

**TUSCARAWAS COUNTY
METROPOLITAN SEWER DISTRICT**

STANDARD DRAWINGS AND SPECIFICATIONS

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TABLE OF CONTENTS

TECHNICAL SPECIFICATIONS

Sanitary Sewer Specifications

Section 100	Sewer Service Line Specifications
Section 110	General Requirements for Privately Constructed Sanitary Sewers
Section 115	Grinder Pump Station and Private Force Main
Section 120	Internal Inspection of Sanitary Sewers
Section 121	Air Testing of Gravity Sanitary Sewers
Section 122	Deflection Testing of Gravity Sanitary Sewers
Section 123	Leakage Testing for Force Main Construction

Waterline Specifications

Section 200	Water Service Line Specifications
Section 201	Specifications for Residential Booster Pumps and Fire Pumps
Section 210	General Requirements for Privately Constructed Waterlines
Section 220	Hydrostatic Pressure Testing of Water Facilities
Section 221	Waterline Testing and Disinfection

STANDARD DRAWINGS

Sanitary Sewer Drawings

SD-100	Sewer Line Responsibility
SD-101	Typical House Connection Detail
SD-102	Typical Sewer Trench Detail
SD-103	Typical Force Main Detail
SD-104	Lateral Saddle Wye
SD-105	**Reserved**
SD-106	Sewer Adapter and Couplings
SD-107	**Reserved**
SD-108	**Reserved**
SD-109	**Reserved**
SD-110	**Reserved**
SD-120	Grinder Pump Station
SD-150	Septic Tank Detail
SD-151	Septic Tank Effluent Pump (STEP) Station
SD-152	Typical STEP Layout
SD-153	Typical Gravity Septic Tank Layout
SD-160	**Reserved**
SD-161	**Reserved**

Waterline Standard Drawings

SD-200	Water Service Line Responsibility (up to and including 2 inch)
SD-201	Water Service Line Responsibility (greater than 2 inch)
SD-202	**Reserved**
SD-203	**Reserved**
SD-204	Fire Hydrant Detail
SD-205	Typical Waterline Trench
SD-206	Valve Detail
SD-207	**Reserved**

SD-208	Typical Water Service Line
SD-209	Typical Domestic Meter Pit Detail
SD-215	Thrust Blocking Details
SD-216	Thrust Blocking Details

Section 100
Sewer Service Line Specifications
Effective Date: January 22, 2021

A. Materials

- 1) The minimum pipe size shall be 4 inches, inside diameter
- 2) The pipe shall be PVC SDR 35 ASTM D-3034 with bell and spigot gasket joints in accordance with ASTM D-3212 installed according to ASTM D-2321, unless otherwise directed by the Sanitary Engineer.
- 3) Granular bedding and backfill shall be #8 or #57 gradation in accordance with ODOT construction and material specifications.
- 4) Adapters and couplings shall be Fernco 1000 Series, Stainless Steel shielded couplings or approved equal.

B. Installation

- 1) Installation shall in general conformance with all applicable District Standard Drawings.
- 2) The lateral sewer and service sewer shall be laid so as to be centered in a dry trench and in a straight line on a uniform slope.
- 3) The minimum slope shall be 1/4 inch per foot (2.08% or 2.08 feet of fall in 100 feet of length).
- 4) Sewer clean-outs shall be installed on the building lateral sewer within 10 feet of the building foundation, at all changes in direction of the sewer lateral, and at the property line or easement / right-of-way line. For long building lateral sewers, clean-outs shall be required at a minimum spacing interval of 150 feet.
- 5) No surface or ground water collecting in basement or foundation excavations shall be allowed to enter the sanitary sewer.
- 6) Bedding: The sanitary sewer pipe shall be so laid that the barrel will be supported over its full length on a minimum 4 inches of granular bedding. Granular bedding shall be placed on undisturbed bottom of the trench. When the trench has been over-excavated because of poor foundation material, it shall be brought to proper grade with compacted granular backfill prior to placement of the granular bedding.
- 7) Backfill
 - a. Initial Backfill: Place the first 12 inches of backfill in the trench using the same granular material that was used for the bedding material.
 - b. Place further backfill in 6 inch lifts and mechanically compact each lift before subsequent lifts.
 - c. Backfill using natural soil that is free from stones greater than 2 inches in dimension; free from organic or deleterious material; debris; rubbish; or frozen material.

- d. Where the sewer pipe is under or adjacent to existing pavement, backfill with the same granular material that was used for bedding and initial backfill.

8) Backwater Valves

- a. Where required, backwater valves conforming to the following requirements shall be used:
 - i. Bearing parts of backwater valves shall be of corrosion-resistant materials and shall comply with ASME A112.14.1, CSA B 181.1 or CSA B 181.2. Backwater valves shall be so constructed as to provide a mechanical seal against backflow. When fully opened, backwater valves shall have a capacity not less than that of the pipes in which they are installed. Backwater valve shall be installed so that access is provided to the working parts for service and repair. Installation, operation, maintenance, repair and replacement of the backwater valve shall be the responsibility of the customer.

C. Testing

- 1) All sewer laterals shall be tested for leakage using low pressure air testing in accordance with Section 121 – Air Testing of Gravity Sanitary Sewers.
- 2) Televised internal inspection of sewer laterals may be required at the sole discretion of the Sanitary Engineer.

Section 110
General Requirements for Privately Constructed Sanitary Sewers
Effective Date: January 22, 2021

Sanitary sewers and appurtenances shall be constructed according to Tuscarawas County Sanitary Engineering Department specifications and details in effect at time of construction.

Roof drains, foundation drains and other clean water connections to the sanitary sewer are prohibited.

Prior to start of construction, the contractor shall schedule a pre-construction meeting with the construction engineer of the Tuscarawas County Sanitary Engineering Department (330-874-3262). A minimum of 72 hours notice is required to schedule this meeting.

The contractor shall notify all property owners along the route of the sanitary sewer at least three (3) days prior to start of construction.

The contractor shall alert the Utilities Protection Service at least 48 hours prior to start of construction.

Approval by the Tuscarawas County Sanitary Engineering Department constitutes neither expressed nor implied warranties as to fitness, accuracy, or sufficiency of plans, designs or specifications.

The contractor shall be responsible for properly maintaining existing sanitary flow during the construction and testing of the proposed improvements. The contractor's methods for maintaining flow must be approved by the Tuscarawas County Sanitary Engineering Department at the pre-construction meeting.

All rough grading to within six (6) inches of finished grade shall be completed within the rights-of-way and easements prior to sanitary sewer construction.

Bulkheads shall be erected in existing manholes where taps for new mainline sewers are made and shall remain in place until the new sewers are complete, tested and approved. In cases where a bulkhead would interrupt the flow from existing service connections, the bulkhead shall be placed in the first new manhole upstream of the existing manhole.

Minimum vertical clearance between sanitary sewer and waterline shall be 18 inches. Minimum horizontal separation shall be 10 ft.

Sanitary sewer service laterals shall be 4-inch diameter and be laid at no less than 1/4 inch per foot (2.08%) grade.

No changes to sanitary sewer service lateral locations shall be made without the approval of the Tuscarawas County Sanitary Engineer.

For new subdivision construction, sewer service laterals shall extend 10 ft. into each lot when the main sewer is in a street right-of-way, and shall terminate at the easement line when the main sewer is in an easement. For other sewer extensions, sewer service laterals shall terminate at the right-of-way line or the easement line, whichever is applicable.

Minimum cover over sanitary sewer shall be 4 ft.

Acceptable sanitary sewer pipe materials are as follows:

Sanitary sewers shall be PVC SDR 35 ASTM D-3034 with joints in accordance with ASTM D-3212 installed in accordance with ASTM D-2321, unless otherwise directed by the Sanitary Engineer.

All sanitary sewers, 8-inch diameter and larger, must pass an internal television inspection. The contractor shall provide complete internal inspection videotape to the Tuscarawas County Sanitary Engineering Department. The videotaping procedure shall be in accordance with Section 120 – Internal Television Inspection.

A deflection test shall be required for all pipe of 8-inch diameter and larger. The test shall be conducted at least 30 days after completion of backfill and shall be in accordance with Tuscarawas County Sanitary Engineering Department specifications. The allowable deflection rate shall not exceed five (5%) percent. Testing shall be in accordance with Section 122 – Deflection Testing of Gravity Sewers.

All sanitary sewers and sewer laterals must pass a low pressure air test, which shall be conducted in accordance with Section 121 – Air Testing of Gravity Sanitary Sewers. The maximum allowable test leakage shall be 100 gal/inch of diameter/mile/day. This test shall conform to ASTM F-1417.

Manhole construction shall meet the requirements of ASTM C-478 and C-443. All manholes shall be air/vacuum tested in accordance with and meet all the requirements of ASTM C1244.

Connections to existing manholes shall be core drilled, with benches and channels formed and repaired as necessary.

Any manhole drop attachments shall be "outside" type.

Manhole top of casting elevations may require adjustment during site grading. Manhole covers may not be buried. Upon completion of construction and restoration, all manholes, proposed and existing, shall be in conformance in all respects with Tuscarawas County Sanitary Engineering Department specifications and details.

All sanitary sewer trenches beneath proposed or existing pavement shall be compacted in Lifts, in a manner, and with material as specified by the Tuscarawas County Sanitary Engineering Department and all applicable ODOT specifications.

Section 120
Internal Inspection of Sanitary Sewers
Effective Date: January 22, 2021

Requirements

The internal inspection shall be video recorded and meet the following requirements:

- 1) All video recordings shall be done in color on DVD showing continuous coverage of the sanitary sewer from manhole to manhole.
- 2) The recording shall be in good focus and have adequate but not excessive lighting. The light intensity shall be adjusted to assure a quality viewing when the pipe changes color due to pipe material used or mud on the pipe.
- 3) The recording shall be free from video "noise" in the form of snow, streaks, migrating color or focus patterns or other electronic interference which would hinder observation of the sanitary sewer. The view shall be clear and unobstructed from dirt or water condensation on the lens or water vapor in the sewer line.
- 4) The video recording shall show the actual footage of the sewer reach located at the top center of the screen. Any tape with footage counters or other notation at the bottom center obstructing the view of the pipe invert shall be summarily rejected. The camera drag line shall not obstruct the view of the flow line of the pipe.
- 5) The camera travel and view shall be upstream so that the butt-ends of the pipe spigot will show clearly. The video inspection sequence shall be from the lowest manhole to the farthest upstream "deadend" manhole. Each subsequent branch shall be recorded from a manhole already recorded to the deadend manhole of the branch.
- 6) The video recording shall be augmented with audio voice recording calling out the nomenclature of the sewer system, the pipe, manholes, wyes, debris, mud, water, bad joints, cracked, damaged or deformed pipe, joints or fittings or any other pertinent information. The voice shall be clear, concise, and loud enough to overcome any background noise from machinery or equipment. The audio annotation shall start by identifying the pipe footage from the downstream manhole of the run and then go on to identify the features of the sewer as listed above. The camera shall stop at any feature that is out of the ordinary. It may be necessary to reverse the camera and pull past an unusual feature several times to capture a good view.
- 7) At each manhole, video and audio annotation shall be presented identifying in a uniform manner the following information:
 - a. Manhole No. from approved construction drawings
 - b. Manhole No. to which the camera is about to travel
 - c. Project Name
 - d. Street Name
 - e. Date of recording
 - f. Name of Company and Person performing the inspection
 - g. Size and material of pipe

Each project or contract shall be recorded separately and supplied on DVD(s). Each DVD shall be marked with the following information:

- 1) Project Name and Number
- 2) Street Name as applicable
- 3) Date of Recording
- 4) Name of Company and Person performing the inspection
- 5) DVD Number if more than one
- 6) Each DVD shall be accompanied with an index for all DVD(s) and their contents.
Information required:
 - a. DVD Number
 - b. File Name for each manhole reach with accompanying manhole numbers.
 - c. Project Identifying Information as listed in the previous paragraph.

Section 121
Air Testing of Gravity Sanitary Sewers
Effective Date: January 22, 2021

Air-testing of projects will be conducted as the project is being installed - at no time will more than four (4) manhole to manhole reaches of pipe be installed before air-testing is performed.

After backfilling a manhole to manhole reach of sanitary sewer line, including service sewers constructed to the Right of Way line, the Contractor shall, at his expense, conduct a Line Acceptance Test using a low pressure air. The test shall be performed using the below stated equipment standards according to the stated procedures and under the supervision of the Engineer.

Equipment

Equipment used shall meet the following minimum requirements and be approved by the Tuscarawas County Sanitary Engineer.

- 1) Pneumatic plugs shall have a sealing length equal to or greater than the diameter of the pipe to be inspected.
- 2) Pneumatic plugs shall resist internal test pressures without requiring external bracing or blocking.
- 3) All air used shall pass through a single control panel.
- 4) Three (3) individual hoses shall be used for the following connections.
 - a. From control panel to pneumatic plugs for inflation.
 - b. From control panel to sealed line for introducing the low pressure air.
 - c. From sealed line to control panel for continually monitoring the air pressure rise in the sealed line.

Procedures

All pneumatic plugs shall be seal tested before being used in the actual test installation. One (1) length of pipe shall be laid on the ground and sealed at both ends with the pneumatic plugs to be checked. Air shall be introduced into the plugs to 25 psig. The sealed pipe shall be pressurized to 5 psig.

The plugs must hold against this pressure without having to be braced.

After a manhole to manhole reach of pipe has been backfilled and cleaned, and pneumatic plugs are checked by the above procedure, the plugs shall be placed in the line at each manhole and inflated to 2.5 psig. Low pressure air shall be introduced into this sealed line until the internal air pressure reaches 4 psig greater than the average back pressure of any ground water that may be over the pipe. At least two (2) minutes shall be allowed for the air pressure to stabilize.

After the stabilization period (3.5 psig minimum pressure in the pipe), the air hose from the control panel to the air supply shall be disconnected. The portion of the line being tested shall be termed "Acceptable" if the time required in minutes for the pressure to decrease from 3.5 to 2.5 psig. (Greater than the average back pressure of any ground water that may be over the pipe) shall not be less than the time indicated in the Uni- Bell PVC Pipe Association's "Recommended Practice for Low-Pressure Air Testing of Installed Sewer Pipe" Bulletin UNI- B-6-98 (latest Edition). Lateral sewers shall be tested at the same time as the main sewer.

In areas where ground water is known to exist, the Contractor shall install a one-half (1/2) inch diameter capped pipe nipple, approximately ten (10") inches long, through the manhole wall on top of one of the sanitary sewer lines entering the manhole. This shall be done at the time the sanitary sewer line is installed. Immediately prior to the performance of the Line Acceptance Test, the ground water shall be determined by removing the pipe cap, blowing air through the pipe nipple into the ground so as to clear it, and then connecting a clear plastic tube to the nipple. The plastic tube shall be vertical and measurement of the height in feet of water over the invert of the pipe shall be taken after the water has stopped rising in this plastic tube. The height in feet shall be divided by 2.3 to establish the pounds of pressure that will be added to all readings. (For example, if the height of water is eleven and one-half (11-1/2') feet, then the added pressure will be 5 psig. This increased the 3.5 psig to 8.5 psig and the 2.5 psig to 7.5 psig. The allowable drop of one (1) pound and the timing remain the same.

If a line acceptability test is being conducted on more than one (1) manhole reach of pipe, the entire section being tested shall meet the line acceptability requirements as if only one (1) of the manhole reaches in the section were being tested. If the installation fails to meet this requirement, the Contractor shall, at his own expense, determine the source of leakage. He shall then repair or replace all defective materials and/or workmanship.

Section 122
Deflection Testing of Gravity Sanitary Sewers
Effective Date: January 22, 2021

Deflection testing shall be conducted 30 days after installation and backfilling of the pipe or as otherwise directed by the Engineer.

The contractor shall furnish all necessary equipment including an approvable mandrel or other approved device and conduct the deflection tests at the direction of the Engineer.

The allowable deflection rate shall not exceed 5%.

The Engineer has the option to require a second test anytime between initial testing and release of the maintenance bond. Any sections found to have a deflection in excess of the specified rate shall be excavated and corrected either by re-bedding, pipe replacement or both as directed by the engineer. These corrections shall be required if warranted by either initial or secondary testing.

Section 123
Leakage Testing for Force Main Construction
Effective Date: January 22, 2021

All force main construction shall be subject to hydrostatic leakage testing as line sections are completed unless otherwise directed by the Engineer.

Before sections are tested, the following must be considered. The pipe must be sufficiently backfilled to prevent movement. Where reaction or thrust blocks are being used, adequate curing time must be allowed. A curing time of seven (7) days shall be required. Test ends shall be capped and braced to withstand thrusts that are developed under test pressures.

The test shall be under the direction of the Engineer. The Contractor is to furnish pressure gauge, pumps, pipe, bulkheads and any other suitable appurtenances necessary to make these tests.

Each section being tested shall be filled slowly with water, and all air shall be expelled during filling and prior to testing.

After testing, the section shall be drained and in cold weather, special care and precautions shall be taken in order to prevent injury due to freezing of the piping and appurtenances.

Leakage is defined as the quantity of water that must be supplied into the pipe as required to maintain the specified leakage test pressure after the pipe has been filled with water and the air expelled as herein required.

In calculating leakage, no allowance will be given for any leakage at valves, bulkheads, etc.

For force main pipe, the leakage tests as specified herein or as directed by the Engineer shall govern. Generally, the line shall be filled and allowed to stand for twenty-four (24) hours, and then hydrostatically tested for two (2) hours at the specified pressure. Allowable leakage shall be determined by the following formula:

$$L = \frac{ND\sqrt{P}}{7,400}$$

L = Allowable leakage in gal./hour
N = Number of joints in section tested
D = Nominal diameter of pipe in inches
P = Test pressure in pounds per square inch gauge

The test pressure shall be 150% of the pump shut-off head, or 100 psi whichever is greater.

All defective materials and construction found in the pipeline as a result of the leakage test shall be corrected by removal of the defective materials and reconstruction with sound materials and construction. The entire section shall then be retested in accordance with the foregoing.

Any testing performed without the knowledge of the Engineer shall not be considered as a test meeting these specifications.

Section 200
Water Service Line Specifications
Effective Date: January 22, 2021

1. For service lines up to and including 2"

A. Materials

- 1) Water service lines shall be polyethylene (PE) pressure tubing, copper tubing size (CTS), in accordance with ANSI/AWWA C901 and shall be NSF certified.
- 2) Furnish stainless steel stiffeners for connections to fittings.

B. Installation

- 1) Water service lines shall have a minimum cover of 48 inches, measured from finish grade elevation to the top of the water service line. Where minimum cover cannot be reasonably achieved, alternative protective measures, such as an insulating jacket, may be used as approved by the Sanitary Engineer on a case by case basis.
- 2) Bedding: Place a minimum of 4 inches of granular material, either course sand or pea gravel, in the bottom of the trench.
- 3) Backfill
 - a. Initial backfill: Place the first 12 inches of backfill in the trench using the same granular material that was used for the bedding material.
 - b. Place a pipe locator strip on top of the granular backfill before further backfill.
 - c. Place further backfill in 6 inch lifts and mechanically compact each lift before placing subsequent lifts.
 - d. Backfill using natural soil that is free from stones greater than 2 inches in dimension; free from organic or deleterious material; debris; rubbish; or frozen material.
 - e. Installation responsibility shall be as shown on Standard Drawing SD-200.

C. Leakage Testing

- 1) Perform a leak test prior to covering the pipe. The leak test shall be done in the presence of a District representative.

2. For service lines 3 inch diameter and larger

A. Water service lines 3 inches in diameter and larger shall be installed in accordance with Section 210 – General Requirements for Privately Constructed Waterlines supplemented as follows:

- 1) 3 inch water service lines shall be polyvinyl chloride (PVC) SDR 21 in accordance with ASTM D 1784 with push-on joints conforming to ASTM D 2672. Pipe and fittings shall conform to NSF 61. Installation shall be in accordance with the above referenced Section 210 – General Requirements for Privately Constructed Waterlines.
- 2) 4 inch and larger water service lines shall be one of the following:

- a. Polyvinyl Chloride (PVC) Pipe, Joints, and Fittings conforming to AWWA C900, DR 14 with push-on type pipe joints conforming to ASTM D 3139 with a thickened bell and with a rubber gasket conforming to ASTM F 477.
 - b. Ductile Iron Pipe, Joints, and Fittings conforming to ANSI/AWWA C151/A21.51 and to ANSI/AWWA C150/A21.50 for thickness design with a cement mortar lining conforming to ANSI/AWWA C104/A21.4. Gaskets shall conform to ANSI/AWWA for each length of pipe and suitable for the type of joint of the pipe. Mechanical joints shall conform to ANSI/AWWA C111/A21.11. Fittings shall conform to ANSI/AWWA C110/A21.10 or ANSI/AWWA C153/A21.53, and ANSI/AWWA C111/A21.11. Fittings shall be cement mortar lined according to ANSI/AWWA C104/A21.4.
- B. Hydrostatic Testing shall be required in accordance with Section 220 – Hydrostatic Testing of Water Facilities.
- C. Provide flushing, disinfection, and testing of all water service lines 3 inch diameter and larger in accordance with Section 221 – Waterline Testing and Disinfection.
- D. Installation responsibility shall be as shown on the District's Standard Details.

Section 201
Specifications for Residential Booster Pumps and Fire Pumps
Effective Date: January 22, 2021

No person shall install or maintain a water service connection where a booster pump has been installed, unless an approved method is in place and is operational to maintain a minimum suction pressure as prescribed as presented in the following:

Residential Booster Pumps

For booster pumps not intended to be used for fire suppression, no person shall install or maintain a water service connection to any premises where a booster pump has been installed on the service line to or within such premises, unless such booster pump is equipped with a low pressure cut-off designed to shut-off the booster pump when the pressure in the service line on the suction side of the pump drops to ten pounds per square inch gauge or less.

Residential booster pumps shall be equipped with a double check detector backflow prevention device that shall require inspection at the time of installation and annually thereafter.

Fire Pumps

No person shall install or maintain a water service connection to any premises where a fire pump has been installed on the service line to or within such premises, unless the pump is equipped with one of the following:

1. A low suction throttling valve which is a pilot-operated valve installed in the discharge piping that maintains positive pressure in the suction piping, while monitoring pressure in the suction piping through a sensing line. The valve must throttle the discharge of the pump when necessary so that suction pressure will not be reduced below ten pounds per square inch gauge while the pump is operating.
2. A variable speed suction limiting control which is a speed control system used to maintain a minimum positive suction pressure at the pump inlet by reducing the pump driver speed while monitoring pressure in the suction piping through a sensing line. It will be set so that the suction pressure will not be reduced below ten pounds per square inch gauge while the pump is operating.
3. Fire pumps installed prior to August 8, 2008, which are equipped with a low pressure cut-off as defined in the Residential Booster Pump section, are not required to modify the installation solely for the purpose of meeting these Rules and Regulations.

Maintenance and Certification Requirements

It shall be the duty of the customer to maintain the low pressure cut-off device, the low suction throttling valve, or the variable speed suction limiting control in proper working order and to certify to the supplier of water, at least once every twelve months that the minimum suction pressure sustaining method is operable and maintained in continuous operation.

Section 210
General Requirements for Privately Constructed Waterlines
Effective Date: January 22, 2021

All materials that will be in contact with potable water shall be NSF 61 certified.

All main line valves shall be operated by District personnel only.

PVC water mains shall conform to AWWA C900, DR14, with either push-on joints or restrained joints. Restrain all joints within 40 feet of each side of all valves, fittings, and bends with mechanical joint restraint. Restrained joints shall be accomplished using either Field Lok 350 gaskets, Diamond Lok 21 pipe or approved equal. Where joint restraints are not feasible, provide concrete reaction (thrust) blocking as shown on Standard Details SD-216 and SD-216.

Fittings for PVC pipe shall be mechanical joint ductile iron full-bodied fittings conforming to AWWA C110 or AWWA C153, and joints conforming to AWWA C111 with cement lining in accordance with AWWA C104. Fittings shall be rated for 250 psi working pressure. Approved manufacturers for mechanical joint restraint fittings are Megalug by EBAA Iron, Smith Blair, or approved equal.

Water Main shall be installed and tested in accordance with AWWA C605 and AWWA Manual M23. Disinfection of the water main shall be in accordance with AWWA C651. Bacteriological sampling and testing shall be performed by the District.

Bedding, haunching and initial backfill shall be #8 gravel. In areas under pavement or within the pavement influence line, use premium backfill, compacted in maximum 6 inch lifts.

Maintain a minimum 18 inch vertical (above) and 10 foot horizontal clearance from outside of pipe to outside of pipe between proposed waterline and sanitary sewers and/or storm sewers.

A minimum of 35 psi shall be maintained to the curb stop during normal operating conditions.

No booster pumps connected on service connections without the written permission of the Sanitary Engineer.

Depth of bury - 48 inch minimum cover, maintain cover within any drainage ditches or swales.

Main line valves shall be resilient wedge gate valves conforming to AWWA C509; Mueller Model #2360, no substitutions. Valve boxes shall be 3 piece, cast iron with a lid marked "WATER", screw type. Contractor shall seal openings at bottom of valve box with approved resilient material.

Provide hydrants that meet AWWA C502 and are UL/FM approved. Hydrants shall be Mueller Super Centurion Model A-423 with 5.25 inch main valve, 2 hose nozzles and 1 pumper nozzle with NST threads. A gate valve, valve box and cover shall be installed on every hydrant lead. Hydrants shall be installed and tested in accordance with AWWA M17.

Service lines shall be PE pipe conforming to AWWA C901, blue color conforming to AWWA C800. Connections for service line shall be made using CTS compression fittings.

Tracer wire shall be installed on the top center of all water main and service lines. Wire shall be fastened to the top of the pipe with duct tape at 5 foot centers. Tracer wire shall be a #10 AWG HS-CCS high-strength copper clad steel conductor (HS-CCS), insulated with a 30 mil, high-density, high molecular weight polyethylene (HDPE) insulation, and rated for direct burial use at 30 volts. HS-CCS conductor must be a 21% conductivity for locating purposes, Break load 600# minimum. HDPE insulation shall be RoHS compliant and utilize virgin grade material. Insulation color shall meet the APWA color code standard for identification of buried utilities. Tracer wire shall be Copperhead HS-CCS, HDPE 30 mil insulation or approved equal. Tracer wires shall in valve boxes as shown on the Drawings.

Warning tape shall be installed in the center of the trench along the entire length of the waterline. The warning tape shall be blue in color and have the following legend: "CAUTION BURIED WATER MAIN BELOW".

Section 220
Hydrostatic Pressure Testing of Water Facilities
Effective Date: January 22, 2021

Description of Work

The work under this section shall consist of furnishing all labor, materials, and equipment required to hydrostatically test water facilities in accordance with the requirements of these specifications. The contractor shall provide a calibrated pump suction tank for the test pressure pump. Water line to be tested shall pass a pretest conducted by the contractor before the official test is scheduled.

General

All new waterline installations, including services and reclaimed waterlines, shall be subjected to a hydrostatic pressure test. In the event that the new waterline requires connection to an existing line for the purpose of filling the new line with water, the connection between the existing and new line shall be broken and the new line plugged prior to commencing the test, unless prior approval is received from the Engineer.

Hydrostatic pressure testing of all waterlines shall be conducted with potable water only. Air testing is not allowable. The contractor shall furnish all material, equipment, and labor necessary to perform the hydrostatic pressure test.

Hydrostatic pressure testing shall be conducted upon completion of backfill and installation of thrust restraints.

Hydrostatic testing may be conducted against existing valves upon written acceptance of the Sanitary Engineer. However, it is understood by the contractor that such acceptance shall in no way relieve the contractor of responsibility for damage to lines, valves, or appurtenances caused by the test. Further, the District assumes no risk, liability, or obligation of any kind regarding the condition of existing facilities nor any connection the contractor may make to said facilities. Any damage to new or existing water facilities resulting from the hydrostatic testing shall be repaired at the contractor's sole cost.

All sections of newly installed waterline shall be inspected to ensure that all entrapped air has been completely expelled from the pipe, valves, and hydrants. If permanent air release outlets are not located at all high points, the contractor shall install additional air release ports as may be necessary or as directed by the Sanitary Engineer.

These components shall be considered incidental to the construction and testing of the waterline.

The test pump shall be connected to the waterline under test only through a tap into the main.

Hydrostatic Testing

Hydrostatic testing shall be conducted only after all new work has been installed. Hydrostatic testing shall be conducted only in the presence of the Sanitary Engineer or his designated representative. The hydrostatic test pressures specified herein shall be maintained for a period of two hours.

The test pressure shall be 150% of the working pressure at the point of testing, but not less than 50 psi at the highest elevation, whichever is greater. In no case shall the test pressure exceed the pressure rating of the pipe.

The test pressure shall not vary by more than ± 5 psi during the duration of the test.

Leakage shall be defined as the quantity of water that must be supplied into the newly installed waterline, or any valved section thereof, to maintain pressure within 5 psi of the specified test pressure after the pipe has been filled with water and all air expelled. Leakage shall not be measured by a drop in pressure in a test section over a period of time.

No pipe installation shall be accepted if the leakage exceeds that determined by the following formula for ductile iron pipe:

$$L = \frac{SD\sqrt{P}}{133,200}$$

Where:

L = Maximum allowable leakage, in gallons per hour

S = Total length of pipe tested, in feet

D = Nominal diameter of pipe, in inches

P = Average test pressure during the leakage test, in pounds per square inch (gauge)

No pipe installation shall be accepted if the leakage exceeds that determined by the following formula for PVC pipe:

$$L = \frac{ND\sqrt{P}}{7,400}$$

Where:

L = The allowable leakage, gallons per hour

N = The number of joints in the length of pipeline tested

D = The nominal diameter of pipe

P = The average test pressure during the leakage test, in pounds per square inch (gauge)

Acceptance shall be determined on the basis of allowable leakage. Should any test of installed pipe disclose leakage of a greater quantity than that specified in this subsection, the contractor shall, at no additional cost to the District, locate and make repairs approved and inspected by the Engineer, until the leakage falls below the maximum allowable.

Retesting of segments shall be with the identical test boundaries used for the initial test.

All visible leaks shall be repaired by the contractor regardless of the amount of leakage.

Leakage Testing for HDPE Pipe

Leakage testing shall for HDPE Pipe shall be in general conformance with Technical Report TR-31 (Plastic Pipe Institute).

Pressure Testing Outside the Trench:

If specified by the engineer, pressure testing may be conducted prior to pipe installation.

After the pipe has been joined, fill it with water, carefully bleed off any trapped air. Subject the pipe to a hydrostatic test pressure that is 1.5 times the system design pressure for a maximum of 3 hours.

During this time, add water periodically to maintain the test pressure; this compensates for the initial stretching of the pipe. The line pressure tightness is determined by visual observation; therefore, it is not necessary to measure the make-up water. Examine every fused joint; any leakage must be repaired and then retested.

It shall be the responsibility of the contractor to ensure that appropriate safety precautions are observed during hydrostatic testing above ground.

Testing In the Trench:

Fill the pipeline with water after it has been laid; bleed off any trapped air. Subject the lowest element in the system to a test pressure that is 1.5 times the design pressure, and check for any leakage. When, in the opinion of the Sanitary Engineer, local conditions require that the trenches be backfilled immediately after the pipe has been laid, apply the pressure test after backfilling has been completed but not sooner than a time which will allow sufficient curing of any concrete that may have been used. Typical minimum concrete curing times are 36 hours for early strengths and 7 days for normal strengths.

The test procedures consist of two steps; the initial expansion and the test phase. When test pressure is applied to a water filled pipe, the pipe expands. During the initial expansion of the pipe under test, sufficient make-up water must be added to the system at hourly intervals for 3 hours to maintain the test pressure. After about 4 hours, initial expansion should be complete and the actual test can start.

When the test is to begin, the pipe is full of water and is subjected to a constant test pressure of 1.5 times the system design pressure. The test phase should not exceed 3 hours, after which time any water deficiency must be replaced and measured. Add and measure the amount of make-up water required to return to the test pressure and compare this to the maximum allowance in the table below.

An alternate leakage test consists of maintaining the test pressure (described above) over a period of 4 hours and then dropping the pressure by 10 psi. If the pressure then remains within 5% of the target value for 1 hour, this indicates there is no leakage in the system.

Under no circumstances shall the total time under test exceed 8 hours at 1.5 times the system pressure rating. If the test is not complete within this time limit (due to leakage, equipment failure, etc.), the test section shall be permitted to "relax" for 8 hours prior to the next test sequence.

Air testing shall not be permitted.

Section 221
Waterline Testing and Disinfection
Effective Date: January 22, 2021

General

The work described herein includes flushing and testing of all pressure pipelines and appurtenant piping for potable water and disinfection of all pipelines and appurtenant piping for potable water, complete, including providing test water and all disposal thereof.

Reference Standards

Except as otherwise indicated, the current editions of the following apply to the work of this Section:

- 1) ANSI/AWWA B300 Hypochlorites
- 2) ANSI/AWWA B301 Liquid Chlorine
- 3) ANSI/AWWA C651 Disinfecting Water Mains
- 4) APHA, AWWA, and WEF Standard Methods for the Examination of Water and Wastewater

Testing Schedule

The Contractor shall submit the following prior to conducting any waterline testing:

- 1) A testing schedule, including proposed plans for water conveyance, control, and disinfection shall be submitted in writing for approval a minimum of 48 hours before testing is to start. The submittal shall also include the contractor's plan for the release of water from pipelines after testing and disinfection has been completed.

Materials Requirements

All test equipment, chemicals for chlorination, temporary valves, temporary blow-offs, bulkheads, or other water control equipment and materials shall be determined and furnished by the Contractor. No materials shall be used which would be injurious to the pipeline or its future function.

Chlorine for disinfection shall be in the form of liquid chlorine, sodium hypochlorite solution, or calcium hypochlorite granules or tablets.

Liquid chlorine shall be in accordance with the requirements of ANSI/AWWA B301.

Liquid chlorine shall be used only:

- 1) In combination with appropriate gas flow chlorinators and ejectors;
- 2) Under the direct supervision of an experienced technician;
- 3) When appropriate safety practices are observed.

Sodium hypochlorite and calcium hypochlorite shall be in accordance with the requirements of ANSI/AWWA B300.

Execution

Unless otherwise indicated, potable water for testing and disinfecting water pipelines will be furnished by the Contractor. The Contractor shall also make all necessary arrangements for conveying the water to the points of use.

Flushing (prior to disinfection)

Contractor shall be responsible for providing any appurtenances necessary (i.e. temporary blow-offs, etc.) to ensure a minimum flushing velocity of 2.5 feet per second for an initial flushing. In the event a secondary rinsing is necessary to refresh the water in the pipeline, the minimum flushing velocity will be 1 foot per second. The Contractor shall flush long enough to provide a minimum of 3 complete changes of water within the pipeline.

Contractor shall provide necessary flow measurement device.

Pipeline Flushing Rates

Pipe Diameter	Initial Flush @ 2.5 fps (gpm)	Secondary Rinse @ 1 fps (gpm)
2	25	10
4	100	40
6	200	90
8	400	150
10	600	250
12	900	350
16	1,600	625

Approximate Flush Volume for Three Water Changes

Pipe Diameter	Volume in 100 ft of pipe (gal)	Volume for Three Water Changes in 100 ft of pipe (gal)
2	16	49
4	65	196
6	148	440
8	261	780
10	408	1,220
12	587	1,760
16	1,040	3,130

Backflow Prevention During Installation

Backflow prevention must be provided for all newly installed, but untested, pipelines. Contractor shall be responsible for providing an approved hydrant connection and reduced pressure backflow preventer. The Contractor shall be responsible for providing a certified backflow technician to test the backflow preventer to ensure that the backflow preventer is in satisfactory condition.

All pressure pipelines shall be tested. Disinfection shall be accomplished by chlorination. All chlorinating and testing operations shall be performed in the presence of the Sanitary Engineer's designated representative.

Disinfection operations shall be scheduled by the Contractor as late as possible during the contract time period so as to assure the maximum degree of sterility of the facilities at the time the facilities are accepted by the County.

Hydrostatic Testing of Pipelines

Hydrostatic testing of pipelines shall be conducted in accordance with Section 220 – Hydrostatic Testing of Water Facilities.

Final Flushing

Following the 24 hour holding period following disinfection, the Contractor shall flush all main fittings, valves, and branches. Chlorine residual of the water exiting the new main shall be measured until the residual is no greater than that of the feed water. Contractor shall be responsible for providing dechlorination of the highly chlorinated flush water prior to discharge to the environment in accordance with Ohio EPA requirements.

Bacteriological Testing

Bacteriological sampling and testing shall be performed by the District before the water main can be connected to the District's system. Bacteriological testing procedures shall be as follows:

- 1) Samples for bacteriological testing shall be obtained by the District.
- 2) The Contractor shall be required to provide sample taps at locations determined by the District.
- 3) The District shall collect two sets of samples from the new pipeline taken at least 24 hours apart.
- 4) A sample shall be collected from at least every 1,200 feet of new main.
- 5) A sample shall be collected from the end of the line and at least one from each branch.
- 6) The samples shall be tested for total coliform bacteria in accordance with Standard Methods for the Examination of Water and Wastewater. At the direction of the Sanitary Engineer, additional tests may be required including: chlorine residual, turbidity, pH, and heterotrophic plate count (HPC).
 - a. In the event HPC is greater than 500 cfu/mL, flush and collect a repeat sample until the HPC is below 500 cfu/mL
- 7) In the event trench water has entered the new main during construction, additional samples shall be collected at intervals of approximately 200 feet or if excessive quantities of dirt and debris have entered the new main.
- 8) In order for the new main to pass the bacteriological testing, coliform bacteria must be absent from the samples and the bacteriological quality of the water shall be equal to or better than that of the distribution system.
- 9) Initial samples shall be provided by the District at no cost to the Contractor. Additional samples required due to failed tests, trench water in the new main, or other issues related to Contractor negligence shall be billed to the Contractor. In the event the Contractor fails to make payment for such additional testing, the Contractor shall be removed from the District's Contractor Registry.

INSTALLATION RESPONSIBILITY:

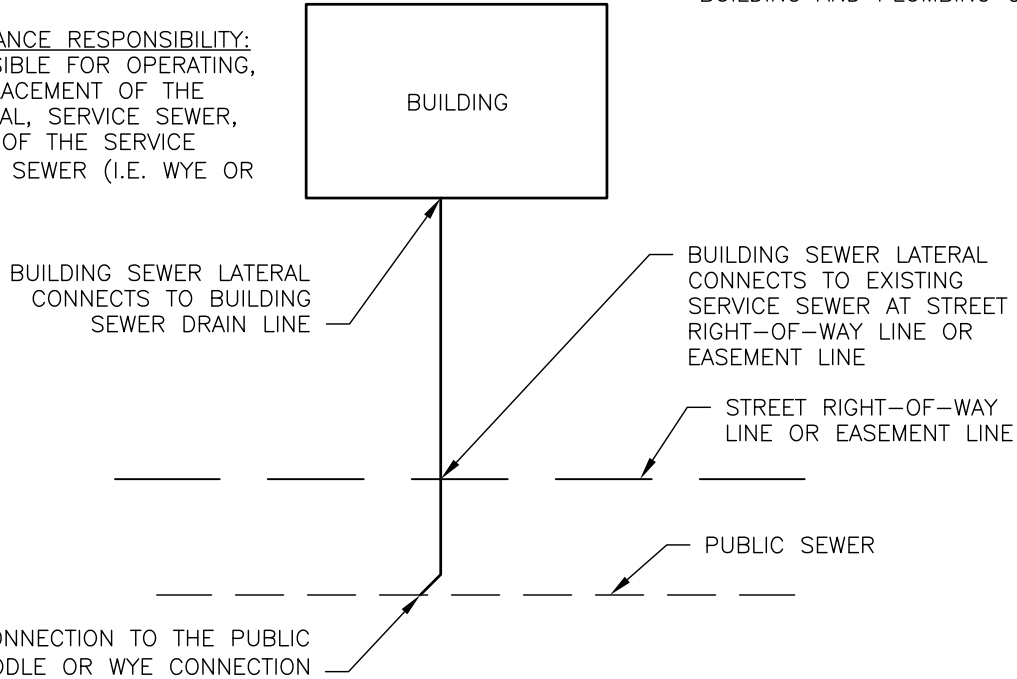
CUSTOMER IS RESPONSIBLE FOR INSTALLING THE BUILDING SEWER LATERAL FROM THE BUILDING SEWER DRAIN LINE CONNECTION TO THE CONNECTION TO THE SERVICE SEWER.

NOTE:

PERMIT FROM THE DISTRICT COVERS THE INSTALLATION OF THE BUILDING SEWER LATERAL. THE BUILDING SEWER DRAIN SHALL COMPLY WITH ALL RELEVANT BUILDING AND PLUMBING CODES.

OPERATION & MAINTENANCE RESPONSIBILITY:

CUSTOMER IS RESPONSIBLE FOR OPERATING, MAINTAINING, AND REPLACEMENT OF THE BUILDING SEWER LATERAL, SERVICE SEWER, AND THE CONNECTION OF THE SERVICE SEWER TO THE PUBLIC SEWER (I.E. WYE OR SADDLE CONNECTION)



SEWER LATERAL RESPONSIBILITY
LATERAL TO PROPERTY ALREADY EXISTS

INSTALLATION RESPONSIBILITY:

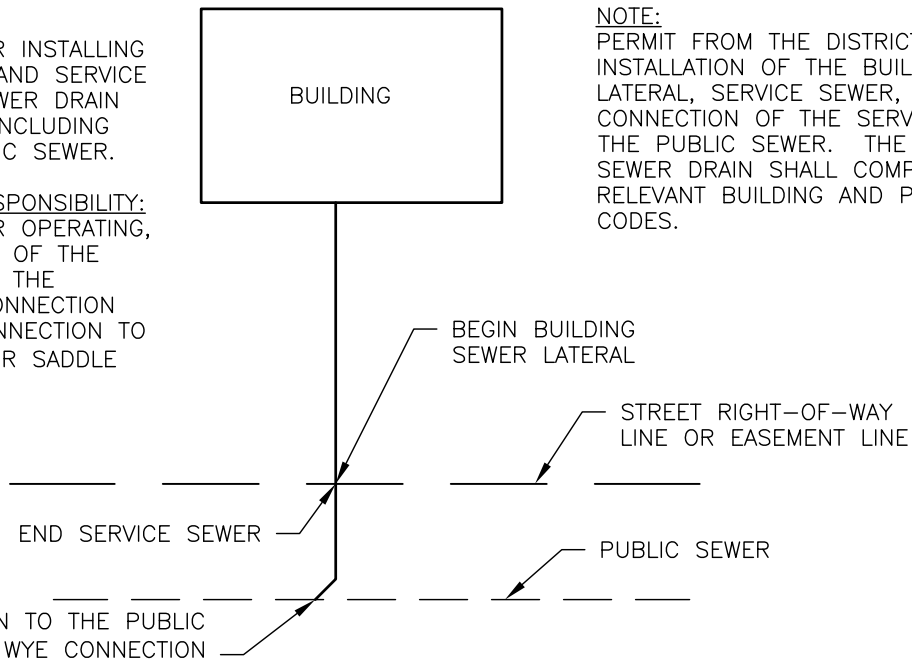
CUSTOMER IS RESPONSIBLE FOR INSTALLING THE BUILDING SEWER LATERAL AND SERVICE SEWER FROM THE BUILDING SEWER DRAIN LINE CONNECTION UP TO AND INCLUDING THE CONNECTION TO THE PUBLIC SEWER.

NOTE:

PERMIT FROM THE DISTRICT COVERS THE INSTALLATION OF THE BUILDING SEWER LATERAL, SERVICE SEWER, AND CONNECTION OF THE SERVICE SEWER TO THE PUBLIC SEWER. THE BUILDING SEWER DRAIN SHALL COMPLY WITH ALL RELEVANT BUILDING AND PLUMBING CODES.

OPERATION & MAINTENANCE RESPONSIBILITY:

CUSTOMER IS RESPONSIBLE FOR OPERATING, MAINTAINING, AND REPLACEMENT OF THE BUILDING SEWER LATERAL FROM THE BUILDING SEWER DRAIN LINE CONNECTION UP TO AND INCLUDING THE CONNECTION TO THE PUBLIC SEWER (I.E. WYE OR SADDLE CONNECTION).



SEWER LATERAL RESPONSIBILITY
LATERAL TO PROPERTY DOES NOT EXIST

FILENAME: 0:_Engineering\Standards\Standard Drawings\SD100_SewerServLine_Responsibility.dwg

TUSCARAWAS COUNTY
METROPOLITAN SEWER DISTRICT

SEWER LATERAL LINE RESPONSIBILITY

STANDARD DRAWING
SD-100

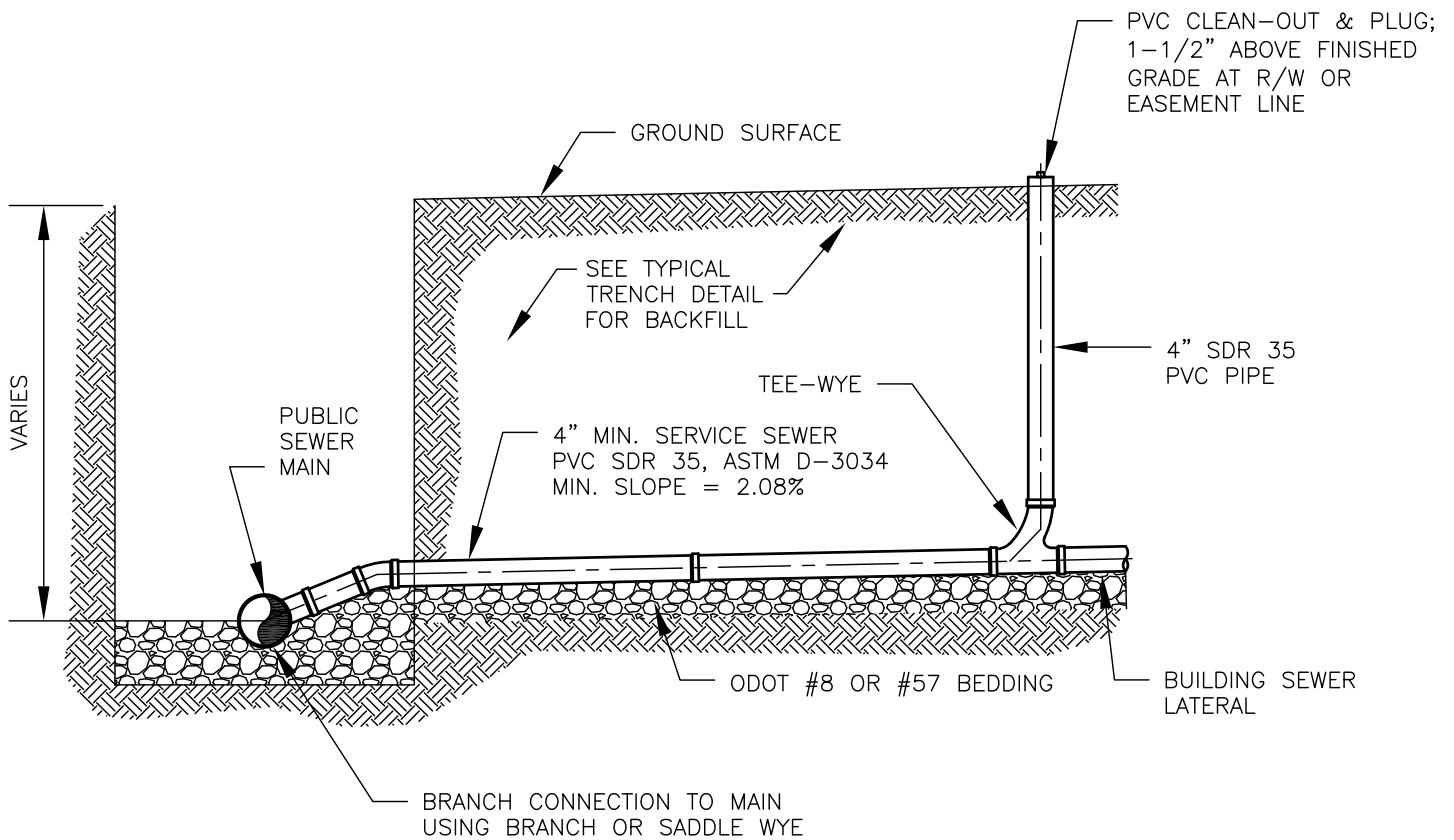
REVISED 5/30/19

APP'D BY: *Michael Jones*
SANITARY ENGINEER

SCALE: NONE

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FILENAME: O:_Engineering\Standards\Standard Drawings\SD-101_SewerLateralConnection.dwg

TUSCARAWAS COUNTY
METROPOLITAN SEWER DISTRICT

TYPICAL HOUSE CONNECTION DETAIL

STANDARD DRAWING
SD-101

REVISED 5/9/18

APP'D BY: *Michael Jones*
SANITARY ENGINEER

SCALE: NONE

PAGE

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USE THIS SECTION WHEN NOT UNDER AND NOT WITHIN A 1:1 SLOPE OF PAVED AREAS

USE THIS SECTION WHEN UNDER OR WITHIN A 1:1 SLOPE OF PAVED AREAS

TOP 12" SHALL CONSIST OF TOPSOIL

PAVEMENT REPLACEMENT REFER TO PAVEMENT REPLACEMENT STANDARD DETAILS

EXIST. PAVEMENT

EARTH BACKFILL - NATURAL SOIL FREE FROM STONES > 2" IN DIMENSION; FREE FROM ORGANIC, DELETERIOUS, DEBRIS, RUBBISH OR FROZEN MATERIAL; COMPACT TO 95% STANDARD PROCTOR

GRANULAR BACKFILL TO BOTTOM OF PAVEMENT SUBGRADE COMPACTED IN 6" LIFTS

12" INITIAL BACKFILL

HAUNCHING TO SPRINGLINE OF PIPE

BEDDING 4" MIN. 6" MAX.

SEE NOTE *

TRENCH WIDTH
MIN. = PIPE O.D. + 12"
MAX. = PIPE O.D. + 24"

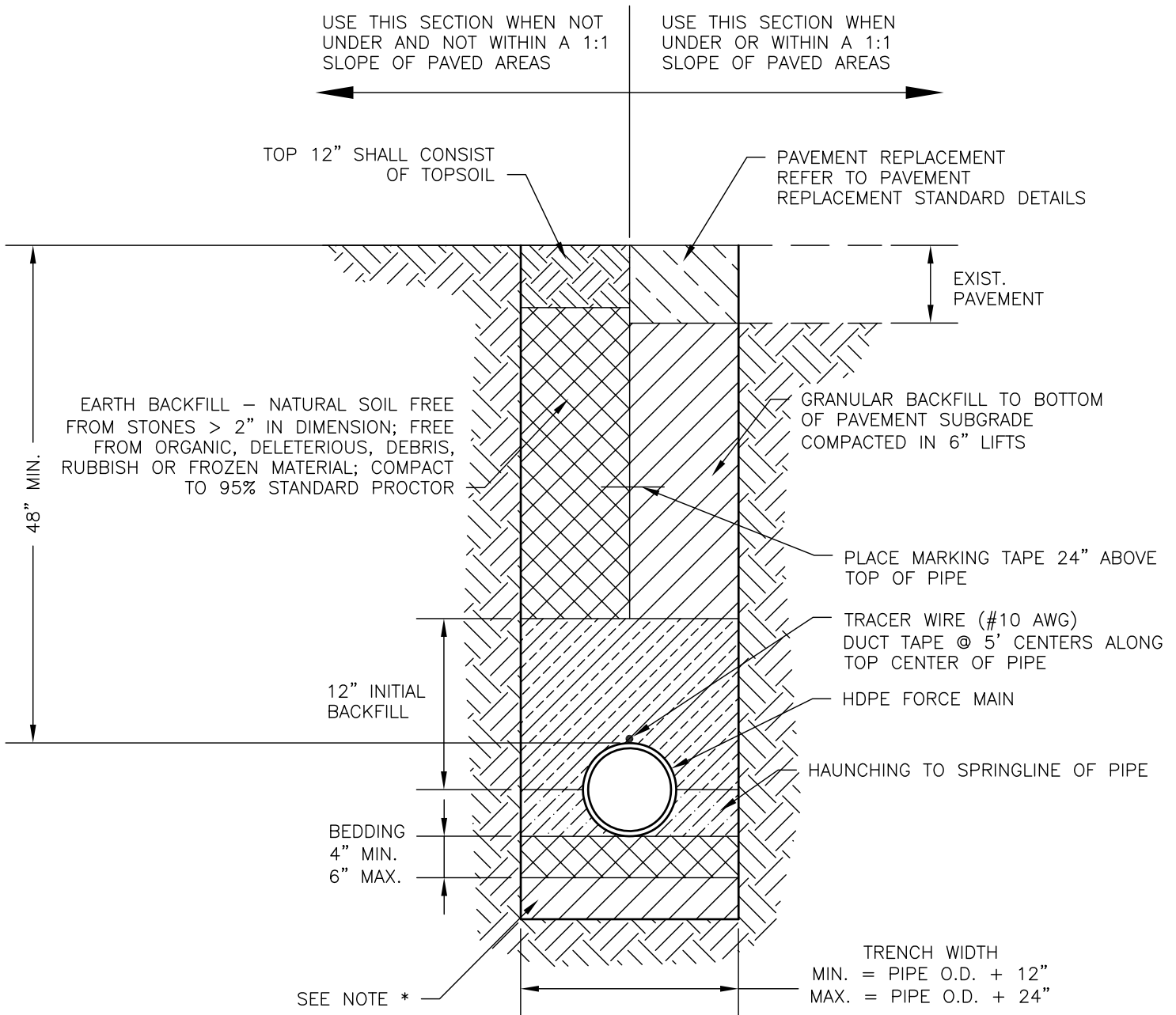
* NOTE: IF TRENCH HAS BEEN OVER EXCAVATED WHETHER DUE TO POOR FOUNDATION MATERIAL OR CONTRACTOR NEGLIGENCE, BRING TO PROPER GRADE WITH COMPACTED GRANULAR BACKFILL PRIOR TO PLACEMENT OF GRANULAR BEDDING.

FILENAME: O:_Engineering\Standards\Standard Drawings\SD-102_TypicalTrenchDetail.dwg

TUSCARAWAS COUNTY METROPOLITAN SEWER DISTRICT		STANDARD DRAWING SD-102	
APP'D BY: <i>Michael Jones</i> SANITARY ENGINEER		TYPICAL SEWER LATERAL TRENCH DETAIL	
SCALE: NONE		PAGE	1 1

USE THIS SECTION WHEN NOT UNDER AND NOT WITHIN A 1:1 SLOPE OF PAVED AREAS

USE THIS SECTION WHEN UNDER OR WITHIN A 1:1 SLOPE OF PAVED AREAS

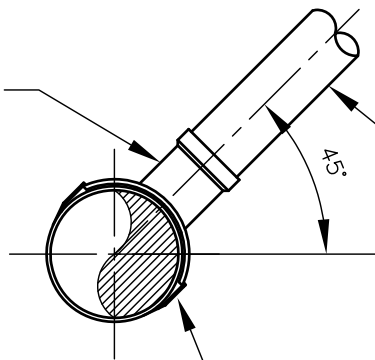


NOTE: WHERE LOCATED IN TRAFFIC AREAS, GRANULAR MATERIAL SHALL BE USED TO BACKFILL ENTIRE TRENCH

FILENAME: O:_Engineering\Standards\Standard Drawings\SD-103 PrivateForceMainTrench.dwg

TUSCARAWAS COUNTY METROPOLITAN SEWER DISTRICT		PRIVATE FORCE MAIN TRENCH DETAIL		STANDARD DRAWING SD-103	
				REVISED 5/30/19	
APP'D BY: <i>Michael Jones</i> SANITARY ENGINEER	SCALE: NONE	PAGE		1	1

GASKETED SADDLE WYE
WITH PVC BELL FOR SDR
35 LATERAL PIPE



LATERAL
CONNECTION LINE

STAINLESS STEEL
STRAP AND BOLTS

TUSCARAWAS COUNTY
METROPOLITAN SEWER DISTRICT

LATERAL SADDLE WYE

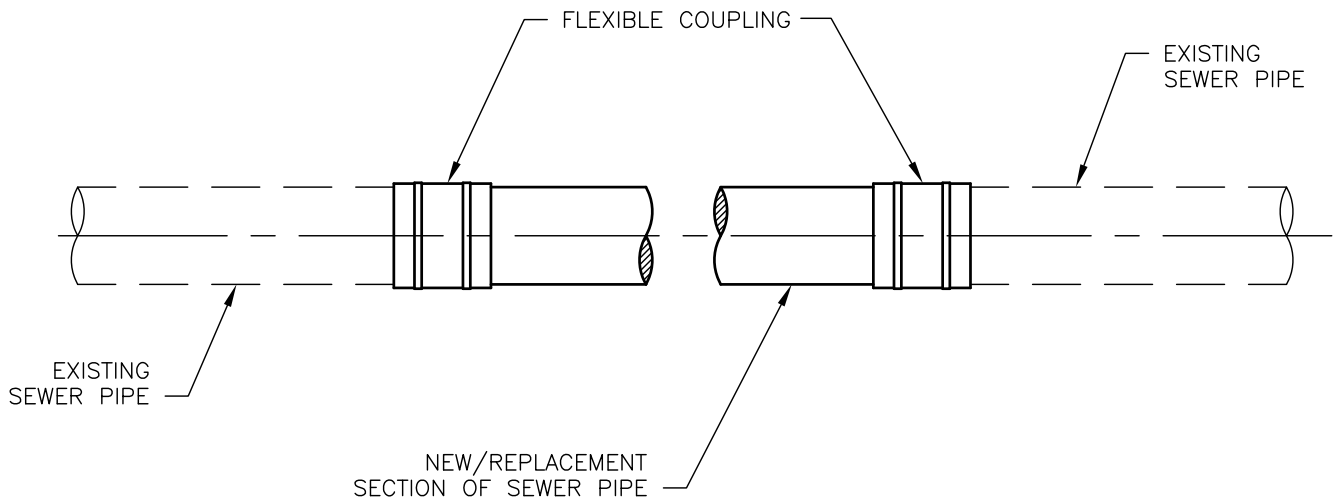
STANDARD DRAWING
SD-104

REVISED 5/9/18

APP'D BY: *Michael Jones*
SANITARY ENGINEER SCALE: NONE

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NOTE: FLEXIBLE COUPLINGS SHALL BE FERNCO 1000 SERIES STAINLESS STEEL SHIELDED COUPLINGS OR APPROVED EQUAL.

FILENAME: O:_Engineering\Standards\Standard Drawings\SD106_SewerCoupling.dwg

TUSCARAWAS COUNTY
METROPOLITAN SEWER DISTRICT

SEWER ADAPTER AND COUPLINGS

STANDARD DRAWING
SD-106

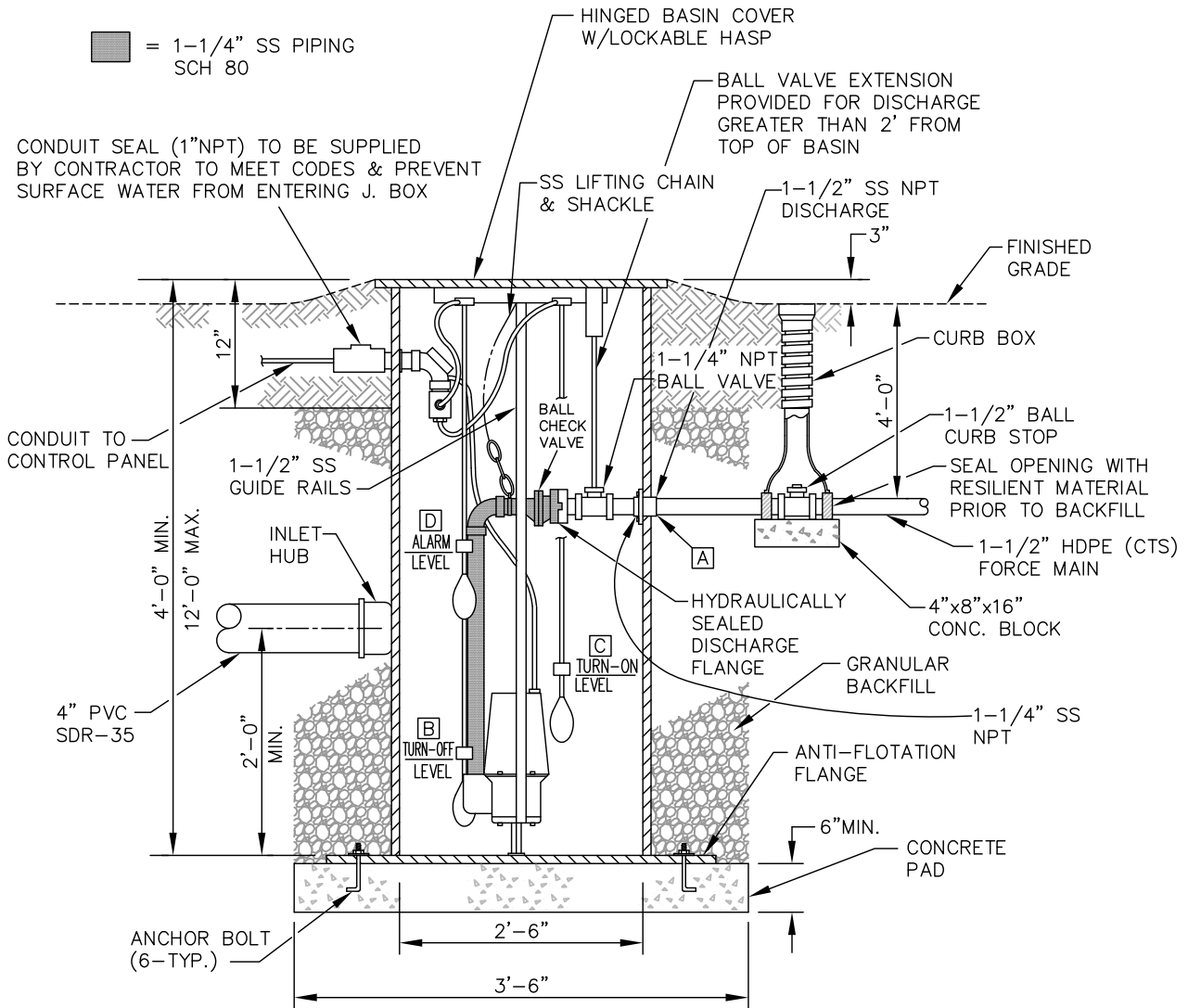
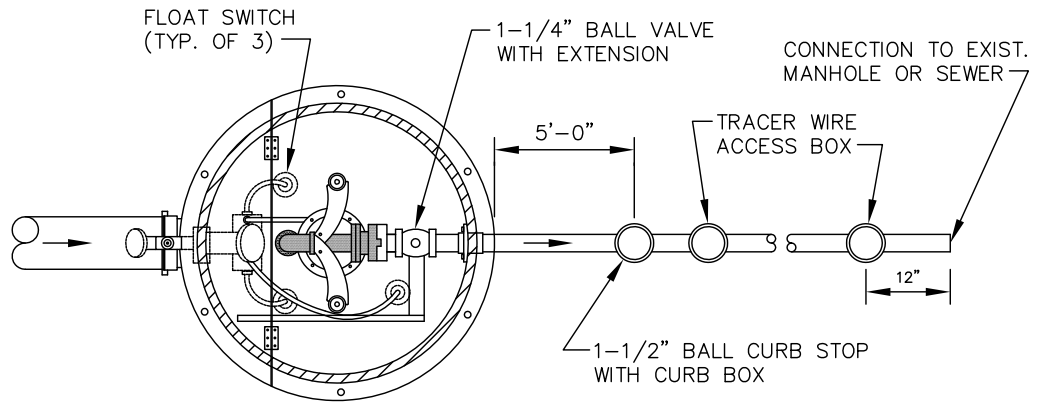
REVISED 5/30/19

APP'D BY: Michael Jones
SANITARY ENGINEER

SCALE: NONE

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DESIGNER/CONTRACTOR TO PROVIDE THE FOLLOWING:

- [A] DISCHARGE ELEVATION
- [B] TURN-OFF LEVEL
- [C] TURN-ON LEVEL
- [D] ALARM LEVEL

FILENAME: O:_Engineering\Standards\Standard Drawings\SD-120 GrinderStation.dwg

TUSCARAWAS COUNTY
METROPOLITAN SEWER DISTRICT

SIMPLEX GRINDER PUMP DETAIL

STANDARD DRAWING
SD-120

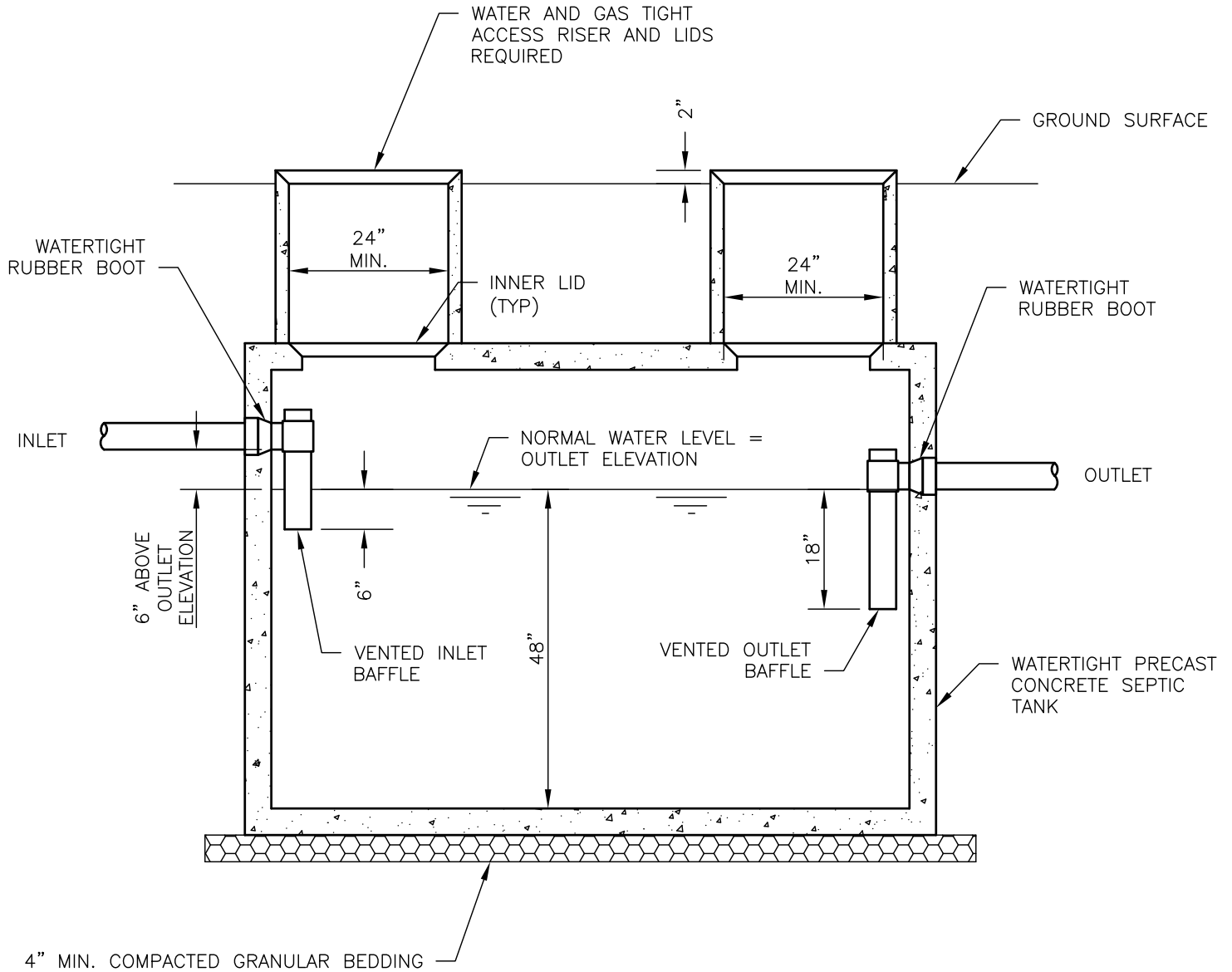
REVISED 5/30/19

APP'D BY: *Michael Jones*
SANITARY ENGINEER

SCALE: NONE

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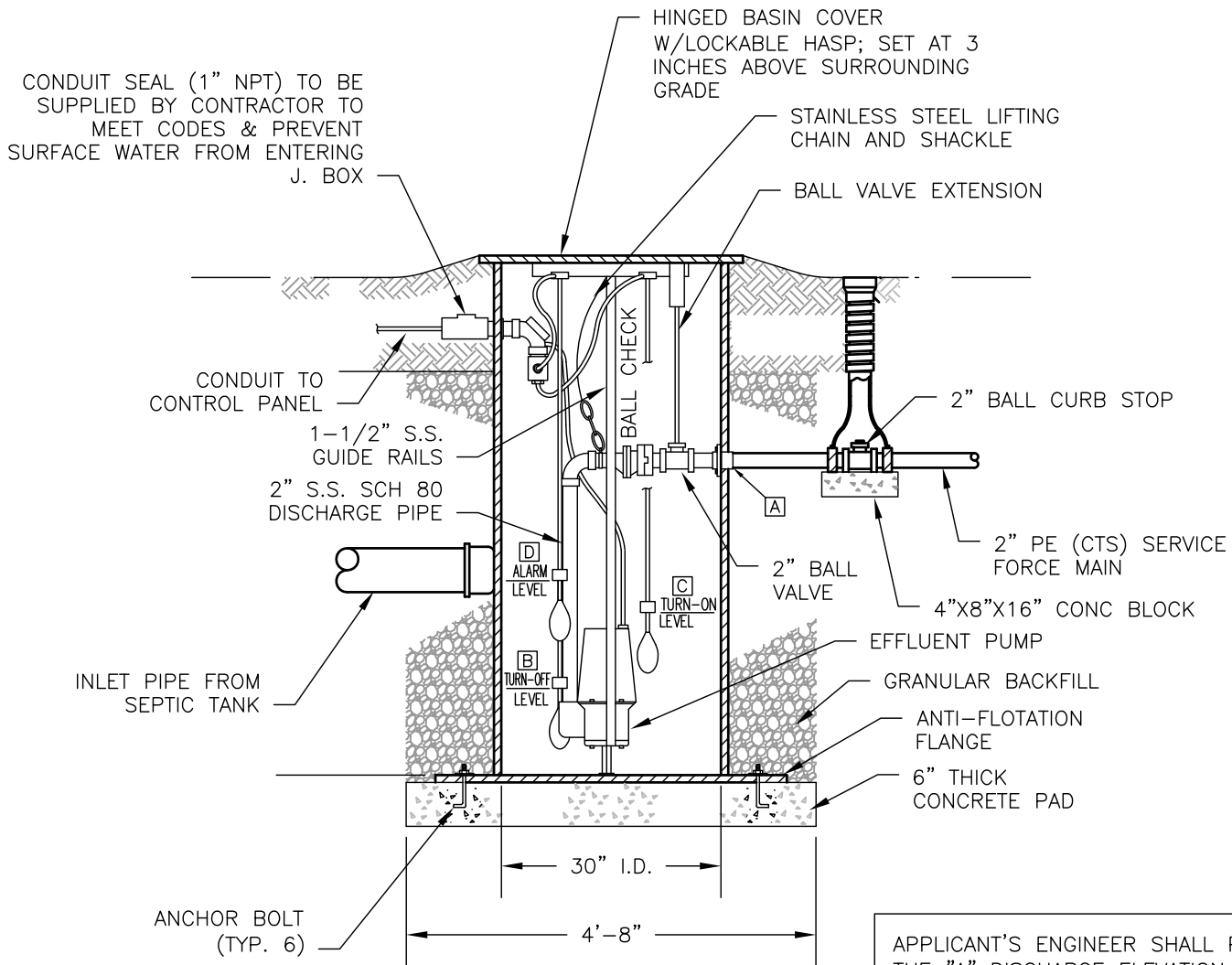
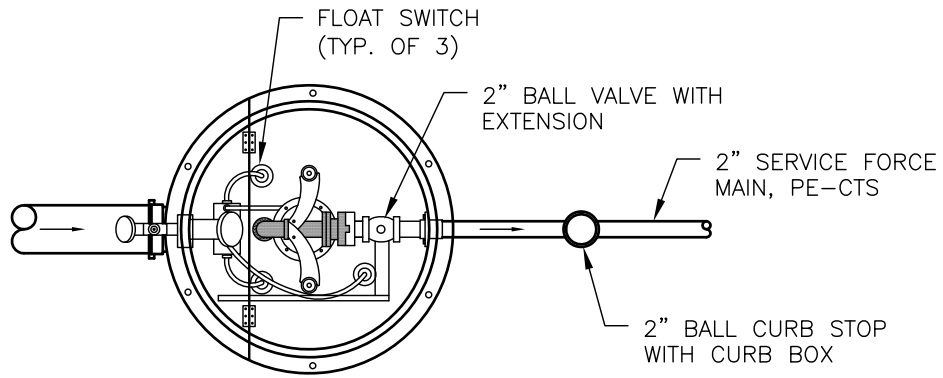
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DIMENSIONS OF TANK SHALL BE DETERMINED BASED UPON THE REQUIRED CAPACITY. MINIMUM TANK SIZE SHALL BE 1,000 GALLONS AND MAXIMUM TANK SIZE SHALL BE 1,500 GALLONS. WHEN CAPACITY GREATER THAN 1,500 GALLONS IS REQUIRED, MULTIPLE TANKS IN SERIES SHALL BE USED.

FILENAME: O:_Engineering\Standards\Standard Drawings\SD-150_SepticTank.dwg

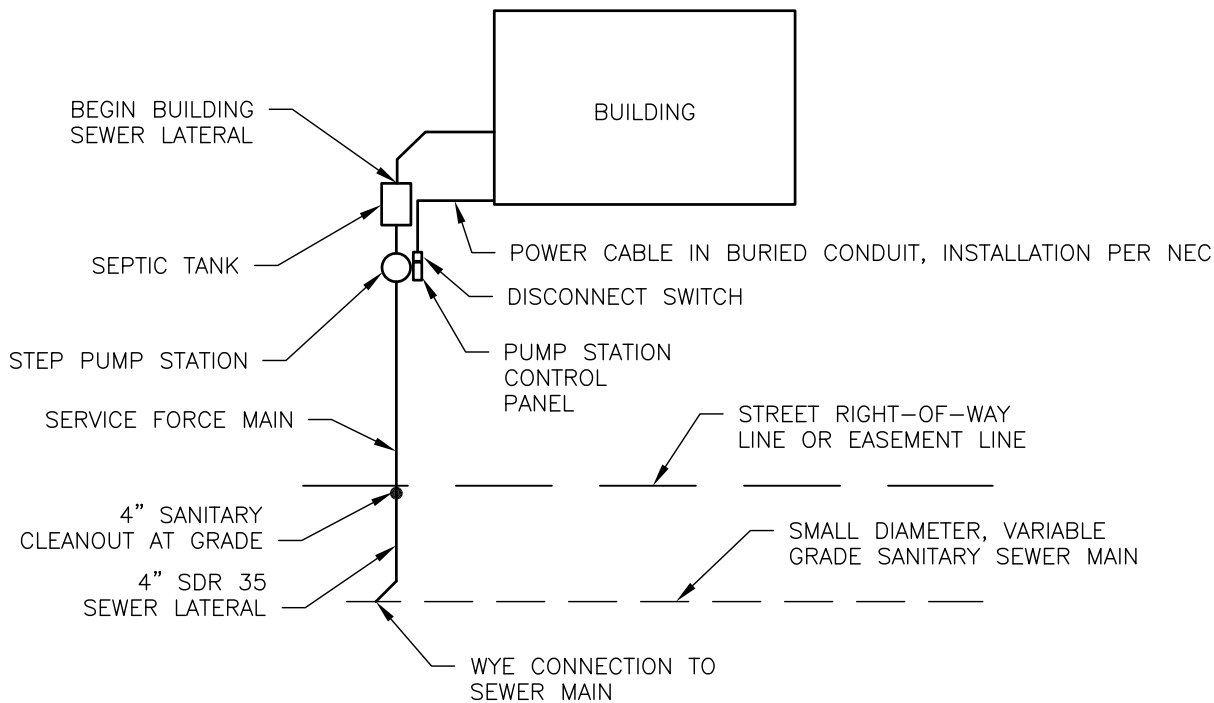
TUSCARAWAS COUNTY METROPOLITAN SEWER DISTRICT		SEPTIC TANK		STANDARD DRAWING SD-150	
				REVISED 5/1/18	
APP'D BY: <i>Michael Jones</i> SANITARY ENGINEER	SCALE: NONE	PAGE		1	1



APPLICANT'S ENGINEER SHALL PROVIDE THE "A" DISCHARGE ELEVATION; "B" TURN-OFF LEVEL; "C" TURN-ON LEVEL; AND "D" ALARM LEVEL

FILENAME: O:_Engineering\Standards\Standard Drawings\SD-151_STEP_PumpStation.dwg

TUSCARAWAS COUNTY METROPOLITAN SEWER DISTRICT		STANDARD DRAWING SD-151	
		REVISED 5/1/18	
APP'D BY: <i>Michael Jones</i> SANITARY ENGINEER		STEP PUMP STATION DETAIL	PAGE
SCALE: NONE			1 1



INSTALLATION RESPONSIBILITY:

CUSTOMER IS RESPONSIBLE FOR INSTALLING THE BUILDING SEWER LATERAL, SEPTIC TANK, STEP PUMP STATION, AND SERVICE FORCE MAIN, AND SEWER LATERAL TO THE POINT OF CONNECTION WITH THE SMALL DIAMETER, VARIABLE SANITARY SEWER MAIN.

OPERATION & MAINTENANCE RESPONSIBILITY:

CUSTOMER IS RESPONSIBLE FOR OPERATION AND MAINTENANCE OF THE BUILDING SEWER LATERAL TO THE POINT OF CONNECTION WITH THE SEPTIC TANK.

CUSTOMER IS RESPONSIBLE FOR ELECTRICAL SUPPLY FROM THE BUILDING TO THE DISCONNECT SWITCH. THE CUSTOMER IS RESPONSIBLE FOR THE MONTHLY POWER USAGE AT THE PUMP STATION.

THE DISTRICT IS RESPONSIBLE FOR OPERATION AND MAINTENANCE OF THE SEPTIC TANK, STEP PUMP STATION, SERVICE FORCE MAIN AND SANITARY LATERAL UP TO THE POINT OF CONNECTION WITH THE SMALL DIAMETER, VARIABLE GRADE SANITARY SEWER MAIN, INCLUDING OPERATION AND MAINTENANCE OF THE ELECTRICAL SYSTEM FROM THE PUMP STATION UP TO AND INCLUDING THE DISCONNECT SWITCH.

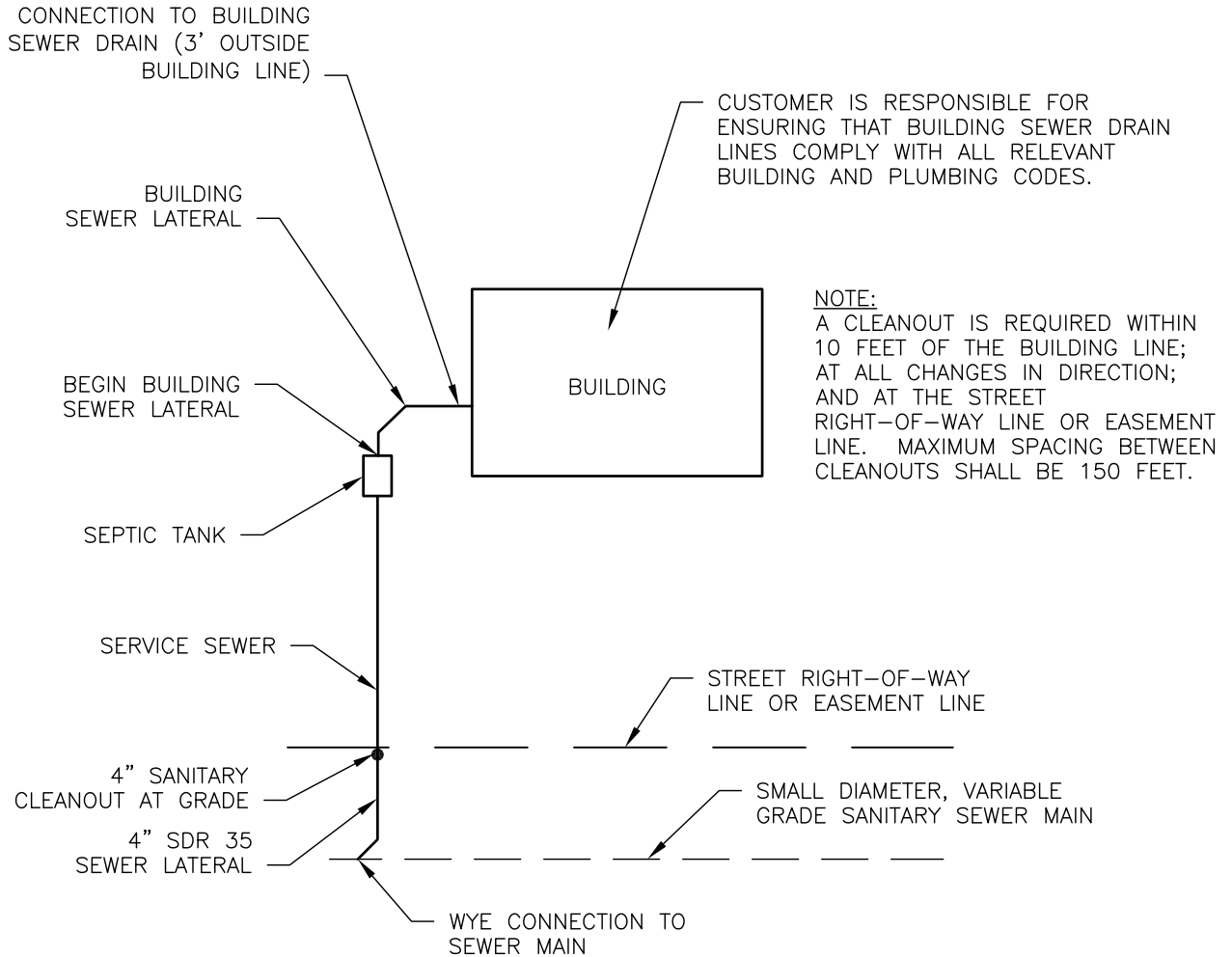
NOTE:

PERMIT FROM THE DISTRICT COVERS THE INSTALLATION OF THE BUILDING SEWER LATERAL, SERVICE SEWER, AND CONNECTION OF THE SERVICE SEWER TO THE PUBLIC SEWER. THE BUILDING SEWER DRAIN SHALL COMPLY WITH ALL RELEVANT BUILDING AND PLUMBING CODES.

THE CUSTOMER IS RESPONSIBLE FOR ALL OTHER PERMITS THAT MAY BE REQUIRED, SUCH AS THE OHIO EPA PERMIT-TO-INSTALL FOR THE STEP PUMP STATION.

FILENAME: O:_Engineering\Standards\Standard Drawings\SD-152_STEP_Connection.dwg

TUSCARAWAS COUNTY METROPOLITAN SEWER DISTRICT		TYPICAL STEP CONNECTION TO A SMALL DIAMETER, VARIABLE GRADE SANITARY SEWER		STANDARD DRAWING SD-152	
				REVISED 5/1/18	
APP'D BY: <i>Michael Jones</i> SANITARY ENGINEER		SCALE: NONE		PAGE	1 1



INSTALLATION RESPONSIBILITY:

CUSTOMER IS RESPONSIBLE FOR INSTALLING THE BUILDING SEWER LATERAL, SEPTIC TANK, SERVICE SEWER UP TO AND INCLUDING THE POINT OF CONNECTION WITH THE SMALL DIAMETER, VARIABLE SANITARY SEWER MAIN.

OPERATION & MAINTENANCE RESPONSIBILITY:

CUSTOMER IS RESPONSIBLE FOR OPERATION AND MAINTENANCE OF THE BUILDING SEWER LATERAL TO THE POINT OF CONNECTION WITH THE SEPTIC TANK.

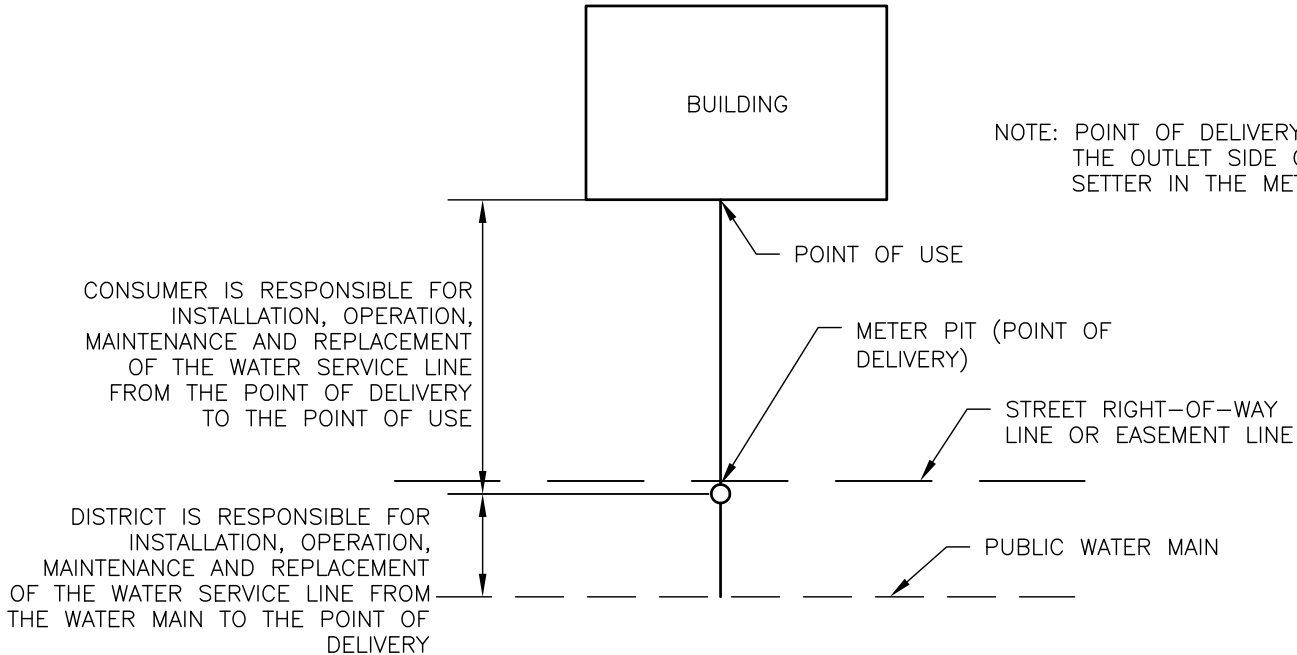
THE DISTRICT IS RESPONSIBLE FOR OPERATION AND MAINTENANCE OF THE SEPTIC TANK AND THE SERVICE SEWER UP TO AND INCLUDING THE POINT OF CONNECTION WITH THE SMALL DIAMETER, VARIABLE GRADE SANITARY SEWER MAIN.

NOTE:

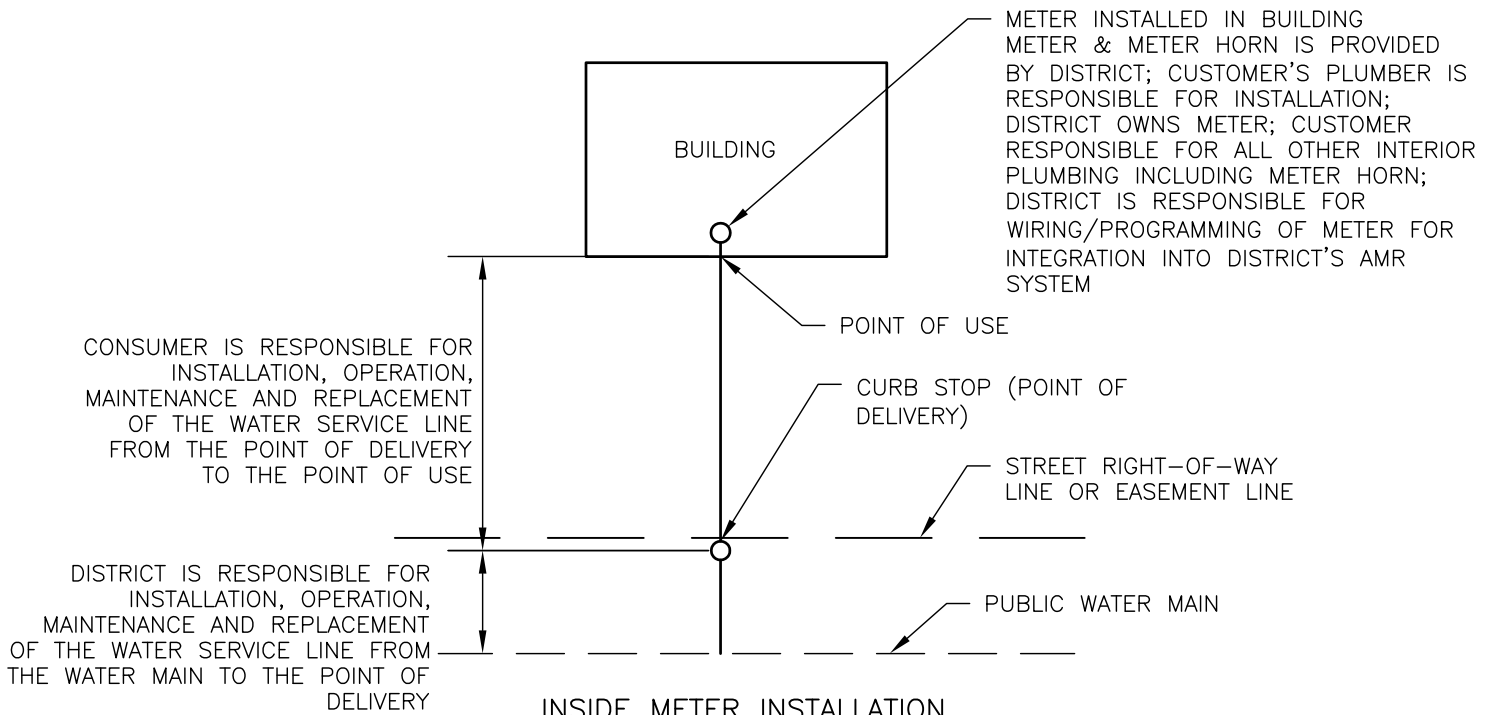
PERMIT FROM THE DISTRICT COVERS THE INSTALLATION OF THE BUILDING SEWER LATERAL, SERVICE SEWER, AND CONNECTION OF THE SERVICE SEWER TO THE PUBLIC SEWER. THE BUILDING SEWER DRAIN SHALL COMPLY WITH ALL RELEVANT BUILDING AND PLUMBING CODES.

FILENAME: O:_Engineering\Standards\Standard Drawings\SD-153_Septic_Connection.dwg

TUSCARAWAS COUNTY METROPOLITAN SEWER DISTRICT		TYPICAL SEPTIC TANK CONNECTION TO A SMALL DIAMETER, VARIABLE GRADE SANITARY SEWER		STANDARD DRAWING SD-153	
				REVISED 5/8/18	
APP'D BY: <i>Michael Jones</i> SANITARY ENGINEER		SCALE: NONE		PAGE	1 1



OUTSIDE METER PIT INSTALLATION

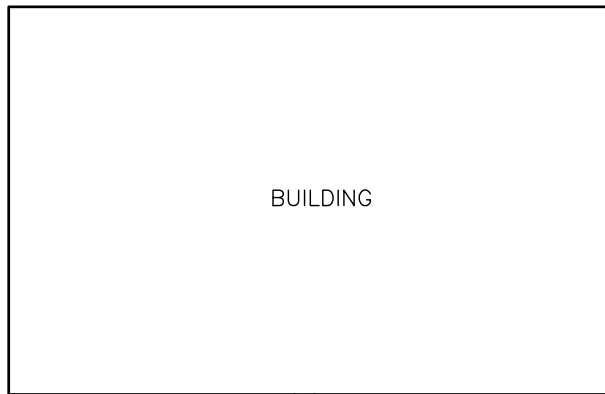


INSIDE METER INSTALLATION

INSIDE METER INSTALLATIONS ARE SUBJECT TO SANITARY ENGINEER APPROVAL ON A CASE BY CASE BASIS

FILENAME: O:_Engineering\Standards\Standard Drawings\SD-200_WaterServLine_Responsibility.dwg

<p>TUSCARAWAS COUNTY METROPOLITAN SEWER DISTRICT</p>		<p>WATER SERVICE LINE RESPONSIBILITY THIS DETAIL COVERS WATER SERVICE LINES UP TO AND INCLUDING 2 INCHES</p>		<p>STANDARD DRAWING SD-200</p>	
				<p>REVISED 5/30/19</p>	
<p>APP'D BY: <i>Michael Jones</i> SANITARY ENGINEER</p>		<p>SCALE: NONE</p>		<p>PAGE</p>	<p>1 1</p>



BUILDING

POINT OF USE

IF FIRE PROTECTION IS INCLUDED, THE SANITARY ENGINEER IS TO BE CONSULTED REGARDING DESIGN REQUIREMENTS. COMPLETE PLUMBING AND FIRE PROTECTION PLANS SHALL BE SUBMITTED TO AND APPROVED BY THE SANITARY ENGINEER.

WATER SERVICE LINE; CUSTOMER IS RESPONSIBLE FOR INSTALLATION, OPERATION AND MAINTENANCE OF THE WATER SERVICE LINE FROM THE POINT OF DELIVERY TO THE POINT OF USE

POINT OF DELIVERY

METER VAULT - DESIGN TO BE SUBMITTED BY CUSTOMER'S ENGINEER. INSTALLATION SHALL BE BY THE CUSTOMER'S CONTRACTOR. DISTRICT SHALL SUPPLY THE METER, METER SETTER FOR INSTALLATION BY CUSTOMER'S CONTRACTOR. DISTRICT SHALL WIRE/PROGRAM THE METER FOR INTEGRATION INTO THE DISTRICT'S AMR SYSTEM.

RIGHT-OF-WAY OR EASEMENT LINE

CUSTOMER'S CONTRACTOR RESPONSIBLE FOR INSTALLATION OF SERVICE LINE FROM TAPPING VALVE TO THE METER VAULT

TAPPING SLEEVE & VALVE

PUBLIC WATER MAIN

DISTRICT SHALL FURNISH AND INSTALL TAPPING SLEEVE, TAPPING VALVE & VALVE BOX; CUSTOMER IS RESPONSIBLE FOR EXCAVATION AND BACKFILL IN ACCORDANCE WITH THE APPLICABLE SPECIFICATIONS AND THE REQUIREMENTS OF THE JURISDICTION HAVING AUTHORITY OVER THE ROADWAY

FILENAME: O:_Engineering\Standards\Standard Drawings\SD-201_LargeWaterServLine_Responsibility.dwg

TUSCARAWAS COUNTY
METROPOLITAN SEWER DISTRICT

WATER SERVICE LINE RESPONSIBILITY
THIS DETAIL COVERS WATER SERVICE LINES 3
INCHES IN DIAMETER AND LARGER

STANDARD DRAWING
SD-201

REVISED 5/30/19

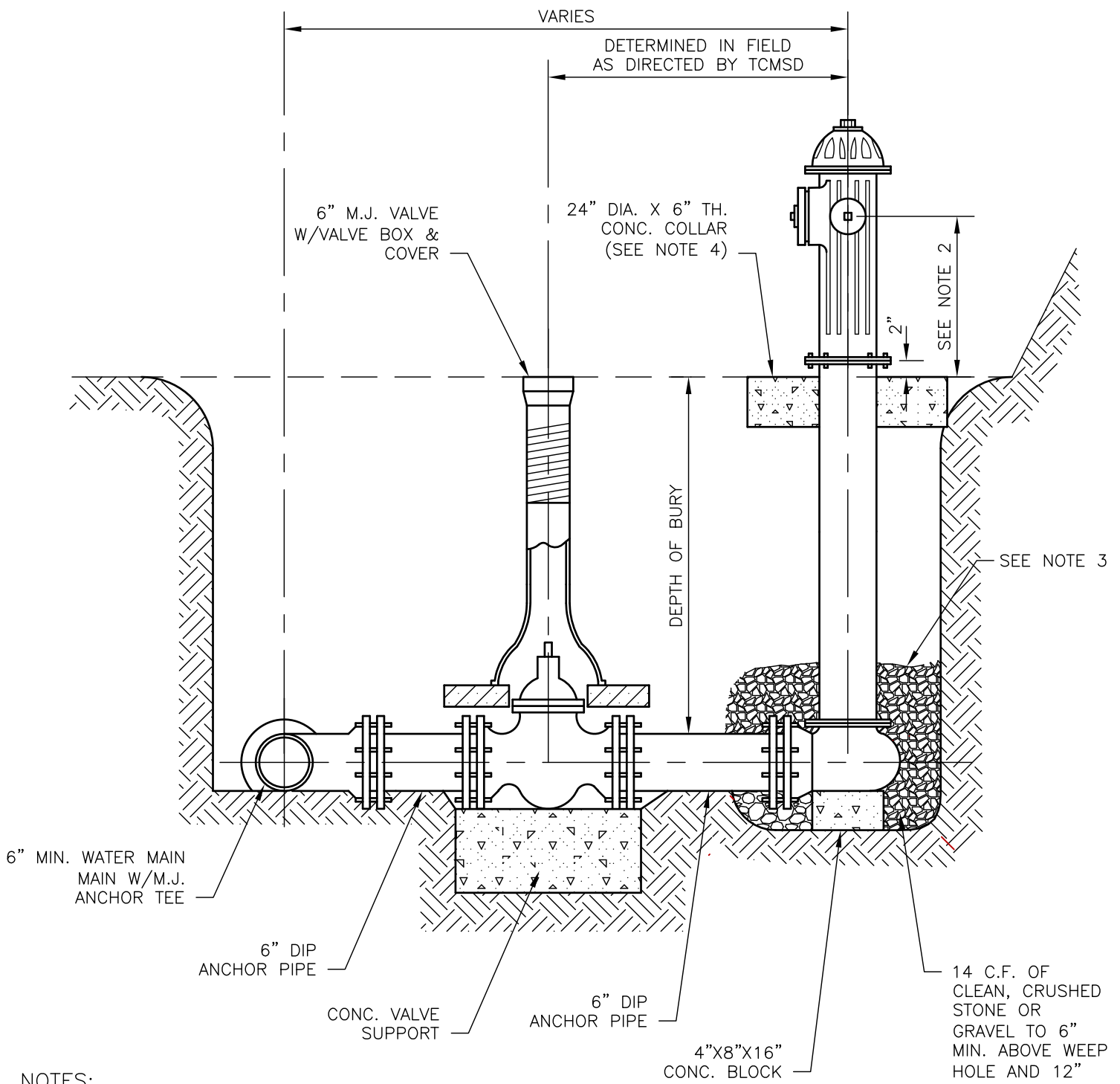
APP'D BY: *Michael Jones*
SANITARY ENGINEER

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NOTES:

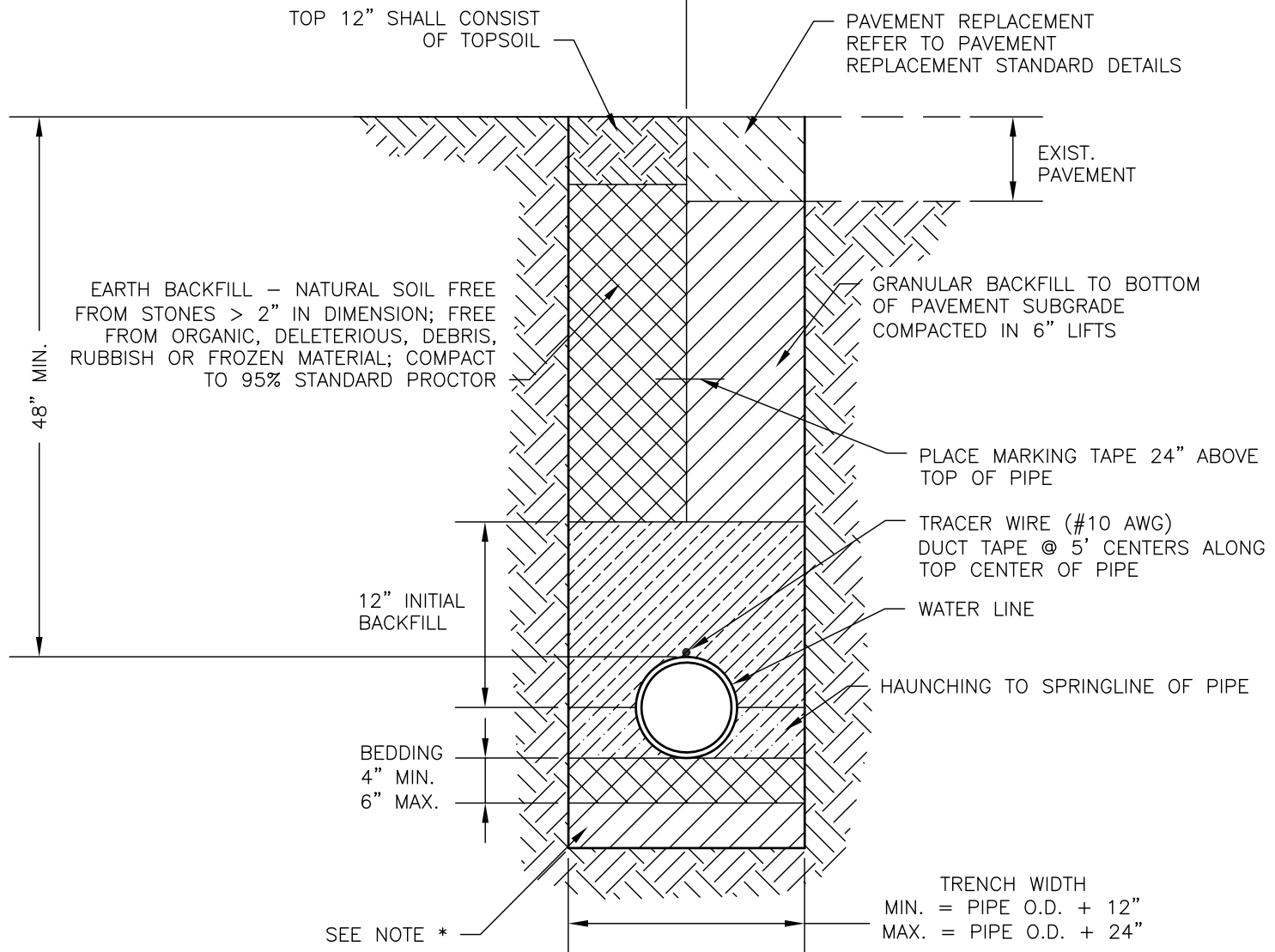
1. ALL CONCRETE SHALL BE FILL CONCRETE
2. TO BE 12" MIN. OR AS RECOMMENDED BY HYDRANT MANUFACTURER.
3. COVER STONE WITH 8-MIL POLYETHYLENE BEFORE BACKFILLING.
4. CONCRETE COLLAR SHALL BE FLUSH WITH GROUND IN RURAL AREAS AND 8" BELOW FINISH GRADE IN RESIDENTIAL AREAS.

FILENAME: O:_Engineering\Standards\Standard Drawings\SD-204_HydrantAssembly.dwg

<p>TUSCARAWAS COUNTY METROPOLITAN SEWER DISTRICT</p>	<p>HYDRANT ASSEMBLY</p>	<p>STANDARD DRAWING SD-204</p>				
		<p>REVISED 5/4/17</p>				
<p>APP'D BY: <i>Michael Jones</i> SANITARY ENGINEER</p>	<p>SCALE: NONE</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%;">PAGE</td> <td style="width: 20%; text-align: center;">1</td> </tr> <tr> <td></td> <td style="text-align: center;">1</td> </tr> </table>	PAGE	1		1
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USE THIS SECTION WHEN NOT UNDER AND NOT WITHIN A 1:1 SLOPE OF PAVED AREAS

USE THIS SECTION WHEN UNDER OR WITHIN A 1:1 SLOPE OF PAVED AREAS



NOTE: WHERE LOCATED IN TRAFFIC AREAS, GRANULAR MATERIAL SHALL BE USED TO BACKFILL ENTIRE TRENCH

FILENAME: O:_Engineering\Standards\Standard Drawings\SD-205_WaterlineTrench.dwg

TUSCARAWAS COUNTY METROPOLITAN SEWER DISTRICT		STANDARD DRAWING SD-205	
		REVISED 5/30/19	
APP'D BY: <i>Michael Jones</i> SANITARY ENGINEER		TYPICAL WATERLINE TRENCH	
SCALE: NONE		PAGE	1 / 1

STRIP 3/4" INSULATION FROM END OF TRACER WIRE AND CURL 18" TO 24" EXTRA TRACER WIRE IN BOX

DROP COVER MARKED "WATER"

3/16" DRILLED HOLE IN VALVE BOX FOR TRACER WIRE - SEAL HOLE WHEN COMPLETED

ADJUSTABLE VALVE BOX 3-PIECE SCREW TYPE

VALVE

LOCKING WIRE CONNECTOR

4"X8"X12" SOLID CONCRETE BLOCKS TO SUPPORT VALVE BOX

TRACER WIRE (SEE NOTE *)

C900 PVC WATER MAIN

PVC BAG

UNDISTURBED EARTH

MECHANICAL JOINT W/ RESTRAINT FOR PVC PIPE

MECHANICAL JOINT W/ RESTRAINT FOR PVC PIPE

PLACE VALVES ON CONCRETE BLOCKS

NOTE: RESTRAIN FIRST JOINT ON BOTH SIDES OF THE VALVE. USE MEGA-LUG SERIES 1600 RESTRAINT JOINT HARNESS FOR C900 PIPE IF FIRST JOINT IS A PVC PIPE.

* NOTE: TRACER WIRE FOR OPEN CUT INSTALLATIONS SHALL BE COPPERHEAD #12 AWG HS-1230 OR APPROVED EQUAL.

TRACER WIRE FOR BORING INSTALLATIONS SHALL BE COPPERHEAD #10 AWG 1045 EHS OR APPROVED EQUAL.

FILENAME: O:_Engineering\Standards\Standard Drawings\SD-206_ValveDetail.dwg

TUSCARAWAS COUNTY
METROPOLITAN SEWER DISTRICT

STANDARD DRAWING
SD-206

TYPICAL VALVE DETAIL

REVISED 5/5/17

APP'D BY: *Michael Jones*
SANITARY ENGINEER

SCALE: NONE

PAGE

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CURB BOX TO BE FLUSH W/FINISH GRADE & PROVIDED W/LOCKABLE COVER MARKED "WATER"

CURB BOX & CURB STOP TO BE LOCATED 12" INSIDE R/W LINE, UNLESS OTHERWISE SHOWN

3/16" DRILLED HOLE IN VALVE BOX FOR TRACER WIRE - SEAL HOLE WHEN COMPLETED

ADJUSTABLE SCREW TYPE CURB BOX

PROVIDE A LOOP WITH SUFFICIENT SLACK TO PREVENT SERVICE LINE FROM BUCKING OR PULLING OUT OF CORPORATION STOP DURING BACKFILLING AND SETTLING OF TRENCH

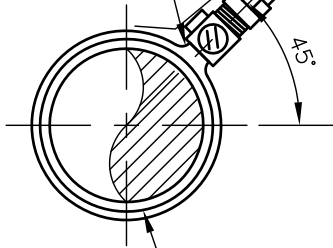
TRACER WIRE (SEE NOTE *)

48" MIN. COVER

TAPPING SADDLE & CORPORATION STOP

SERVICE LINE

CURB STOP



WATER MAIN

4"X8"X16" CONC. BLOCK VALVE SUPPORT

* NOTE: TRACER WIRE FOR OPEN CUT INSTALLATIONS SHALL BE COPPERHEAD #12 AWG HS-1230 OR APPROVED EQUAL.

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O:_Engineering\Standards\Standard

Drawings\SD-208_WaterServiceLine.dwg

TUSCARAWAS COUNTY
METROPOLITAN SEWER DISTRICT

TYPICAL SERVICE LINE & SERVICE
STOP DETAIL

STANDARD DRAWING
SD-208

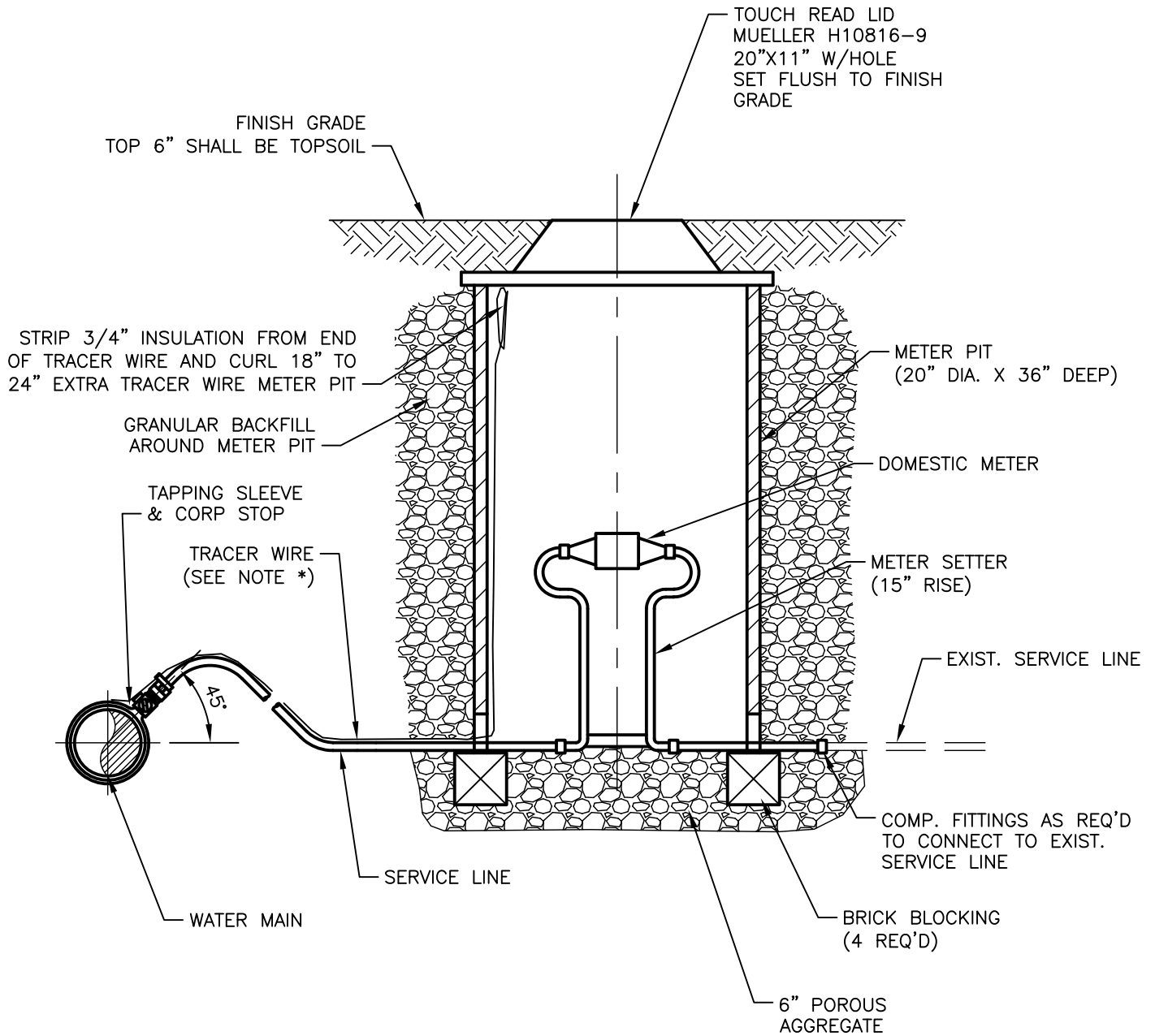
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* NOTE: TRACER WIRE FOR OPEN CUT INSTALLATIONS SHALL BE
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TRACER WIRE FOR BORING INSTALLATIONS SHALL BE COPPERHEAD
#10 AWG 1045 EHS OR APPROVED EQUAL.

O:\Standards\Standard Drawings\SD-209_Domestic_Meter_Pit.dwg

TUSCARAWAS COUNTY
METROPOLITAN SEWER DISTRICT

TYPICAL DOMESTIC METER PIT DETAIL

STANDARD DRAWING
SD-209

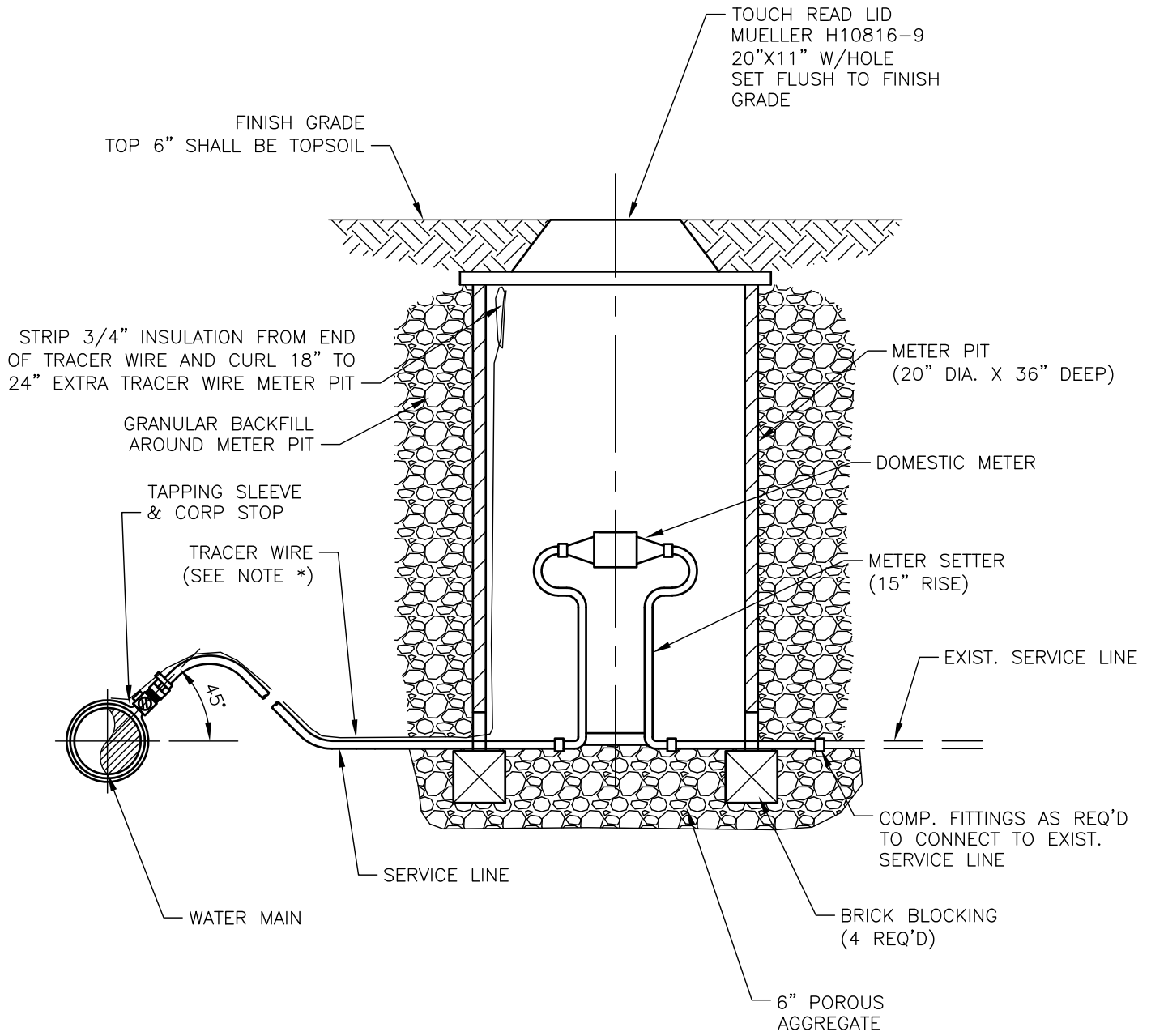
REVISED 5/16/18

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SANITARY ENGINEER

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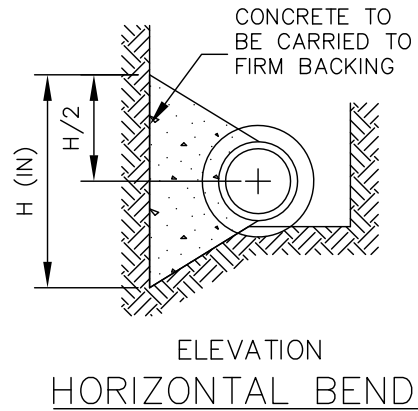
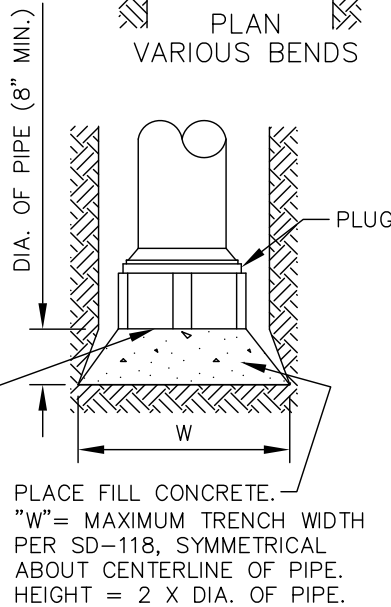
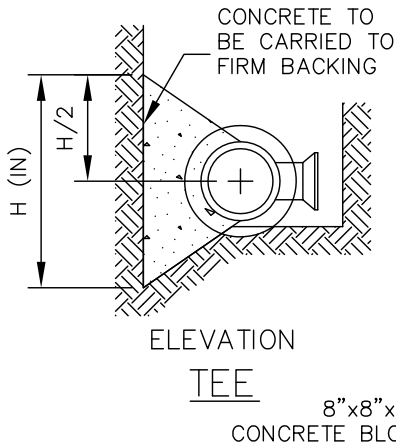
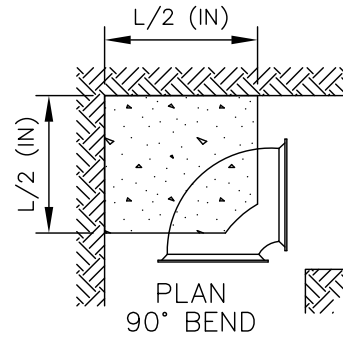
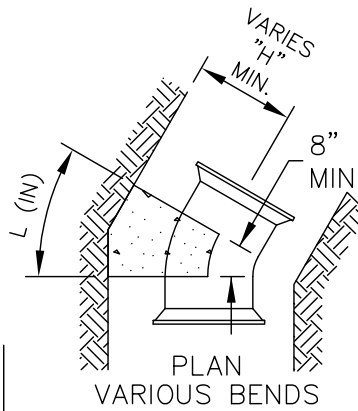
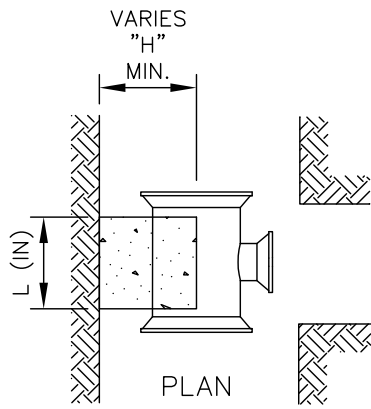


* NOTE: TRACER WIRE FOR OPEN CUT INSTALLATIONS SHALL BE COPPERHEAD #12 AWG HS-1230 OR APPROVED EQUAL.

TRACER WIRE FOR BORING INSTALLATIONS SHALL BE COPPERHEAD #10 AWG 1045 EHS OR APPROVED EQUAL.

O:_Engineering\Standards\Standard Drawings\SD-209_Domestic_Meter_Pit.dwg

TUSCARAWAS COUNTY METROPOLITAN SEWER DISTRICT		STANDARD DRAWING SD-209	
		REVISED 5/16/18	
APP'D BY: <i>Michael Jones</i> SANITARY ENGINEER	SCALE: NONE	TYPICAL DOMESTIC METER PIT DETAIL	
		PAGE	1 1



L & H DIMENSIONS ARE IN INCHES

R U N	BRANCH													
	2"		3"		4"		6"		8"		10"		12"	
	L	H	L	H	L	H	L	H	L	H	L	H	L	H
2"	6	5												
3"	6	5	8	6										
4"	6	5	8	6	12	7								
6"	6	6	8	6	10	8	15	12						
8"	6	8	6	8	10	8	15	12	18	18				
10"	6	10	6	10	8	10	15	12	18	18	22	22		
12"	6	12	6	12	7	12	15	12	18	18	22	22	24	29
14"	6	14	6	14	6	14	13	14	18	18	22	22	26	27

SIZE OF PIPE	DEGREE OF BEND							
	11¼°		22½°		45°		90°	
	L	H	L	H	L	H	L	H
2"	4	3	4	4	5	4	10	5
3"	4	3	5	4	7	5	16	6
4"	5	4	7	5	10	6	20	8
6"	6	6	10	7	17	8	30	12
8"	8	8	14	9	19	13	36	18
10"	10	10	17	11	22	17	44	22
12"	12	12	19	15	24	22	48	29
14"	14	14	20	19	25	29	52	36
16"	16	16	20	24	27	35	58	42
18"	18	18	22	28	28	42	62	50
20"	20	20	25	30	32	46	68	56
24"	23	24	29	37	36	58	80	68

NOTE:
USE FILL CONCRETE. DESIGN BASED ON A
WORKING PRESSURE OF 125 PSI AND A SOIL
BEARING OF 3000 LB./SQ. FT.

FILENAME: O:_Engineering\Standards\Standard Drawings\SD-215_Thrust_Blocking_Details.dwg

TUSCARAWAS COUNTY
METROPOLITAN SEWER DISTRICT

THRUST BLOCKING DETAILS

STANDARD DRAWING
SD-215

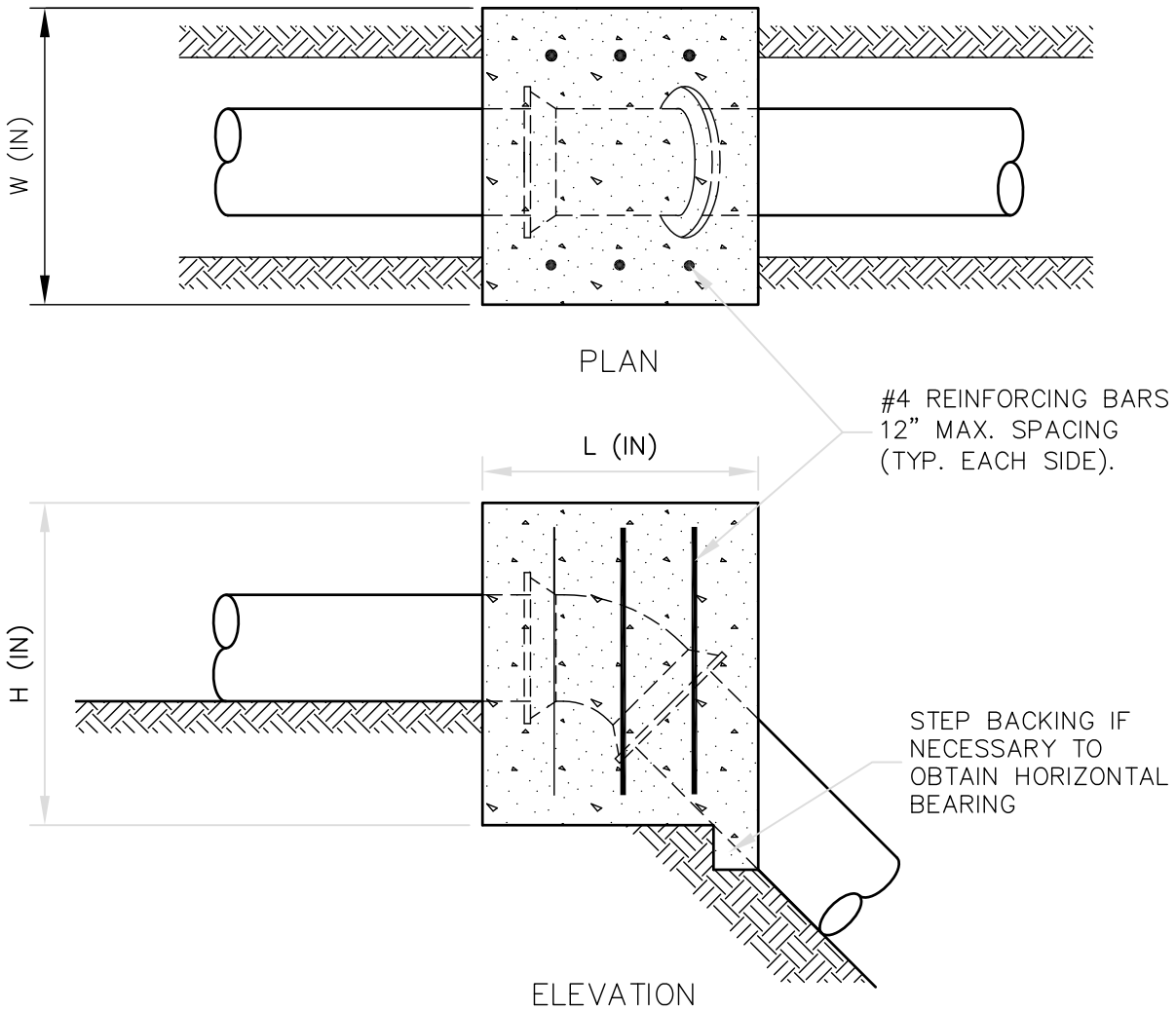
REVISED 5/22/18

APP'D BY: *Michael Jones*
SANITARY ENGINEER

SCALE: NONE

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1
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VERTICAL BENDS

NOTES:

1. BLOCKING TO BE CENTERED ON BEND HORIZONTALLY.
2. ALL CONCRETE TO BE FILL CONCRETE.
3. L & W & H DIMENSIONS ARE IN INCHES.
4. BLOCKING DESIGN BASED ON A WORKING PRESSURE OF 125 P.S.I. AND A SOIL BEARING OF 3000 LB./SQ. FT.

SIZE OF PIPE (D)	DEGREE OF BEND											
	11¼°			22½°			45°			90°		
	L	W	H	L	W	H	L	W	H	L	W	H
3"	12	18	15	13	24	15	18	30	16	25	30	20
4"	13	24	16	16	30	16	25	30	20	27	40	24
6"	15	36	18	27	36	18	30	44	24	36	45	36
8"	20	40	20	28	48	22	34	50	34	43	58	42
10"	24	44	22	32	54	27	40	55	40	51	64	50
12"	32	48	24	36	60	30	46	60	46	60	66	59

FILENAME: O:_Engineering\Standards\Standard Drawings\SD-216_Thrust_Blocking_Details.dwg

<p>TUSCARAWAS COUNTY METROPOLITAN SEWER DISTRICT</p>	<p>THRUST BLOCKING DETAILS</p>	<p>STANDARD DRAWING SD-216</p>				
<p>APP'D BY: <i>Michael Jones</i> SANITARY ENGINEER</p>	<p>SCALE: NONE</p>	<p>REVISED 5/22/18</p>				
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