NORTHWESTERN WATER & SEWER DISTRICT
WATER MAIN GENERAL NOTES AND SPECIFICATIONS

1.0 GENERAL

1.1 Technical Standards

A. All material and construction shall meet the requirements of the American Water Works Association (AWWA), Ohio Department of Transportation (ODOT), The Ohio Environmental Protection Agency (OEPA), Recommended Standards for Water Works (10 States Standards) and American Society of Testing Materials (ASTM).

B. References to the "District" in these specifications shall mean the Northwestern Water and Sewer District or its designated representative.

1.2 Drinking Water Facilities Separation

A. A minimum of 10-foot horizontal and eighteen 18-inches of vertical clearance shall be maintained between sanitary sewers and public water mains. In the event that specified clearances cannot be maintained between the sanitary sewer and water main pipe, the sanitary sewer pipe shall be installed in accordance with the requirements of 10 States Standards.

B. The District shall reserve the right to require the sanitary sewer to be constructed using pressure pipe in accordance 10 States Standards.

1.3 Minimum Cover

A. Water mains shall be installed a minimum of 5-feet below final grade. The Contractor shall submit installations requiring less than 5-feet of cover or review by the District.

1.4 Erosion and Sedimentation Control

A. All activities where disturbed soils are anticipated shall be maintained with proper erosion and sedimentation controls in accordance with the OEPA General Permit for Construction Activities and to the satisfaction of the Wood County Engineer or other local agency having jurisdiction over storm water drainage.

1.5 Coordination

A. The Contractor shall schedule and attend a pre-construction meeting to be held prior to commencing any part of the work. The pre-construction meeting shall be scheduled to occur at minimum of one-week prior to the start of any part of the work.

B. The Contractor shall notify the District a minimum of 72-hours prior to the commencement of any part of the work.

C. The Contractor shall submit any proposed changes to the approved design plan in writing to the District for review.

D. The Contractor shall promptly notify the District of any discrepancies between the requirements of these Specifications.

1.7 Inspections

A. All work is subject to inspection and review of the District.

B. No work shall be permitted without a designated representative of the District present.

1.8 Construction Limits

A. The Contractor must at all times conduct his operations within the public right-of-way, easements, or work agreements as shown.

1.9 Existing Utilities

A. The location of all utilities shown are as obtained from the owners of the utility. No guarantee of accuracy of these utilities is made. The Contractor shall be responsible for verifying the location of existing utilities and protecting the same during the execution of the work.

B. Prior to commencing construction operations in an area which may involve underground utility facilities, the Contractor shall notify the District, and the Ohio Utilities Protection Service (OUPS) (1-800-362-2764).

1.10 Permits

A. The District shall obtain environmental and roadway permits from: OEPA, ODOT, Townships and Wood County Engineer.

B. The Contractor shall obtain all other required work permits prior to commencing any portion of the work.

1.11 Maintenance of Existing Flows

A. The Contractor shall maintain flow in all pipelines encountered during the work. Sewage or other liquid must be handled by the Contractor either by connection into an existing sewer or by temporary pumping to a satisfactory outlet as approved by the District. Sanitary sewage and storm drainage shall not be drained to the same outlet.

B. The Contractor shall submit all plans for pumping flow into alternate outlets for review by the District.

C. Flow maintenance pumps and equipment shall be of sufficient capacity and design to handle the range of flow expected to occur. This District can provide guidance regarding the typical existing flow, however, the Contractor shall be responsible for the design and operation of pumping equipment provided to maintain of all existing flows including those in excess of the District's recommendations.

D. The Contractor shall be prepared to perform the work on weekends and or evenings so as to minimize disruptions to the public.

1.12 Safety

A. The provision of all safety measures shall be responsibility of the Contractor.

B. Contractors performing work under these specifications shall conduct the work in accordance with all applicable local, State and Federal safety requirements.

2.0 WATER MAIN PIPE, FITTINGS, STRUCTURES AND MATERIALS

2.1 General

A. Polyvinyl Chloride (PVC) pipe shall be used for water main pipe sizes 4-inches through 16-inches in diameter. Ductile Iron pipe shall be used for pipe larger than 16-inches in diameter and less than or equal to 24-inches in diameter. The District shall reserve the right to specify the pipe material for water main and services based upon the proposed service or installation method.

B. Valves required on waterlines 12-inches in diameter and larger shall be placed in manholes.

C. The opening direction for valves and hydrants shall be as specified.

D. Bolts, nuts or other required hardware to be placed below grade shall be type 304 stainless steel or shall be coated with a baked ceramic filled fluorocarbon resin.

2.2 Polyvinyl Chloride Pipe

A. PVC pipe for water mains 4-inches through 12-inches in diameter shall be a minimum of DR18 with ductile iron equivalent outside diameter in accordance with AWWA C900. Molecular Oriented Polyvinyl Chloride Pipe (PVCO) pipe for water mains 4-inches through 12-inches in diameter shall be a minimum of PC235 with ductile iron equivalent outside diameter in accordance with AWWA C909.

B. PVC pipe for water mains 14-inches through 16-inches in diameter shall be a minimum of DR18 in accordance with AWWA C905.

C. Restrained or fused joint PVC pipe may be used for water mains installed by horizontal directional drilling.

D. Pipe shall be of the integral wall-thickened bell end type incorporating elastomeric gaskets to affect the pressure seal.

E. Pipe shall be designed for direct connection into ductile iron fittings using mechanical joints.

2.3 Ductile Iron Pipe

A. Ductile iron pipe for water mains shall be Class 52, minimum in accordance with AWWA C151 with rubber gasket joints in accordance with AWWA C111. The pipe shall have a cement mortar lining AWWA C104 and asphaltic coating in accordance with AWWA C151. Bronze wedges shall be used at all push-on joints (two per joint). The wedge shall be driven into the push-on joint to provide electrical conductivity between pipes.

2.4 Fire Hydrant Assemblies

A. Fire hydrant assemblies shall include hydrants, watch valves, valve boxes and the required anchoring pipe and fittings.

B. Fire hydrants shall be of the compression type, opening against and closing with the water pressure in the main, with a 6-inch mechanical joint base, two hose nozzles and one pumper nozzle as specified. Hydrants be provided in accordance with AWWA C502 and existing local fire department requirements.

C. Fire hydrants shall be Mueller Super Centurion 250, American Darling B-84B, or Kennedy K-81D. With the prior approval of the District, post-type fire hydrants may be used. Post-hydrants shall be Eclipse Model #2 with 4-inch mechanical joint inlet.

D. Fire hydrants assemblies shall be provided with a 6-inch gate valve and valve box.

E. Hydrants shall be provided with a Storz fitting compatible with a 5-inch diameter coupled fire hoses as manufactured Harrington, Inc or approved equal. The Storz fitting shall be integral and factory mounted to the fire hydrant assembly. Add-on Storz compatible adapters are not acceptable.

F. Hydrants shall be factory coated with weatherproofing paint prior to shipment and again following installation. The portion of hydrants below ground shall be painted with black paint and the portion above ground shall be Rust-Oleum, 3444 Safety Yellow Industrial Enamel or approved equal. Hydrants installed on private waterlines shall be painted red.

G. The hydrant and watch valve shall be secured to the water main with anchoring couplings as shown or required. All anchoring pipe and fittings shall be of the plain end mechanical joint type incorporating an integral follower gland and shall be as manufactured by Clow Corporation, American Cast Iron Pipe Company, US Pipe or approved equal.

H. Hydrants shall be set plumb and to the grade of the surrounding area as approved by the District.

I. Pumper nozzle shall be set toward the centerline of the street, highway, or right-of-way. Excavation for hydrants shall first be backfilled with No. 57 stone to a minimum depth of two feet. Remainder of excavation shall then be backfilled as specified for the trenches. Hydrants on main lines smaller than 6" in diameter shall not be equipped with a pumper nozzle.

J. The hydrant base and watch valve shall rest on a 8" x 8" x 16" concrete block.

2.5 Gate Valves

A. Gate valves shall be resilient seated, non-rising stem type, designed for a maximum working pressure of 200 psi, provided in accordance with AWWA C509 or C515.

B. Gate valves shall be provided with a 2-inch operating nut.

C. Gate valves shall be Mueller A-2361, Mueller A-2362, Kennedy C-509, or Kennedy C-515.

2.6 Double Check Valves

A. A Double Check Valve in a manhole shall be installed on all Fireline connections.

2.7 Butterfly Valves

A. Butterfly valves shall be used on all water mains 16-inches in diameter and larger.

B. Butterfly valves shall be designed for a maximum working pressure of 150 psi and shall be provided in accordance with AWWA C504-Class 150B. Butterfly valves shall be provided with a 2-inch operating nut

C. Butterfly valves shall be Mueller Lineseal III or Kennedy 4500.

2.8 Fittings and Joints

A. Fitting shall be of ductile iron, mechanical joint type or push-on type incorporating rubber gaskets. Caps and plug fittings shall be provided with standard tapped connections. Fittings shall be class 250 minimum, provided in accordance with AWWA C111 and C150, asphaltic coated in accordance with AWWA C151 or fusion bonded epoxy coating in accordance with AWWA C116 and cement mortal lined in accordance with AWWA C104.

B. Fittings for HDPE pipe including but not limited to, elbows, tees, branch saddles, adaptors and transitions shall be HDPE pipe. Fittings shall have the same or better cell classification as the pipe. Fittings shall provide a pressure rating equal to or greater than the HDPE pipe. Joint restraints shall be provided as specified.

C. HPDE pipe shall be joined by heat fusion butt welds between plain ends of pipe. Where conditions are not conducive to allow or manufacturer does not recommend heat fusion butt welds, an electrofusion coupling shall be used.

D. HDPE mechanical joint adaptor and backer ring (retainer gland) shall be used to connect HDPE pipe to PVC or Ductile Iron Pipe (DIP) materials. The mechanical joint adapter shall join to the HDPE pipe as specified and the DIP mechanical joint shall connect to the PVC or DIP end using a standard mechanical joint connection.

2.9 Joint Restraints

A. Mechanical joint restraints shall be provided at all dead ends, bends, tees, valves and other locations as required or specified. Mechanical joint restraints shall be provided in accordance with AWWA C111 and C153. Mechanical joint restraints shall include a restraining mechanism that when actuated, impacts multiple wedging actions against the pipe, increasing its resistance to movement as internal pipe pressure increases. The restraining device shall be constructed of ductile iron with a minimum working pressure of 250 psi and a safety factor of 2:1.

B. The dimensions of the joint restraint shall be such that it can be used with standard mechanical joint bell and tee-head bolts conforming to AWWA C111. Twist-off nuts shall be used to insure proper actuation of the restraining devices

2.10 Polyethylene Wrap

A. Ductile iron pipe and fittings shall be wrapped in a minimum 8 mil thick polyethylene tube per AWWA C-105. Fittings shall be wrapped for a distance of 5-feet on each side of the fitting. Rips, tears, punctures or other damage to the polyethylene tube shall be repaired prior to placement of backfill.

2.11 Water Services

A. Water services shall be Type K copper or HDPE pipe DR9 copper tubing size in accordance with AWWA C901 on services less than 3-inches in diameter.

2.12 Manhole Structures

A. All water manholes shall be precast concrete sections provided in accordance with ASTM C-478. Cast in place structures may be substituted for precast sections if approved in advance by the District. The minimum wall thickness shall be as shown on these Specifications with Grade 60 steel reinforcement. Concrete shall have a minimum compressive strength of 5000 psi.

B. ADJUSTMENT RINGS: Precast concrete adjustment rings shall be provided with a maximum of 18-inches of total adjustment height between the bottom of the casting and the top of the manhole chimney section.

C. CASTINGS: Standard cast iron manhole frame and covers shall be East Jordan Iron Works 1020A or Neenah 1772 with the District Logo cast on cover.

D. RUBBER GASKET JOINTS: An o-ring type gasket shall be provided at all manhole joints in accordance with ASTM C-443.

E. MANHOLE JOINT SEALANTS: Manhole joint sealants shall meet the Requirements of ASTM C-990, Federal Specification SS-S-210A or AASHTO M198B.

F. MANHOLE STEPS: Manhole steps shall be constructed from polypropylene material, installed at the locations and spacing as specified, meeting the requirements of ODOT Item 711.31.

G. MANHOLE IDENTIFICATION: The following shall be clearly stenciled or impressed on each manhole section: manhole number, casting date, the name or trademark of the manufacturer and location of plant.

H. CONCRETE COLLARS: All manholes located in existing pavement areas shall be provided with a concrete collar unless otherwise approved. The specifications for the local jurisdiction in charge of roadway maintenance shall take precedence when determining the proper concrete collar detail.

2.13 Valve Boxes

A. Valve boxes shall be 3 piece design, cast iron installed plumb and centered over the valve operator. Valve boxes located in pavement shall be installed so no loads are transmitted by the valve box onto the valve.

B. Valves located more than 5-feet below grade shall be provided with valve extensions.

C. Valve box castings shall be marked "Water".

D. All valve boxes located in existing pavement areas shall be provided with a concrete collar unless otherwise approved. The specifications for the local jurisdiction in charge of roadway maintenance shall take precedence when determining the proper concrete collar detail.

2.14 Locating Wire / Identification Tape / Utility Markers

A. A detectable locating tracer wire shall be installed directly over and on the center of non-metallic pressure pipes in open cut applications along the entire length to provide a reflective (inductive) path to determine pipe alignment and location after installation. The tracer wire shall be brought to the surface at a minimum of 500-foot intervals in a Copperhead Industries SnakPit Roadway tracer box. A 4-foot extra tracer wire extension shall be provided at each access point. The tracer wire shall be brought to the surface on the outside of all valve boxes and manholes. All wire connections shall be made with a Copperhead SnakeBit DryConn Direct Bury 3 way Lug or approved equal.

B. For open cut trench applications, the tracer wire shall be #12 gauge wire with 30 mil polyethylene insulation coating.

C. For horizontal directional drilling applications the tracer wire shall be Copperhead or Equal #12 gauge Extra High Strength (EHS) wire that has a minimum of an 1150 lbs break load. The tensile strength of the tracer wire shall be greater than the tensile strength of the pipe being installed by horizontal directional drilling methods.

D. After installation tracer wire shall be tested for continuity. Tracer wire shall be considered acceptable when a continuous non-interrupted read is obtained for the entire length of the pipe line.

E. An identification tape printed with the wording "WATER" shall be installed directly over the main approximately 30-inches below grade.

F. Utility markers shall be provided over the pressure pipe at intervals not to exceed 1000-feet spacing and at all valves and fittings to properly show the alignment. Markers shall be Carsonite CUM-375 or approved equal. The wording for the markers shall be submitted to the District for review.

2.15 Water Main Tapping Sleeves and Valves

A. Tapping valves for new water main connections smaller than 12-inches in diameter shall be Mueller T-2361 or T-2362 or approved equal in accordance with AWWA C509 or C515. The tapping saddle and valve shall be designed for a maximum of 250 psi.

G. Tapping valves for new water main connections larger than 12-inches in diameter shall be Mueller T-2361 or approved equal in accordance with AWWA C515.

H. Tapping Sleeves for new water main connections 4"-12" in diameter shall be Ford FTSS style.

2.16 Service Tapping Saddles

A. Tapping saddles shall be in accordance with the Water Main Service Connection Detail.

3.0 INSTALLATION OF WATER MAINS

3.1 Excavation

A. Excavations shall be made to the outside dimensions and to the depths shown or as specified. Topsoil which is suitable for finish grading shall first be carefully removed, stored separately and replaced, after backfilling and rough grading are complete.

3.2 Pipe Bedding Material

A. Pipe shall be laid on a properly shaped and firm bedding of the type specified meeting the requirements of ODOT Table 703.01-1. If directed by the District, the Contractor shall excavate unsuitable material below the bottom of the pipe bedding. Unsuitable material removed shall be replaced with granular material per ODOT Table 703.01-1.

B. Pipe bedding material for water mains shall consist of a bed of granular stone with a thickness as specified below the bottom of the pipe to provide proper support and extending to a plane as specified above the crown of the pipe. Granular bedding material shall be No. 8 aggregate stone for PVC or HDPE water main pipes and sand or screenings for ductile iron water main pipes in accordance with ODOT Item 703.10 unless otherwise approved by the District.

3.3 Installation of Pipe

A. Pipe and appurtenances shall be installed true to line, grade and locations shown on the design drawings with joints centered, spigots pushed home and properly supported. Care shall be used in the laying of pipe to ensure the pipe is properly supported for the entire length of the pipe barrel.

3.4 Manholes

A. The Contractor shall note any damaged or defective manhole sections for review by the District. The District shall reserve the right to direct repairs to damaged or defective manhole sections or to require replacement. Repairs shall be in accordance with the requirements of ASTM C-478.

B. Pipe connections shall be a minimum of 6-inches from any joints in the structure.

3.5 Connections to Existing Mains

A. New mains shall be connected to existing mains or services, using fittings appropriate for the pipe materials being used and as approved by the District. The Contractor shall notify the District a minimum of 48-hours in advance of performing connections to existing mains. The Contractor shall be prepared to work weekends and or evenings so as to minimize disruptions to existing customers.

B. The Contractor shall make new connections carefully to prevent contamination of the existing mains. All fittings, valves, and pipe shall be washed with clean water and then sterilized by washing with a chlorine solution having a residual chlorine strength or not less than 50 ppm.

C. The Contractor shall hydrostatically test the tapping saddle in accordance with the manufacturer's recommendations prior to the construction of the new water main connection.

3.6 Maintenance of Trenches and Backfill

A. Backfill shall be to the limits shown on the drawings and according to the compaction requirements of this section. Backfill material shall be placed and compacted for the entire width, length and height of the trench or excavation.

B. Trenches and excavations shall be backfilled immediately after the pipe placed and bedded. Pipe bedding and trench and excavation backfill material shall be placed in the presence of a representative of the District. Backfill shall not contain stones, rock, pieces of masonry, organic material, frozen earth, debris, earth with a high void content or other material considered unsatisfactory by the District.

C. NON-STRUCTURES: Backfill not under structures or outside the pavement influence area shall be compacted in 6-inch layers to 95% of Standard Proctor or as directed by the District for the entire width, length, and vertical height of the trench.

D. STRUCTURES: Backfill under structures or adjacent to pavement shall be ODOT Type 304 or 411 and compacted in 6-inch lifts to 100% of Standard Proctor. Structures include manholes, pump stations, grinder pumps, roads, drives, sidewalks, and any other miscellaneous items called out on the drawings.

E. PAVEMENT INFLUENCE AREA: Excavations below a line extended from the edge of pavement (or back of curb) at a 45 degree angle downward from the surface shall be backfilled as specified for structures. Areas of the excavation above the 45 degree projection may be backfilled as listed for non-structures.

F. Water may be used to attain the proper moisture content in achieving compaction requirements. Prior to the placement of soil over the granular material all free water shall be drained from the excavation.

G. In areas where granular material is not acceptable for use as backfill, provide Controlled Density Fill (CDF) in accordance with ODOT Item 613, Low Strength Mortar Backfill. CFD shall not be placed around ductile iron pipe without polyethylene wrap.

3.7 Stockpiles

A. Stockpiles of excavated material and all construction material shall be of limited size and shall be neatly maintained or removed from the project site so as not to block existing drainage or impede pedestrian or vehicular traffic.

B. Excess excavated material stockpiled at the work site, and not be used for backfill or other restoration purposes, must be removed from the project area within 2 weeks of the initial disturbance.

C. Stockpiles shall not be permitted to be replaced within Ohio Department of Transportation right-of-way.

4.0 HORIZONTAL DIRECTIONAL DRILLING

4.1 General

A. Pipe to be installed by HDD shall use a surface launched steerable drill tool controlled from a mobile drilling frame that includes a field power unit, drilling fluid mixing system and mobile spoils extraction system.

B. The Contractor shall be responsible for any settlement, heaving, drilling fluid contamination or other damage caused to surface or underground features as a result of the HDD operation. The Contractor shall closely monitor the volume of drilling fluid used, pulling forces and the pullback operation to avoid damage to adjacent facilities or pipe being installed.

4.2 Procedure

A. PILOT HOLE: The pilot hole shall be drilled in accordance with the tolerance limits listed below. The Contractor shall clearly mark the alignment and depth of the pilot hole on the ground or with paint, lathe or flags as the drilling head advances.

B. REAMING: The drill hole shall be pre-reamed as necessary for the type of soil and ground conditions. The reaming diameter shall not exceed 1.5 times the diameter of the product pipe being installed.

C. PIPE INSTALLATION: The pipe shall be pulled into place in one continuous operation and properly supported and protected to prevent damage during installation. The Contractor shall carefully monitor the pullback operation to ensure the allowable strength of the pipe is not exceeded. Pipe connections shall be made after pipe has had adequate time to adjust to environmental conditions such as temperature.

4.3 Drilling Fluid

A. The Contractor shall utilize drilling fluid consisting of a bentonite, water and polymer solution to stabilize the hole, remove cuttings and lubricate the pipe. All drilling fluid mixtures shall meet the requirements of applicable environmental regulations. The pipe shall be cleaned of any drilling fluid that enters the pipe during the execution of the work.

B. The Contractor shall provide measures to contain the drilling fluid to the work area to prevent damage to adjacent facilities.

4.4 Tolerances

A. The pipe shall be installed to the specified tolerances as summarized below. Pipe installations that fall outside of these tolerances shall be re-drilled to achieve the required tolerances.

B. The vertical elevation shall be within 0.50-feet of the plan elevation and the horizontal alignment shall be within 2-feet of the plan location unless otherwise specified.

C. The pilot hole curve radius shall be no greater than 75% of the maximum bending radius of the pipe being installed.

D. The pilot hole shall be no closer than 3-feet from any right-of-way or easement boundary.

E. In the case that the pilot hole must be abandoned, the Contractor shall submit a plan for filling, grouting or securing the pilot for review by the District.

F. QUALITY CONTROL: The Contractor shall locate the pilot hole every 10-feet and maintain accurate record of the horizontal and vertical location of the pilot hole. The Contractor shall maintain drilling logs recording the following information: date, times, soil conditions, depth of bury and horizontal location referenced to stationing, centerline, R/W or permanent easement line. The Contractor shall pot hole excavate all existing utilities to be crossed by the proposed boring prior to commencing drilling operations. The District shall reserve the right to require more frequent pot holing or pilot hole excavation location checks.

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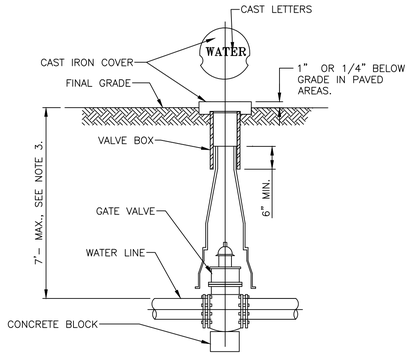
WATER MAIN
GENERAL NOTES AND SPECIFICATIONS

#	DATE	BY	REVISION	CHECKED BY:
	02/25/13	TB	CONTENT REVISION	
	06/06/13	MD	DBL CHECK VALVE, TAPPING SLEEVE	
	04/25/17	MD	MUELLER GV #'S & PVC PIPE #'S	
	12/13/18	MD	REMOVED HDPE, ADD VALVE COLLAR	

DRAWN BY:

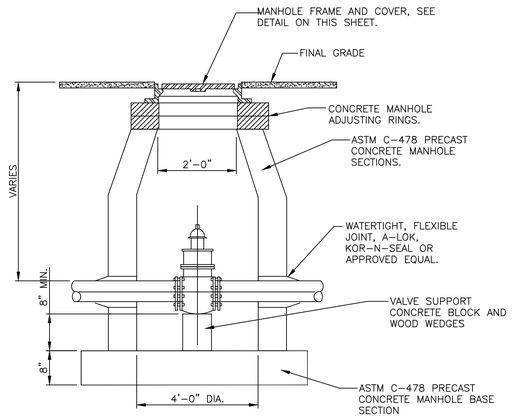


GATE VALVE DETAIL FOR 10" AND SMALLER WATER MAINS

NOT TO SCALE

NOTES:

1. VALVES WITH THE OPERATING NUT GREATER THAN 5-FEET BELOW GRADE SHALL BE PROVIDED WITH A VALVE EXTENSION.

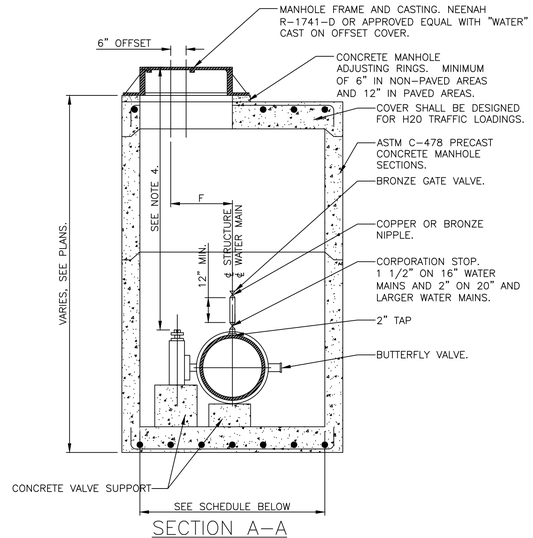


GATE VALVE IN MANHOLE DETAIL FOR 12" WATER MAINS

NOT TO SCALE

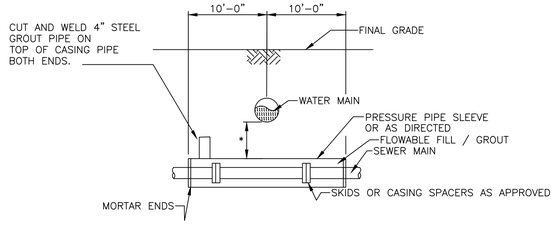
NOTES:

1. PROVIDE MANHOLES ON WATER MAINS 12" AND LARGER OR FOR VALVES LOCATED IN PAVEMENT IN ACCORDANCE WITH THE SPECIFICATIONS.



SECTION A-A

NOT TO SCALE

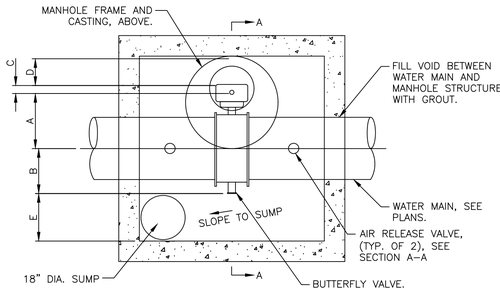


ENCASEMENT DETAIL

NOT TO SCALE

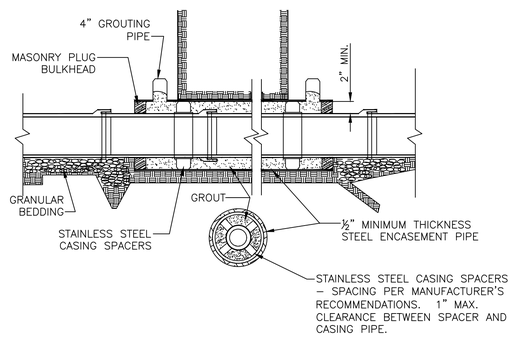
NOTES:

1. WHERE "*" IS LESS THAN 18" A PRESSURE PIPE SLEEVE ON THE SEWER LINE IS REQUIRED. WHEN DIVERTING THE WATER MAIN OR PROVIDING SLEEVING, ONE LENGTH OF WATER PIPE IS TO BE LOCATED SO THAT BOTH JOINTS WILL BE AS FAR FROM THE SEWER AS POSSIBLE.
2. ALTERNATIVELY, THE SANITARY SEWER MAY BE CONSTURCTED USING A PIPE MATERIAL EQUAL TO THE WATERMAIN BEING CROSSED.



SQUARE MANHOLE PLAN

NOT TO SCALE

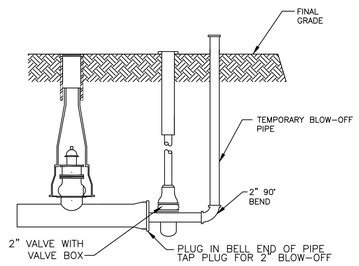


SANITARY SEWER AND WATER LINE BORING DETAIL

NOT TO SCALE

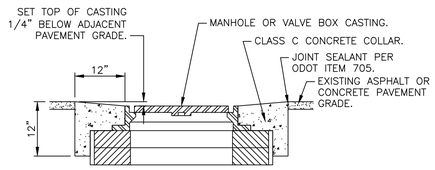
NOTES:

1. CASING PIPES FOR ROADWAY AND RAILROAD BORES SHALL BE PROVIDED IN ACCORDANCE WITH APPLICABLE RAILROAD AND OHIO DEPARTMENT OF TRANSPORTATION SPECIFICATIONS AND DETAILS.
2. BANDED WOOD BLOCKS MAY BE USED IN LIEU OF STAINLESS STEEL CASING SPACERS AS APPROVED BY THE DISTRICT.



STANDARD DETAIL FOR DEAD END WITH 2" BLOW-OFF

NOT TO SCALE

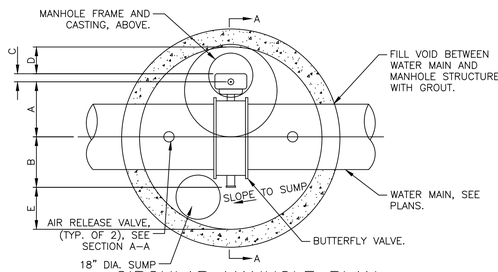


MANHOLE CONCRETE COLLAR DETAIL

NOT TO SCALE

NOTES:

1. THE CONCRETE COLLAR SHALL BE CONSTRUCTED USING FAST SET CONCRETE.
2. THE CONCRETE COLLAR SHALL NOT BE OPENED TO TRAFFIC UNTIL THE CONCRETE HAS CURED FOR 24-HOURS.



CIRCULAR MANHOLE PLAN

NOT TO SCALE

WATER MAIN DIAMETER (IN.)	MH SIZE (IN.)	MH SHAPE	MIN. WALL THICKNESS (IN.)	A (IN.)	B (IN.)	C (IN.)	D (IN.)	E (IN.)	F (IN.)
16	60	CIRCULAR	6	16	14.5	3	11	15.5	17
20	72	SQUARE	8	19	17	3.5	13.5	19	23
24	72	SQUARE	8	21.5	18.5	4	10.5	17.5	23
30	78	SQUARE	8	25	24.5	4	10	14.5	26
36	90	SQUARE	8	29	28	4	12	17	32

BUTTERFLY VALVE MANHOLE SCHEDULE

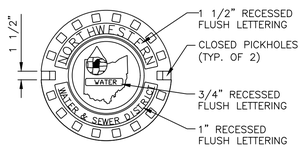
BUTTERFLY VALVE IN MANHOLE FOR 16" WATER MAINS AND LARGER

NOTES:

1. VALVES WITH THE OPERATING NUT GREATER THAN 7-FEET BELOW GRADE SHALL BE PROVIDED WITH A VALVE STEM EXTENSION AND STEM GUIDES.

WL-#	VALVE OPENING DIRECTION
WL-100 AREA	CLOCKWISE
WL-6100 AREA	CLOCKWISE
WL-7100 AREA	CLOCKWISE
WL-200 AREA	CLOCKWISE
WL-4000 AREA	CLOCKWISE
WL-5000 AREA	CLOCKWISE
ALL OTHERS	COUNTERCLOCKWISE

VALVE SCHEDULE

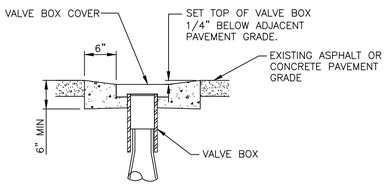


MANHOLE COVER DETAIL

NOT TO SCALE

NOTES:

1. DISTRICT WATER MANHOLE COVER AND FRAME SHALL BE EJIW 1020A OR NEENAH 1772 MANHOLE FRAME AND COVER AS DETAILED ABOVE.
2. PRIVATE WATER MANHOLES COVERS SHALL BE MARKED "WATER".



VALVE BOX CONCRETE COLLAR DETAIL

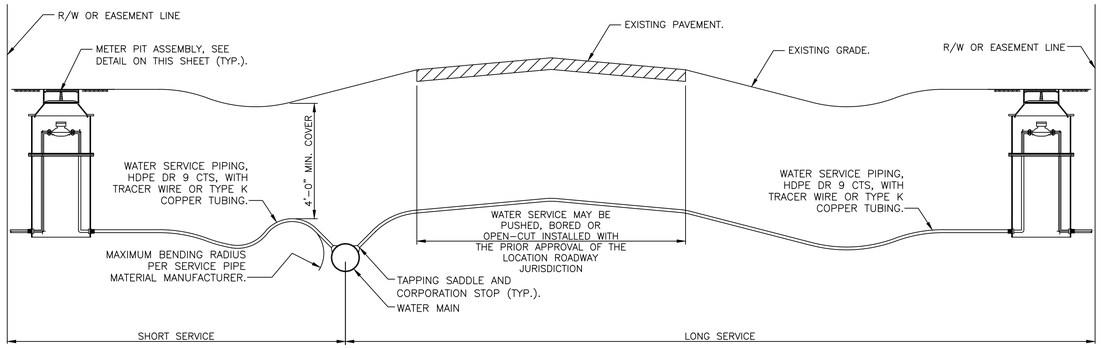
NOT TO SCALE

NOTES:

1. CONCRETE COLLARS SHALL BE A MINIMUM OF 6" THICK, BUT MATCH EXISTING PAVEMENT IF IT'S THICKER.

CHECKED BY:

DRAWN BY:



TYPICAL WATER SERVICE DETAIL

NOT TO SCALE

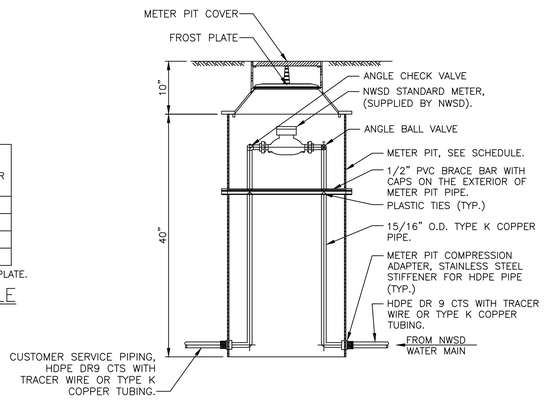
NOTES:

1. WHERE METER PITS ARE NOT APPLICABLE, A FORD MODEL COMPRESSION STYLE CURB STOP WITH A CAST IRON CURB BOX SHALL BE INSTALLED.
2. LEAD SOLDER AND FLUX THAT EXCEEDS 0.2 PERCENT LEAD CONTENT AND ANY PIPE OR PIPE FITTING THAT EXCEEDS A 0.25 PERCENT LEAD CONTENT SHALL NOT BE USED IN THE INSTALLATION OF THE PROPOSED FACILITIES.

WATER SERVICE SIZE (IN.)	METER PIT ASSEMBLY PART NO.	LID PART NUMBER
3/4	FORD PDBHC-95469-001	W3T
1	FORD PDBHC-488-20-48-FP	W3T
1 1/2	FORD PMBB-688-36HB-48	MC-36-T
2	FORD PMBB-788-36HB-48	MC-36-T

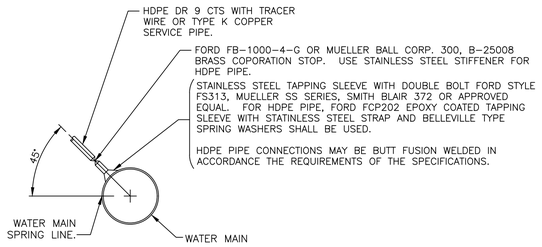
ALL METER PIT COVERS SHALL BE PROVIDED WITH FROST PLATE.

METER PIT ASSEMBLY SCHEDULE



METER PIT ASSEMBLY

NOT TO SCALE



WATER MAIN SERVICE CONNECTION DETAIL

NOT TO SCALE

NOTES:

1. REPAIR ANY DAMAGE TO EXISTING POLYWRAP FOR DUCTILE IRON WATER MAINS AS REQUIRED.
2. SERVICE TRACER WIRE SHALL BE CONNECTED TO MAINLINE TRACER WIRE WITH COPPERHEAD SNAKEBITE DRYCONN 3-WAY DIRECT BURY LUG 3WB-01.

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WATER MAIN DETAILS
WATER SERVICE DETAILS

DRAWN BY:	#	DATE	BY	REVISION
CHECKED BY:	1	10/25/12	TB	CONTENT REVISION
	2	09/11/14	MD	PIT ASS'Y SCHED, SERV. DET. NOTE
	3	11/19/18	MD	NOTE #2 TO TYP. WATER DETAIL