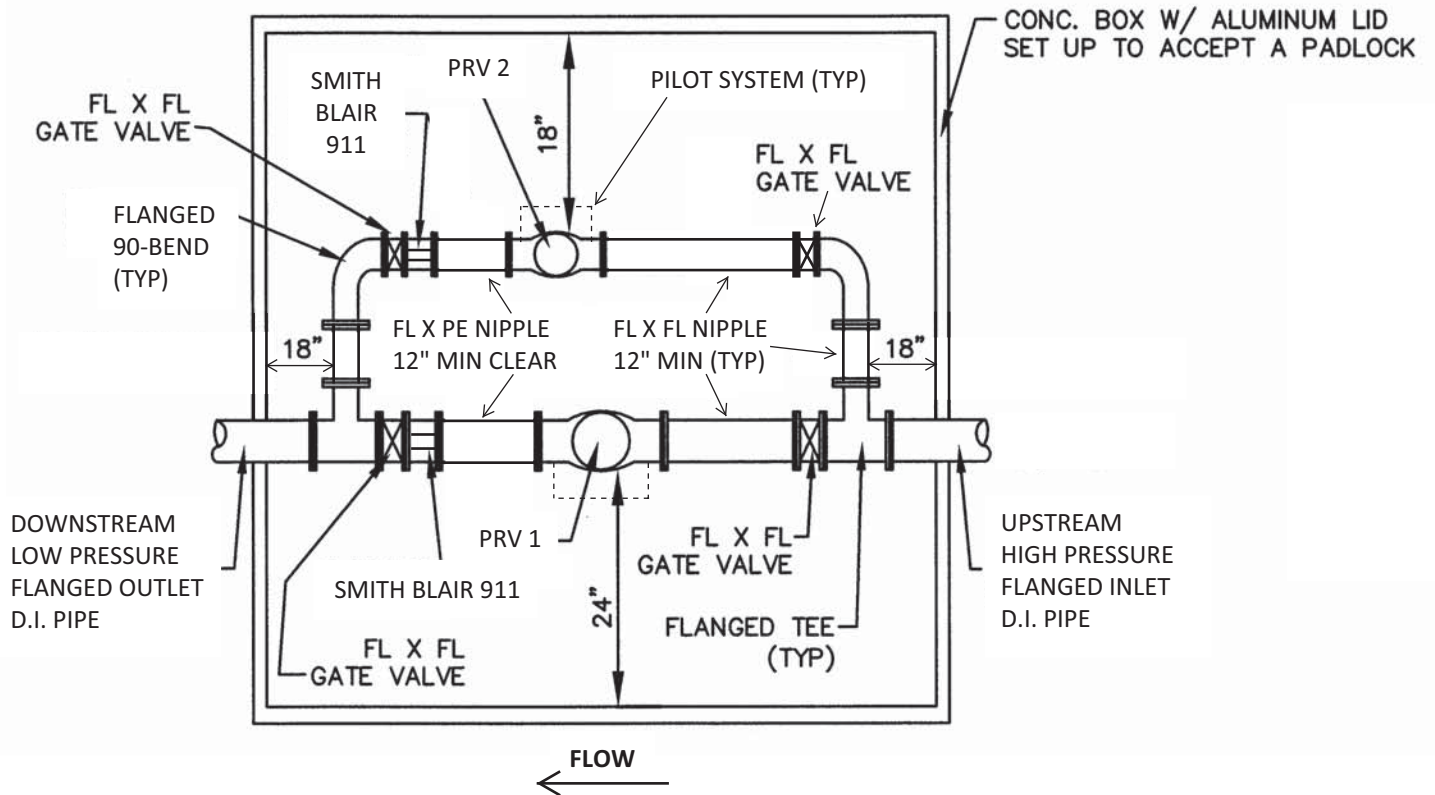
1. All work shall be in accordance with GBRA standards as published at the following website: <http://www.gbra.org/public/waterwastewaterservices.aspx>
2. Copies of each construction submittal (shop drawings, product data, etc.) shall be provided for GBRA review and approval prior to fabrication. Use clouds, boxes, arrows, etc., to clearly

mark all proposed options and part numbers. List any proposed deviations on the submittal cover sheet. Allow 21 calendar days for review.

3. All water and wastewater installations must be inspected and approved by GBRA prior to backfilling or otherwise covering the work. This includes crossings of water and wastewater by other utilities. GBRA will perform a maximum of one (1) inspection daily for one (1) hour duration between 8:00am and 5:00pm excluding weekends and holidays. Call 830-379-5822 to schedule inspections (48 hours advance notice is required for all inspections).
4. Trench excavation and pipe installation will not be permitted until subgrade has been established. Survey staking must be installed prior to and maintained during trench excavation and pipe installation. Survey staking shall include horizontal and vertical control at a minimum of 50 foot station intervals. Horizontal offsets shall be 15 feet maximum. Install property pins and stakes. Mark finish grade lines with cut/fill on offset stakes and property stakes. All marks shall face the pipeline. Survey staking shall be performed by the contractor.
5. Backflow prevention in the form of a reduced pressure backflow assembly must be provided for temporary connections to existing water lines. Backflow devices shall be tested by a licensed backflow prevention assembly tester. Submit test reports.
6. PVC male adapters are not allowed.
7. Sanitary tapping saddles are not allowed.
8. Manhole internal drops are not allowed.
9. Pipe bells shall be installed in upstream direction.
10. All piping shall be designed in straight alignment vertically and horizontally. Pipe curvature and/or deflection are not allowed.
11. Install concrete thrust blocking and mechanical restraints for pressure piping systems.
12. Maintain a minimum of 10 feet horizontal and 12 inches vertical clearance between water and wastewater and other utilities. Shared trenches are not allowed.
13. Water and wastewater pipe lengths shall be centered at crossings with all other utilities, including dry utility services. Both pipes shall be centered at water and wastewater crossings, including wastewater service laterals and fire hydrant leads.
14. Water and wastewater piping (including mains, services, and laterals) shall be sleeved if located under concrete channels, box culverts, or multiple barrel storm sewer crossings regardless of size and single barrels 30" or larger.
15. Valve boxes, exposed piping and valves, and appurtenances shall be painted. Provide painted curb cut markings at valves and services.
16. All exposed vertical and horizontal concrete edges shall be formed with  $\frac{3}{4}$ " chamfer strips.
17. Existing facilities that are disturbed shall be restored and tested to be in full compliance with current GBRA standards. The contractor shall adjust existing water and wastewater facilities to proposed finish grades including but not limited to manholes, cleanouts, valves, hydrants, appurtenances, etc.
18. Existing manholes that are disturbed shall be restored to be in full compliance with current GBRA standards including testing, corrosion resistant lining, rings and covers, etc.



19. The contractor shall maintain service to existing water and wastewater systems at all times during construction. Any work involving power outages, bypass pumping, pump and haul, or any other interruption of flow must be performed between 8:00am and 5:00pm excluding weekends and holidays. All necessary temporary power, bypass pumping, pump and haul, temporary plugs, etc., shall be furnished and performed by the contractor. Coordinate and schedule any such activities with GBRA at least two (2) weeks in advance.
20. Explosives and blasting are not allowed.

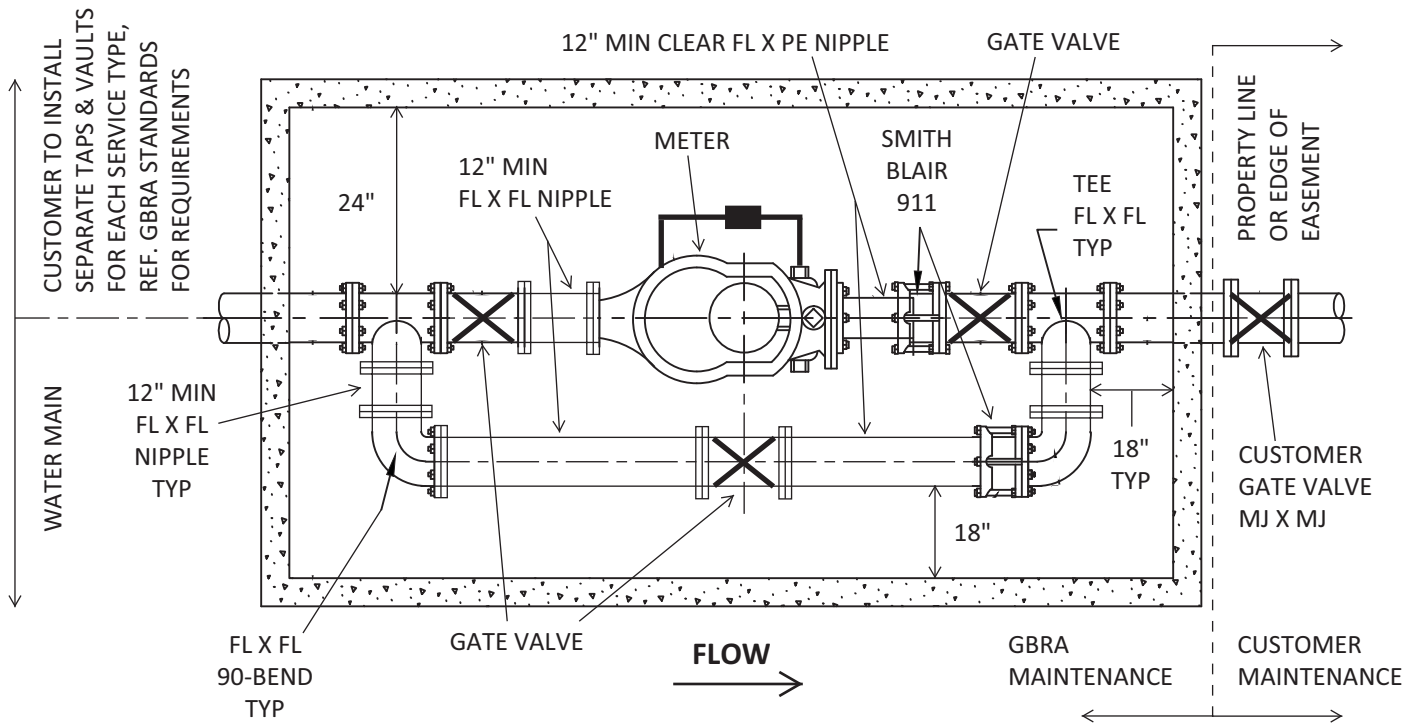


#### NOTES:

1. ALL BOLTS, NUTS, FASTENERS, AND HARDWARE SHALL BE STAINLESS STEEL (E.G. VALVES, PIPE, FITTINGS, APPURTENANCES, HATCH, ETC.).
2. PRESSURE REDUCING VALVES SHALL BE CLA-VAL MODEL 90-01G WITH ANTI-CAVITATION TRIM AND STAINLESS STEEL PILOT SYSTEMS. INSTALL PILOT SYSTEMS ON WALL SIDE OF VALVES. STRAINERS ARE REQUIRED IF WATER IS NOT POTABLE.
3. PRESSURE GAUGES SHALL BE 4" OR 4.5" STAINLESS STEEL, GLYCERIN FILLED, SELECT RANGE FOR NORMAL WORKING PRESSURE TO BE MID-RANGE. INSTALL GAUGES ON EACH PRV INLET AND OUTLET.
4. GATE VALVES SHALL BE FLANGED AFC SERIES 2500 RISING STEM WITH HAND WHEELS.
5. ALL PIPING INSIDE VAULT SHALL BE FLANGED DUCTILE IRON. BYPASS PIPING MAY BE THREADED BRASS OR FLANGED DUCTILE IRON. NIPPLES SHALL BE 12" MINIMUM LAY LENGTH.
6. ALL PIPING OUTSIDE VAULT SHALL BE RESTRAINED.
7. SLEEVES SHALL BE INSTALLED ON LOW PRESSURE SIDE ONLY. USE SMITH BLAIR MODEL 911.
8. INSTALL ADJUSTABLE PIPE SUPPORTS WITH FLANGE CONNECTIONS UNDER ALL VALVES (REF. GBRA STANDARD DETAILS). INSTALL CAST-IN-PLACE REINFORCED CONCRETE BASES CAST AGAINST UNDISTURBED EARTH UNDER SUPPORTS.
9. PRECAST CONCRETE VAULT AND ALUMINUM HATCH SHALL BE H-20 TRAFFIC RATED. HATCH SHALL BE PER CITY OF AUSTIN SPL-614A WITH PADLOCK STAPLE.
10. VAULT SHALL BE OPEN BOTTOM INSTALLED ON 6" LAYER OF TXDOT GRADE 4 COARSE AGGREGATE.
11. PROVIDE 24" CLEARANCE FROM BOTTOM OF PIPE TO BOTTOM OF VAULT. DEPTH OF PIPE SHALL MEET PROJECT MINIMUM COVER REQUIREMENTS.
12. FORM AND PLACE NON-SHRINK GROUT IN WALL PIPE PENETRATIONS.
13. TOP OF VAULT SHALL BE 4" ABOVE FINISH GRADE.
14. ALL EXPOSED VERTICAL AND HORIZONTAL CONCRETE CORNERS SHALL HAVE 3/4" CHAMFER.
15. PAINT PIPING, VALVES, AND FITTINGS INSIDE VAULT IN ACCORDANCE WITH GBRA STANDARDS.

## DUAL PRV PLAN DETAIL

Guadalupe-Blanco River Authority, 01/28/2018

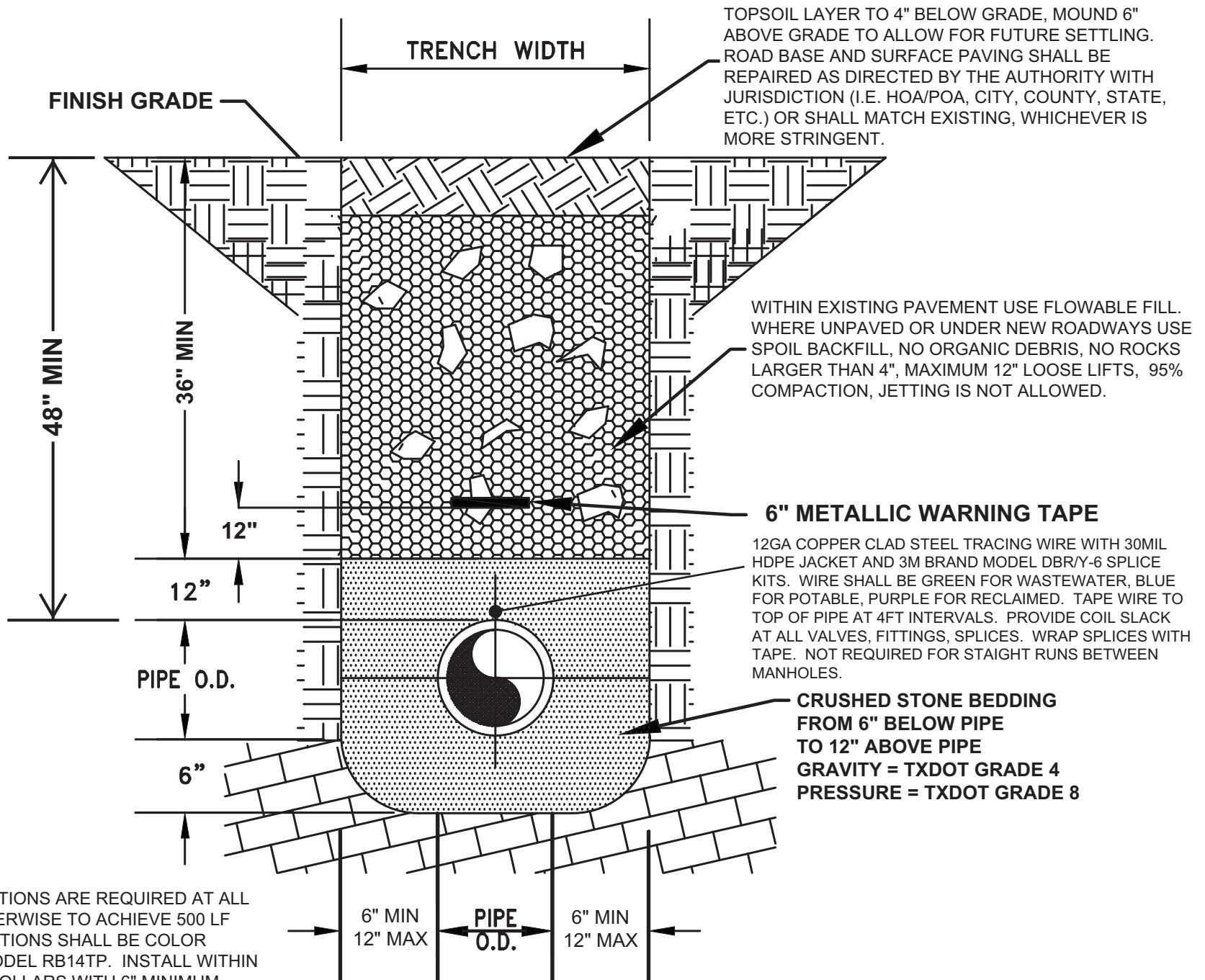


#### NOTES:

1. ALL BOLTS, NUTS, FASTENERS, AND HARDWARE SHALL BE STAINLESS STEEL (E.G. METERS, VALVES, PIPE, FITTINGS, APPURTENANCES, HATCH, ETC.).
2. CUSTOMER SHALL FURNISH AND INSTALL THE ENTIRE ASSEMBLY AS DETAILED INCLUDING NEPTUNE BRAND WATER METERS WITH STAINLESS STEEL TRIM AND R900i RADIO READING SYSTEM. PROVIDE TRU/FLO COMPOUND METERS FOR POTABLE SERVICE. PROVIDE HP PROTECTUS III METERS FOR FIRE SERVICE WITH LOW FLOW METERS INSTALLED ON WALL SIDE OF HIGH FLOW METERS.
3. CUSTOMER SHALL FURNISH AND INSTALL APPROPRIATE BACKFLOW PREVENTION DEVICES IN SEPARATE VAULTS DOWNSTREAM OF METER VAULTS FOR EACH SERVICE TYPE (REF. TCEQ 290.47 APPENDIX F).
4. GATE VALVES INSIDE VAULT SHALL BE FLANGED AFC SERIES 2500 RISING STEM WITH HAND WHEELS.
5. ALL PIPING INSIDE VAULT SHALL BE FLANGED DUCTILE IRON. NIPPLES SHALL BE 12" MINIMUM LAY LENGTH. ALL PIPING OUTSIDE VAULT SHALL BE RESTRAINED.
6. BYPASS PIPING SHALL BE SAME SIZE AS METER PIPING.
7. INSTALL ADJUSTABLE PIPE SUPPORTS WITH FLANGE CONNECTIONS UNDER ALL VALVES (REF. GBRA STANDARD DETAILS). INSTALL CAST-IN-PLACE REINFORCED CONCRETE BASES CAST AGAINST UNDISTURBED EARTH UNDER SUPPORTS.
8. PRECAST CONCRETE VAULT AND ALUMINUM HATCH SHALL BE H-20 TRAFFIC RATED. HATCH SHALL BE PER CITY OF AUSTIN SPL-614A WITH PADLOCK STAPLE.
9. INSTALL VAULT ON 6" LAYER OF TXDOT GRADE 4 COARSE AGGREGATE.
10. PROVIDE 24" CLEARANCE FROM BOTTOM OF PIPE TO BOTTOM OF VAULT. DEPTH OF PIPE SHALL MEET PROJECT MINIMUM COVER REQUIREMENTS.
11. FORM AND PLACE NON-SHRINK GROUT IN WALL PIPE PENETRATIONS.
12. TOP OF VAULT SHALL BE 4" ABOVE FINISH GRADE.
13. ALL EXPOSED VERTICAL AND HORIZONTAL CONCRETE CORNERS SHALL HAVE 3/4" CHAMFER.
14. PAINT METERS, PIPING, VALVES, AND FITTINGS INSIDE VAULT IN ACCORDANCE WITH GBRA STANDARDS.
15. DESIGN AND MATERIAL SUBMITTALS MUST BE REVIEWED AND APPROVED BY GBRA.
16. INSTALLATION MUST BE INSPECTED BY GBRA PRIOR TO BACKFILL OR OTHERWISE COVERING ANY WORK.

## **METER WITH BYPASS PLAN DETAIL**

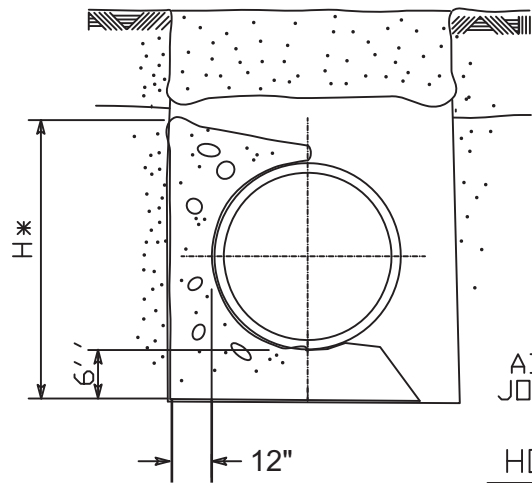
Guadalupe-Blanco River Authority, 01/28/2018



**NOTE:**  
TRACING WIRE TEST STATIONS ARE REQUIRED AT ALL FIRE HYDRANTS OR OTHERWISE TO ACHIEVE 500 LF MAX SPACING. TEST STATIONS SHALL BE COLOR CODED COPPERHEAD MODEL RB14TP. INSTALL WITHIN VALVE BOX CONCRETE COLLARS WITH 6" MINIMUM CONCRETE COVER ON ALL SIDES. LEAVE 12" WIRE SLACK INSIDE TEST STATIONS. NOT REQUIRED FOR STRAIGHT RUNS BETWEEN MANHOLES.

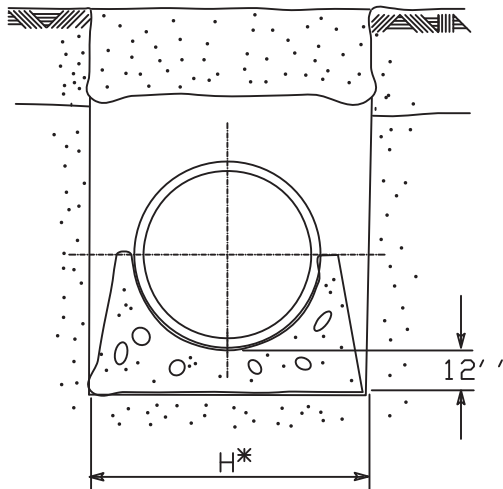
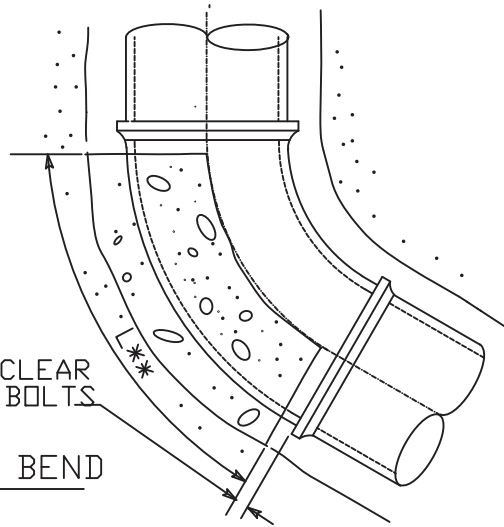
## TYPICAL PIPE TRENCH

Guadalupe-Blanco River Authority, 02/05/2018

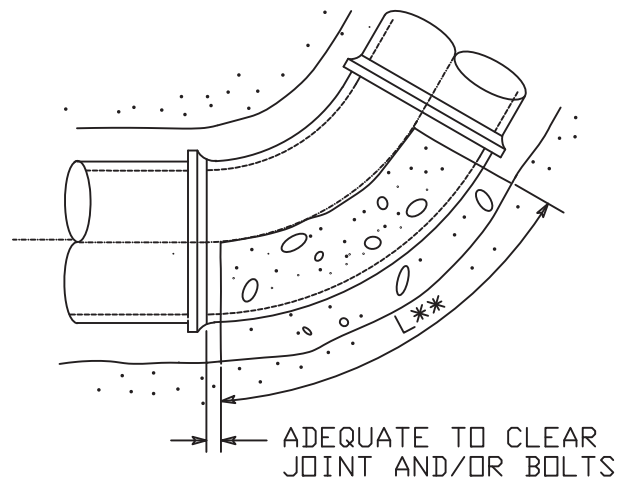


ADEQUATE TO CLEAR  
JOINT AND/OR BOLTS

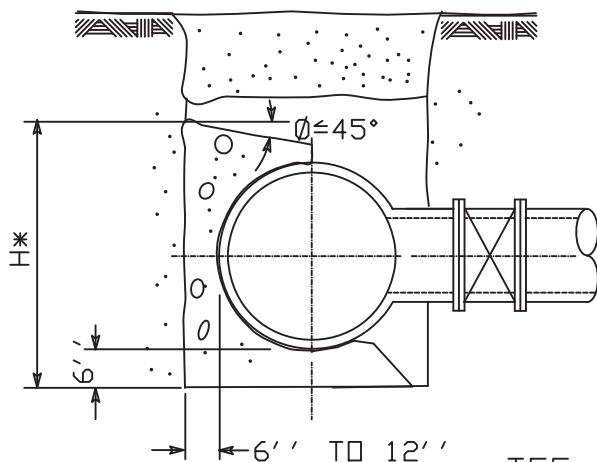
HORIZONTAL BEND



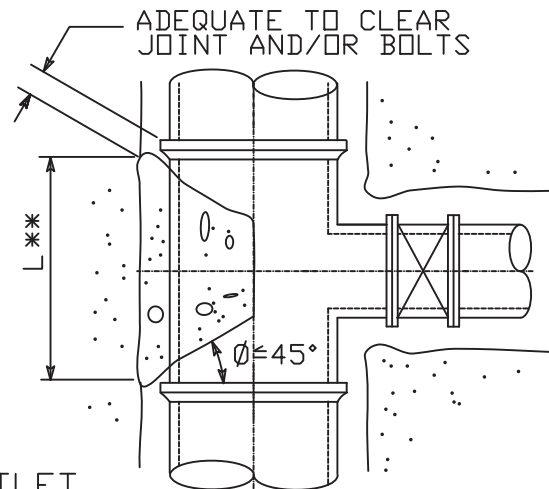
VERTICAL BEND UPWARD



ADEQUATE TO CLEAR  
JOINT AND/OR BOLTS



TEE / OUTLET



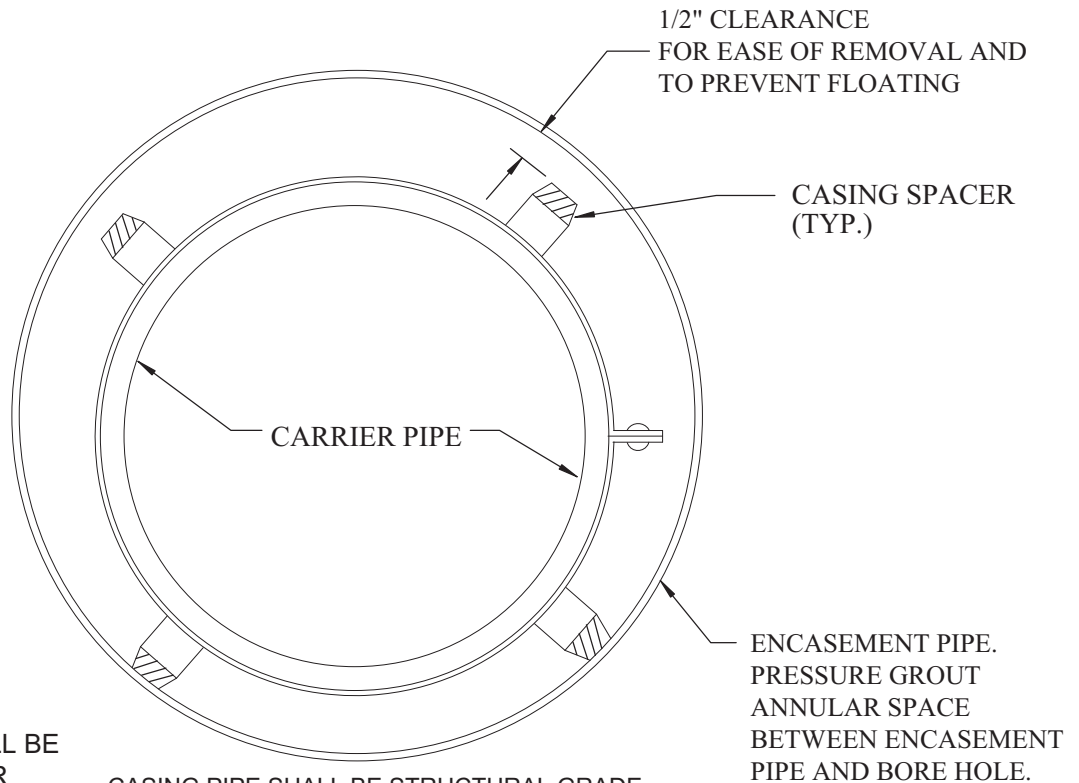
ADEQUATE TO CLEAR  
JOINT AND/OR BOLTS

\* THE DIMENSION FOR "H" MUST BE GREATER THAN DIAMETER OF THE PIPE.

\*\* LENGTH "L" ALONG THE BEND MUST BE GREATER THAN "H" AND LESS THAN 2 TIMES "H".

NOTES: BLOCKING SHALL BE USED IN ADDITION TO MECHANICAL RESTRAINTS. BLOCKING MUST BE PLACED AGAINST UNDISTURBED EARTH. MECHANICAL RESTRAINTS SHALL BE PROVIDED 60 LF EACH WAY FROM ALL FITTINGS, VALVES, DEAD ENDS, ETC. MECHANICAL RESTRAINTS SHALL BE UNIFLANGE SERIES 1300, 1400, 1500.

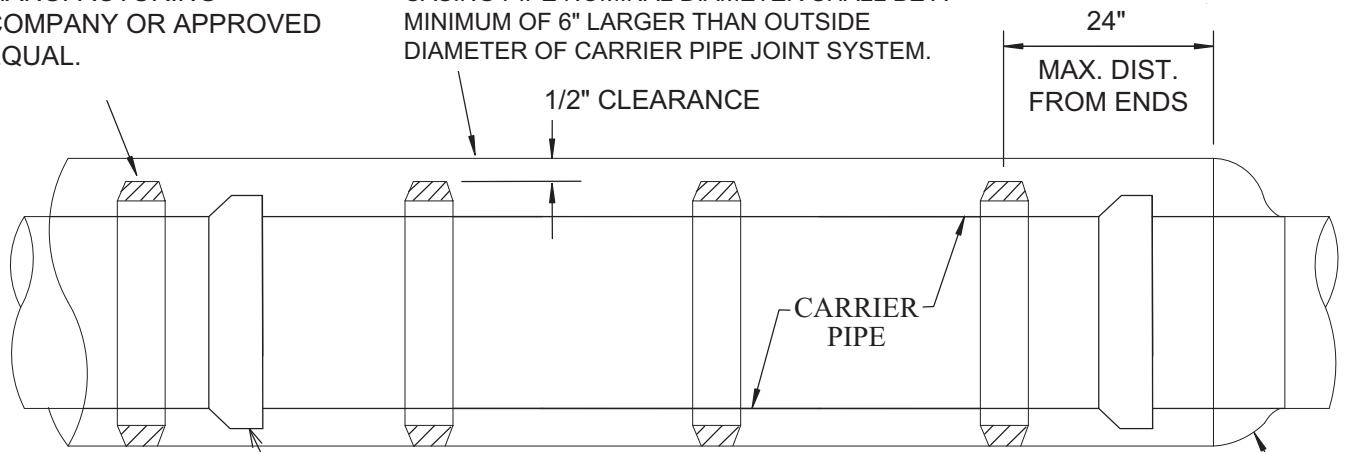
# MECHANICAL RESTRAINTS & THRUST BLOCKING



CASING SPACERS SHALL BE STYLE CCS, CCS-ER, OR CCS-JR BY CASCADE WATERWORKS MANUFACTURING COMPANY OR APPROVED EQUAL.

CASING PIPE SHALL BE STRUCTURAL GRADE STEEL WITH A MINIMUM YIELD STRENGTH OF 35,000 PSI AND 3/8" MINIMUM WALL THICKNESS. CASING PIPE NOMINAL DIAMETER SHALL BE A MINIMUM OF 6" LARGER THAN OUTSIDE DIAMETER OF CARRIER PIPE JOINT SYSTEM.

ENCASEMENT PIPE. PRESSURE GROUT ANNULAR SPACE BETWEEN ENCASEMENT PIPE AND BORE HOLE.



CARRIER PIPE SHALL HAVE RESTRAINED JOINTS.

A MINIMUM OF THREE CASING SPACERS ARE REQUIRED PER FULL JOINT OF PIPE. MAXIMUM SPACING 8 FEET (O.C.). INSTALL SPACERS A MAXIMUM OF 2 FEET ON EACH SIDE OF BELLS OR MECHANICAL JOINTS.

CASING END SEALS SHALL BE SEAMLESS RUBBER PULL-ON TYPE WITH STAINLESS STEEL BAND CLAMPS.

**NOTE:**

THE MATERIALS SHOWN APPLY TO JACK AND BORE INSTALLATIONS AND STREAM/RIVER CROSSINGS. OPEN CUT SLEEVING OF SUBDIVISION UTILITIES UNDER STORM SEWER MAY BE C900/905 DR18 CASING (COLOR TO MATCH CARRIER PIPE) AND HDPE SPACERS WITH STAINLESS STEEL HARDWARE. THE CLEARANCES AND DIMENSIONS SHOWN APPLY TO ALL INSTALLATIONS.

Guadalupe-Blanco River Authority

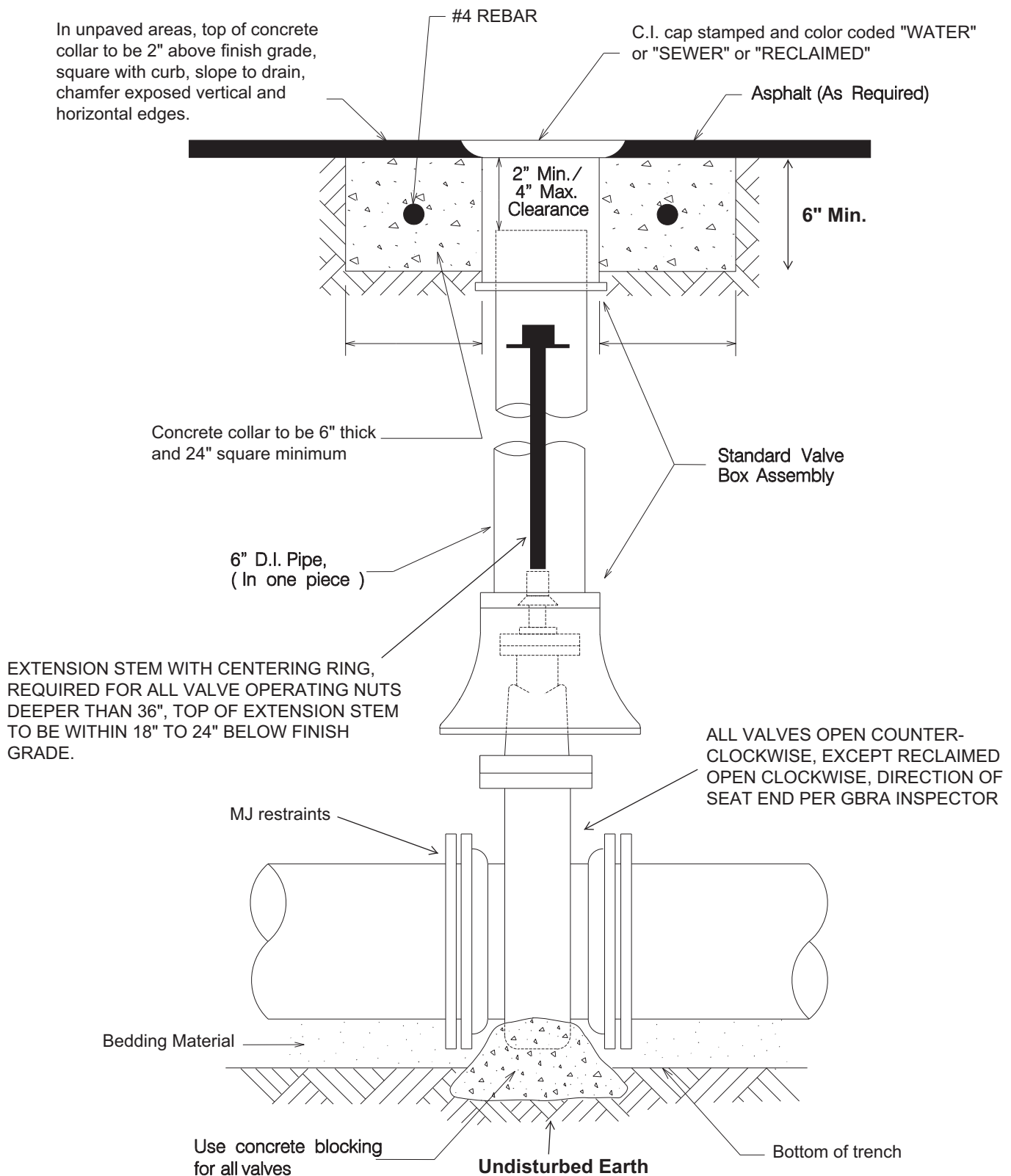
## CASING AND SPACERS DETAIL

C. LEWIS

JAN. 28, 2018

THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.

STANDARD NO.



**NOTES:**

- 1) FOR WATER, USE MJ RESILIENT WEDGE GATE VALVES, AFC SERIES 2500 OR GBRA APPROVED EQUAL.
- 2) FOR SEWER, USE MJ ROUND PORT PLUG VALVES BY CRISPIN, GA, MILLIKEN, OR PRATT WITH 304SS EXTERNAL BOLTS, NUTS, AND HARDWARE. PLUG VALVES SHALL BE HORIZONTAL SHAFT CLOSING DOWNWARD.
- 3) VALVE MARKERS ARE REQUIRED FOR ALL BURIED VALVES IN UNPAVED AREAS.
- 4) PVC MALE ADAPTERS ARE NOT ALLOWED.

**Guadalupe-Blanco  
River Authority**

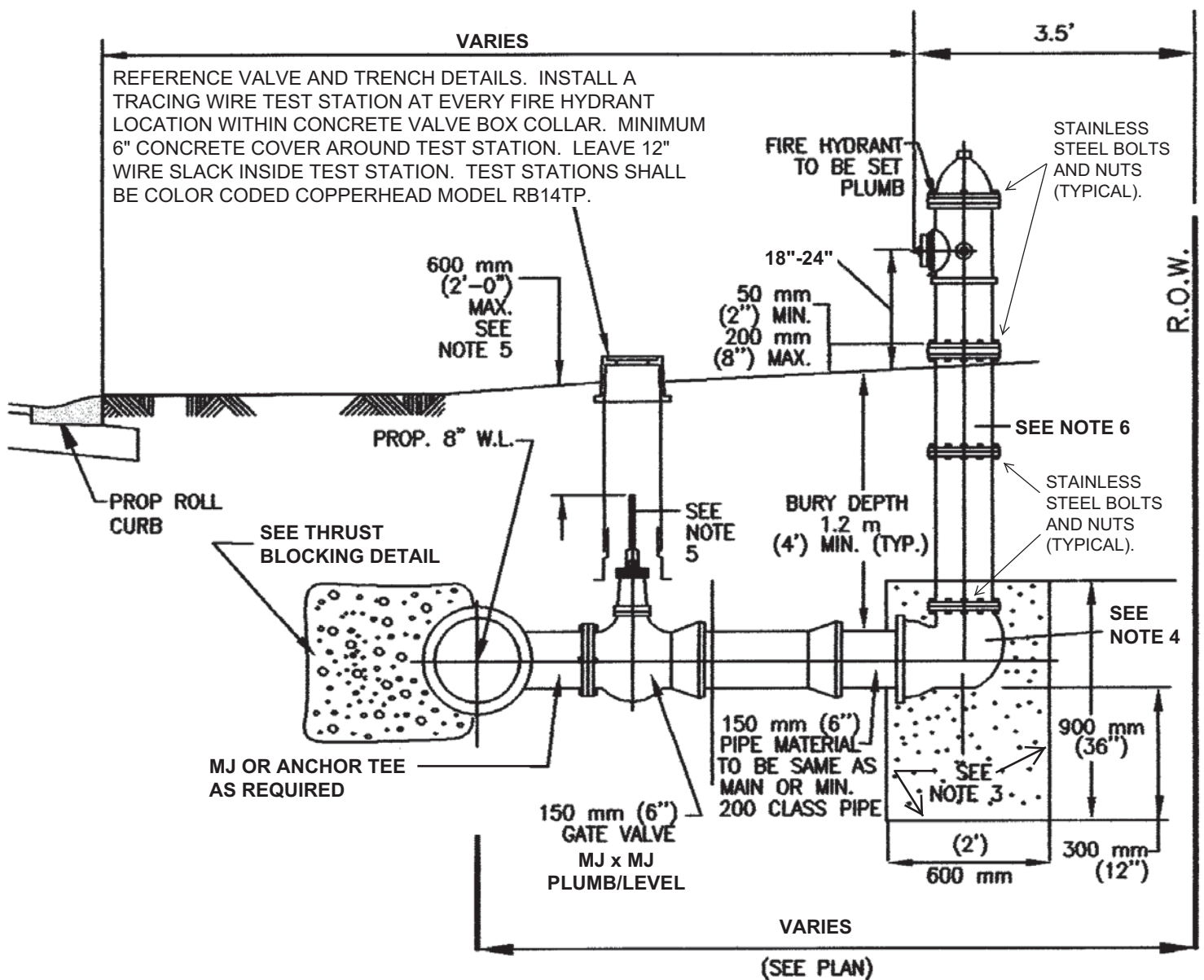
**INSTALLATION OF VALVE  
WITH VALVE BOX AND  
EXTENSION**

APPROVED  
C. LEWIS

REVISED  
AUG. 31, 2017

SHEET



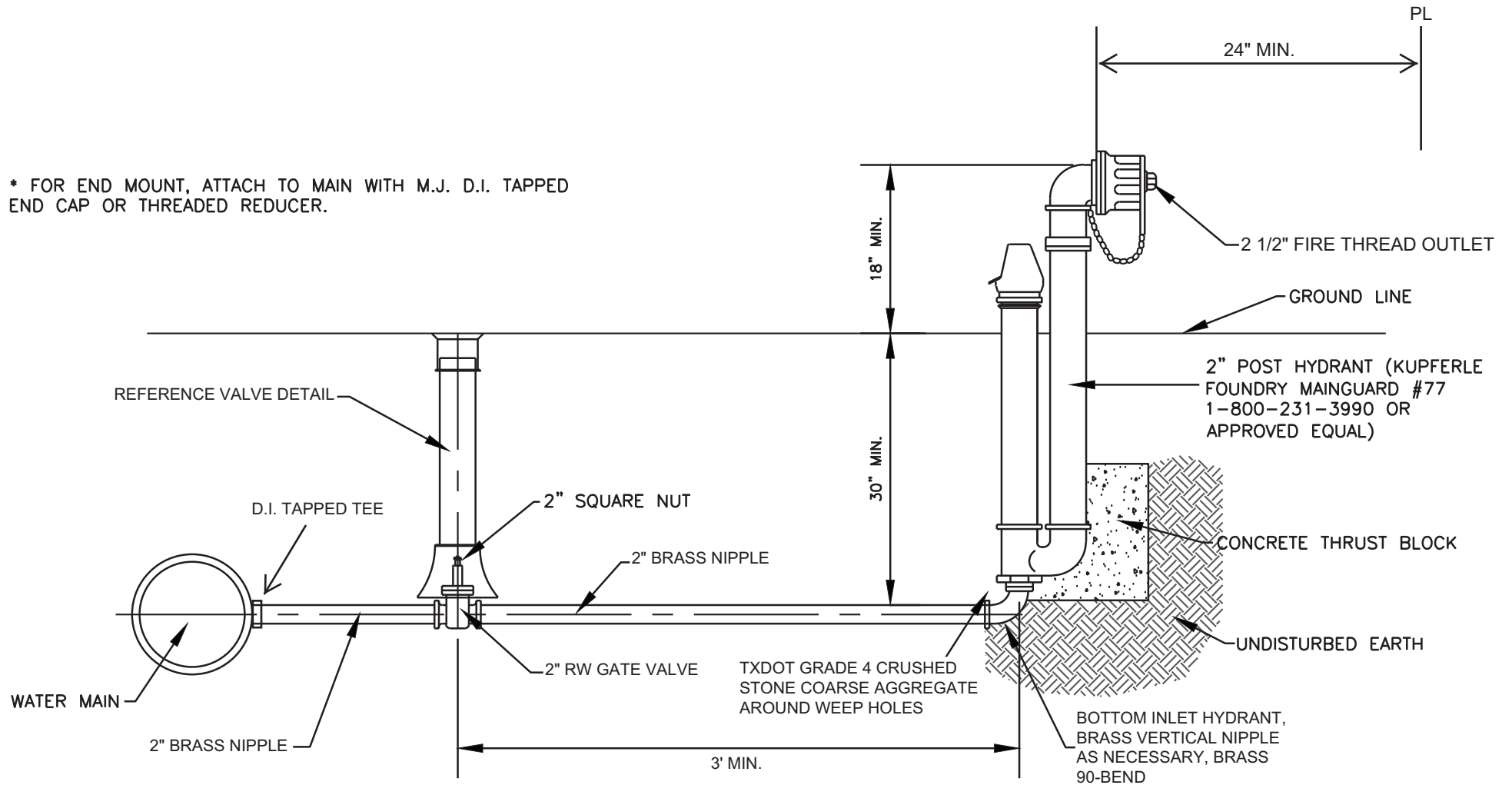


**NOTES:**

1. FIRE HYDRANTS SHALL BE INSTALLED AT 500LF MAXIMUM STATION INTERVALS.
2. FIRE HYDRANTS SHALL BE RED COLOR AMERICAN-DARLING B-84-B-5 OR GBRA APPROVED EQUAL; WITH 1EA 4 1/2" PUMPER NOZZLE, 2EA 2 1/2" HOSE NOZZLES, CHAINS, STAINLESS STEEL BOLTS AND NUTS ABOVE AND BELOW GRADE.
3. CONCRETE BLOCKING SHALL BE PLACED AGAINST UNDISTURBED EARTH. DO NOT BLOCK DRAIN HOLES. TXDOT GRADE 4 CRUSHED STONE COARSE AGGREGATE SHALL BE PLACED ON TOP OF CONCRETE. COARSE AGGREGATE LAYER SHALL BE AT LEAST 12" THICK AND EXTEND AT LEAST 12" IN RADIUS AROUND HYDRANT.
4. FIRE LINE SHALL BE MECHANICALLY RESTRAINED FROM MAIN TO FIRE HYDRANT.
5. REFERENCE VALVE DETAIL.
6. MAXIMUM OF ONE (1) BARREL EXTENSION ALLOWED.

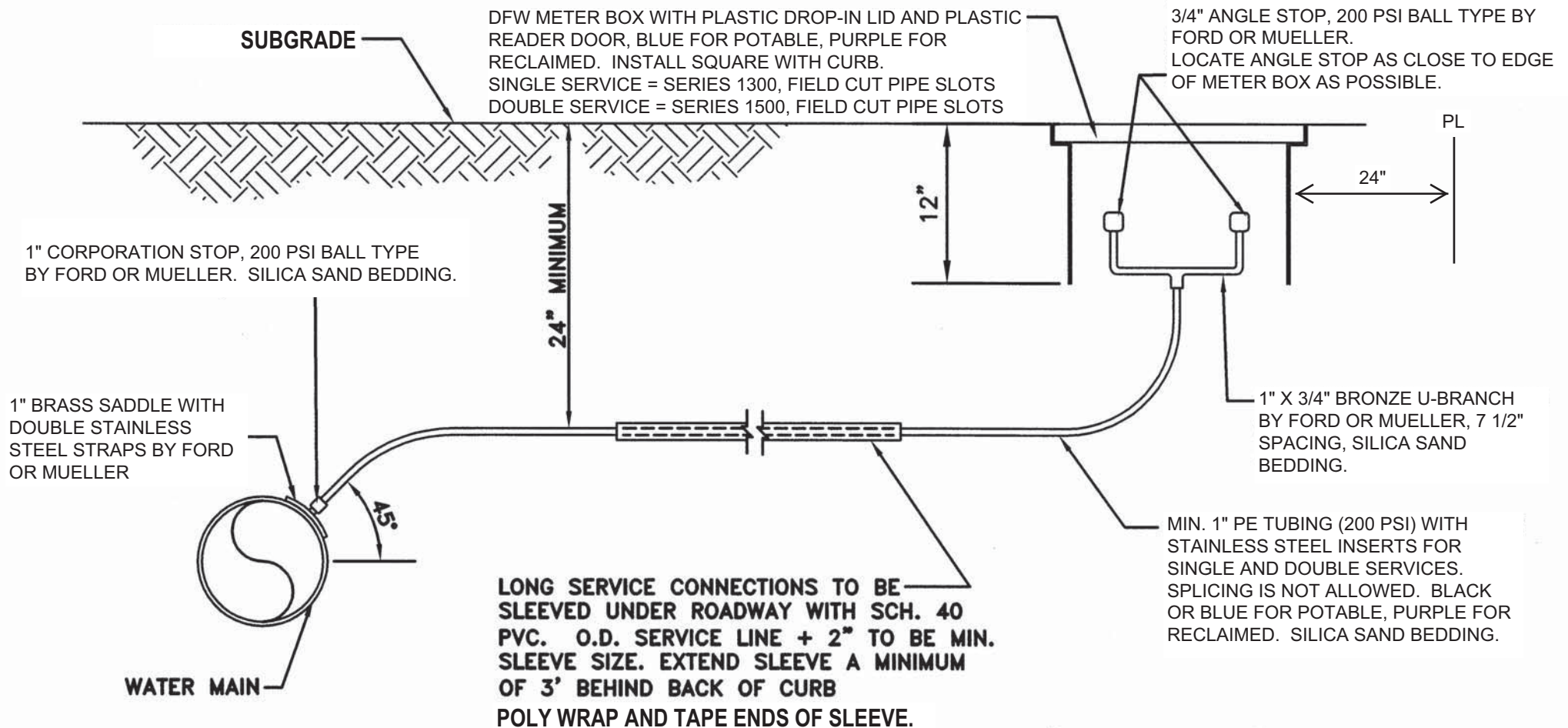


\* FOR END MOUNT, ATTACH TO MAIN WITH M.J. D.I. TAPPED  
END CAP OR THREADED REDUCER.



## **2" BLOWOFF HYDRANT DETAIL**

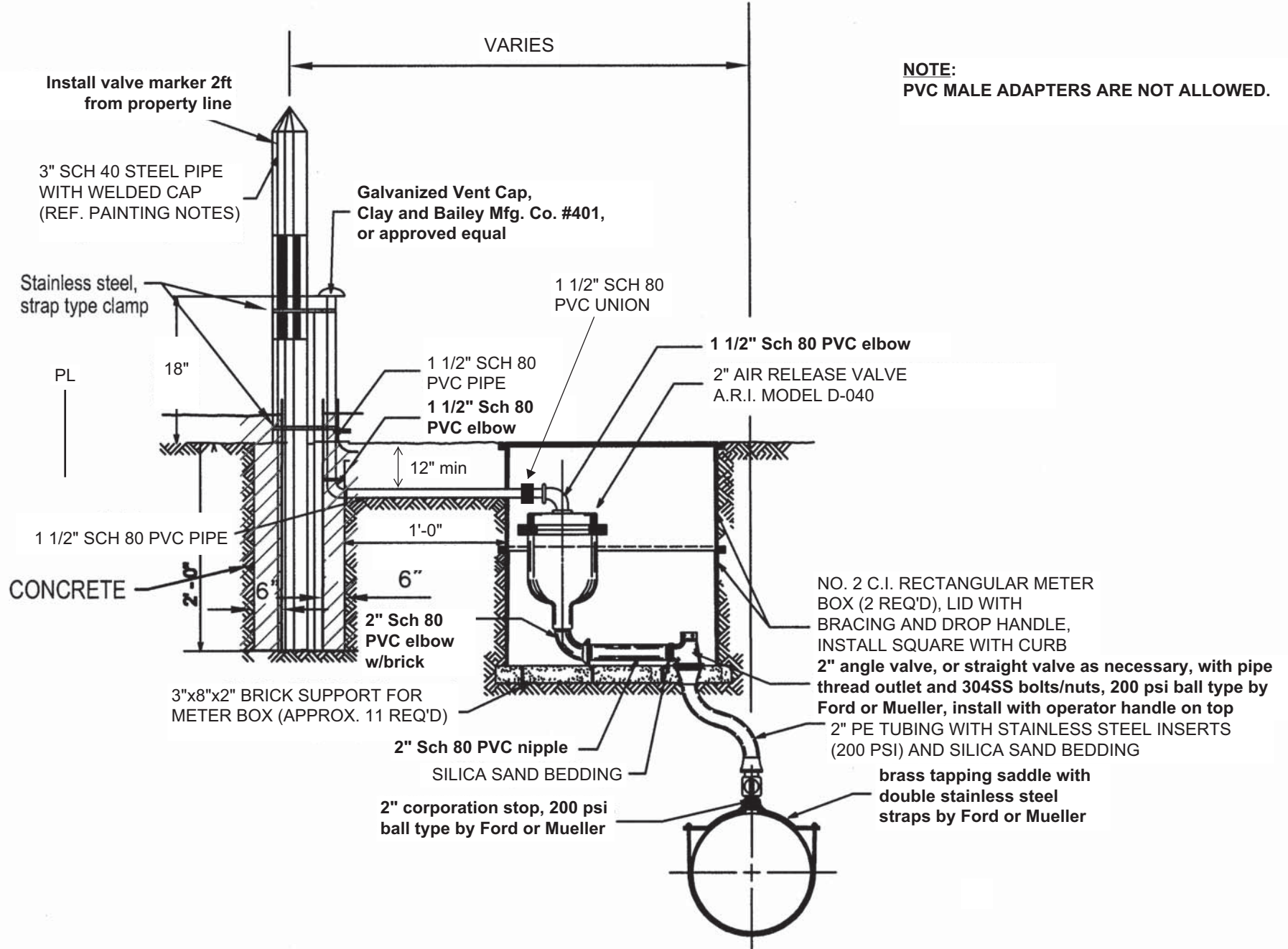
Guadalupe-Blanco River Authority, 01/28/2018



**NOTE:** ENTIRE SERVICE ASSEMBLY AS SHOWN ON THIS DETAIL SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR. GBRA WILL FURNISH AND INSTALL THE WATER METERS ONLY.

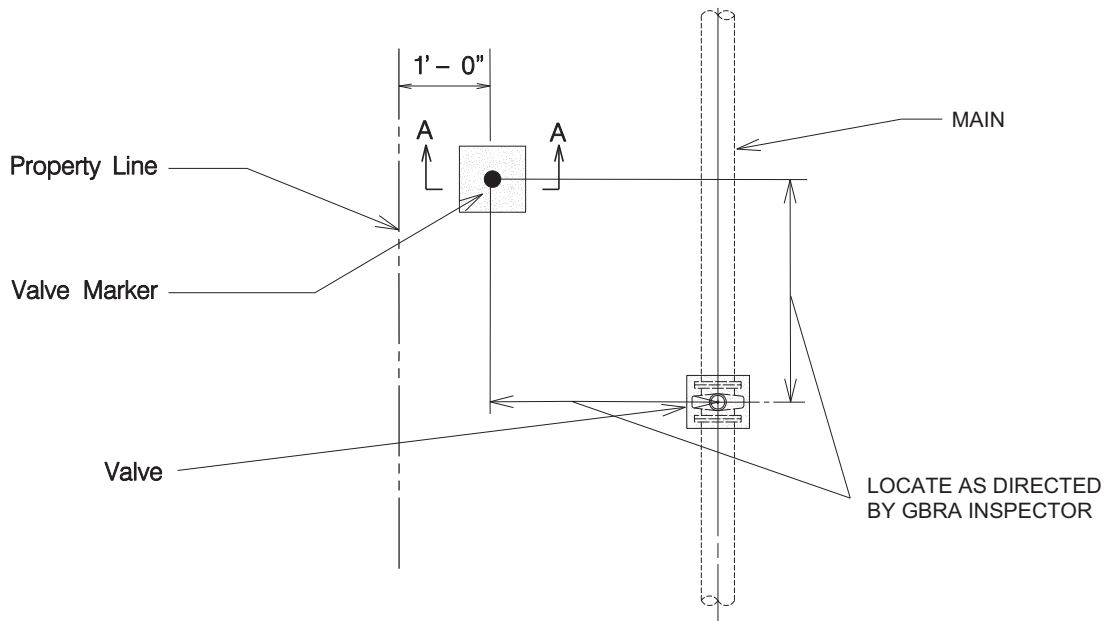
## **WATER SERVICE DETAIL**

Guadalupe-Blanco River Authority, 01/28/2018



# AIR RELEASE VALVE FOR WATER DISTRIBUTION MAIN

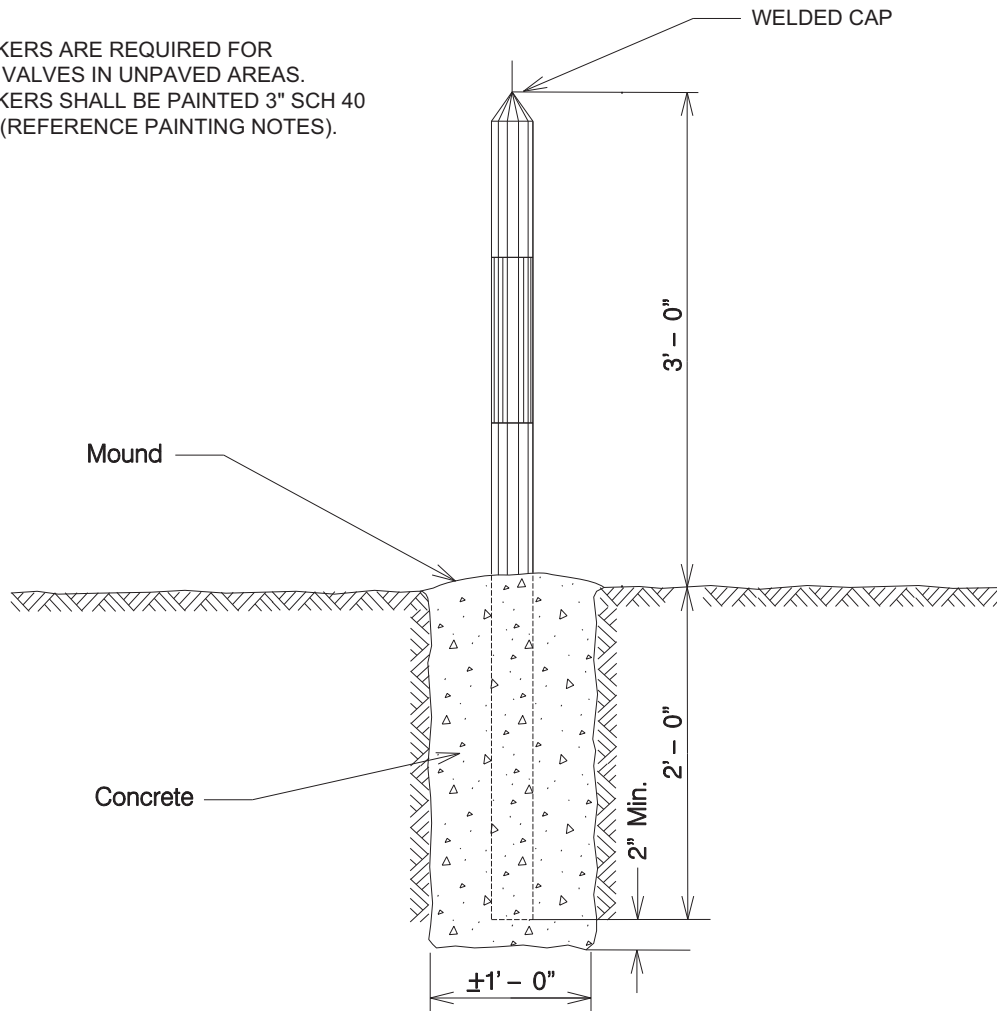
Guadalupe-Blanco River Authority, 01/28/2018



VALVE MARKER

NOTES:

- 1) VALVE MARKERS ARE REQUIRED FOR ALL BURIED VALVES IN UNPAVED AREAS.
- 2) VALVE MARKERS SHALL BE PAINTED 3" SCH 40 STEEL PIPE (REFERENCE PAINTING NOTES).



SECTION A-A

Guadalupe-Blanco  
River Authority

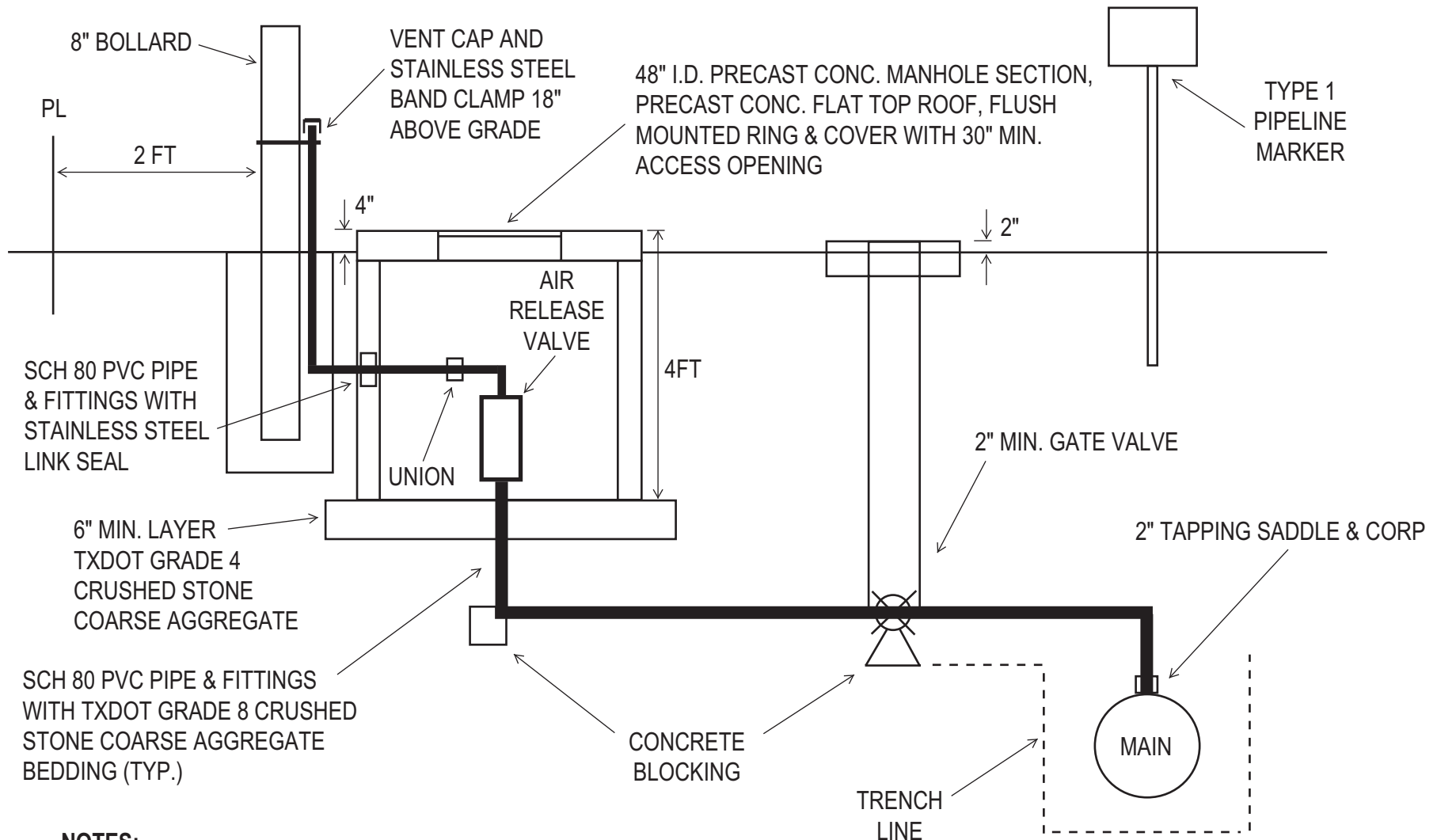
VALVE MARKER

APPROVED  
C. LEWIS

REVISED  
AUG. 31, 2017

SHEET





**NOTES:**

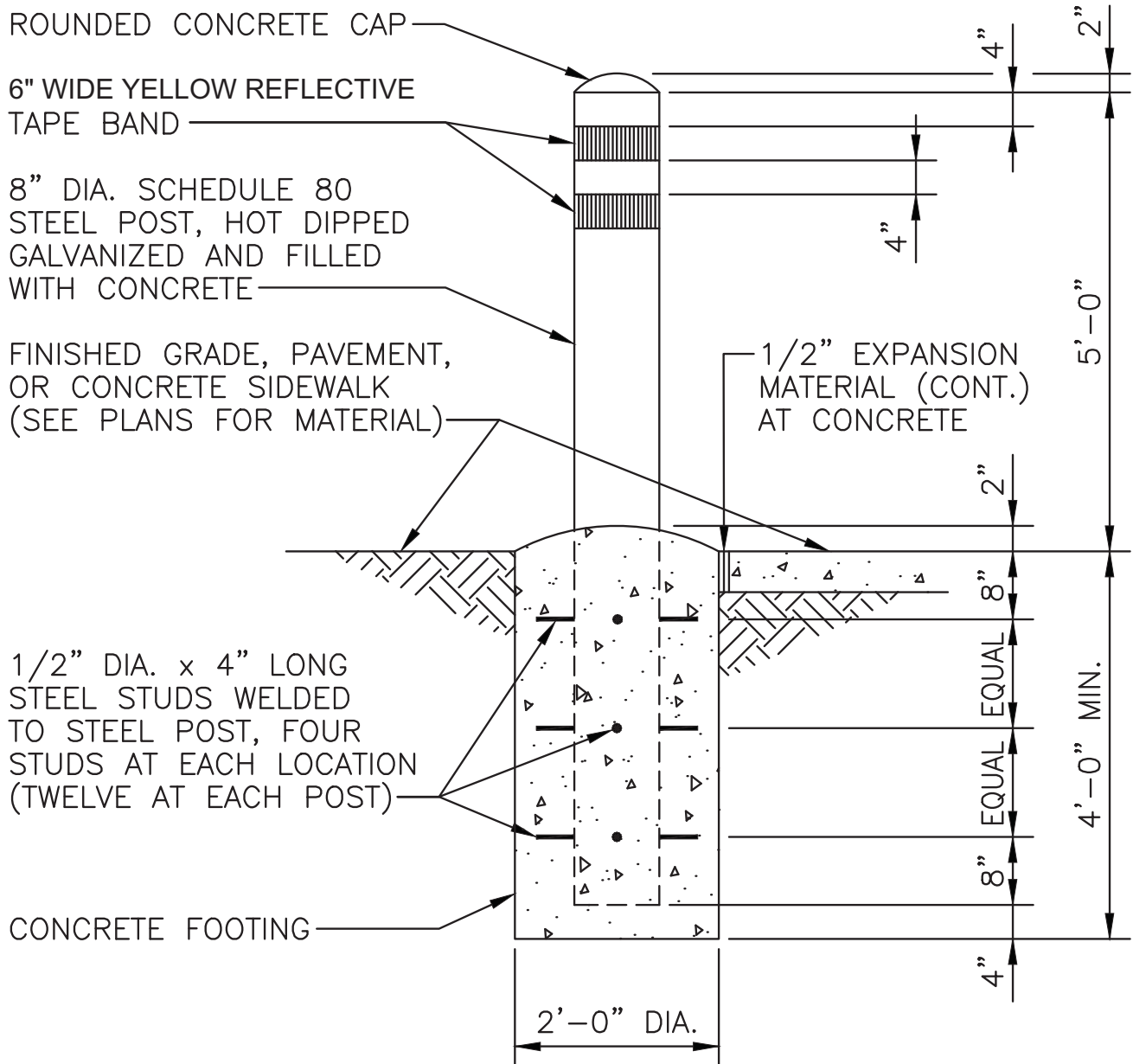
- 1) AIR RELEASE VALVE SHALL BE 2" MINIMUM A.R.I. MODEL D-040.
- 2) PVC MALE ADAPTERS ARE NOT ALLOWED.
- 3) TAPPING SADDLE SHALL BE BRASS WITH DOUBLE STAINLESS STEEL STRAPS BY FORD OR MUELLER.
- 4) CORP STOP SHALL BE 200 PSI MINIMUM BALL TYPE BY FORD OR MUELLER.
- 5) REFERENCE GBRA STANDARD DETAILS FOR BOLLARDS, BURIED VALVES, PIPELINE MARKERS, THRUST BLOCKING, ETC.
- 6) VENT CAP SHALL BE GALVANIZED CLAY AND BAILEY MFG. CO. #401 OR EQUAL WITH STAINLESS STEEL SCREEN.
- 7) EXPOSED VERTICAL AND HORIZONTAL CONCRETE EDGES SHALL BE FORMED WITH 3/4" CHAMFER STRIPS.

# AIR RELEASE VALVE FOR WATER TRANSMISSION MAIN





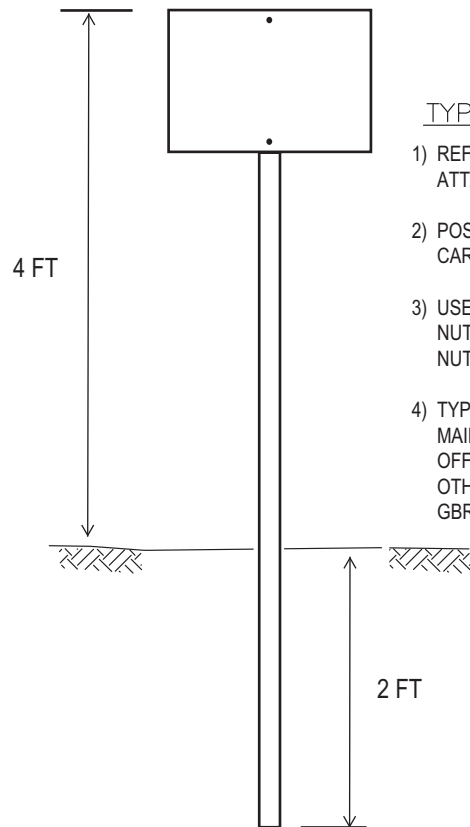
**NOTE:**  
BOLLARDS ARE REQUIRED AT ALL BURIED VALVES AND AT OTHER LOCATIONS WHERE SHOWN ON DRAWINGS.



# **BOLLARD DETAIL**

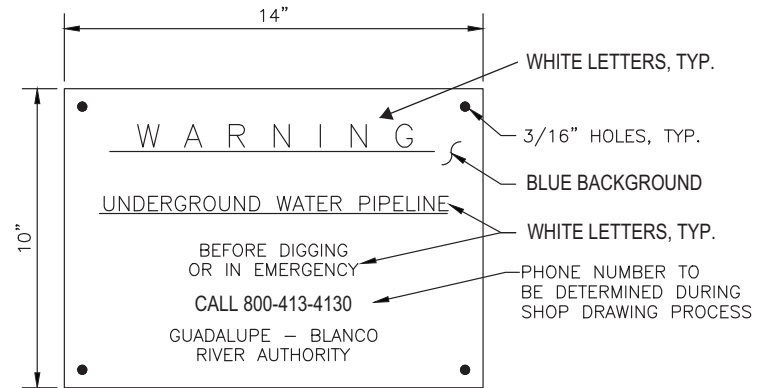
Guadalupe-Blanco River Authority, 01/28/2018





#### TYPE 1 MARKER NOTES:

- 1) REFERENCE TYPE 2 MARKER DETAIL FOR SIGN REQUIREMENTS. ATTACHMENT HOLES WILL DIFFER.
- 2) POST SHALL BE DRIVE-IN TYPE GALVANIZED U-CHANNEL (MCMASTER-CARR 5735T61 OR EQUAL).
- 3) USE 1/4" DIAMETER STAINLESS STEEL BOLTS, FLAT WASHERS, AND LOCK NUTS TO ATTACH SIGN TO POST. INSTALL FLAT WASHERS ON BOLTS AND NUTS. DO NOT OBSTRUCT LETTERING.
- 4) TYPE 1 MARKERS ARE REQUIRED IN UNPAVED AREAS AT ALL MANHOLES, MAIN LINE BENDS, VALVES, AIR RELEASE VALVES, TEST STATIONS, BLOW-OFF/DRAIN VALVES, HYDRANTS, LINE PLUGS OR CAPS, AND AT ANY OTHER LOCATIONS INDICATED ON THE DRAWINGS, OR AS DIRECTED BY GBRA.



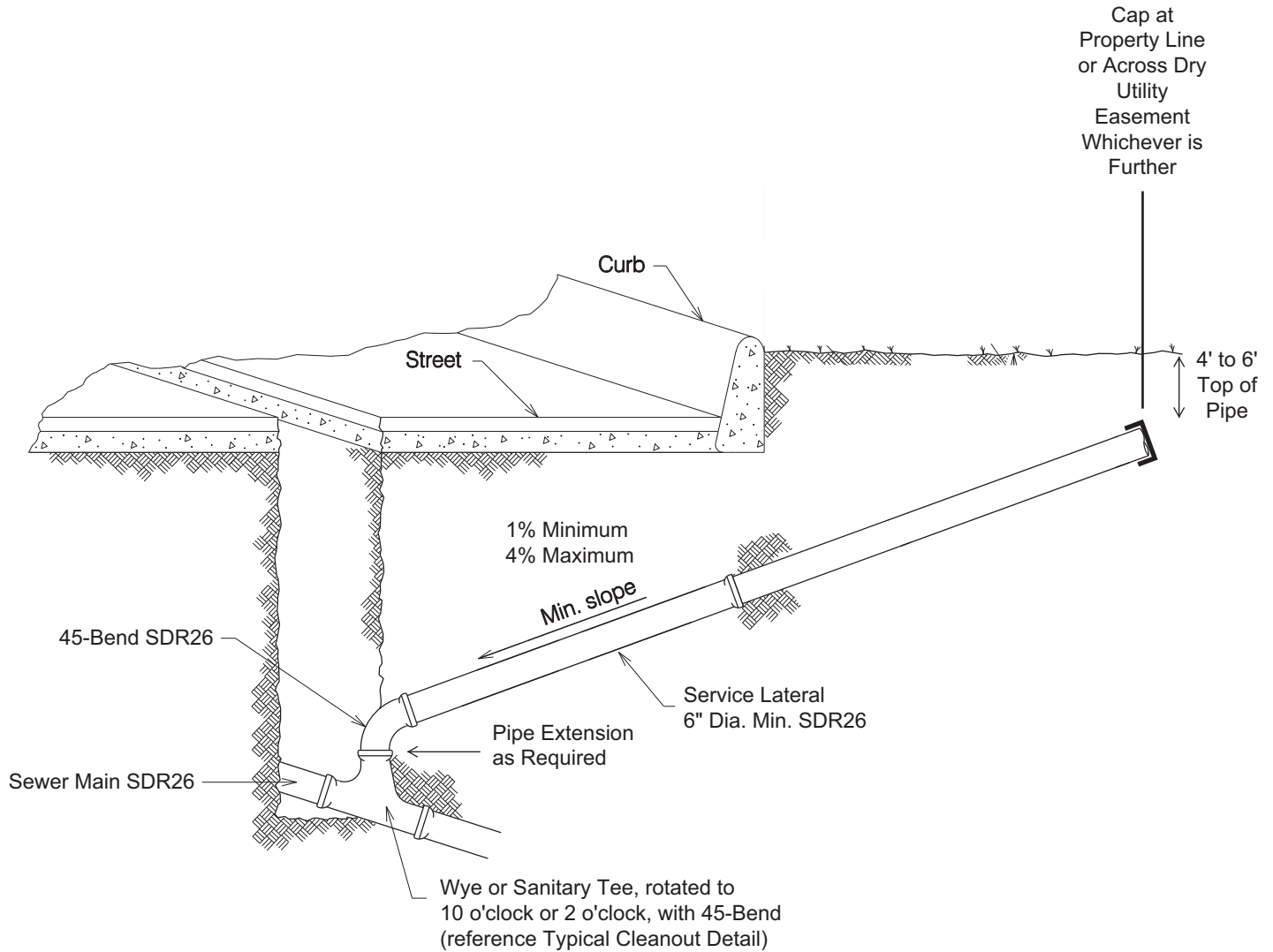
#### TYPE 2 MARKER NOTES:

- 1) MARKERS SHALL BE 0.080" THICK ALUMINUM WITH PAINTED BACKGROUND AND PAINTED LETTERING.
- 2) INSTALL TYPE 2 MARKERS ON PIPE CENTERLINE AT ALL GATE AND FENCE CROSSINGS AND AT ANY OTHER LOCATIONS INDICATED ON THE DRAWINGS, OR AS DIRECTED BY GBRA.
- 3) ATTACH TO GATES AND FENCES WITH 14 GAUGE STAINLESS STEEL WIRE.
- 4) COLORS AND LABELS SHOWN ARE FOR POTABLE WATER. FOR WASTEWATER CHANGE BACKGROUND TO GREEN AND CHANGE "WATER" TO "SEWER". FOR RECLAIMED CHANGE BACKGROUND TO PURPLE AND CHANGE "WATER" TO "RECLAIMED".

# PIPELINE MARKERS

Guadalupe-Blanco River Authority, 01/30/2018

Depth and grade of service laterals as shown, are typical only. Actual depth, alignment and grade of service laterals shall be determined by the Engineer based on the elevations of the sewer main, street, natural ground and building to be serviced.



**NOTES:**

- 1) Install double services where indicated on design drawings.
- 2) Cleanout to be installed by customer plumber.
- 3) Pipe and fittings shall be gasketed. Tees and 90-bends are not allowed.
- 4) Pressure rated pipe and fittings shall be installed for sewer mains and laterals that cross water lines (use ASTM D2241 SDR26). Center both water and sewer pipe lengths at all crossings. Comply with TCEQ Rules.
- 5) Tapping saddles are not allowed.

**Guadalupe-Blanco  
River Authority**

**LATERAL DETAIL**

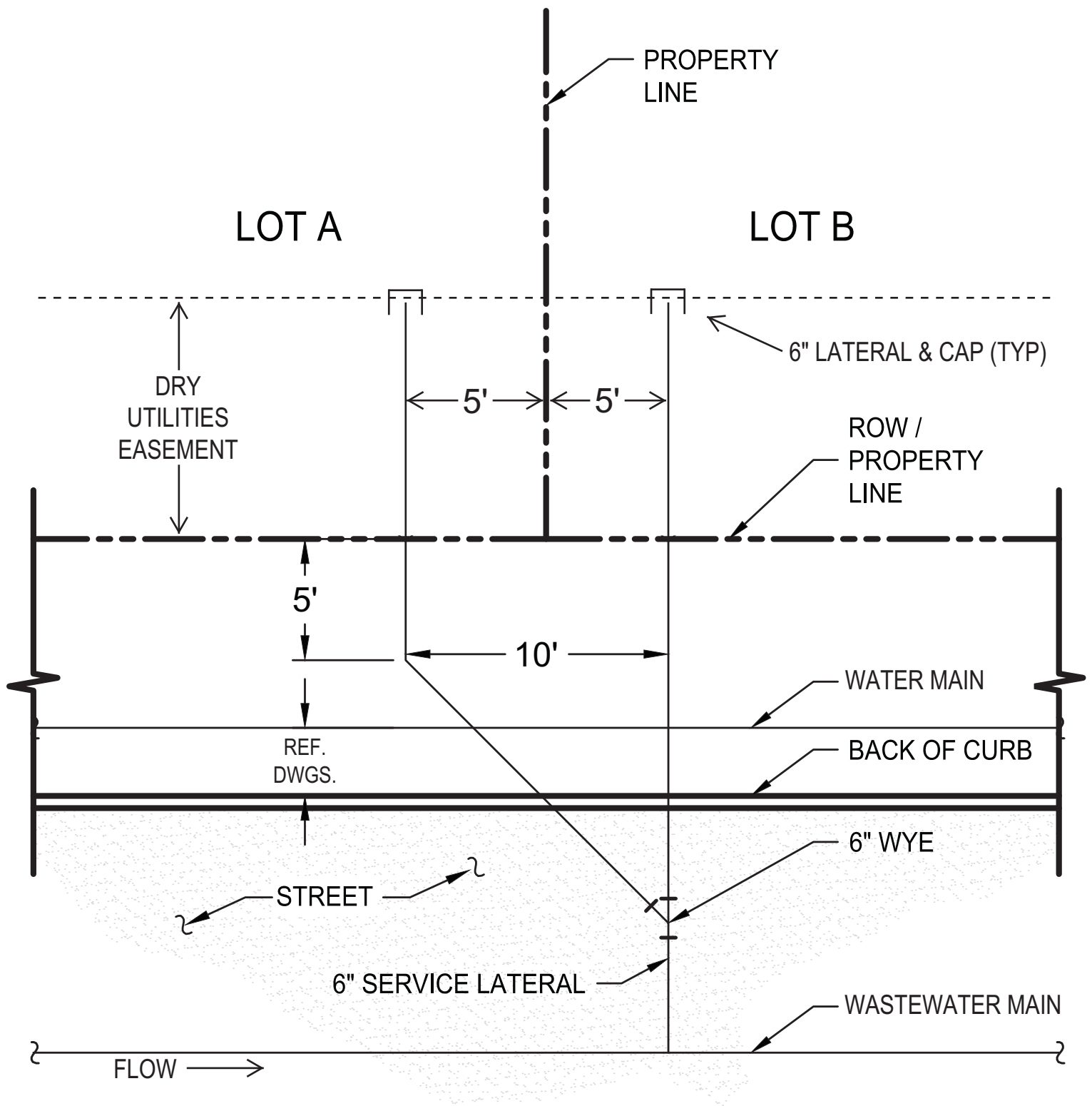
APPROVED

C. LEWIS

REVISED

JAN. 28, 2018

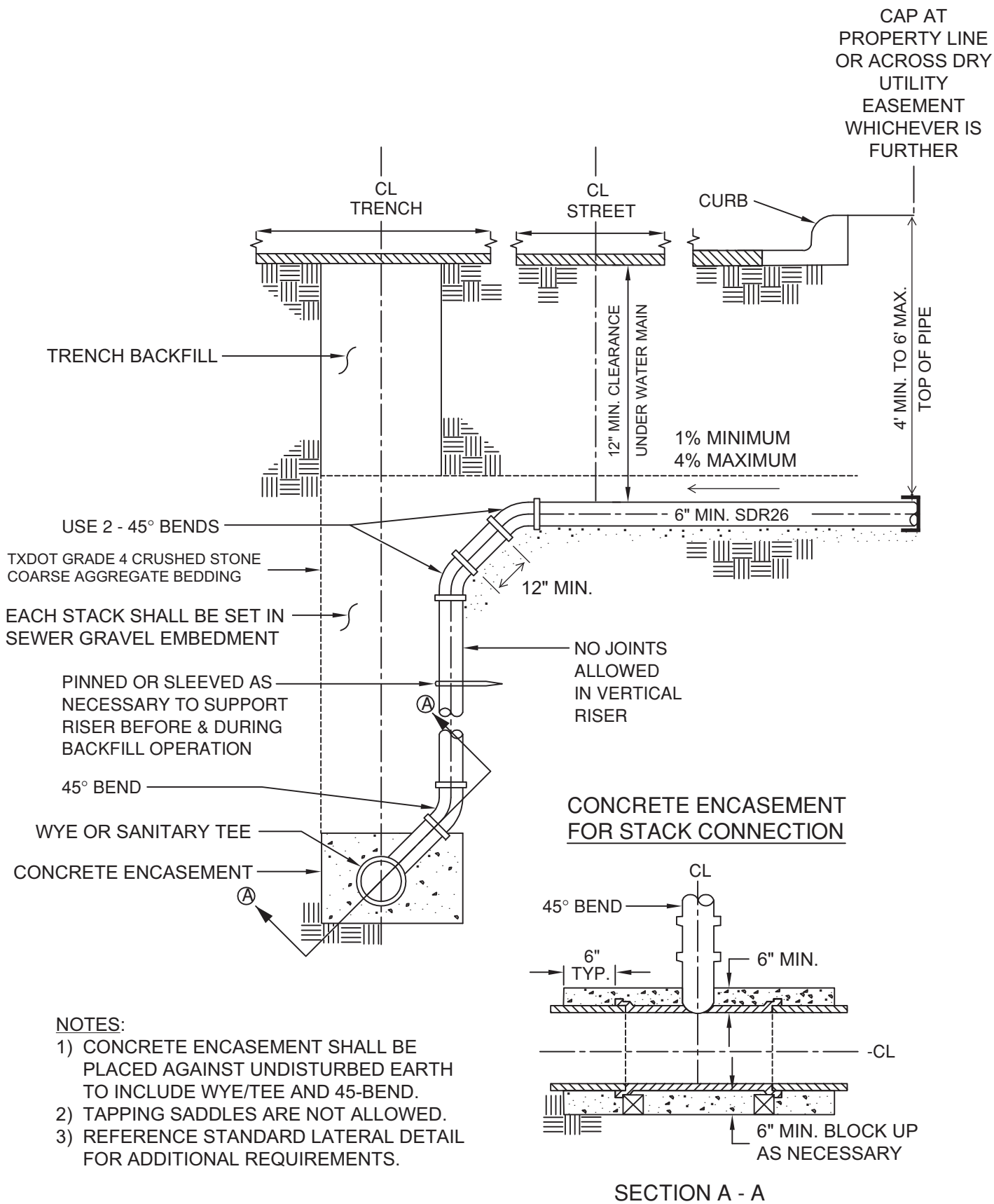
SHEET



NOTE: REFERENCE STANDARD LATERAL DETAIL FOR ADDITIONAL REQUIREMENTS.

## **DOUBLE WASTEWATER LATERAL DETAIL (N.T.S.)**

Guadalupe-Blanco River Authority, 01/28/2018



GUADALUPE-BLANCO  
RIVER AUTHORITY

APPROVED BY:  
C. LEWIS

STANDARD DRAWING:

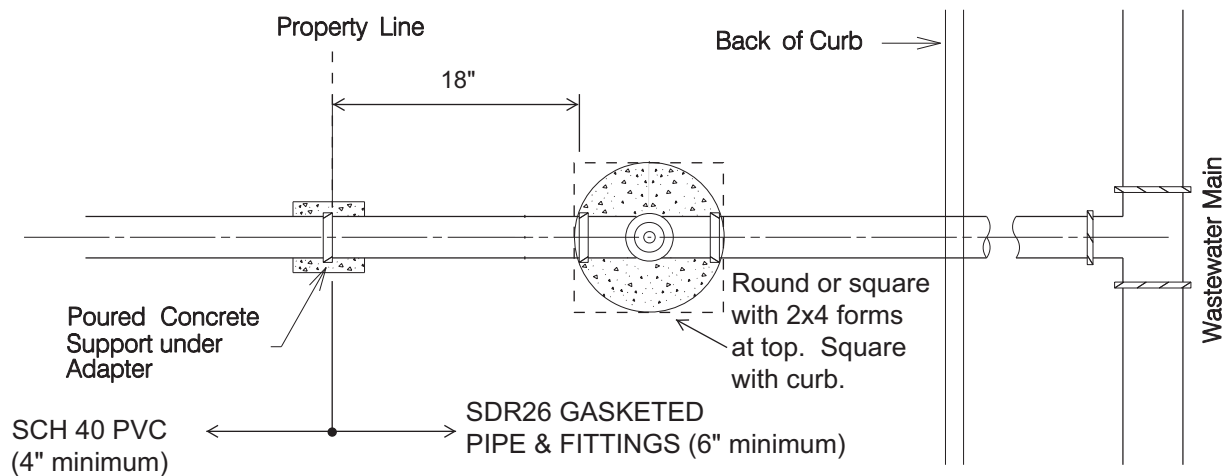
UPDATED:  
JAN. 28, 2018

SCALE:

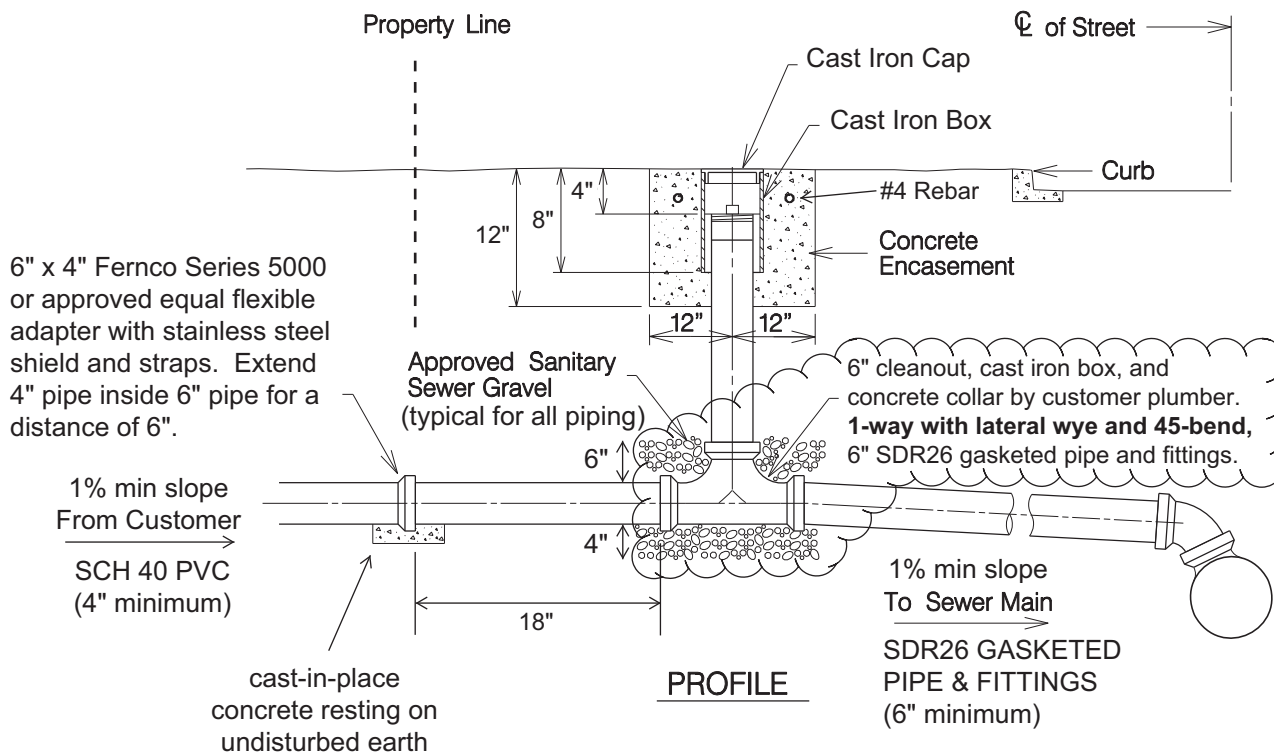
SHEET:

DRAWING NO.

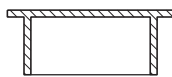
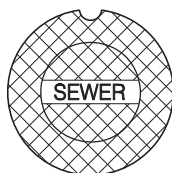
## WASTEWATER LATERAL VERTICAL STACK DETAIL



**PLAN**



**PROFILE**



Cast Iron Box & Cap  
East Jordan Iron Works  
Model 1566 or approved equal

**NOTES:**

- 1) Cleanouts are not allowed within driveways.
- 2) Tapping saddles are not allowed.
- 3) Cleanout risers shall be installed plumb/level. Top of concrete shall be 2" above finish grade. Vertical and horizontal edges of exposed concrete shall be formed with 3/4" chamfer strips.
- 4) Customer plumber must install a separate 2-way cleanout (4" minimum size) at customer facility.
- 5) Use TXDOT Grade 4 crushed stone coarse aggregate bedding for all piping, 4" minimum below pipe, 6" minimum above pipe.
- 6) Obtain GBRA inspection prior to backfill (830-379-5822). Minimum 48-hours notice is required.

**Guadalupe-Blanco  
River Authority**

**TYPICAL CLEANOUT DETAIL**

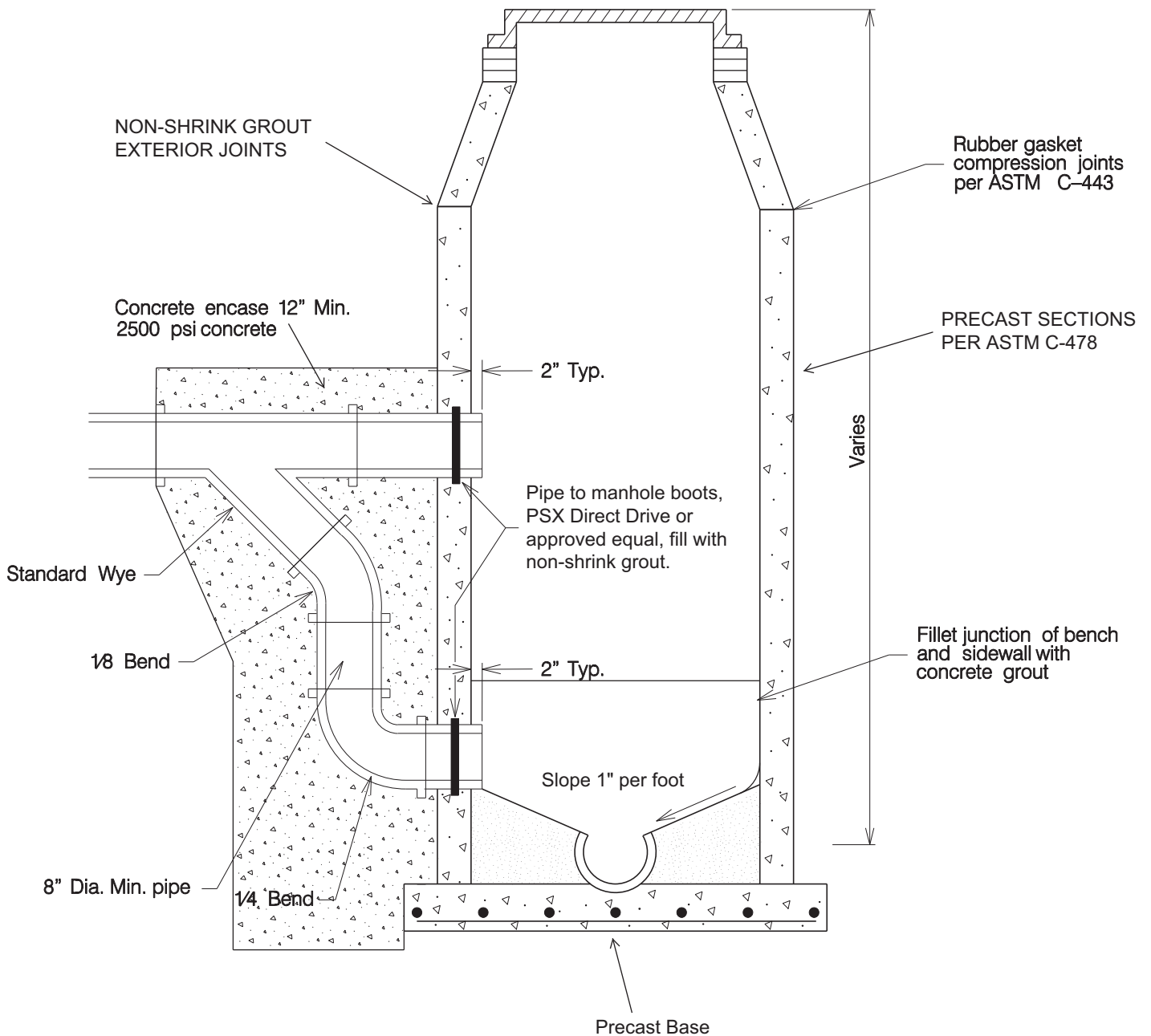
APPROVED  
C. LEWIS

REVISED  
JAN. 28, 2018

SHEET



<p><b>Guadalupe-Blanco River Authority</b></p>	DRAWN BY:	<p><b>MANHOLE CAST IN PLACE BASE</b></p>			
	APPROVED BY: C. LEWIS				
		UPDATED: JAN. 28, 2018	SCALE: N.T.S.	SHEET:	DRAWING NO.

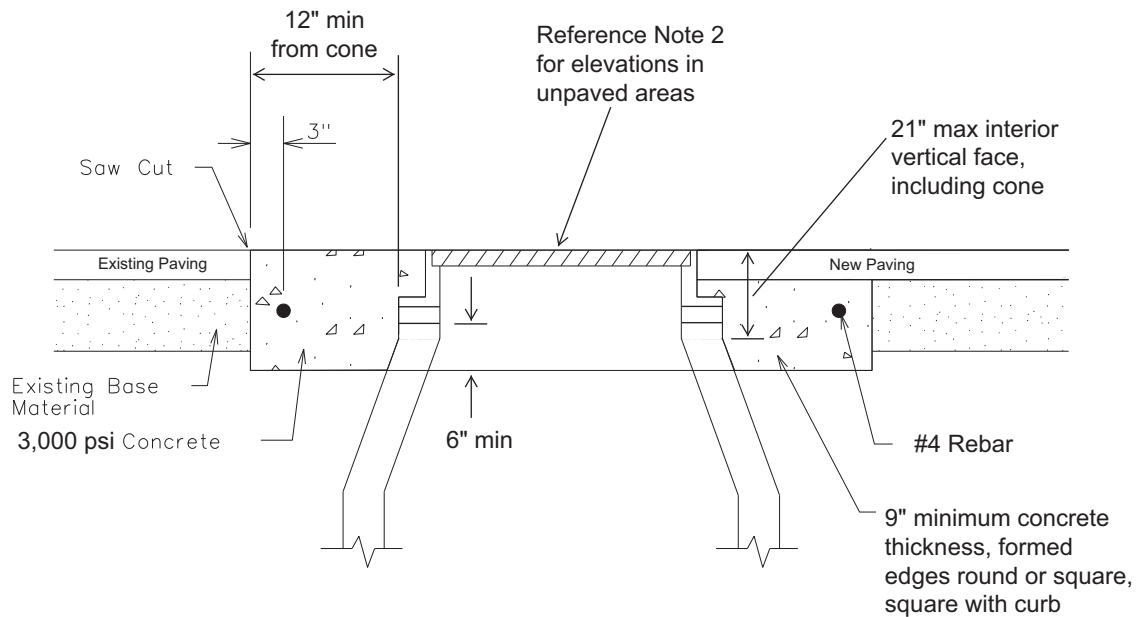


**NOTES:**

- 1) A wastewater collection system pipe, including service laterals, entering a manhole more than 24" above the manhole out invert must have an external drop pipe. Internal drops are not allowed.
- 2) Reference standard precast manhole detail for additional requirements.

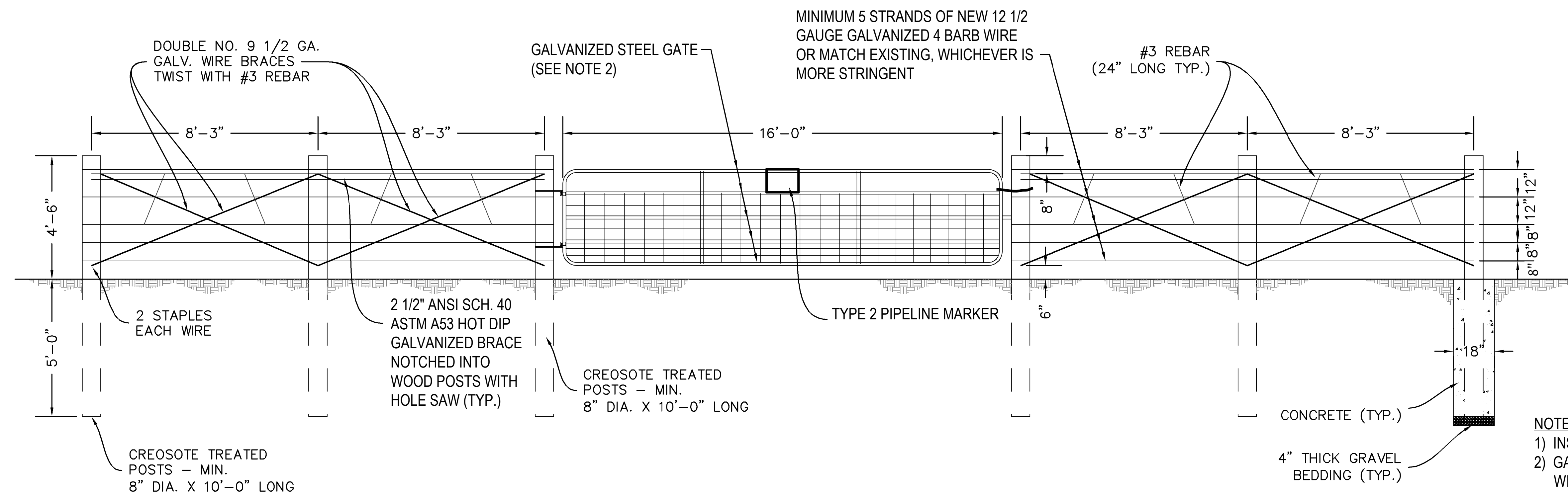
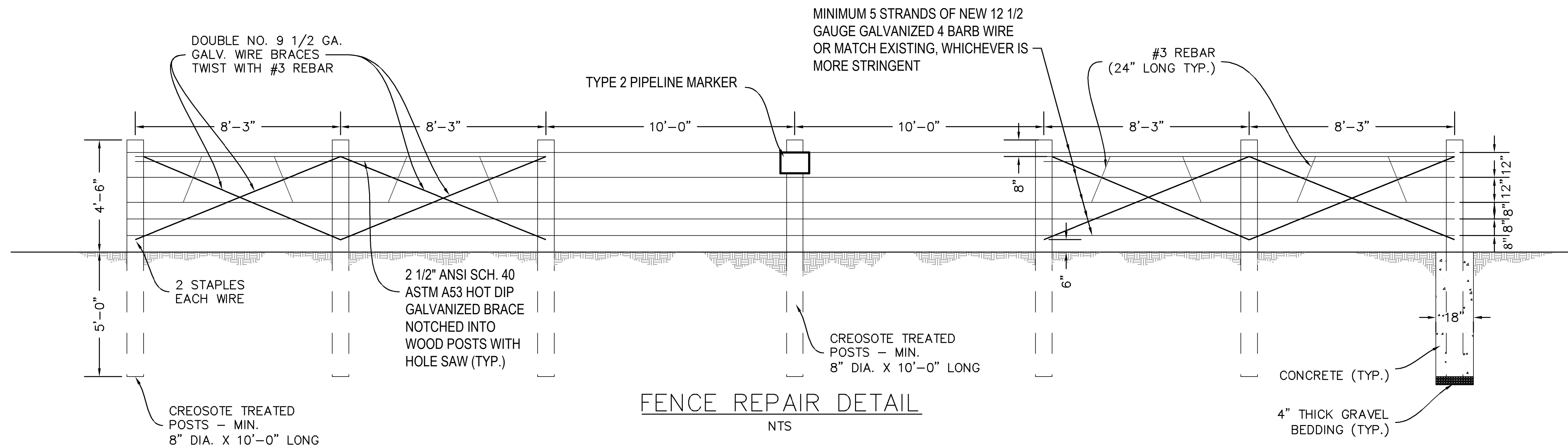
Guadalupe-Blanco River Authority	<b>DROP MANHOLE</b>	APPROVED	REVISED
		C. LEWIS	JAN. 28, 2018
		SHEET	





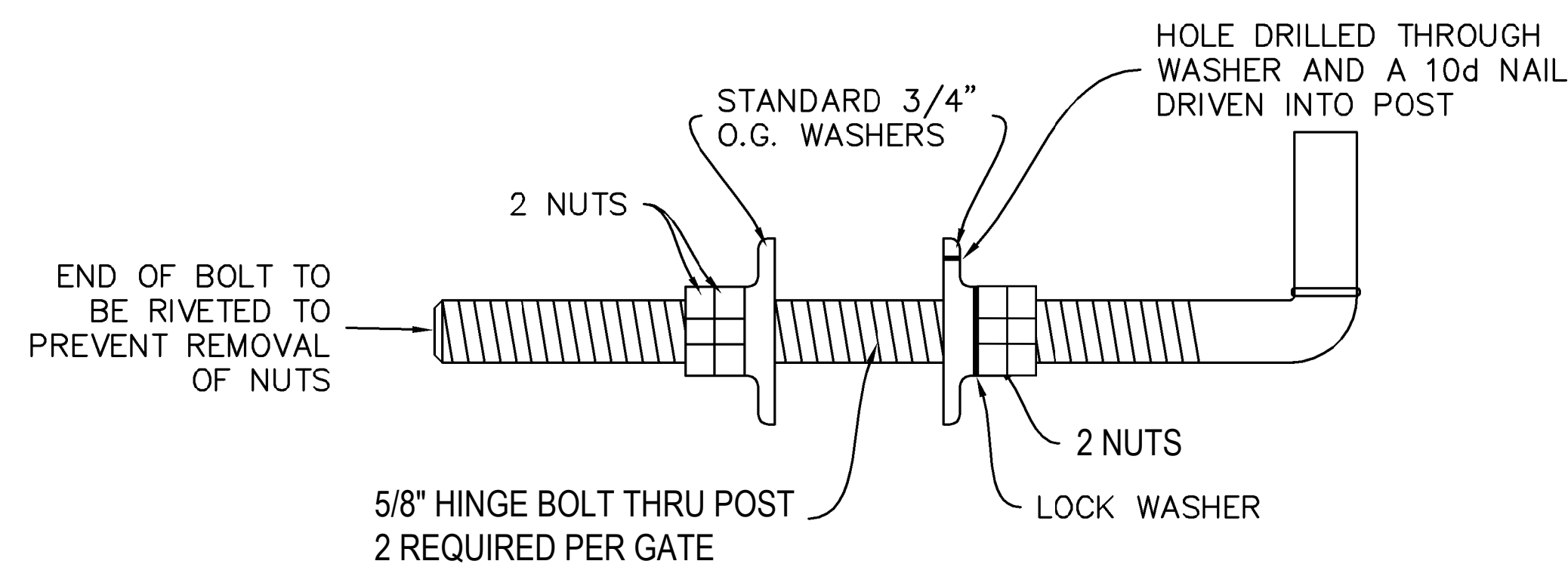
**NOTES:**

- 1) Manhole ring concrete encasement is required for all manholes.
- 2) Manhole rim elevations shown in plan and profile views are approximate. Manholes located in unpaved areas shall be installed with top of concrete encasement 2" above finish grade and covers 2" above top of concrete encasement. Square with curb. All exposed vertical and horizontal concrete edges shall be formed with 3/4" chamfer.
- 3) Use non-shrink grout for grade ring installation. Grade rings shall be precast concrete.
- 4) Manhole rings and covers shall be East Jordan Product Number 42432109W01.
- 5) All manhole rings shall have 30" minimum clear access opening.
- 6) All manhole covers shall have pick bars.
- 7) All manhole covers shall be stamped "SANITARY SEWER" only without any city references.
- 8) All manholes shall have traffic rated bolted and gasketed watertight rings and covers. Bolts, nuts, and flat washers shall be 316SS, apply nickel or aluminum anti-seize compound to threads prior to assembly. Bolts shall include gasket washers. Schedule GBRA to witness final bolting of manholes.
- 9) Install vented covers where required by TCEQ.



**NOTES:**

- 1) INSTALL GATE IN CENTER OF PERMANENT EASEMENT.
- 2) GATES SHALL BE CONSTRUCTED OF 16 GAUGE GALVANIZED STEEL 1 5/8" O.D. TUBING WITH WELDED SADDLE CONNECTIONS AND 4 GAUGE GALVANIZED HOG WIRE. CRIMPED CONNECTIONS ARE NOT ACCEPTABLE.
- 3) HINGES SHALL BE HOT DIP GALVANIZED, THRU BOLT TYPE AT POST, WITH RECEIVERS WELDED TO GATE.
- 4) LATCH SHALL BE 3 1/2" BRASS DOUBLE BOLT SNAP HOOK WITH 1/4" DIAMETER HOT DIP GALVANIZED CHAIN AROUND POST. SECURE CHAIN TO POSTS WITH FENCE STAPLES.
- 5) ALL POSTS SHALL BE TREATED WITH CREOSOTE.
- 6) CONCRETE SHALL CONTAIN AT LEAST 4 SACKS OF CEMENT PER YARD.
- 7) FASTEN EXISTING FENCE WIRES TO NEW BRACE POSTS BEFORE CUTTING THE EXISTING WIRES.



**DETAIL OF GATE HINGE BOLT ASSEMBLY**

NTS

**GATE DETAIL**

NTS

# **GATE AND BARBED WIRE FENCE DETAILS**