San Antonio Water System Standard Specifications for Construction

ITEM NO. 824

Water Service Supply Lines
New Services

824.1 DESCRIPTION: This item shall consist of New Water Service Supply Lines installation in accordance with these specifications and as directed by the Engineer.

824.2 REFERENCED STANDARDS: Reference standards cited in this Specification Item No. 824 refer to the current reference standard published at the time of the latest revision date.

1. San Antonio Water System (SAWS):
   a. Specifications for Water and Sanitary Sewer Construction
   b. SAWS Materials Specifications
2. City of San Antonio (COSA) Standard Specification for Construction
3. Texas Commission of Environmental Quality (TCEQ)
   a. Chapter 290; Subchapter D – Rules and Regulations for Public Drinking Water
4. American National Standards Institute (ANSI)/American Water Works Association (AWWA)
   a. ANSI†/AWWA C105/A21.5—Polyethylene Encasement for Ductile-Iron Pipe Systems.
   b. ANSI A 21.11/AWWA C111 - Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
   c. ANSI/AWWA C150/A21.50—Thickness Design of Ductile-Iron Pipe.
   d. ANSI/AWWA C151/A21.51—Ductile-Iron Pipe, Centrifugally Cast.
   e. ANSI/AWWA C500—Metal-Seated Gate Valves for Water Supply Service.
   f. ANSI/AWWA C515—Reduced-Wall, Resilient-Seated Gate Valves for Water Supply Service.
   g. ANSI/NSF Standard 61 - Drinking Water System - Health Components
   h. AWWA C 206 - Standard for Field Welding of Steel Water Pipe.
   i. AWWA C 207 - Standard for Steel Pipe Flanges for Waterworks Service - Sizes 4 Inches through 144 Inches.
   j. ANSI/AWWA C509—Resilient-Seated Gate Valves for Water Supply Service.
   k. AWWA C605, "Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water
   l. AWWA C651 Disinfecting Water Mains
   m. AWWA C900, "Polyvinyl Chloride (PVC) Pressure Pipe And Fabricated Fittings, 4 In. Through 60 In. (100 Mm Through 1,500 Mmfor Water Distribution"

n. AWWA C907, "Polyvinyl Chloride (PVC) Pressure Fittings for Water –4 in. through 8 In (100 mm Through 200 mm)
o. AWWA Manual M27, External Corrosion: Introduction to Chemistry and Control.
p. AWWA M28 Rehabilitation of Water Mains
q. AWWA Manual M41—Ductile-Iron Pipe and Fittings

5. American Society for Testing and Materials (ASTM) International:
   a. ASTM A 36 - Standard Specification for Carbon Structural Steel.
   b. ASTM A 536 - Standard Specification for Ductile Iron Castings.
   c. ASTM A 126 - Standard Specification for Gray Iron Castings for Valves, Flanges, and
   d. Pipe Fittings.
   e. ASTM B 21 - Standard Specification for Naval Brass Rod, Bar, and Shapes.
   f. ASTM B 98 - Standard Specification for Copper-Silicon Alloy Rod, Bar, and Shapes.
   g. ASTM B 301 - Standard Specification for Free-Cutting Copper Rod and Bar.
   h. ASTM B 584 - Standard Specification for Copper Alloy Sand Casting for General Application.
   i. ASTM E 165 - Standard Test Method for Liquid Penetrant Examination.
   j. ASTM E 709 - Standard Guide for Magnetic Particle Examination.
   k. ASTM F 1674 - Standard Test Method for Joint Restraint Products for Use with PVC Pipe.
6. International Organization of Standardization (ISO)
   a. ISO9001

824.3 SUBMITTALS: All submittals shall be in accordance with most recent version of SAWS's General Conditions requirements. Submit the following for approval prior to performing any work.

1. Certifications:
   a. Per General Conditions section 5.12.2 all Contractor submittals for all pipe and other products or materials furnished under this specification shall be marked as reviewed and approved by Contractor for compliance with Contract Documents and the referenced standards.
   b. The Manufacturer shall provide ISO 9001 Certificate by a third party.
   c. Submit written verification from the pipe Manufacturer demonstrating compliance with the production and delivery schedule of the pipe as indicated in the Contractor's schedule.
   d. Contractor shall submit Manufacturer's product data, installation recommendations, shop drawings, and certifications.
   e. Shop Drawings

f. Catalog Data Sheets for all materials confirming pipe, fittings, and other materials conform to requirements of this specification.
g. Pipe Supplier Information. Submit company name, contact name, and contact number.
h. Details of all piping systems components confirming that the pipe and fittings conform to the specified requirements.

824.4 MATERIALS: The materials for water service supply lines installation and adjustment shall conform to the specifications contained within the latest revision of SAWS' Material Specification Item Nos. 21-10, "Brass Gate Valves,"15-40, "Brass Goods, 19-01 HDPE Tubing and 100-30, "Service Saddles," 10-30 Water Meter Boxes (5/8", 3/4", 1", 1-1/2" AND 2" Meters).

824.5 CONSTRUCTION:

1. General: Service supply lines and fittings, meter boxes and appurtenances shall conform to the Material Specifications and shall be installed by the Contractor as specified herein, or as directed by the Engineer and in accordance with the DD-824 Standard Drawing Series.
   a. All services shall be in line with meter box location, any variance requires prior approval from SAWS' Inspector.
   b. Tracer wire shall be utilized for location and taped directly to the pipe.
      i. Tracer wire shall be properly spliced at each end connection and each service connection.
      ii. Tracer wire shall be adequately wrapped and protected at each splice location in accordance with manufacturer recommendations.
      iii. No bare tracer wire shall be accepted.
      iv. Wire shall also come up to the top of valve extensions and fire hydrant stems, as directed by the Inspector.
      v. Tracer wire shall be utilized for location purposes and taped directly to the top of pipe.
      vi. Tracer wire shall be of solid core (14 gauge insulated), and shall be taped to the main in minimum of 10 inch increments.
      vii. Detection tape cannot be used in lieu of tracer wire.
2. Designation of Service Supply Lines: A service supply line located between the water main and the inlet side of the water meter is designated as a "water service line."
   a. A service supply line located between the outlet side of the water meter to the point of connection within the limits of the Customer's lot or property is designated as the "Customer's yard piping" and is covered under Specification Item No. 822 "Customer's Water Yard Piping" of these specifications.
   b. Services 2 inches and smaller are designated "small services."

c. Services 4 inches and larger are designated "large services."

3. New Services: If a new main is required to be extended to provide water service for new Customers, the service lines laid to the new main shall be designated as "new services."
   a. New laid main(s) to which new services are on the same side of the street as the Customer's new meter box location, are designated as "new short services."
   b. New laid main(s) to which new services on the opposite side of the street from the Customer's new meter box location, are designated as "new long services."
4. New Unmetered Services: New unmetered services are defined as services that are installed on existing or new mains to provide service to platted vacant lots.
   a. Where the new or existing main to which new unmetered services are being installed, is on the same side of the street as the Customer's new meter box location (Inspector is to set location of new meter box), the services to be laid are designated "new unmetered short services."
   b. Where the new or existing water main to which new unmetered services are installed, is on the opposite side of the street from the Customer's new meter box location (Inspector is to set location of new meter box), the services to be laid are designated "new unmetered long service."
   c. New unmetered long services and new unmetered short services will not include "Customer's yard piping," and no meter will be set.
   d. New meter box will be included with unmetered service, and is inclusive to the unmetered service. See material specifications.
5. Service Line Installation: Unless otherwise notified new services shall be installed as described herein, and in the DD-824 Standard Drawing Series.
   a. Unless otherwise indicated, existing meter and meter box relocation shall be included in the service line installation.
   b. All service lines longer than 60 ft. in length in concrete pavement or major thoroughfares crossings shall be installed in Schedule 80 PVC conduit, or rigid pipe.
   c. Cutting, excavation, backfill and replacement of pavement shall be done as specified herein and in accordance with applicable sections of the City of San Antonio Specification Item No. 511, "Cutting and Replacing Pavements (Trench Repair), and Specification Item No. 804, "Excavation, Trenching, and Backfill."
   d. The minimum trench width for small service lines shall be 8 inches, while the minimum trench width for large service lines shall be the nominal pipe diameter plus 16 inches, except when specified otherwise by the Engineer.
   e. For ¾ inch to 2 inch service lines, the minimum bury depth shall be 3 feet.
   f. For services greater than 2 inches, the minimum depth of bury shall be 4 feet.
   g. All service lines shall be installed in accordance with the DD-824 Standard Drawing Series, SAWS' Standard Material Specification Item No. 100-30

"Service Saddles," with two strap service saddle clamps for all taps services.

h. The Contractor shall use precaution to protect and preserve the polyethylene wrap around ductile-iron water mains when installing service saddles and service corporations.

i. The required method is wrap pipe tape around the pipe, over the polywrap, after the service saddle and service corporation has been installed.

j. HDPE shall have stiffners installed per manufactures' recommendation.

k. The tap shall be made through the tape and polywrap. It is not necessary to remove and replace polywrap.

l. All exposed pipe, corporation, and the first three feet of the service, shall be wrapped and taped to achieve a complete seal.

m. In addition, a sand envelope shall extend over and around the connection to a depth of 8 inches above the main.

n. Small service lines shall be embedded in sand in accordance with Specification Item No. 804, "Excavation, Trenching and Backfill."

o. When approved by the Inspector, the Contractor may lay the new service line from the corporation stop to the curb stop or angle valve.

p. Upon completion, the Contractor shall isolate the new service line by closing the curb stop or angle valve until the meter box is set.

6. Splicing: A long service line single slice may be permitted only when approved in advance by the Inspector, provided the location of the splice is not under pavement, concrete, or roadways.

   a. The segment added is required to be the same material as the existing service line, unless otherwise directed by the Inspector.

   b. Splicing short service lines will not be permitted.

7. Directional Boring/Drilling: Service lines which cross paved streets may be installed at the Contractor's option by boring or jacking operations at no additional cost to SAWS. PVC schedule 80 shall be used for casing (2" and 3"), Certa-T lock or steel pipe shall be used for larger casing 4" and up.

8. Tapping Asbestos Cement (AC) Pipe: Direct tapping will not be allowed. Service saddles must be used when tapping AC pipe.

   a. Shell cutters with pilot bit type shall be used for services less than 2 inches.

   b. Shell cutters with pilot bit type shall be used for all services 2 inches and greater.

   c. The tapping of AC pipe must be done in accordance with manufacturers' recommendations and done only with tap machine having a built in flush valve and the flush valve must be open during the entire procedure.

9. Abandonment of Service Lines: The Contractor shall accomplish all cutting, capping, and plugging necessary to isolate new service lines transferred to new and existing mains from those abandoned, including service lines designated in the contract documents as "tap plug".

   a. The corporation stop for an abandoned service line tapped on a ferrous main shall be removed, and the tap at the main shall be plugged with an appropriately sized brass plug.

   b. For a non-ferrous main, the corporation stop shall not be removed from the

main. Instead, the corporation stop shall be closed and the flared nut shall be removed from the corporation stop.

c. After the appropriately sized copper disc is inserted inside the flared nut, replace the flared nut on the corporation stop.

10. Tapping PVC (C-900) Pipe: Tapping of PVC pipe must be done in accordance with Uni-Bell procedures.
    a. Direct tapping will not be allowed. All drill cutting tools must be the "shell type" with internal teeth or double slots which will retain the coupon.
    b. The shell cutters must be designed for C-900 pipe, thus having sufficient root depth to handle the heavier walled pipe.
    c. Direct tapping will not be allowed. Service saddles must be used when tapping C-900 pipe
11. Tapping Ductile Iron Main:
    a. Direct tapping will not be allowed. All drill cutting tools must be the "shell type" with internal teeth or double slots which will retain the coupon.
    b. The shell cutters must be designed for DI pipe, thus having sufficient root depth to handle the heavier walled pipe.
    c. Direct tapping will not be allowed. Service saddles must be used when tapping DI pipe.
12. Small Service Lines:
    a. HDPE tubing shall be used for ¾ inch through 2 inch service lines.
    b. Brass fittings for ¾ inch and 1 inch service lines shall be of compression type for the use with HDPE tubing.
    c. Brass fittings for 1½ inch and 2 inch lines shall be of compression type for use with or HDPE tubing, except as modified in this specification. Stiffner verbage
    d. Tubing shall be cut squarely by using an approved cutting tool and by avoiding excessive pressure on the cutting wheels which might bend or flatten the pipe walls.
    e. Tubing shall be cut squarely and burred.
    f. Pipe adjacent to the fittings shall be straight for at least 10 inches.
    g. Bending of tubing shall be accomplished by using an appropriate sized bending tool. No kinks, dents, flats, or crimps will be permitted, and should such occur, the damaged section shall be replaced.
    h. Final assembly shall be in accordance with the manufacturer's recommendations.
13. Small Service Lines on New Mains: Installation of new service lines shall consist of all excavation through miscellaneous material encountered; trench excavation protection; drilling and tapping the new main with an approved tapping machine; setting the curb stop or angle valve at the meter; laying the new service line at the specified depth between the main and the meter and its tie-in at the corporation and the curb stop or the angle valve; "Meter and Meter Box Installation."; backfilling the trench with approved selected material and disposal of surplus excavated material; capping the tap hole with asphalt treated base, including the outer limits of the main trench line with service line trench; cutting and replacing pavements,

curbing and sidewalks of all types over the limits of the main line trench and the completed service line trench.

14. Single Service Line - Dual Meters: The single service line - dual meter installation shall consist of a 1" service line reducing to two ¾ inch service lines at a tee which shall be set in line with the front edge of meter boxes for ⅝ inch and ¾ inch meters.
    a. A single service line with dual meters shall be installed in those new residential developments where new ⅝ inch and ¾ inch meters are required and in main replacement work, where it is necessary to change the location of existing ⅝ inch and ¾ inch meters.
    b. Single service line - dual meter materials and installation requirements shall conform to requirements established herein See DD-824 Drawing Series.
    c. No branching will be allowed on services that require pressure reducing valves (PRVs).
    d. Dual Meters will be allowed for new development only.
15. Small Service Lines on Existing Mains: The work involved in the installation of new service lines on existing mains shall consist of jacking, boring, tunneling, and, open trench operations; all excavation through any material encountered; trench excavation protection; using the existing corporation when approved by the Inspector; tapping the existing main and installing the new corporation and setting the curb stop or angle valve at the meter; abandoning the existing corporation stop, removing the existing flared nut, inserting inside the existing flared nut an appropriately-sized copper disc and replacing the existing flared nut on the corporation stop, if the main is non-ferrous, or plugging the existing service line at the main if the main is ferrous; installing the new service line at the same grade as the existing service line or at the specified grade between the main and the existing meter and its tie-in at the corporation and the curb stop; disposal of surplus excavated material; capping the tap hole with asphalt treated base including the outer limits of the main line trench and the service line trench; cutting and replacing all surfaces of all type encountered over the completed service line trench; restoration of the site.
16. Large Service Lines: Ductile iron pipe, HDPE, and PVC fittings used for metered service lines and non-metered fire service lines larger than 2 inch shall be installed in accordance with the applicable provisions of Specification Item No. 812, "Water Main Installation," except where otherwise approved by the Engineer.
17. Large Service Lines on New Mains: Work involved in the installation of a new metered service lines and non-metered fire service lines shall consist of all excavation through all material encountered, trench excavation protection, installing tees, pipe and fittings of various sizes including main line and service line valves, valve boxes, ductile iron pipe, PVC, HDPE, fittings, in accordance with the associated DD-824 Drawing Series, and reaction block, backfilling with approved selected material, cutting and replacing pavements, curbing, and sidewalks of all types over the limits of the main line trench and the completed service line.
18. Large Service Lines on Existing Mains: The work involved in the installation of

the new metered service lines and non-metered fire service lines shall consist of all excavation through all material encountered, trench excavation protection, cutting-in tees and installing tapping sleeves and valves, pipe and fittings of various sizes including main line and service valves, valves boxes, ductile iron pipe, PVC, HDPE, fittings and reaction block required, backfilling with approved selected material, cutting and replacing pavements, curbing, and sidewalks of all types over the limits of the main line trench and the completed service line.

824.6 MEASUREMENT:

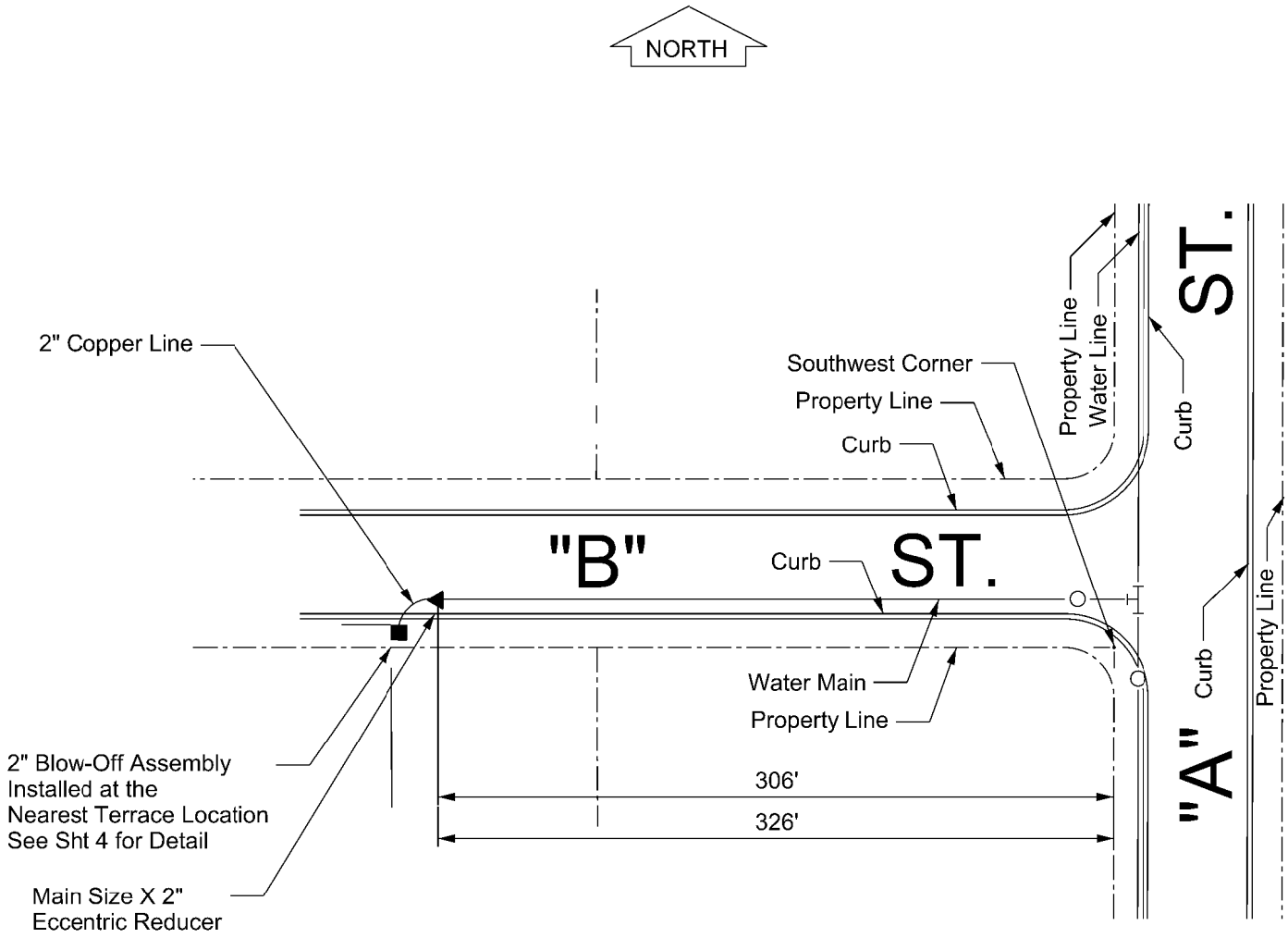
1. New Short Service will be measured by the unit of the various types and sizes of each new service line installed.
2. New Long Service will be measured by the unit of the various types and sizes of each new service line installed.
3. New Un-metered Short Service will be measured by the unit of the various type and sizes of each new un-metered service line installed.
4. New Un-metered Long Service will be measured by the unit of the various type and sizes of each new un-metered service line installed.

824.7 PAYMENT:

1. Payment for New Short Service will be made at the unit of the various types and sizes of each new service line installed.
   a. Such payment shall also include excavation, new meter box trench excavation protection, hauling and disposition of surplus excavated materials, sand backfill, cutting pavement and surface structures of all type encountered and replacement with all type specified, and tubing and fittings of the various sizes used in the service line reconnection.
2. Payment for New Long Service will be made at the unit of the various types and sizes of each new service line installed.
   a. Such payment shall also include excavation, trench excavation protection, hauling and disposition of surplus excavated materials, sand backfill, cutting pavement and surface structures of all type encountered and replacement with all type specified, and tubing and fittings of the various sizes used in the new service line reconnection.
   b. New Meter box template.
3. Payment for New Un-metered Short Service will be made at the unit of the various type and sizes of each new un-metered service line installed.
   a. Such payment shall also include excavation, trench excavation protection, hauling and disposition of surplus excavated materials, sand backfill, cutting pavement and surface structures of all type encountered and replacement with all type specified, and tubing and fittings of the various sizes used in the un-metered service line reconnection.
   b. New Meter box template.

4. Payment for New Un-metered Long Service will be made at the unit of the various type and sizes of each new un-metered service line installed.
   a. Such payment shall also include excavation, trench excavation protection, hauling and disposition of surplus excavated materials, sand backfill, cutting pavement and surface structures of all type encountered and replacement with all type specified, and tubing and fittings of the various sizes used in the un-metered service line reconnection.
   b. New Meter box template.

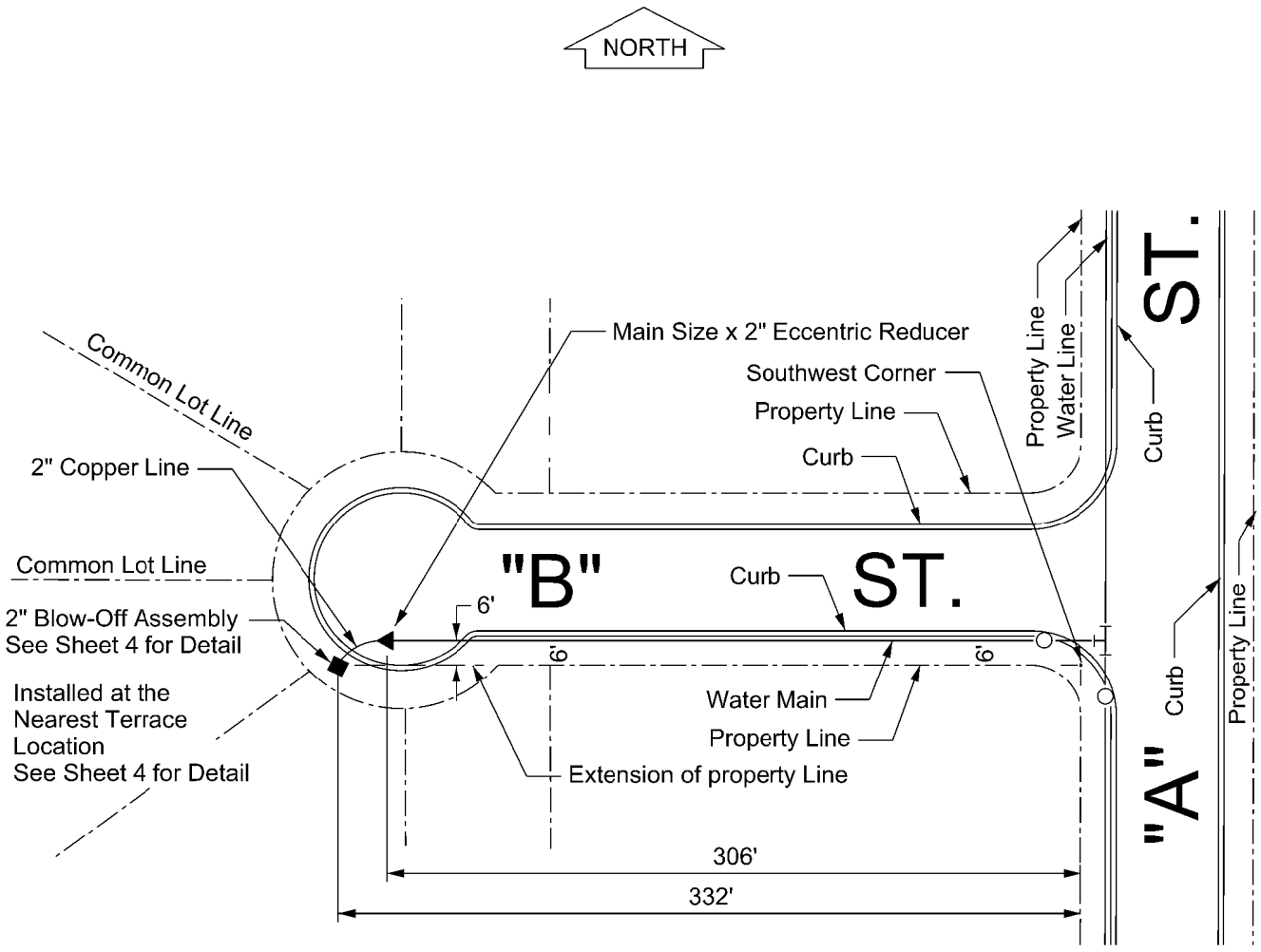
-End of Specification-



EXAMPLE BLOW-OFF MEASUREMENT:

From the Southwest Corner of "A" St. and "B" St. West 306'
and North 13' to Eccentric Reducer
West 326' and North 8' to Blow-Off Assembly Box

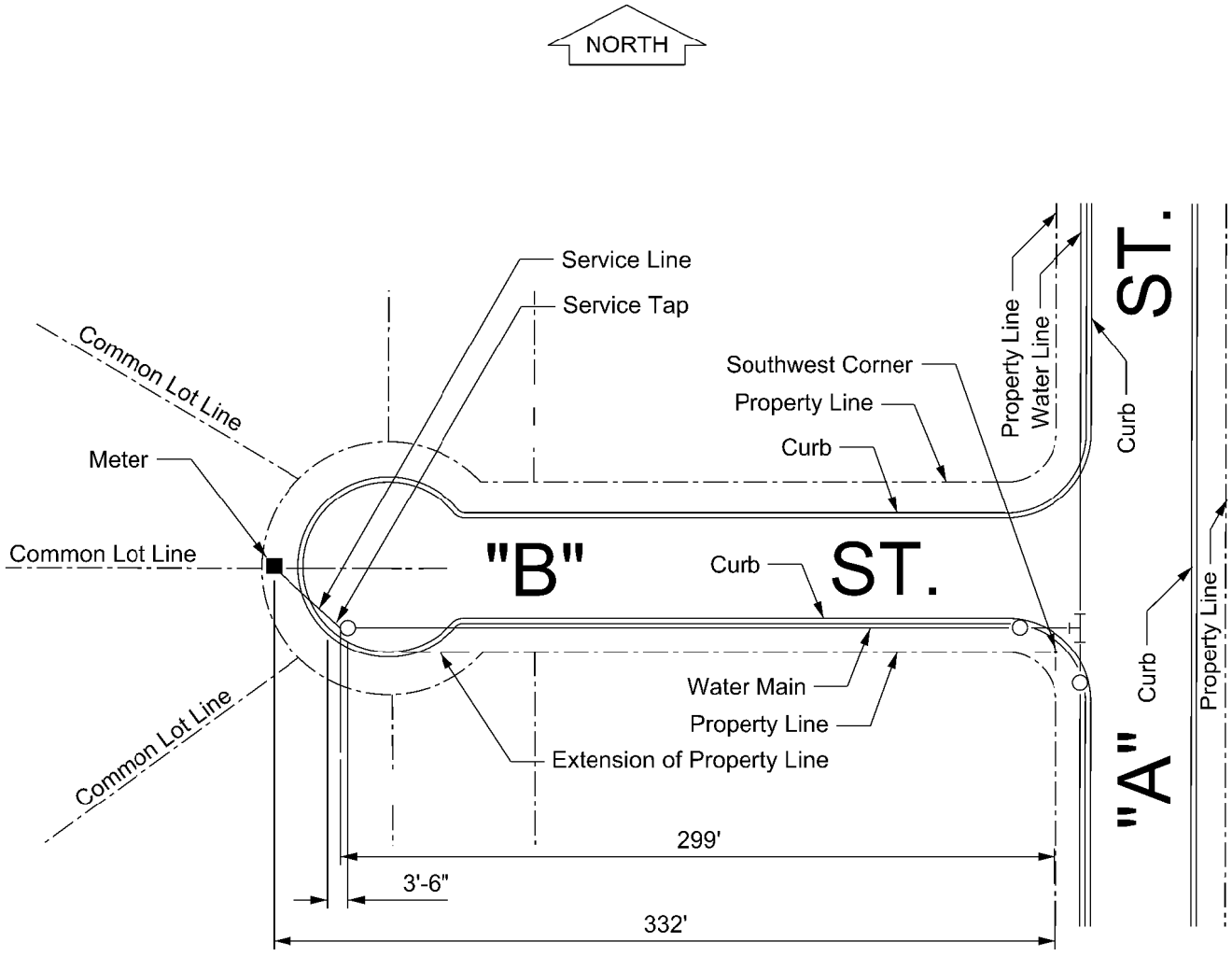
PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	TYPICAL BLOW-OFF ARRANGEMENT ON DEAD END MAINS	APPROVED MARCH 2008	REVISED AUG 2019
		DD-824-04	SHEET 1 OF 4



EXAMPLE BLOW-OFF MEASUREMENT:

- From the Southwest Corner of "A" St. and "B" St. West 306' and North 6' to Eccentric Reducer,
- West 332' and North 0' to Blow-Off Assembly Box.

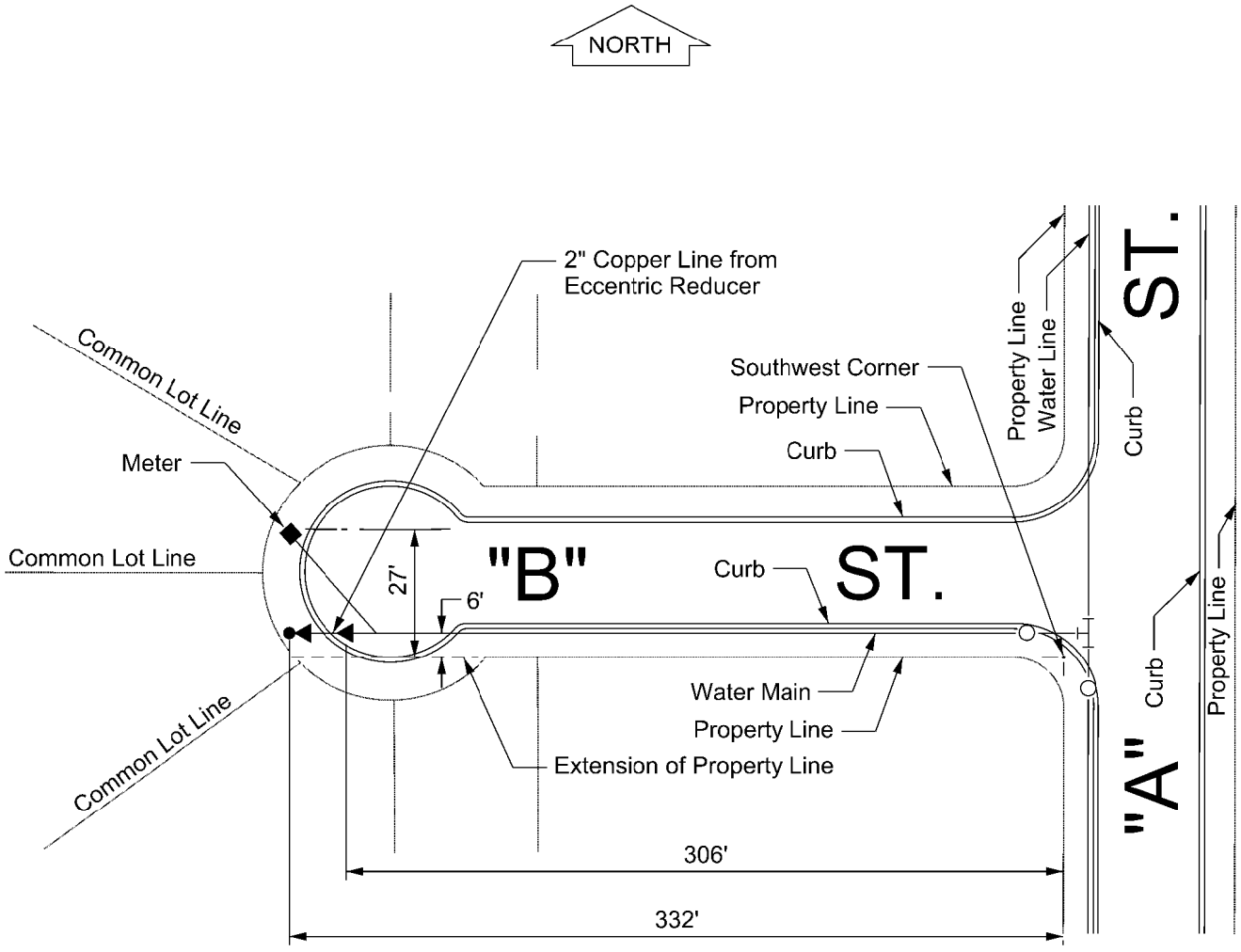
PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	TYPICAL BLOW-OFF ARRANGEMENT IN CUL-DE-SAC	APPROVED MARCH 2008	REVISED AUG 2019
		DD-824-04	SHEET 2 OF 4



EXAMPLE SERVICE MEASUREMENT:

- From the Southwest Corner of "A" St. and "B" St. West 299' and North 6' to Tap, and West 332' and North 17' to Meter.

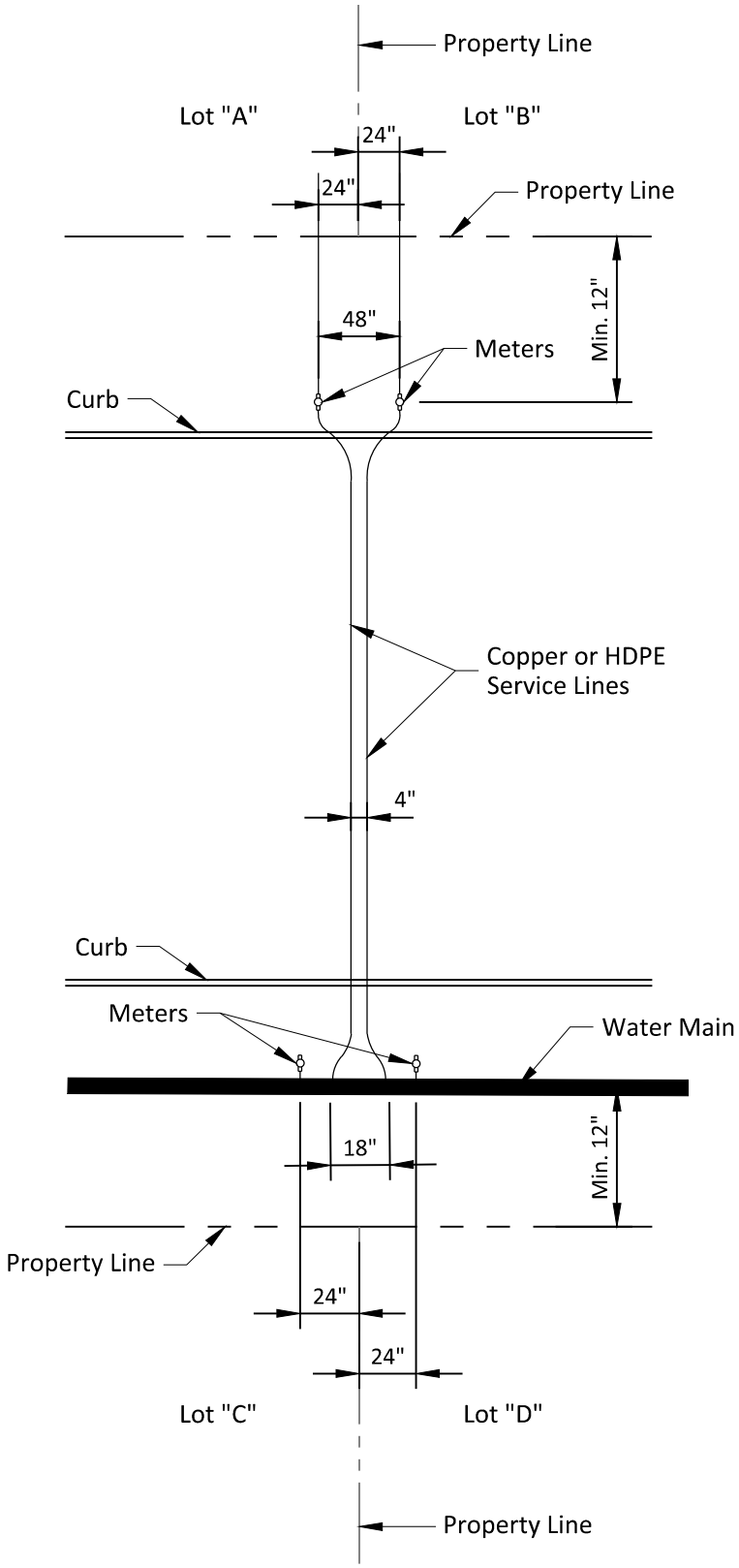
PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	TYPICAL SERVICE ARRANGEMENT IN CUL-DE-SAC	APPROVED MARCH 2008	REVISED AUG 2019
		DD-824-04	SHEET 3 OF 4



EXAMPLE BLOW-OFF MEASUREMENT:

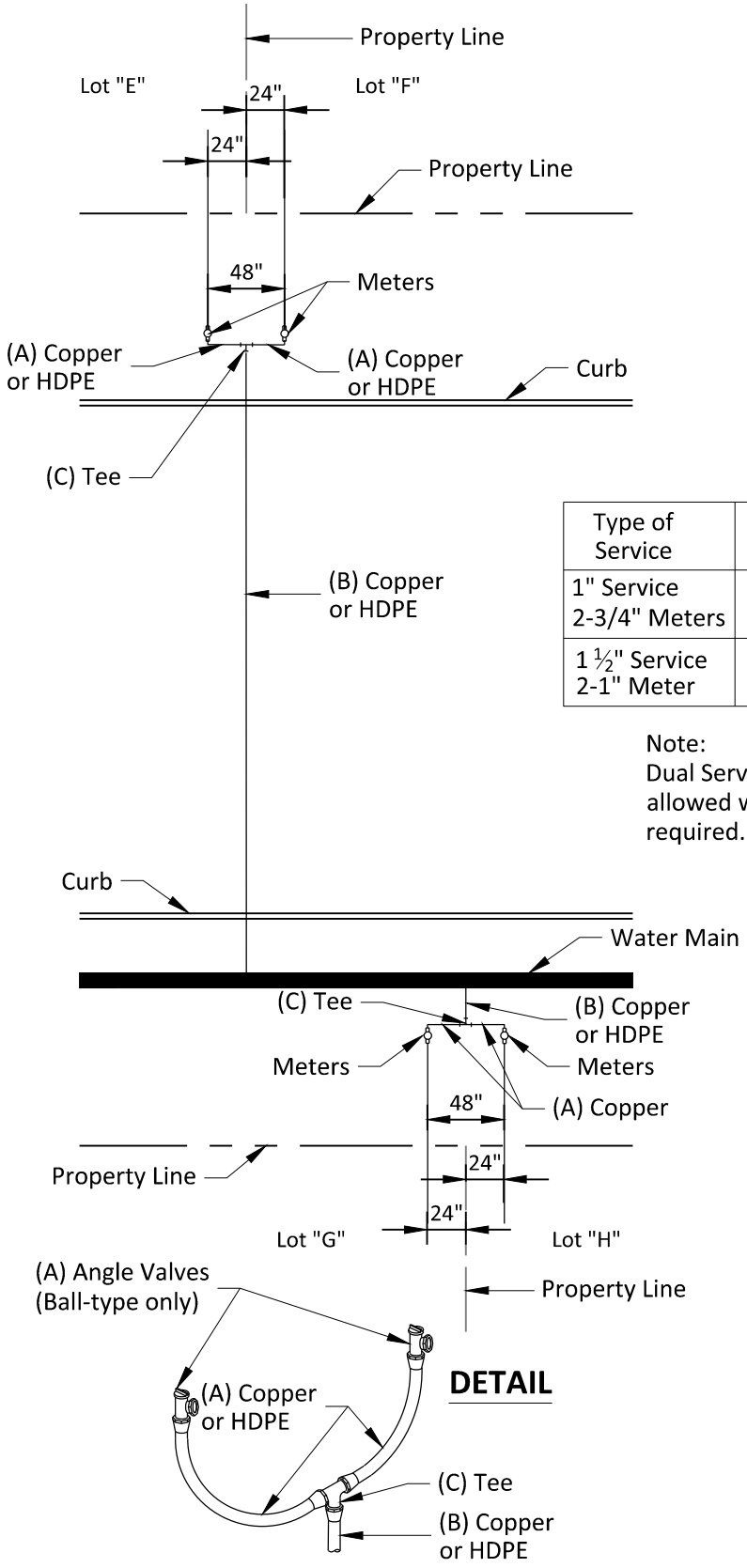
- From the Southwest Corner of "A" St. and "B" St. West 306' and North 6' to End of Eccentric Reducer and West 332' and North 6' Blow-Off Assembly.

PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	TYPICAL 2" BLOW-OFF ASSEMBLY ON DEAD END MAINS	APPROVED MARCH 2008	REVISED AUG 2019
		DD-824-04	SHEET 4 OF 4



SINGLE SERVICE LINE - SINGLE METER

PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	TYPICAL NEW DEVELOPMENT SERVICE ARRANGEMENT	APPROVED March 2008	REVISED December 2018
		DD-824-05	SHEET 1 OF 3



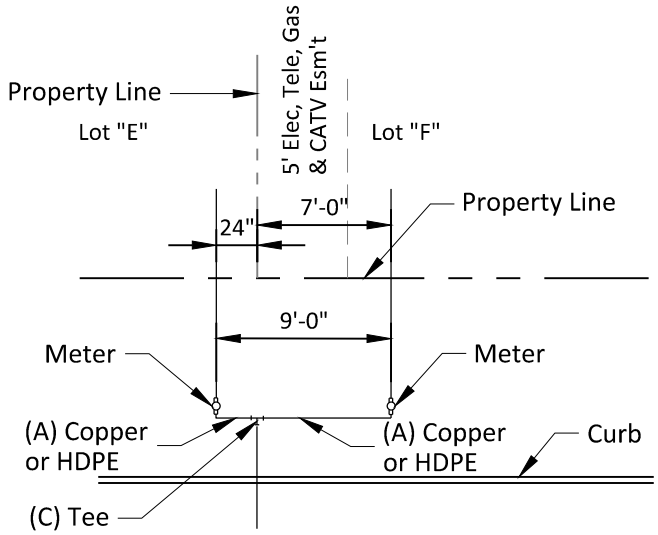
DETAIL

Type of Service	A	B	C
1" Service 2-3/4" Meters	¾"	1"	¾" x ¾" x 1"
1 ½" Service 2-1" Meter	1"	1 ½"	1" x 1" x 1 ½"

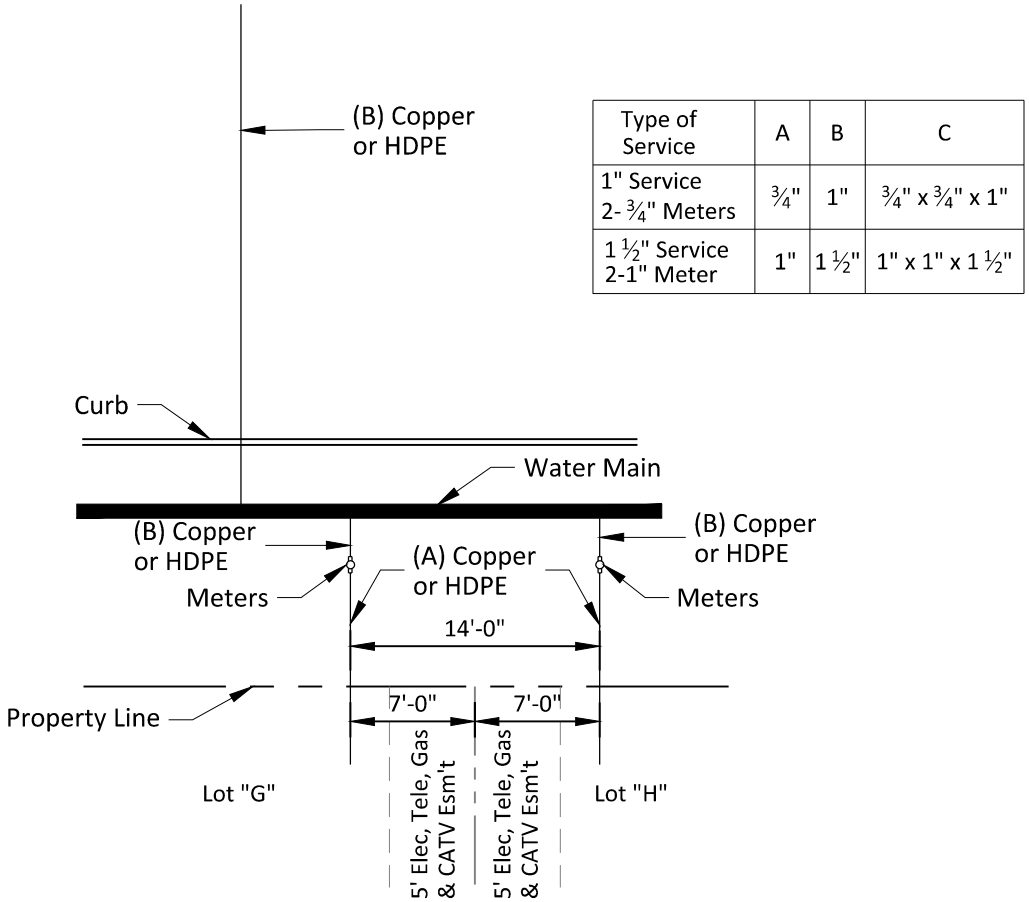
Note:
Dual Services not allowed when PRVs are required.

SINGLE SERVICE LINE - DUAL METER

PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	TYPICAL SERVICE ARRANGEMENT	APPROVED March 2008	REVISED December 2018
		DD-824-05	SHEET 2 OF 3



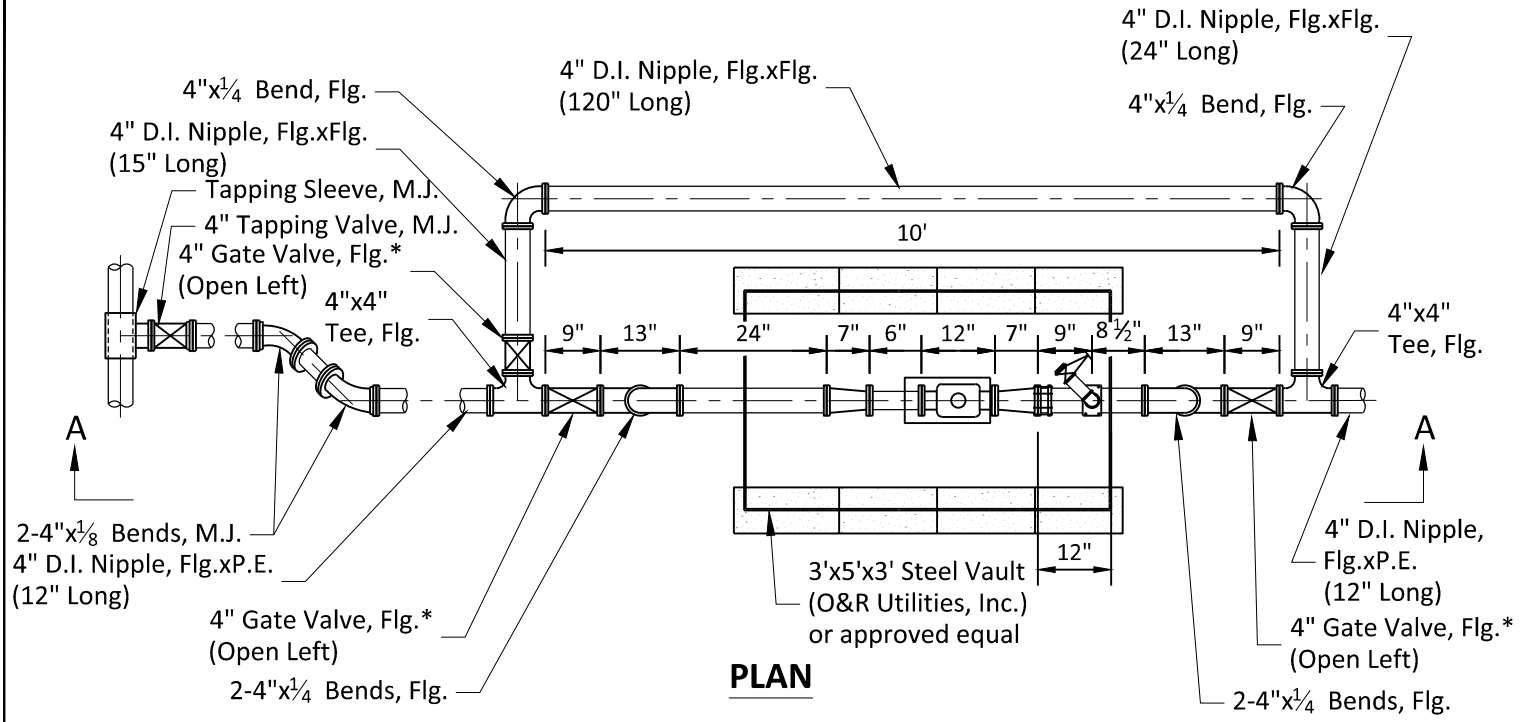
SINGLE SERVICE LINE - DUAL METER W/ EASEMENT



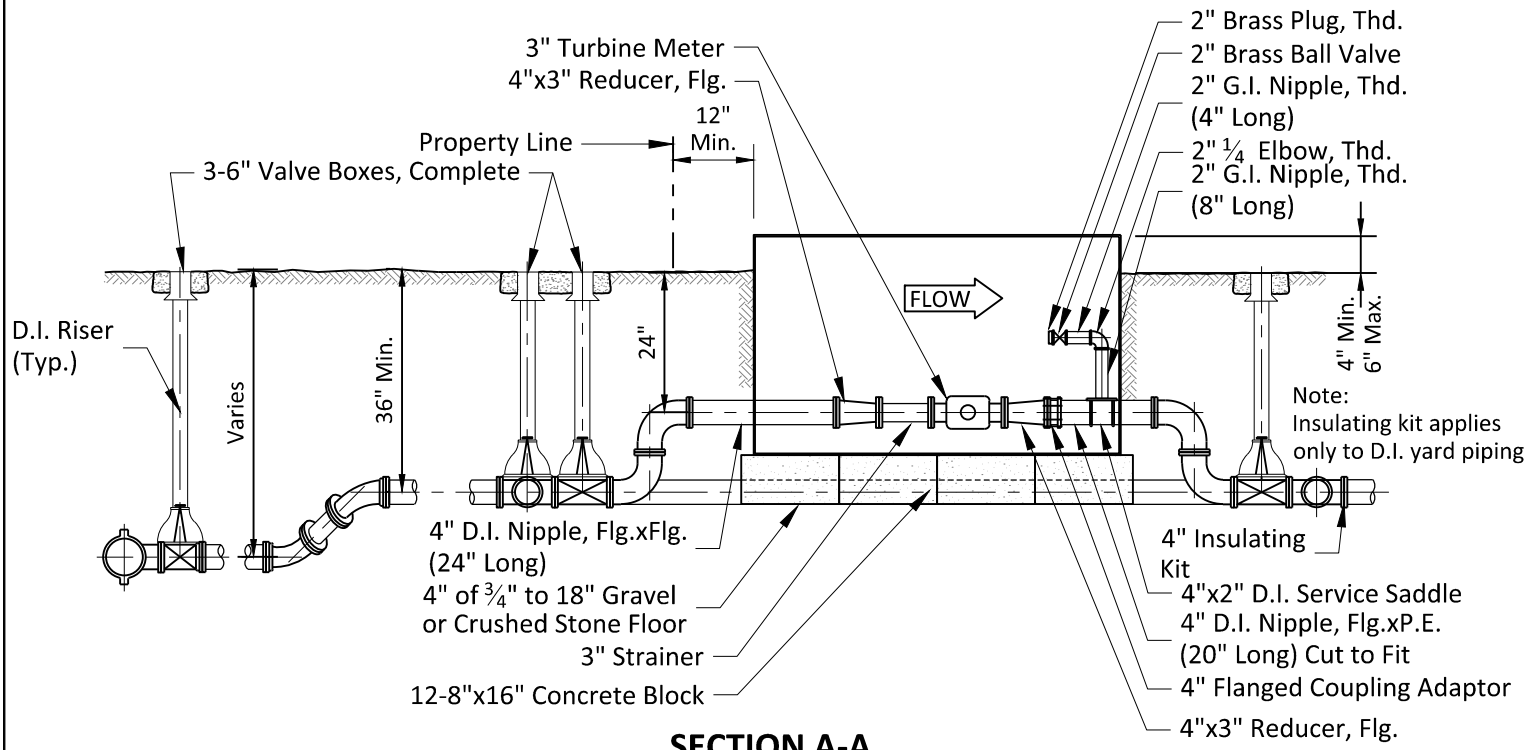
Type of Service	A	B	C
1" Service 2- ¾" Meters	¾"	1"	¾" x ¾" x 1"
1 ½" Service 2-1" Meter	1"	1 ½"	1" x 1" x 1 ½"

SINGLE SERVICE LINE W/ EASEMENT

PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	ALTERNATE SERVICE ARRANGEMENT	APPROVED March 2008	REVISED December 2018
		DD-824-05	SHEET 3 OF 3



PLAN

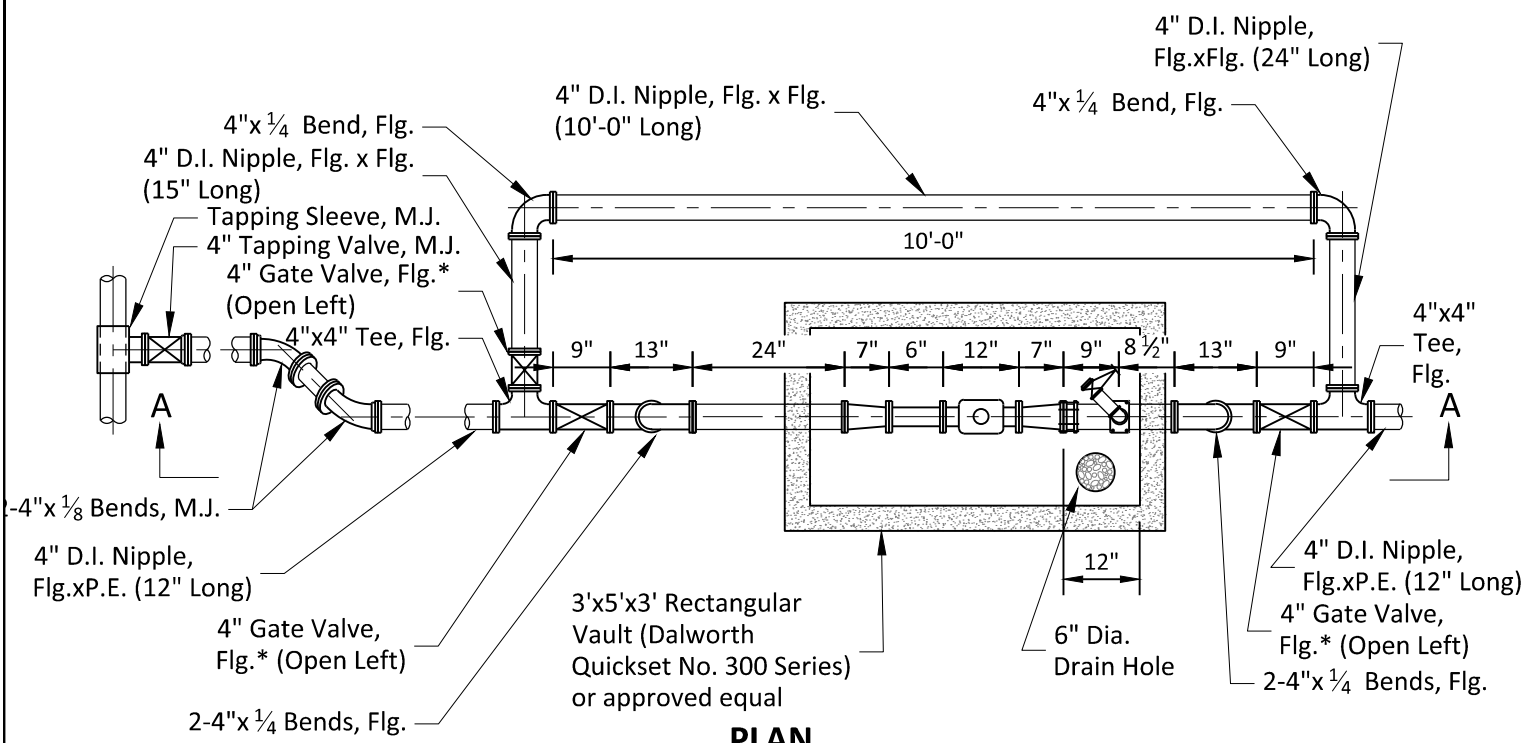


SECTION A-A

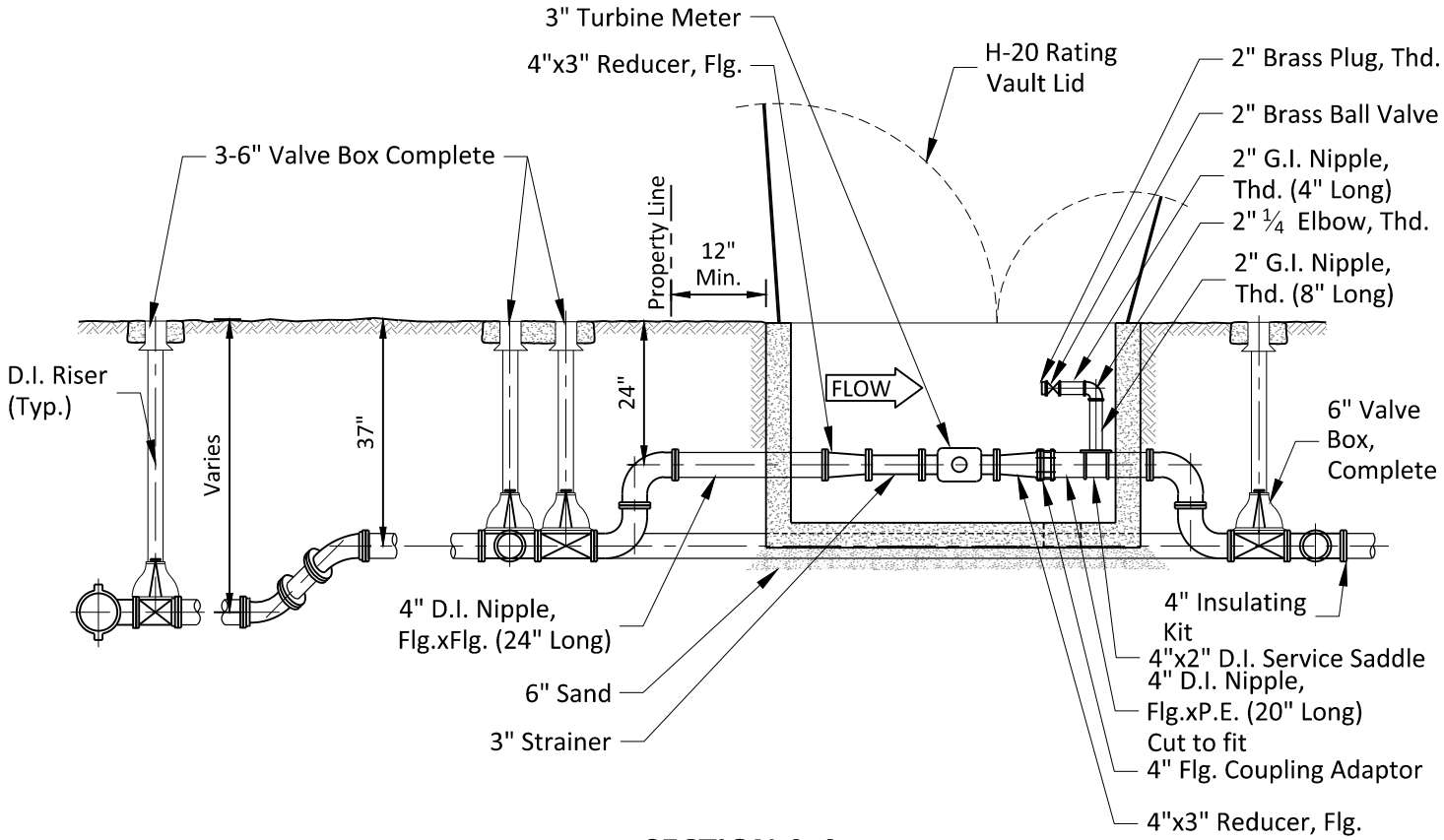
3'x5'x3' STEEL VAULT
(NON-TRAFFIC BEARING LOCATION)

*Resilient Seat

PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	3" TURBINE METER INSTALLATION	APPROVED March 2008	REVISED December 2018
		DD-824-06	SHEET 1 OF 2



PLAN



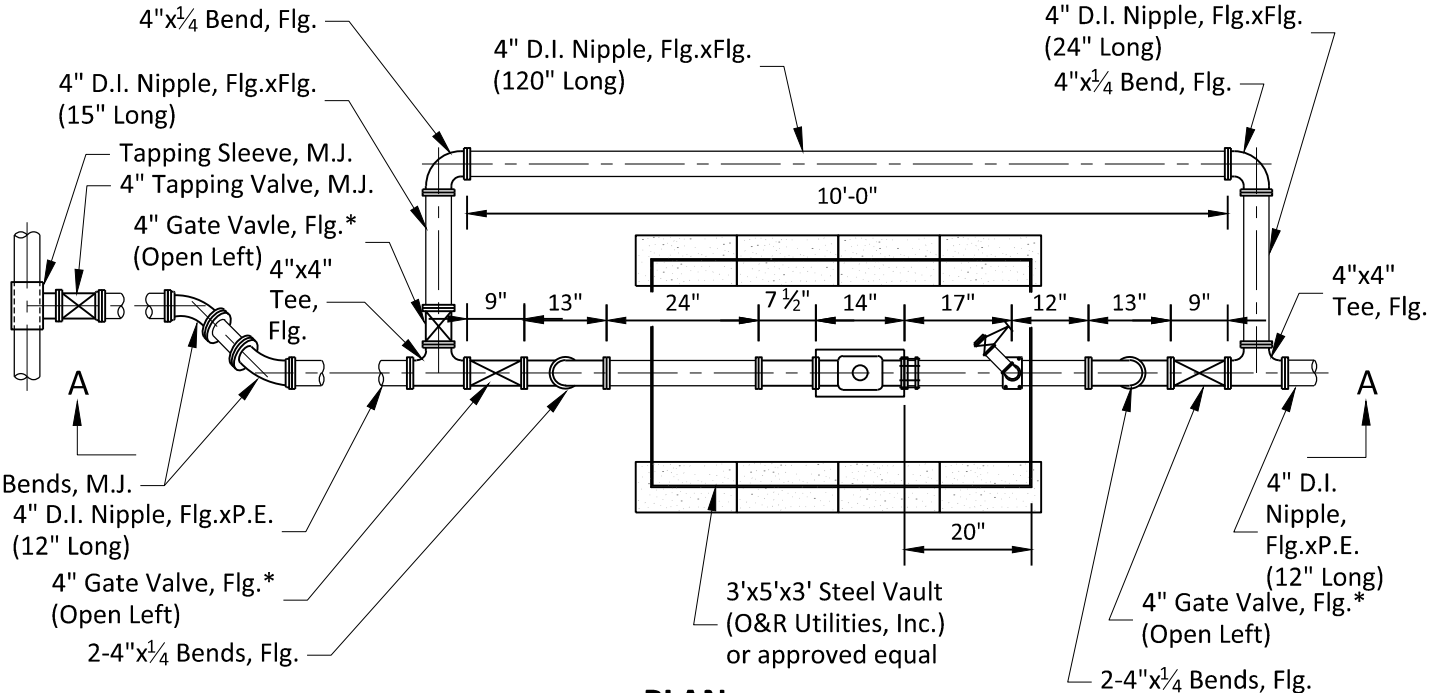
SECTION A-A

3'x5'x3' CONCRETE VAULT (TRAFFIC BEARING LOCATION)

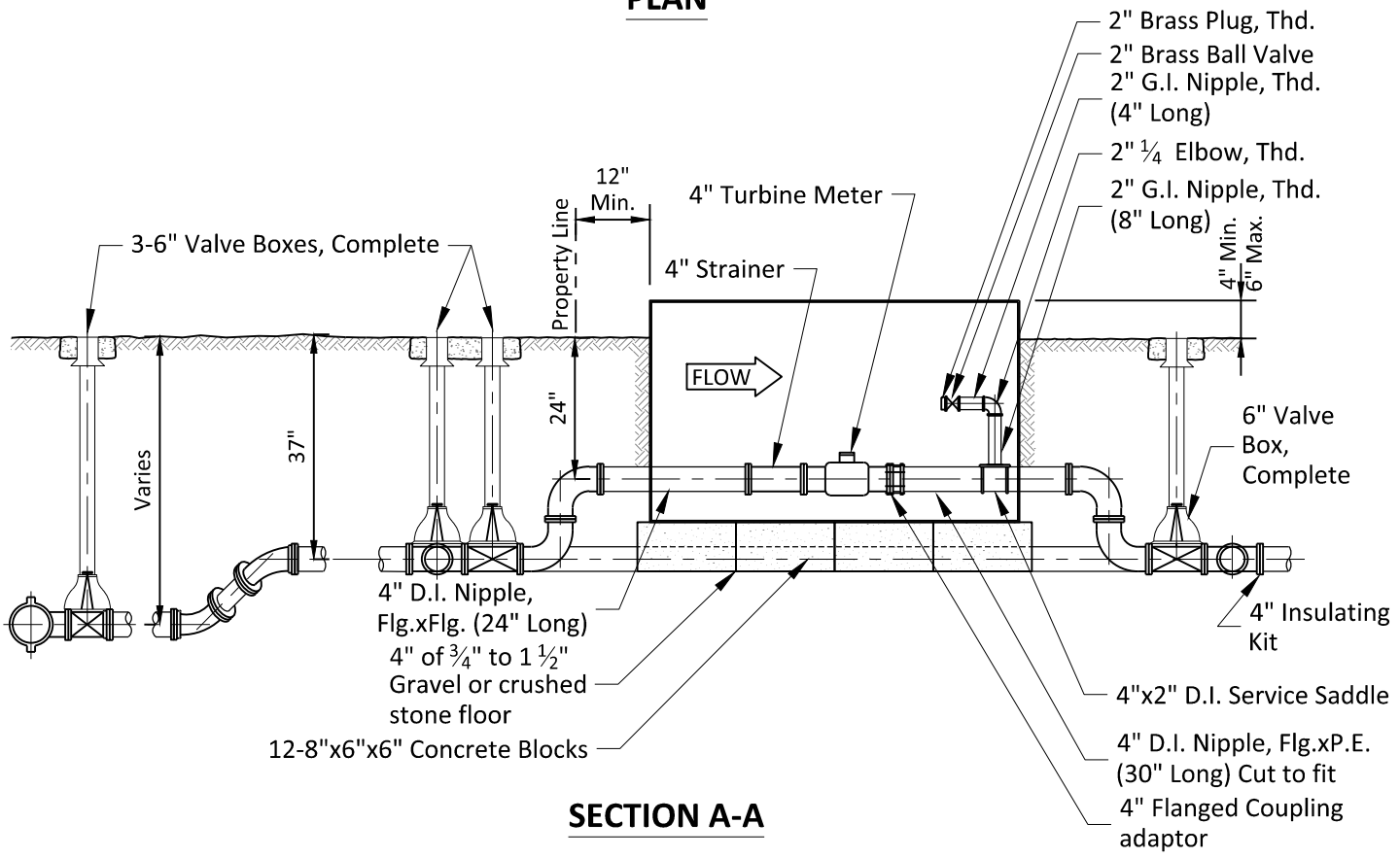
* Resilient Seat

Note:
Insulating kit applies only to D.I. yard piping

PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	3" TURBINE METER INSTALLATION	APPROVED March 2008	REVISED December 2018
		DD-824-06	SHEET 2 OF 2



PLAN



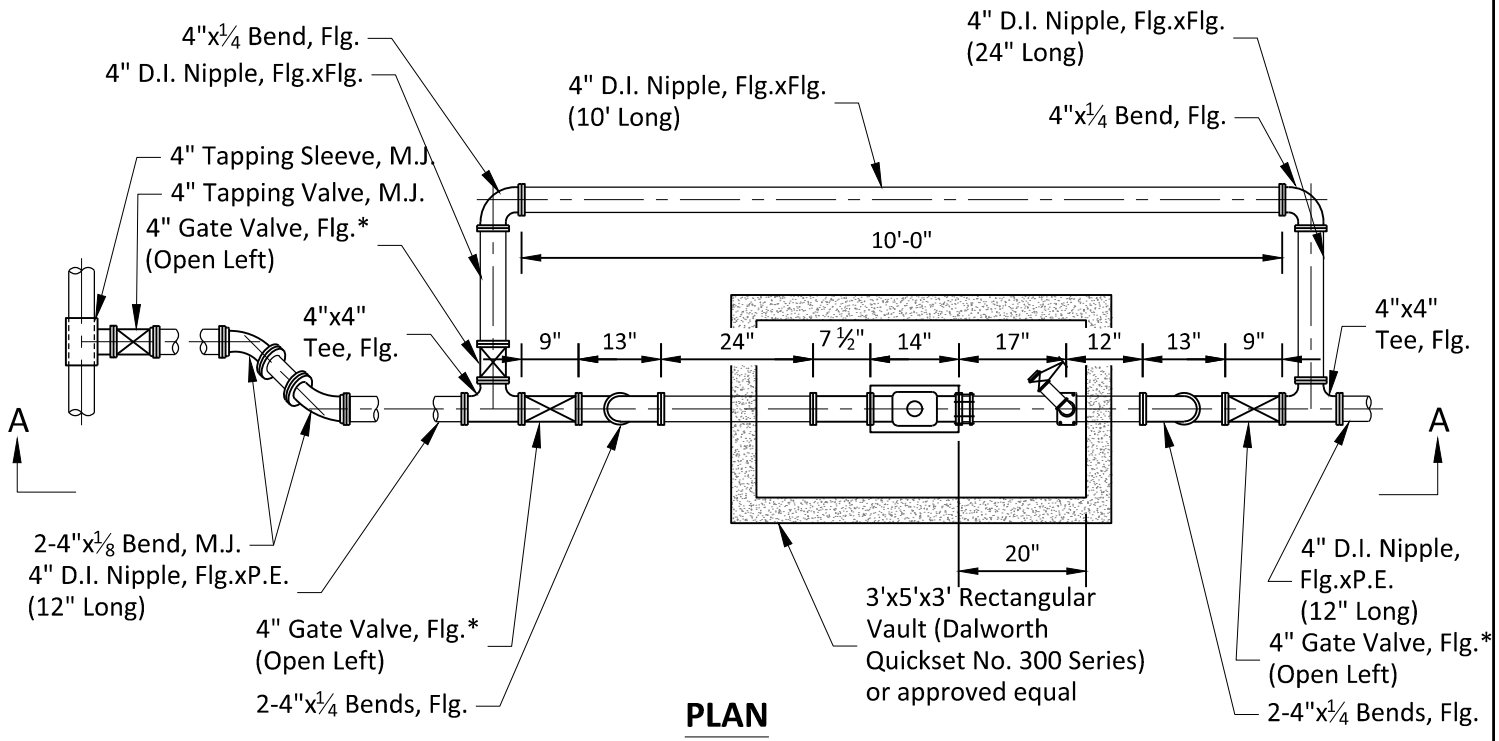
SECTION A-A

3'x5'x3' STEEL VAULT
(NON-TRAFFIC BEARING LOCATION)

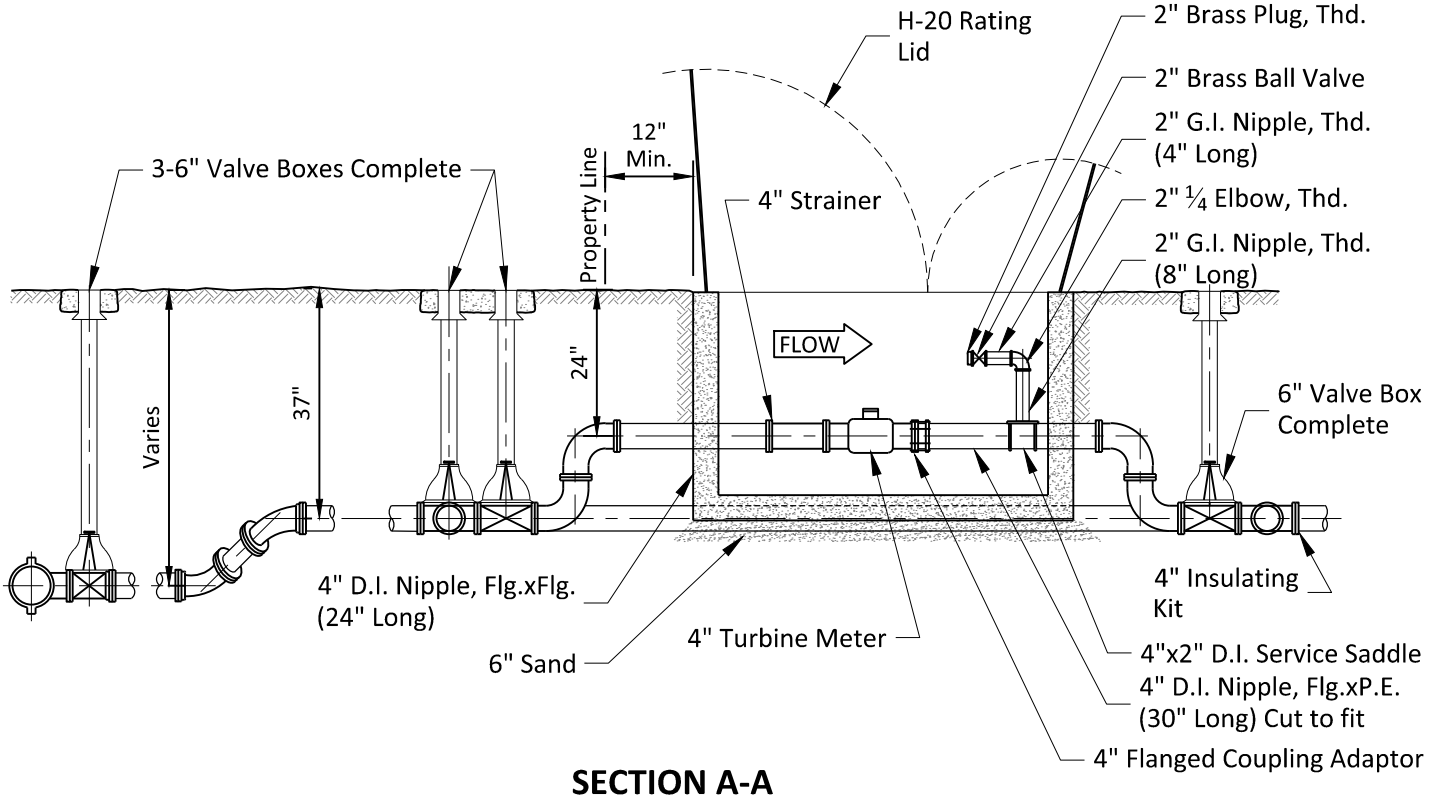
Note:
Insulating kit applies only to D.I. yard piping

* Resilient Seat

PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	3" TURBINE METER INSTALLATION	APPROVED March 2008	REVISED December 2018
		DD-824-07	SHEET 1 OF 2



PLAN



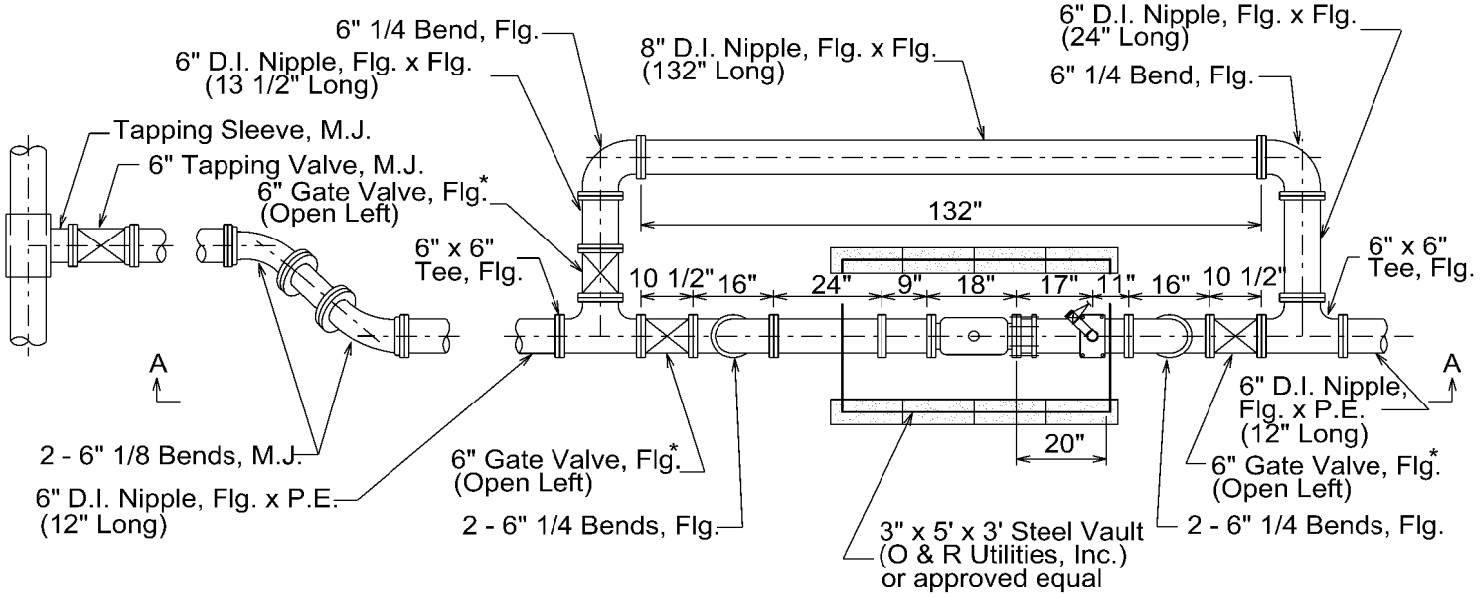
SECTION A-A

3'x5'x3' RECTANGULAR CONCRETE VAULT (TRAFFIC BEARING LOCATION)

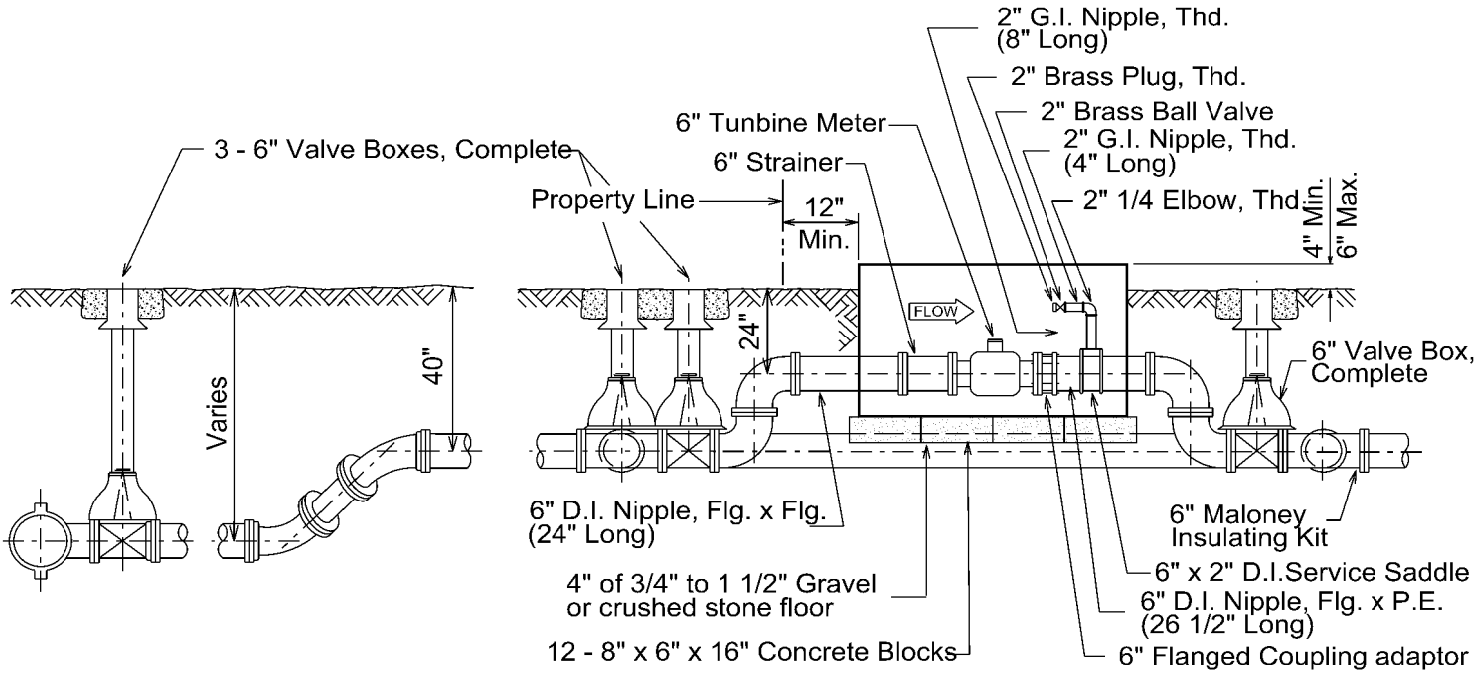
Note:
Insulating kit applies
only to D.I. yard piping

* Resilient Seat

PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	4" TURBINE METER INSTALLATION	APPROVED	REVISED
		March 2008	December 2018
		DD-824-07	SHEET 2 OF 2



PLAN

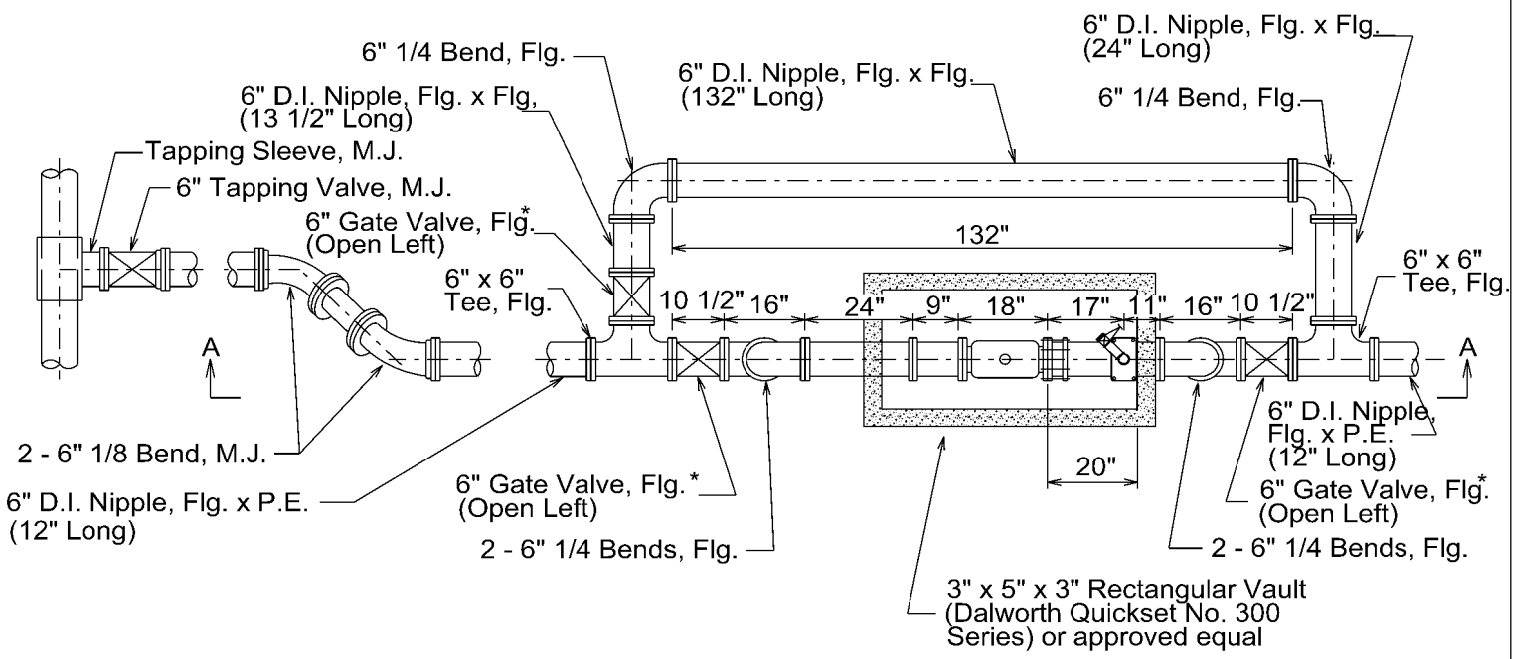


SECTION A-A

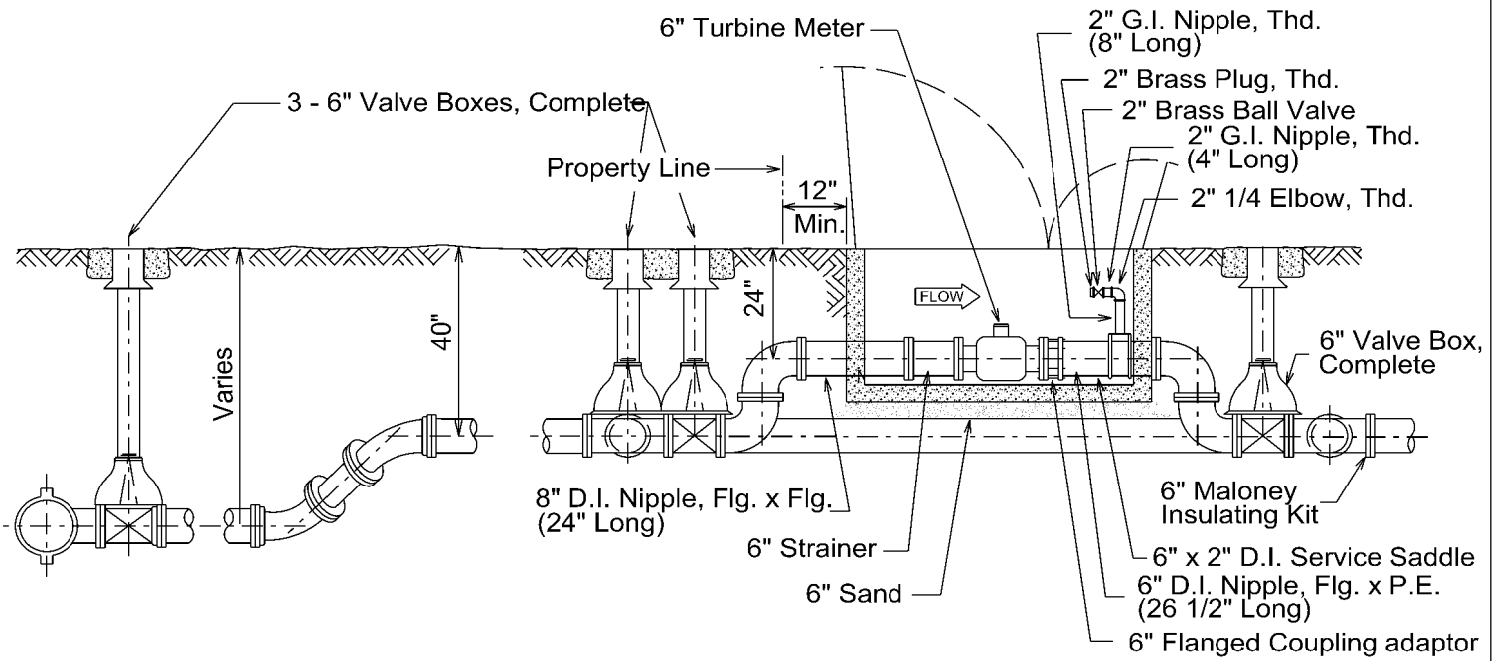
* Resilient Seat

3' x 5' x 3' STEEL VAULT
(NON-TRAFFIC BEARING LOCATION)

PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	6" TURBINE METER INSTALLATION	APPROVED March 2008	REVISED AUG 2019
		DD-824-09	SHEET 1 OF 2



PLAN

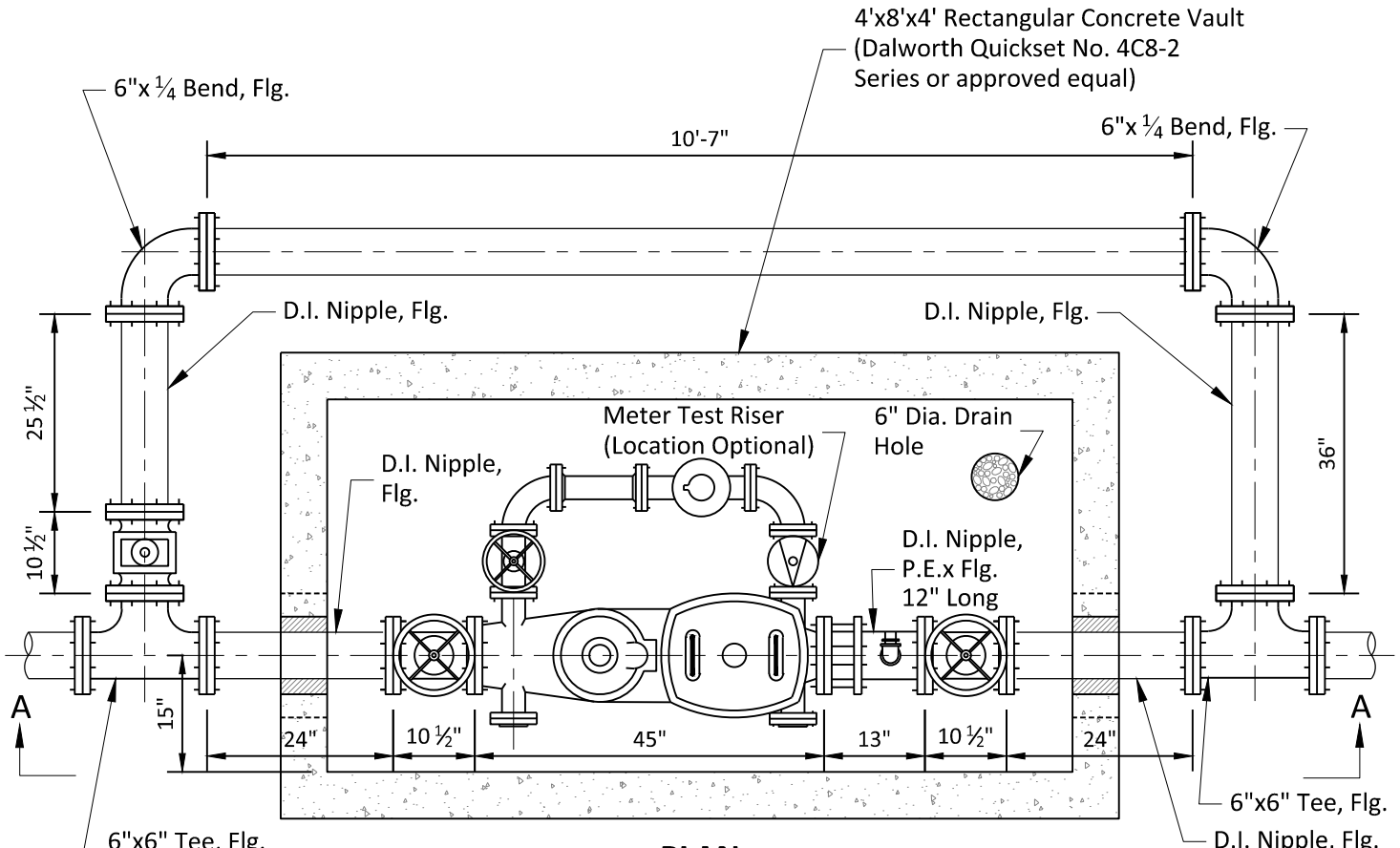


SECTION A-A

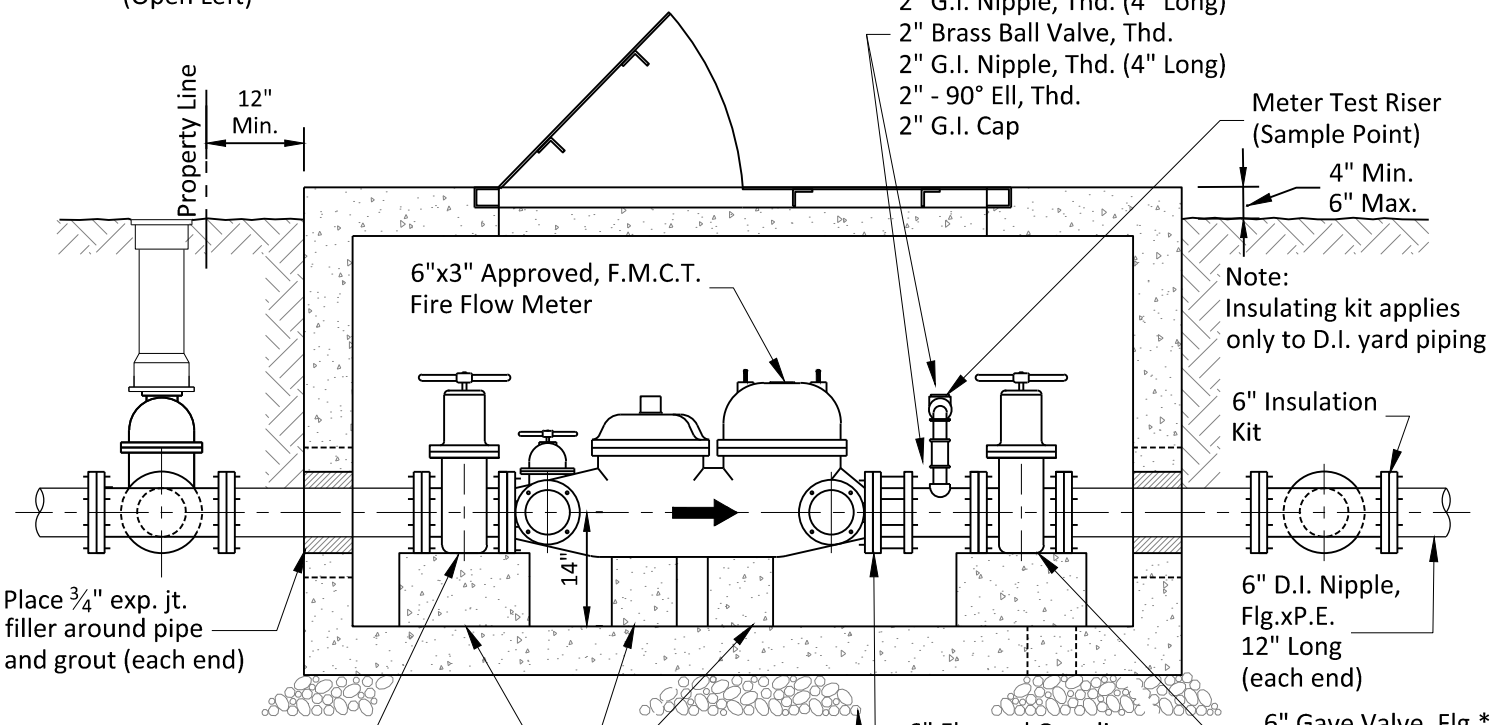
3' x 5' x 3' RECTANGULAR CONCRETE VAULT
(TRAFFIC BEARING LOCATION)

* Resilient Seat

PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	6" TURBINE METER INSTALLATION	APPROVED March 2008	REVISED AUG 2019
		DD-824-09	SHEET 2 OF 2



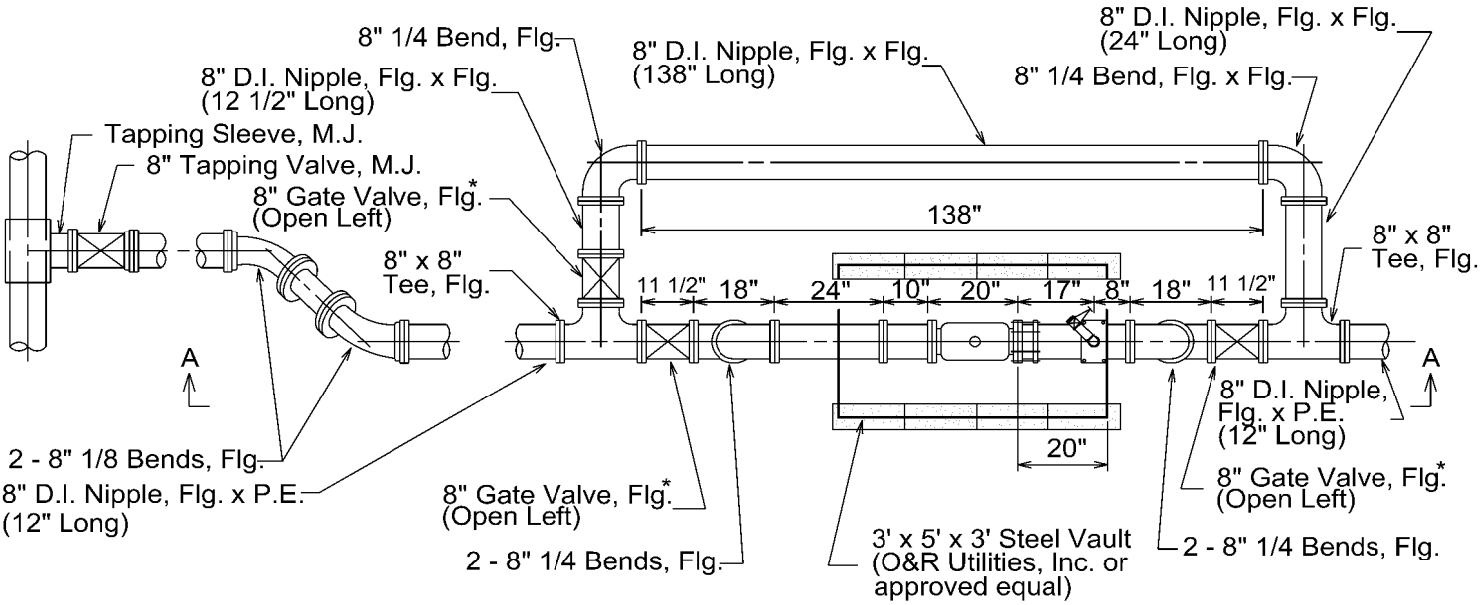
PLAN



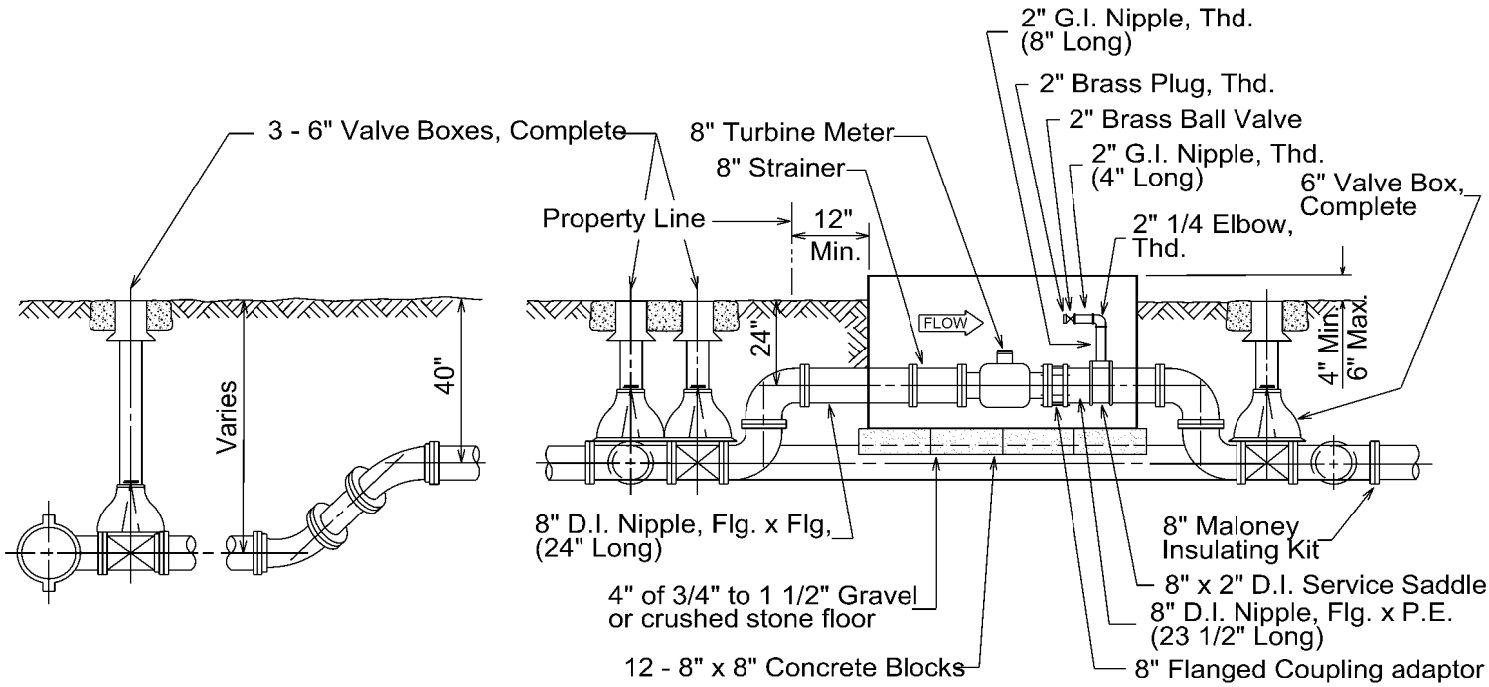
SECTION A-A

* Resilient Seat

PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	6"x3" FIRE FLOW METER INSTALLATION	APPROVED March 2008	REVISED December 2018
		DD-824-10	SHEET 1 OF 1



PLAN

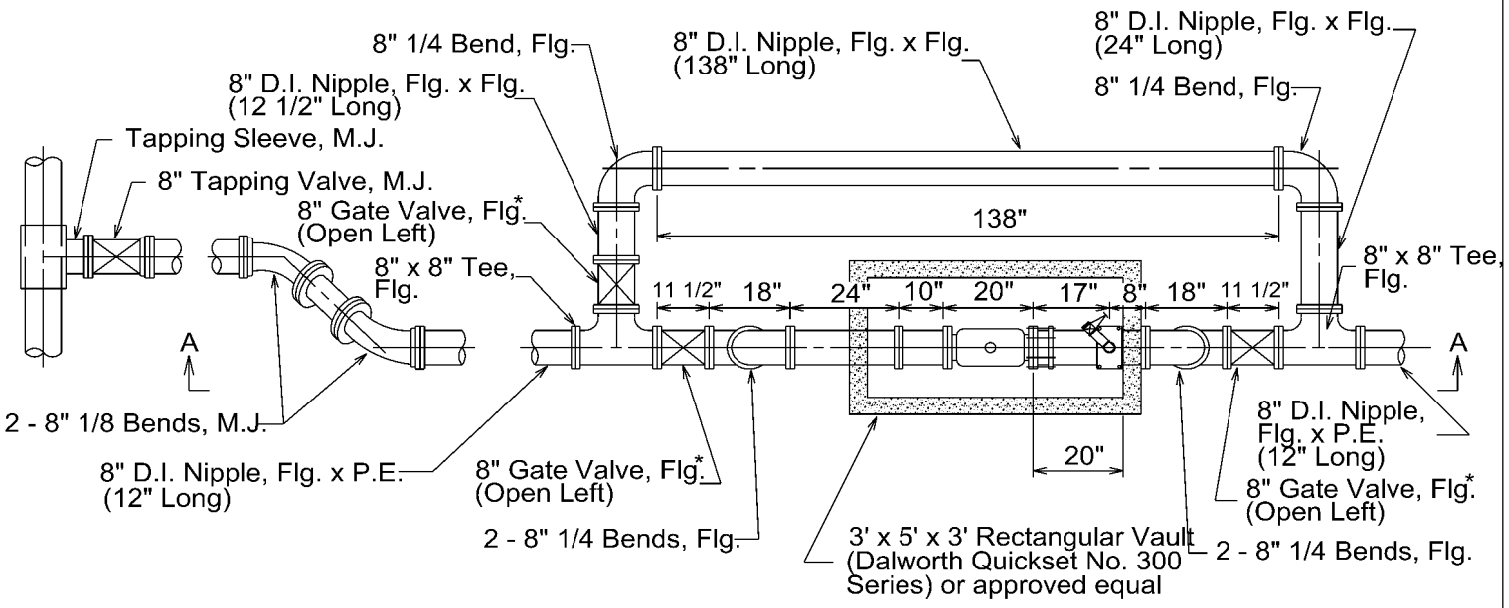


SECTION A-A

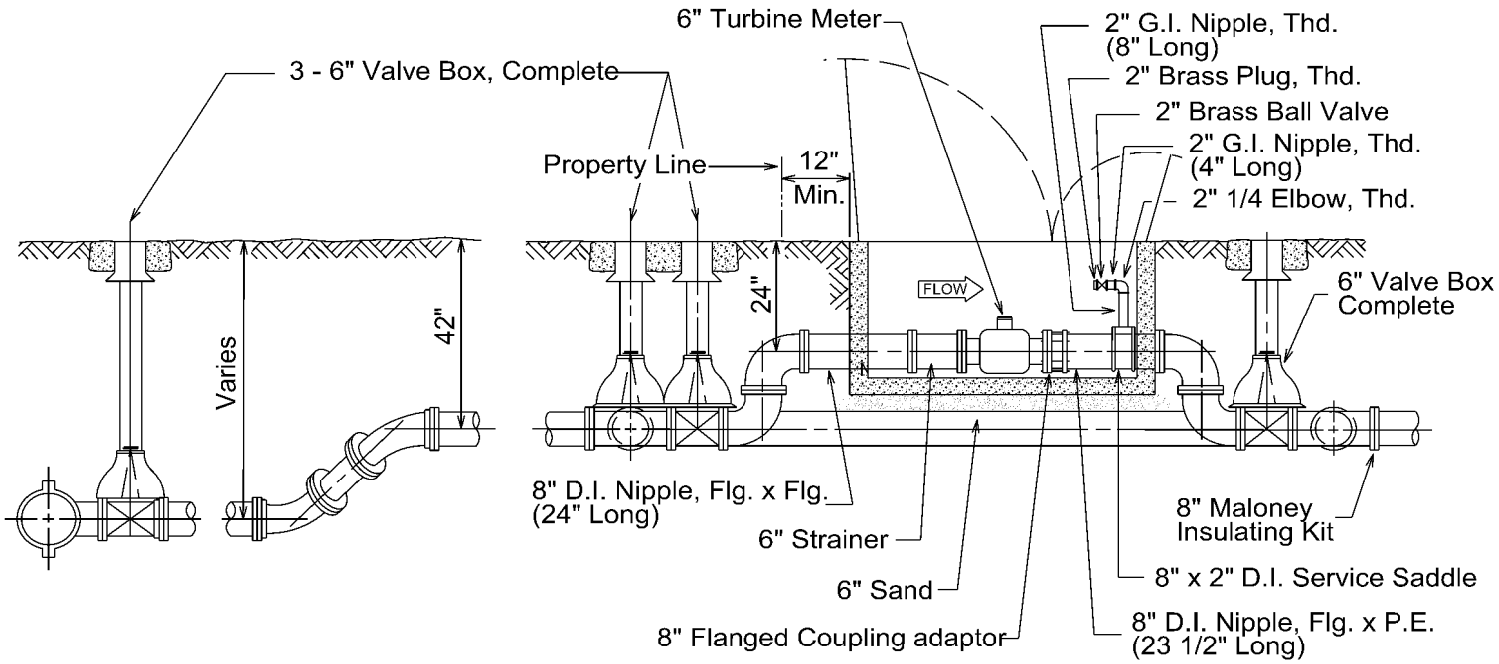
* Resilient Seat

3' x 5' x 3' STEEL VAULT
(NON-TRAFFIC BEARING LOCATION)

PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	8" SERVICE WITH AN 8" TURBINE METER	APPROVED March 2008	REVISED AUG 2019
		DD-824-12	SHEET 1 OF 2



PLAN

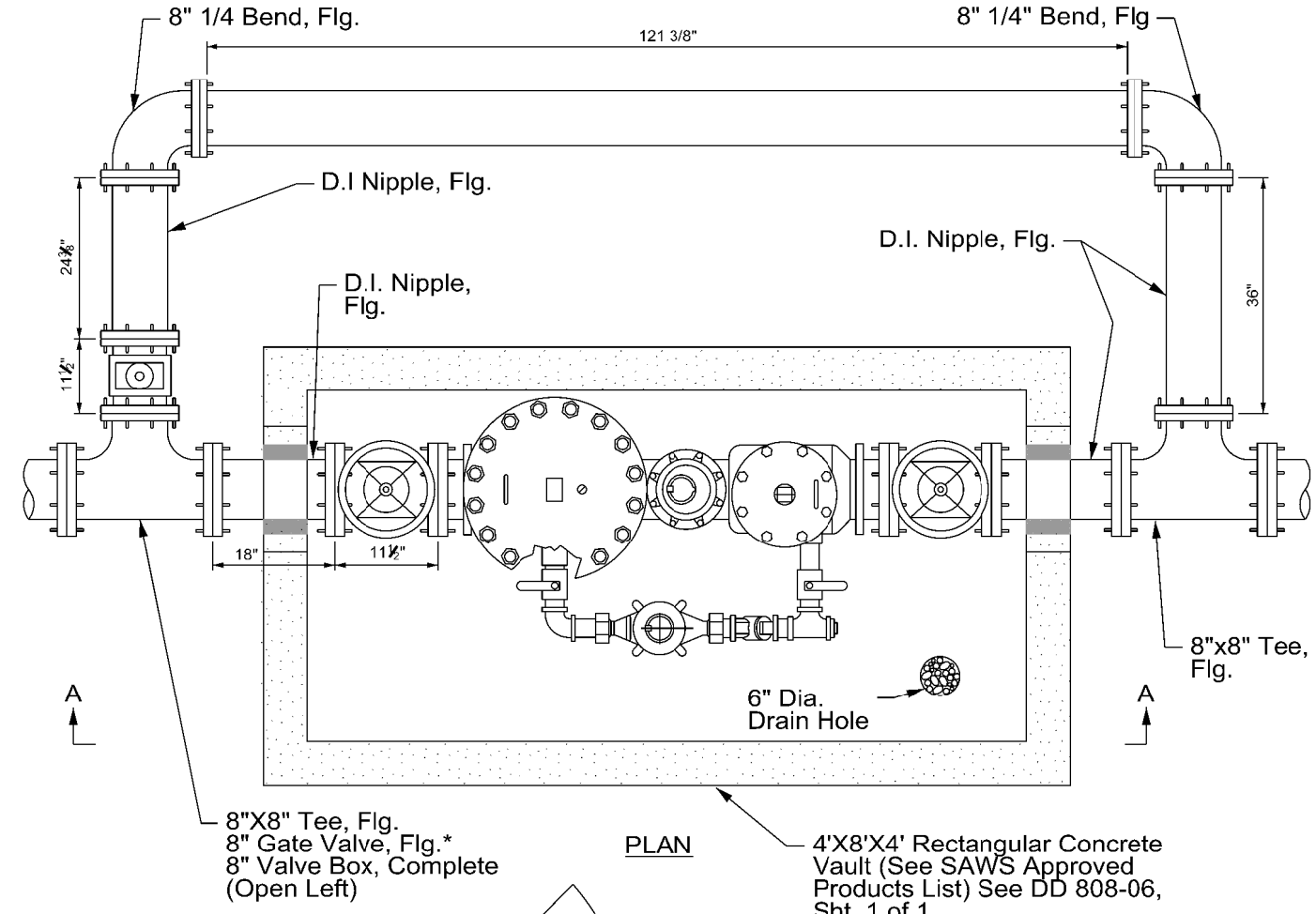


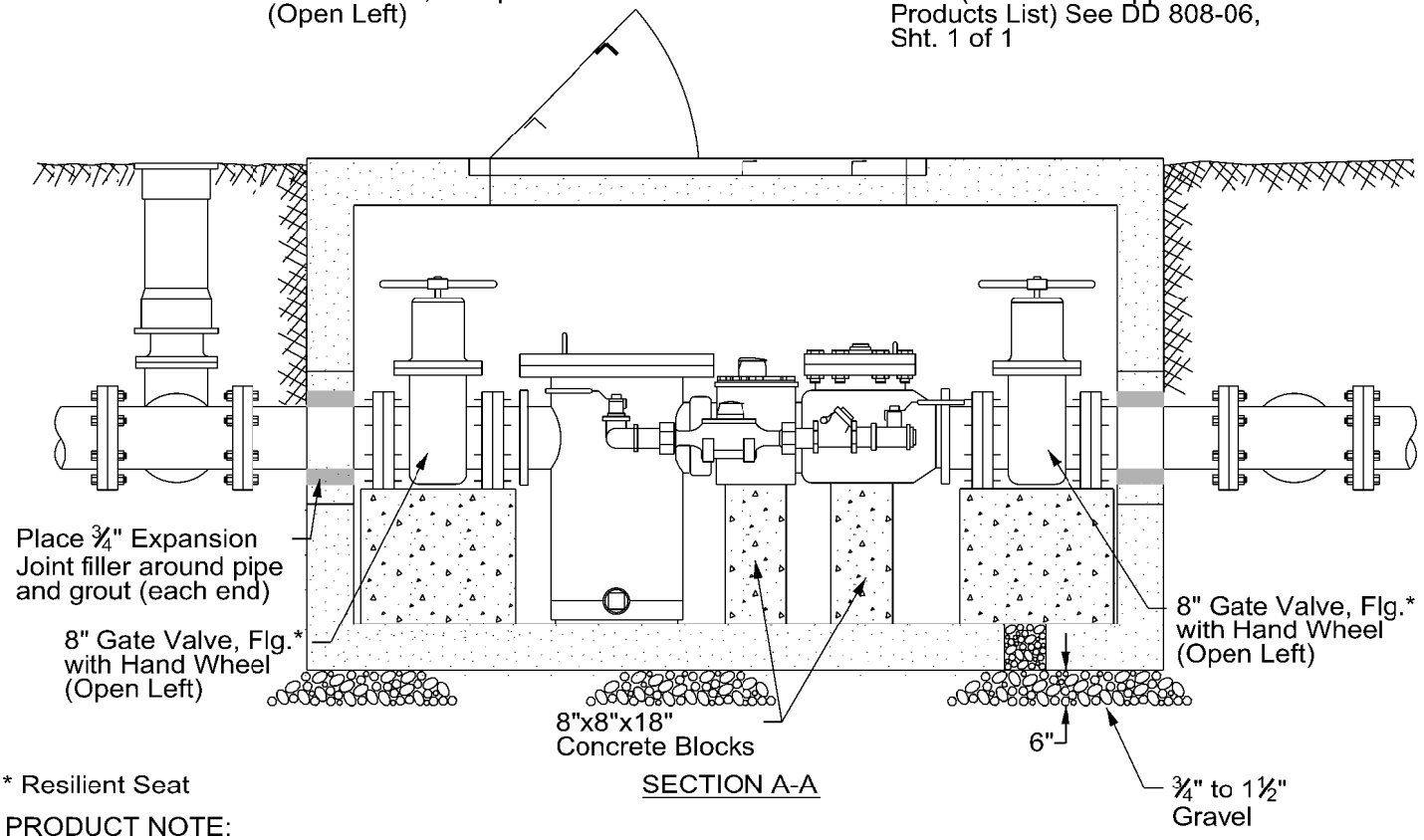
SECTION A-A

* Resilient Seat

3' x 5' x 3' RECTANGULAR CONCRETE VAULT
(TRAFFIC BEARING LOCATION)

PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	8" SERVICE WITH AN 8" TURBINE METER	APPROVED March 2008	REVISED AUG 2019
		DD-824-12	SHEET 2 OF 2



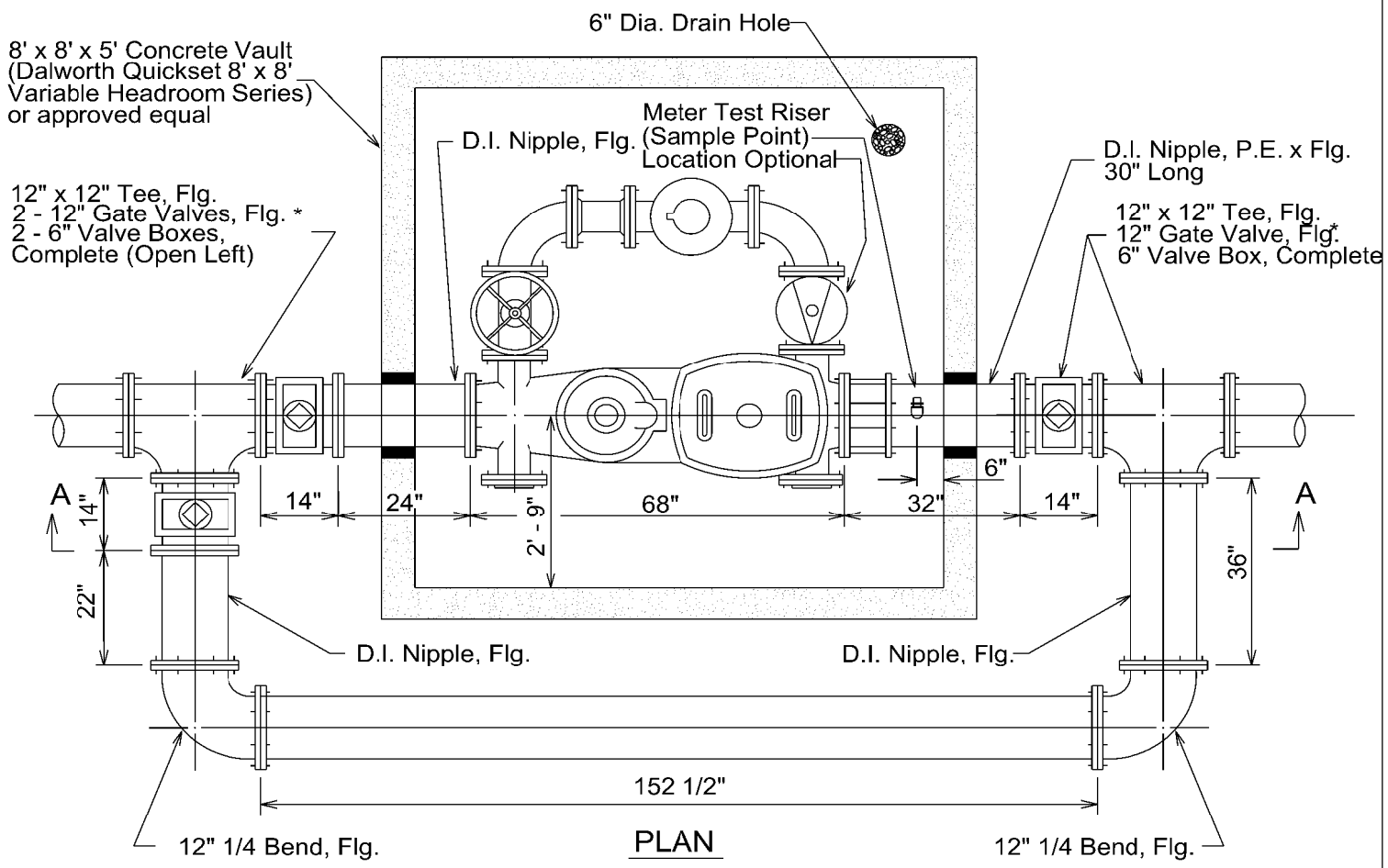


SECTION A-A

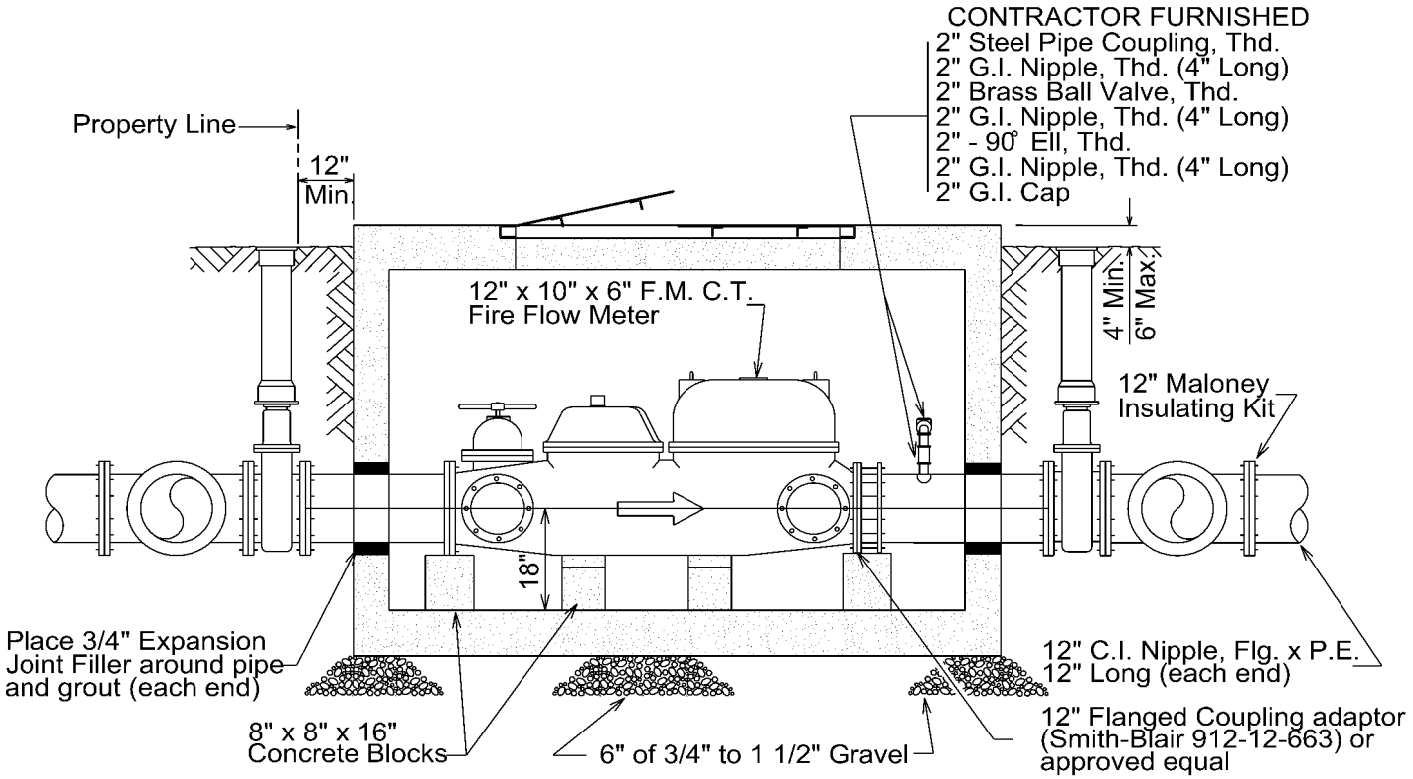
* Resilient Seat

PRODUCT NOTE:
NEPTUNE TECHNOLOGY GROUP
HIGH PERFORMANCE PROTECTUS III - FIRE SERVICE METER

PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	8" X 2" COMBINATION FIRE & DOMESTIC METER INSTALLATION	APPROVED March 2008	REVISED AUG 2019
		DD-824-13	SHEET 1 OF 1



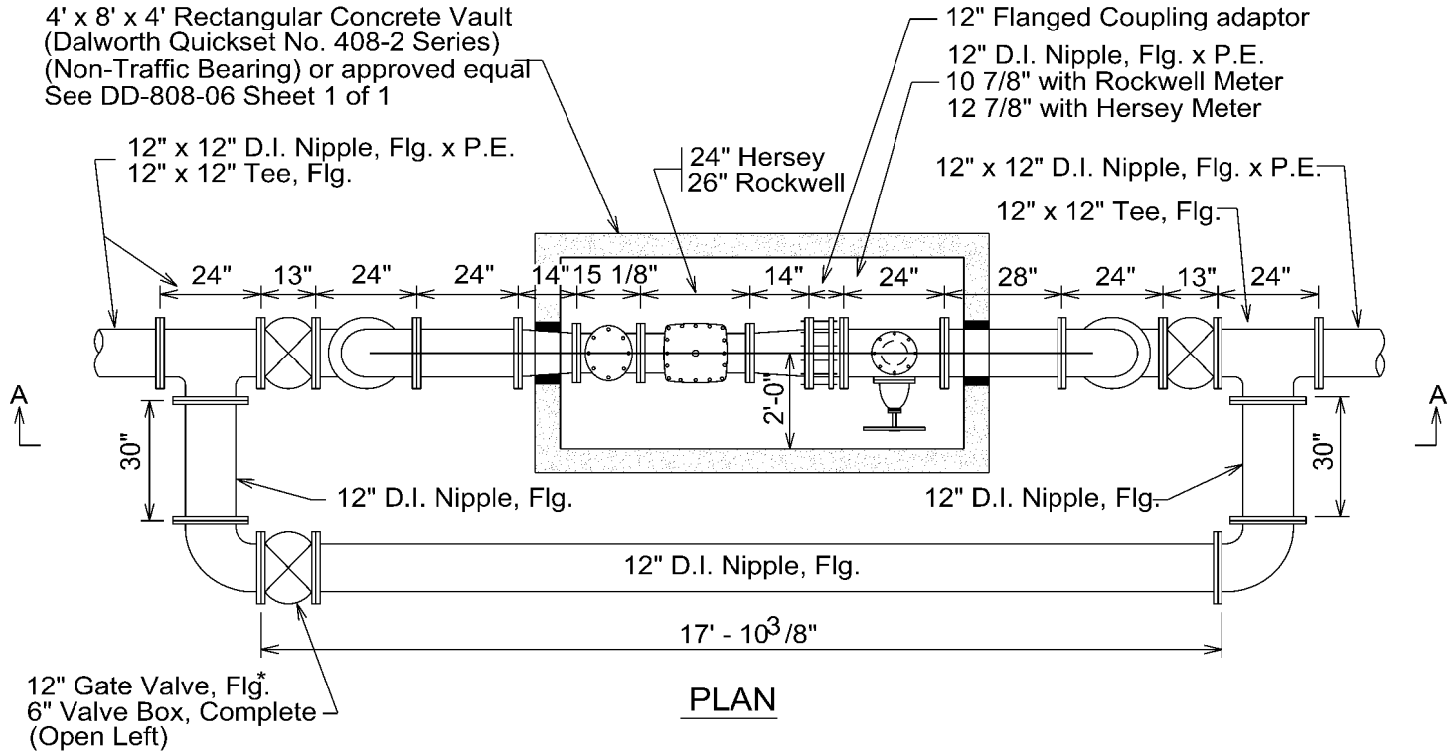
PLAN



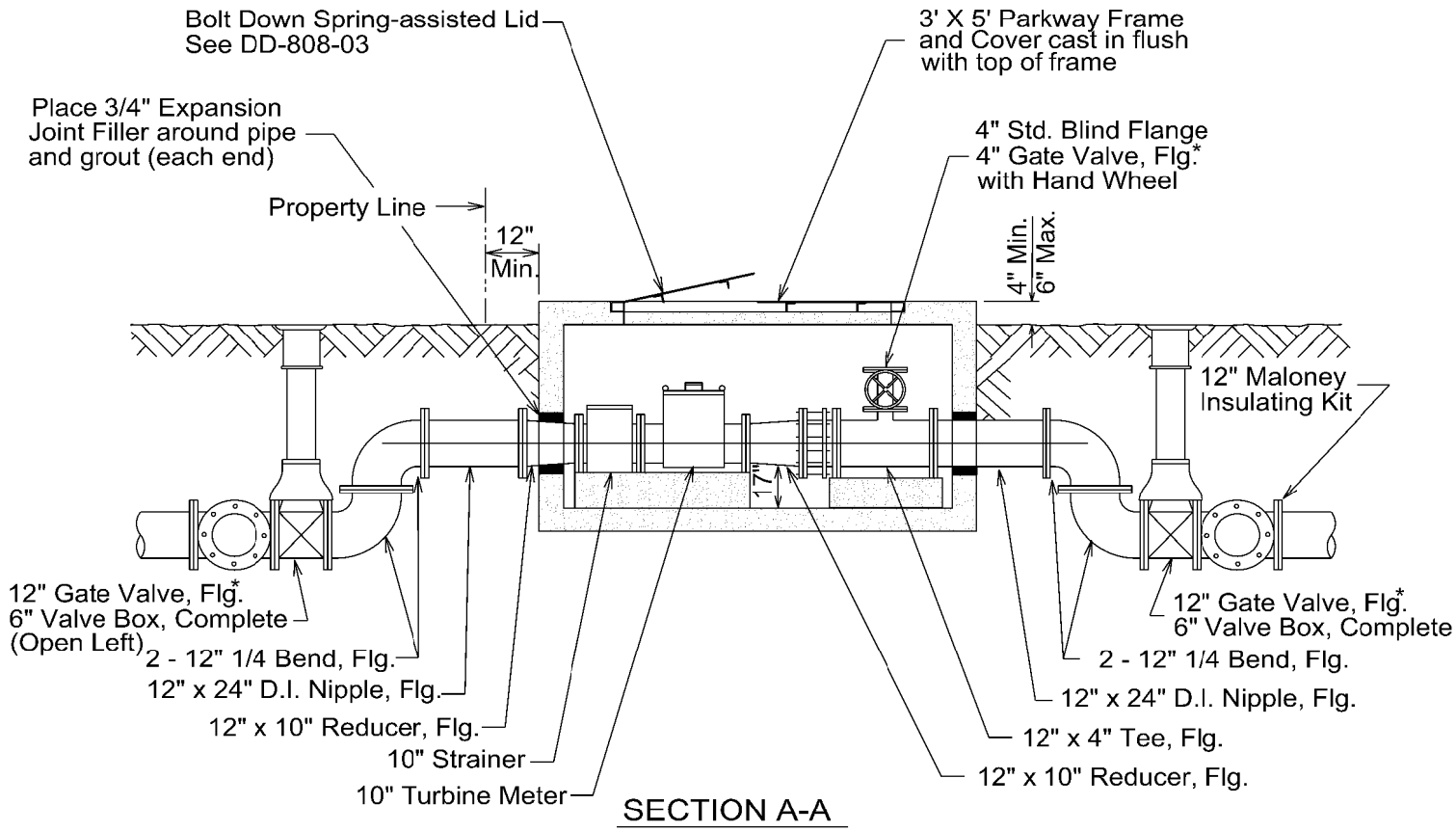
* Resilient Seat

SECTION A-A

PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	12" X 10" X 6 FIRE FLOW METER INSTALLATION	APPROVED March 2008	REVISED AUG 2019
		DD-824-14	SHEET 1 OF 1



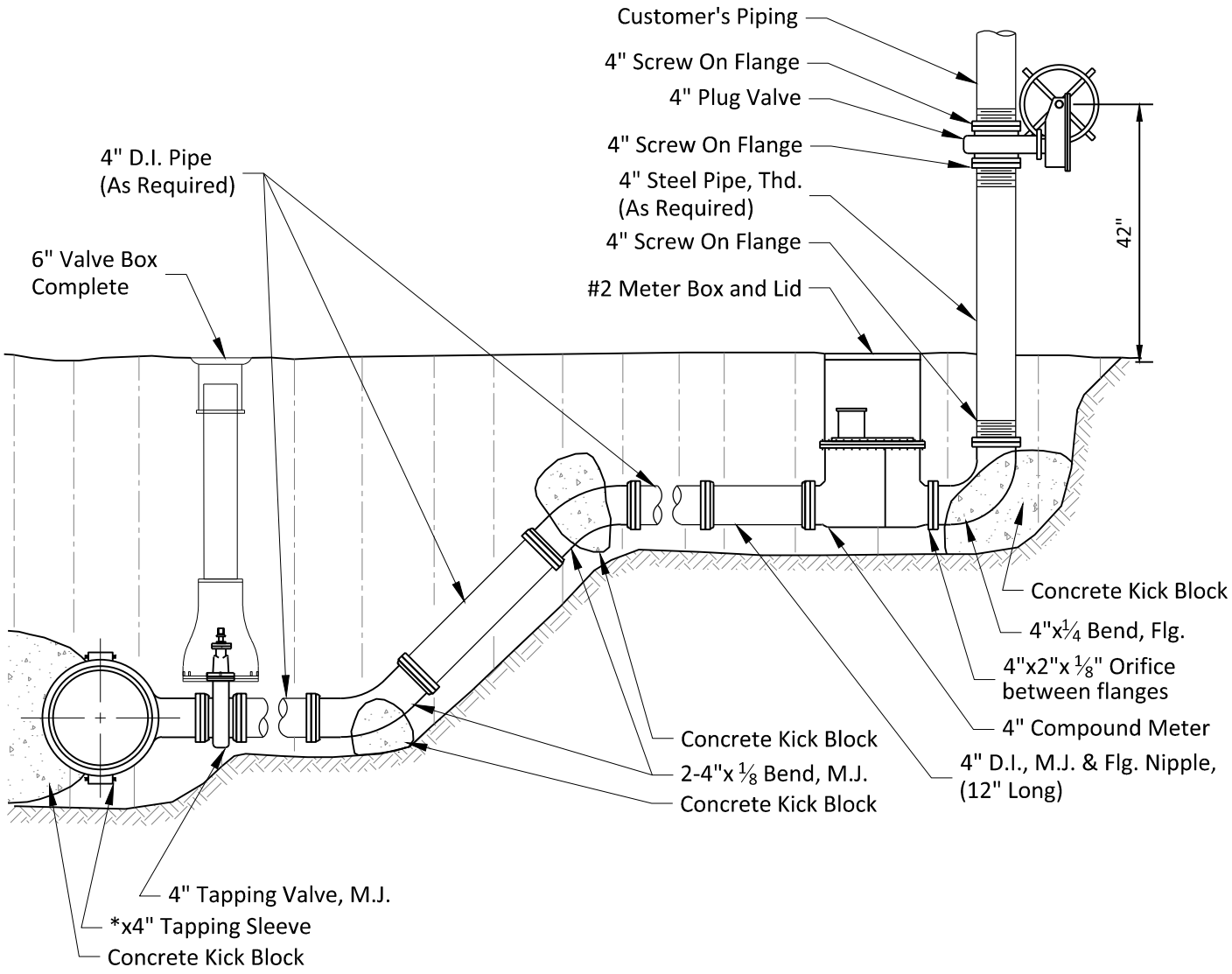
PLAN



SECTION A-A

* Resilient Seat

PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	12" SERVICE WITH 10" TURBINE METER	APPROVED March 2008	REVISED AUG 2019
		DD-824-15	SHEET 1 OF 1

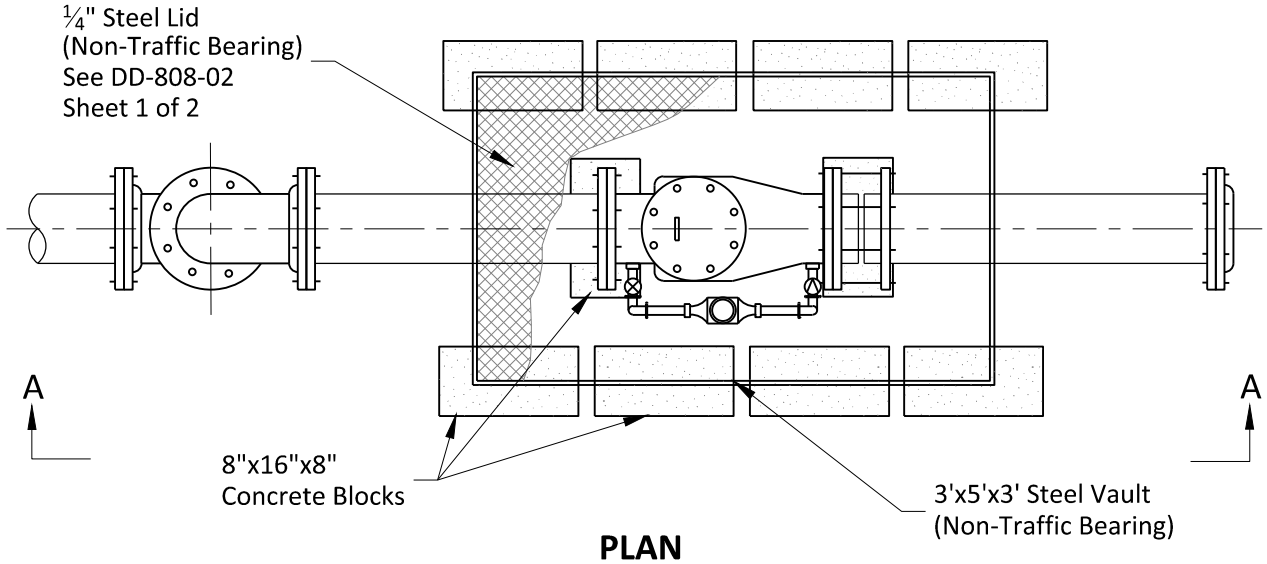


NOT TO SCALE

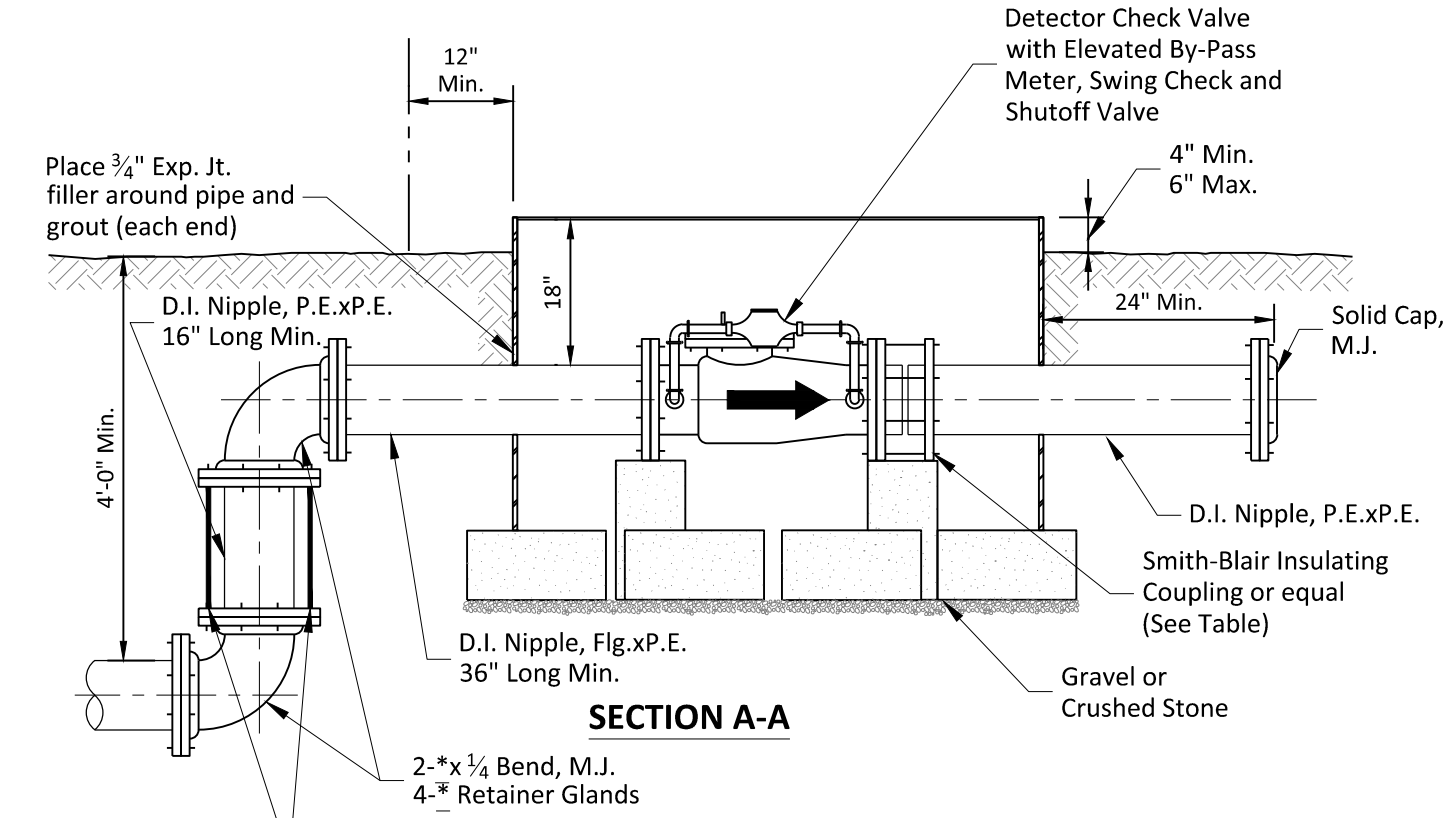
* Existing main size and type

PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	TYPICAL TEMPORARY 4" SERVICE WITH 4" METER (WITH PLUG VALVE)	APPROVED March 2008	REVISED December 2018
		DD-824-16	SHEET 1 OF 1

PIPE DIAMETER	DETECTOR CHECK	BY-PASS METER	SMITH-BLAIR COUPLING
6"	6"	¾"	1932-6-690
8"	8"	1"	932-8-905



PLAN

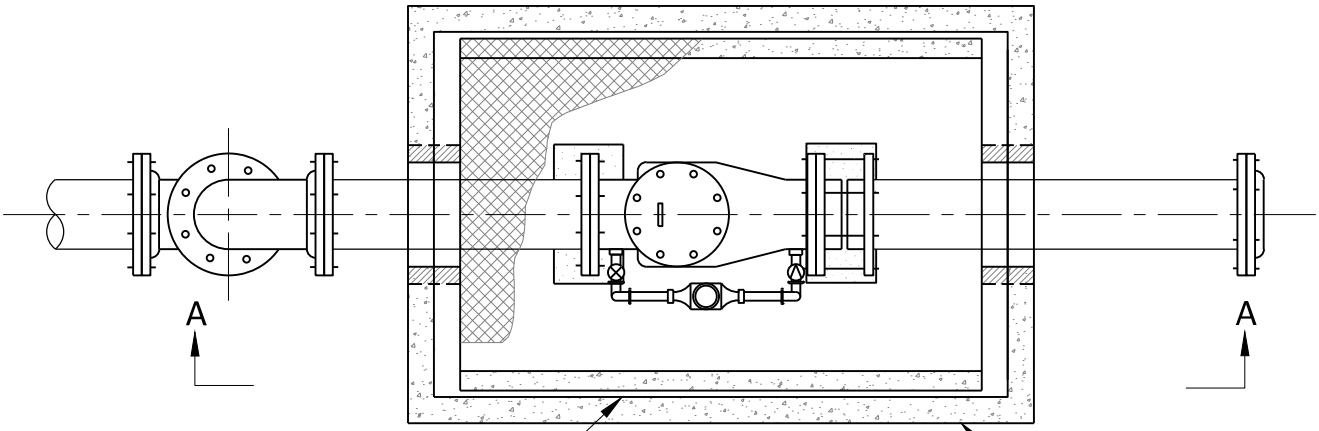


SECTION A-A

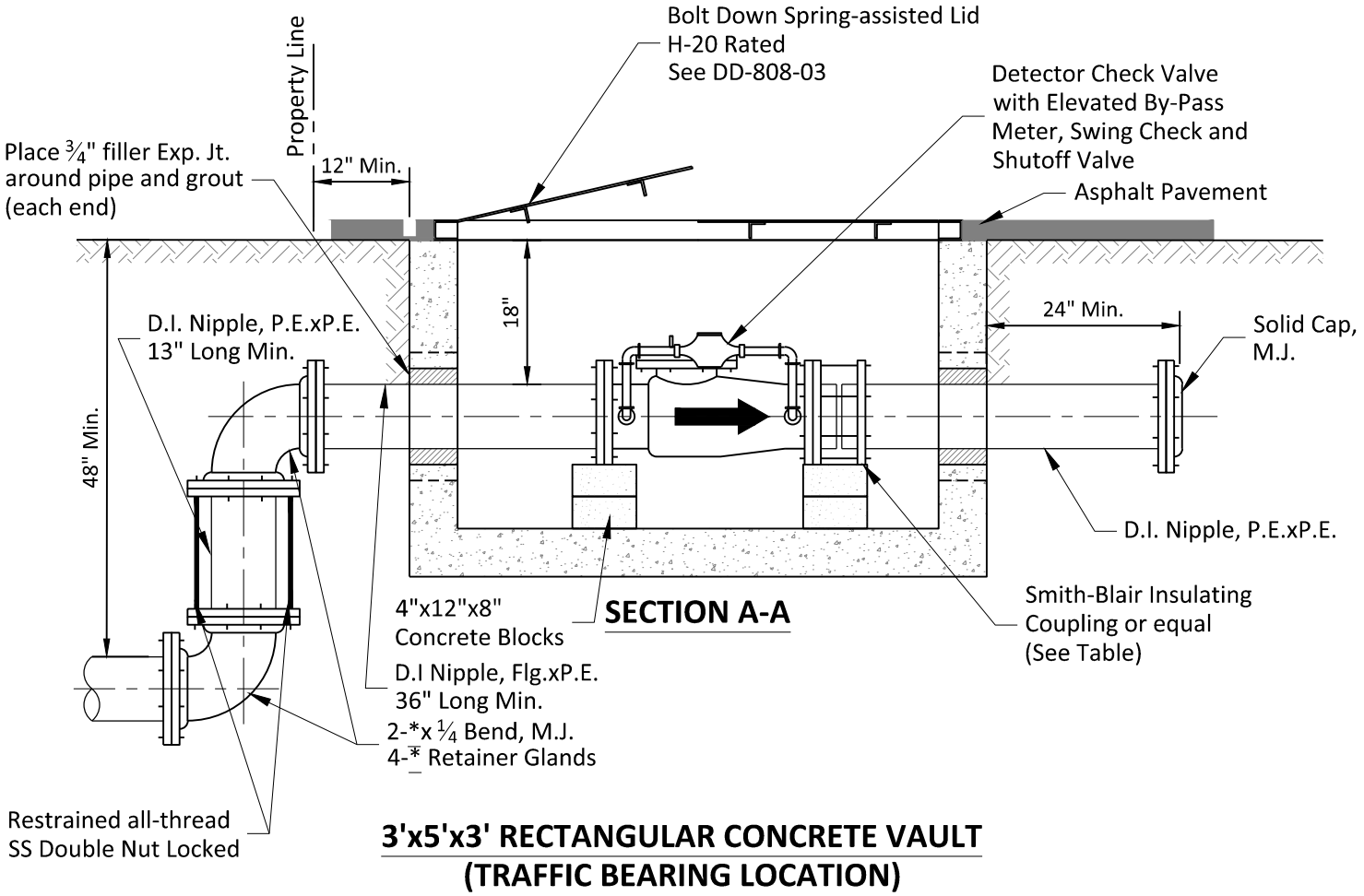
3'x5'x3' RECTANGULAR STEEL VAULT (NON-TRAFFIC BEARING LOCATION)

PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	6" & 8" DETECTOR CHECK FOR FIRE LINE	APPROVED	REVISED
		March 2008	December 2019
		DD-824-17	SHEET 1 OF 2

PIPE DIAMETER	DETECTOR CHECK	BY-PASS METER	SMITH-BLAIR COUPLING
6"	6"	¾"	1932-6-690
8"	8"	1"	932-8-905



PLAN

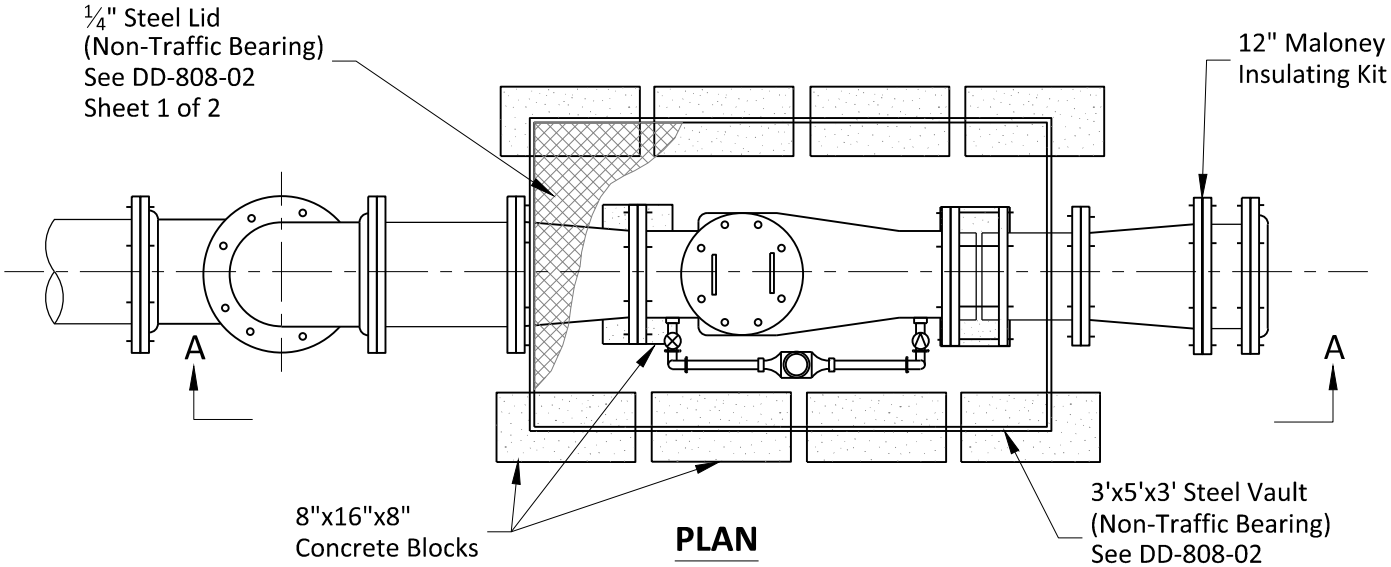


SECTION A-A

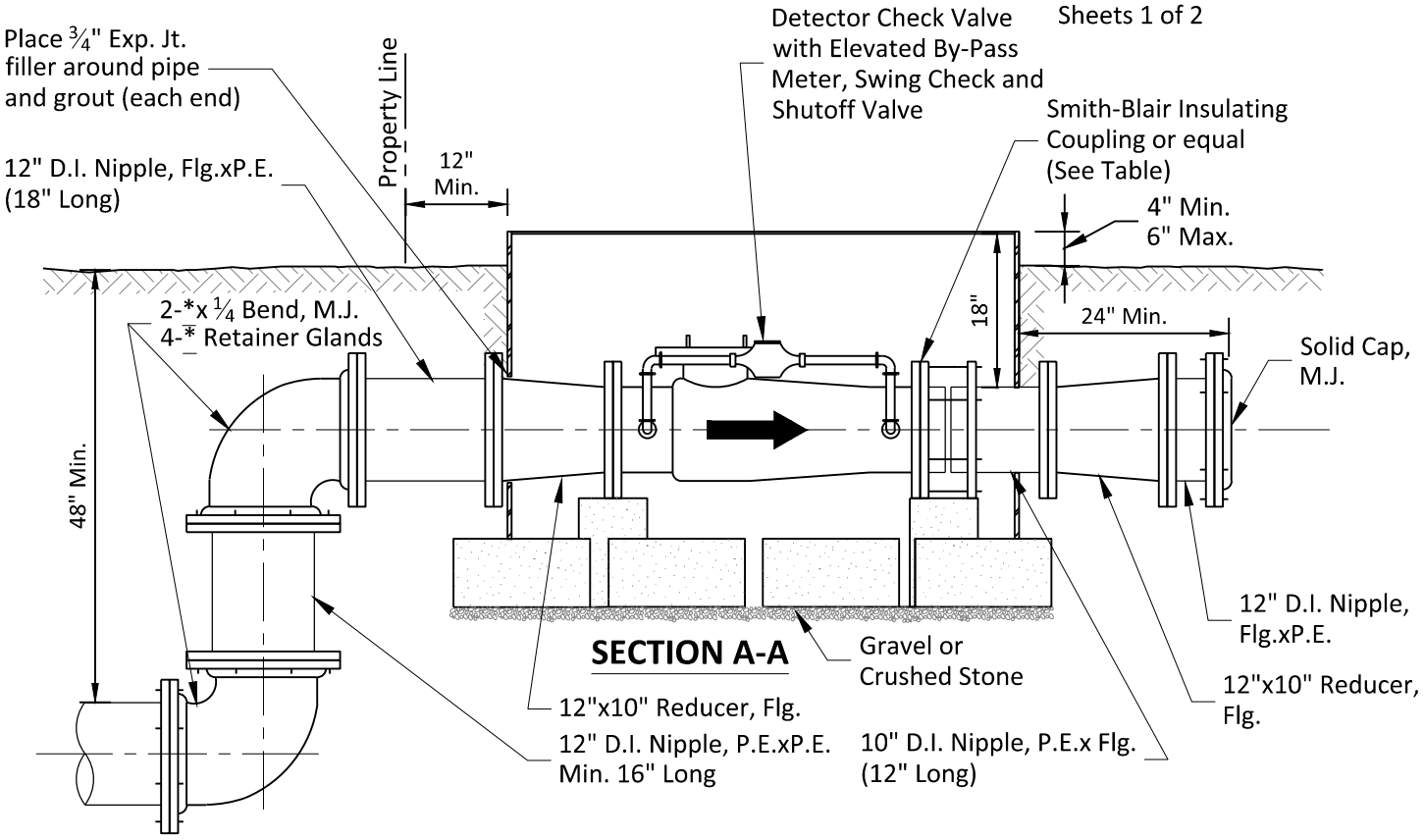
3'x5'x3' RECTANGULAR CONCRETE VAULT
(TRAFFIC BEARING LOCATION)

PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	6" & 8" DETECTOR CHECK FOR FIRE LINE	APPROVED March 2008	REVISED December 2018
		DD-824-17	SHEET 2 OF 2

PIPE DIAMETER	DETECTOR CHECK	BY-PASS METER	SMITH-BLAIR COUPLING
10"	10"	1"	912-10-663



PLAN

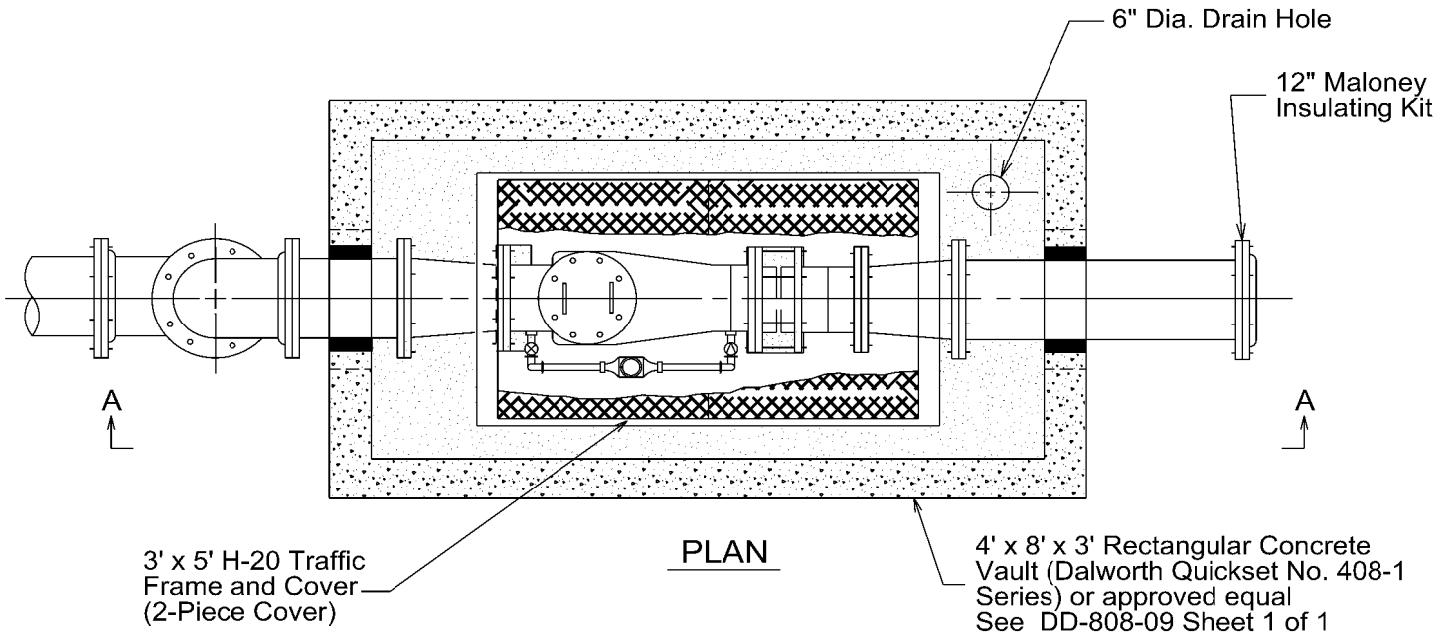


SECTION A-A

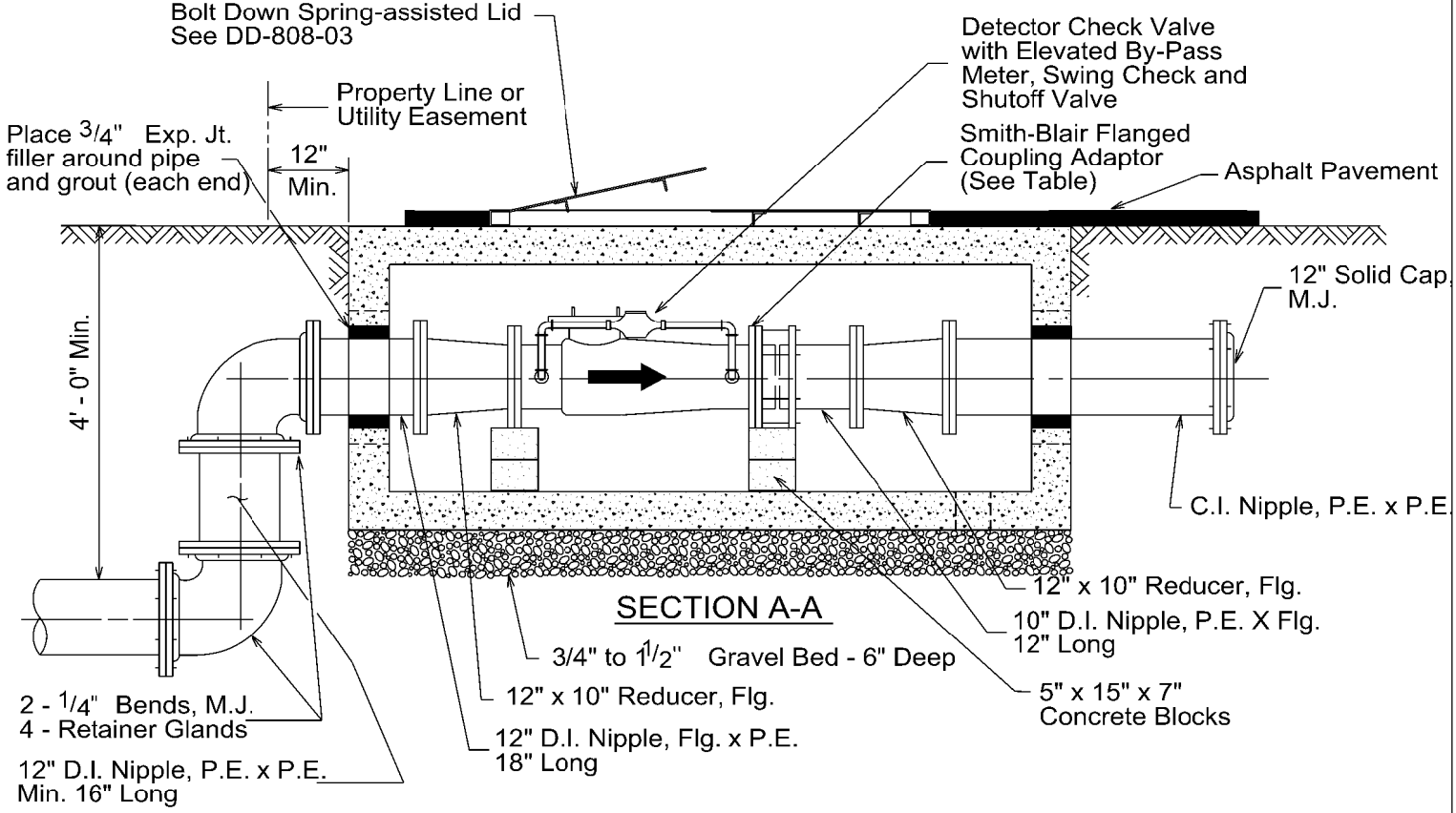
3'x5'x3' RECTANGULAR STEEL VAULT
(NON-TRAFFIC BEARING LOCATION)

PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	10"x12" DETECTOR CHECK FOR FIRE LINE	APPROVED March 2008	REVISED December 2018
		DD-824-18	SHEET 1 OF 2

PIPE DIAMETER	DETECTOR CHECK	BY-PASS METER	SMITH-BLAIR COUPLING
10"	10"	1"	912-10-663



PLAN

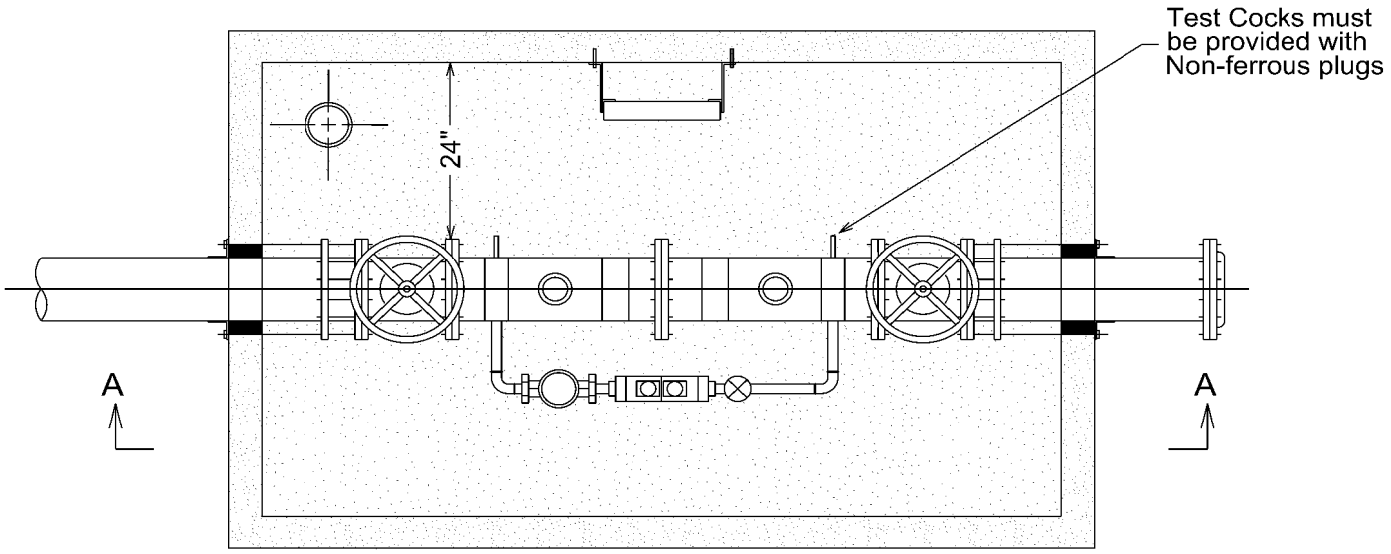


SECTION A-A

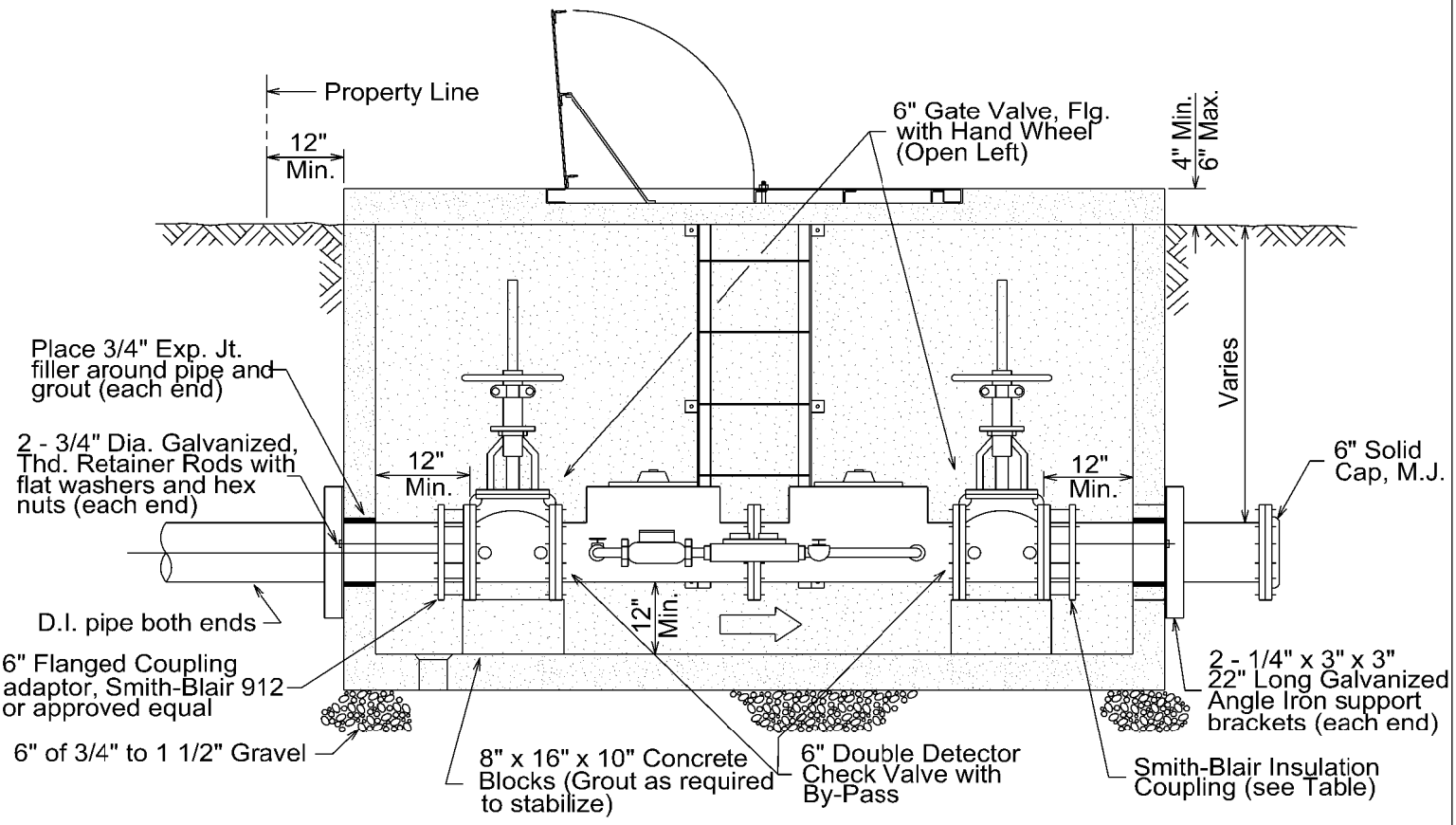
4' x 8' x 3' RECTANGULAR CONCRETE VAULT
(TRAFFIC BEARING LOCATION)

PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	10" X 12" DETECTOR CHECK FOR FIRE LINE	APPROVED March 2008	REVISED AUG 2019
		DD-824-18	SHEET 2 OF 2

Pipe Diameter	Double Detector Check	By-Pass Meter	Smith-Blair Coupling
6"	6"	5/8" - 3/4"	1932-6-690
8"	8"	5/8" - 3/4"	932-8-905



PLAN

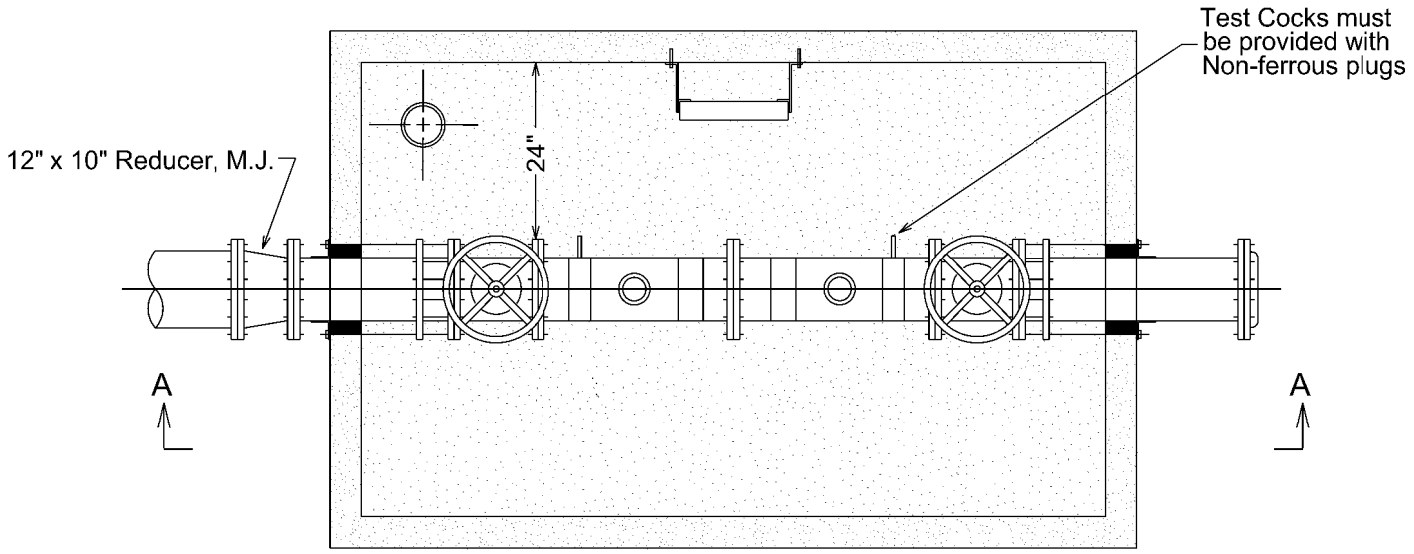


SECTION A-A

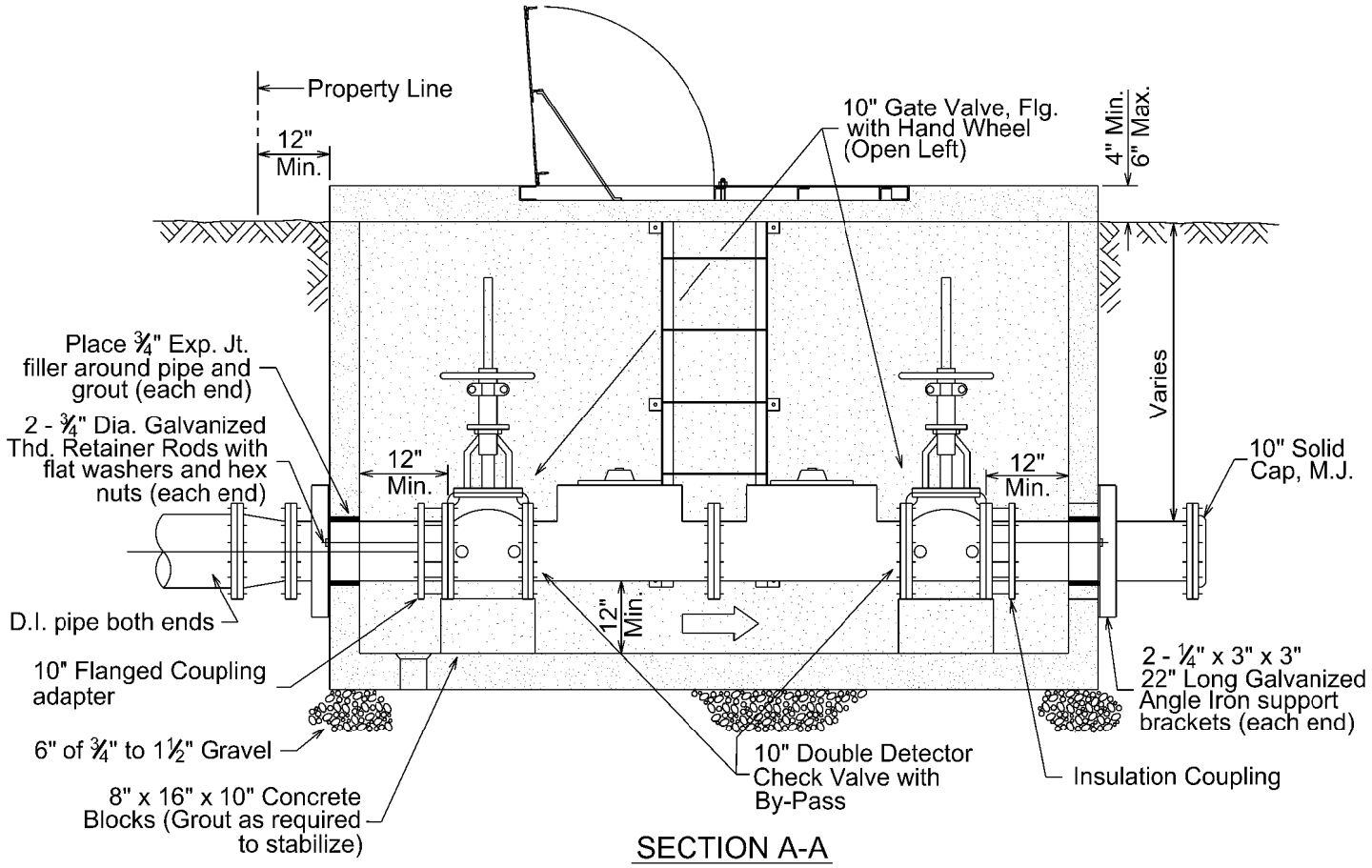
Notes:
1. Tamper switches may be required by Fire Code.
2. Assemblies must be U.L. Listed for Fire Protection purposes.

PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	6" & 8" DOUBLE CHECK (DCDA) DETECTOR ASSEMBLY INSTALLATION	APPROVED March 2008	REVISED AUG 2019
		DD-824-19	SHEET 1 OF 1

Pipe Diameter	Double Check Valve Assembly
12"	10"



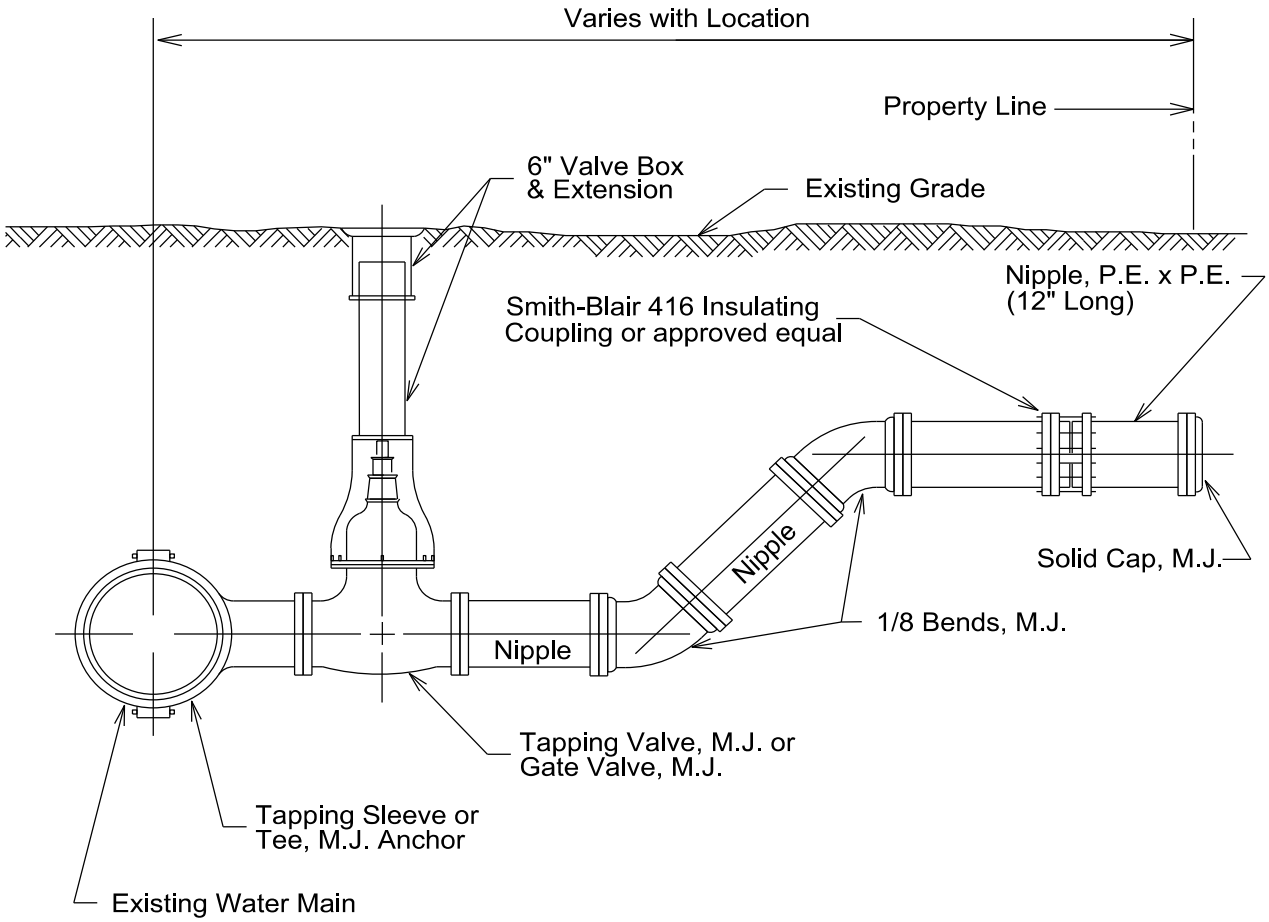
PLAN



SECTION A-A

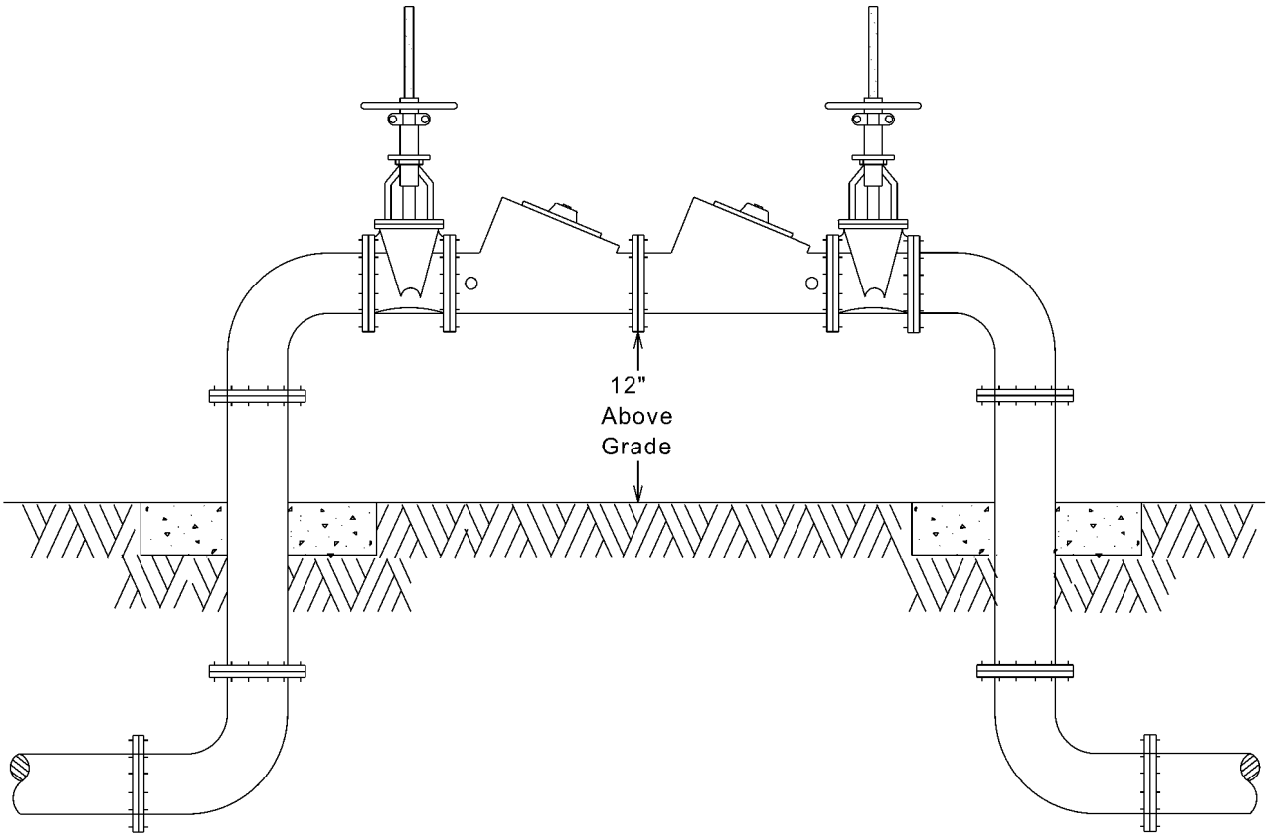
Notes:
1. Tamper switches may be required by Fire Code.
2. Assemblies must be U.L. Listed for Fire Protection purposes.

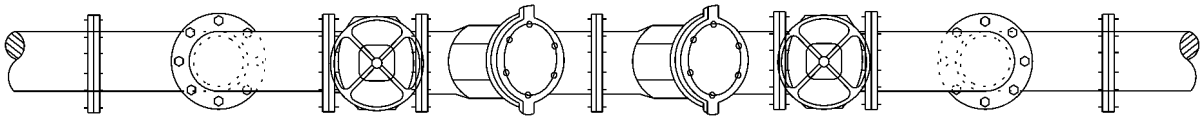
PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	10" DOUBLE CHECK ASSEMBLY INSTALLATION (DCVA)	APPROVED	REVISED
		March 2008	AUG 2019
		DD-824-20	SHEET 1 OF 1



Notes:
Thrust Blocking as per San Antonio Water System Specifications.

PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	4", 6" & 8" NON-METERED FIRE SERVICE	APPROVED March 2008	REVISED AUG 2019
		DD-824-21	SHEET 1 OF 1





PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	DOUBLE CHECK ASSEMBLY (DCVA) ABOVE GRADE INSTALLATION	APPROVED June 2009	REVISED AUG 2019
		DD-824-22	SHEET 1 OF 1