NORTHWESTERN WATER & SEWER DISTRICT
SANITARY SEWER 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 Wastewater Facilities (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. Gravity and pressure pipe sanitary sewers shall be installed a minimum of 5-feet below final grade. The Contractor shall submit installations requiring less than 5-feet of cover for review by the District.

1.4 Storm Water and Drainage Connections

A. Roof drains, foundation drains, storm sewers, sump pumps and other clean water connections to the sanitary sewer are strictly prohibited.

1.5 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.

1.6 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.

C. Sewer pipe invert elevations will be checked at manholes to ensure proper grade.

D. Sewers with grades less than the design grades shall be rejected. Rejected sewers shall be replaced at no additional cost to the District.

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 on the plans 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 in each sewer. 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 GRAVITY SANITARY SEWERS, FITTINGS, STRUCTURES AND MATERIALS

2.1 Gravity Sanitary Sewer Pipe Materials

A. Gravity sanitary sewers less than or 18-inches in diameter shall be solid wall premium joint SDR 35 PVC sewer pipe conforming to ASTM D-3034. Gravity sanitary sewer deeper than 20' in depth shall be solid wall premium joint SDR 26 PVC sewer pipe conforming to ASTM D-3034. The minimum cell classification for PVC pipe shall be 12454.

B. Gravity sanitary sewers 18-inches in diameter and larger shall be shall be solid wall, premium joint PVC sewer pipe provided in accordance with ASTM F-679. The required SDR for pipes 18-inches and larger shall be determined on a case by case basis with consideration given to the soil materials and depth of installation.

C. IDENTIFICATION TAPE: An identification tape printed with the wording "SEWER" shall be installed directly over the main approximately 30-inches below grade.

D. SERVICE LATERALS: Sanitary sewer laterals shall be 6-inch diameter premium joint SDR 35 PVC sewer pipe conforming to ASTM D-3034 unless otherwise approved by the District.

E. PRIVATE SEWERS: Private sanitary sewers larger than 6-inches in diameter shall require manhole structures at all connecting sewers and changes in direction in accordance with the 10 States Standards.

F. Private sewers connecting to the District's system shall be constructed in accordance with the requirements of these Specifications.

G. Alternate Pipe materials may be submitted by the Contractor for review by the District.

2.2 Gravity Sanitary Sewer Fittings

A. PVC Pipe Fittings shall have a minimum cell classification of 12454-B as defined in ASTM D-1784. The SDR ratio for fittings shall be equal to or greater than the SDR ratio of the pipe used for the construction of the gravity sewer main.

B. PVC pipe sanitary sewer fittings installed greater than 18-feet below grade shall be ASTM D-3034 SDR-26 deep socket style fittings.

2.3 Sanitary Sewer Manhole Structures

A. All sanitary sewer 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. CHIMNEY SEALS: All manhole adjustment rings and casting shall be sealed with an internal or external seal. Internal seals shall be FLEX Seal. External seals shall be WRAPID Seal or approved equal. Alternate chimney seal materials may be submitted for review by the District.

G. 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.

H. 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.

I. 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.

2.4 Sanitary Manhole Connections

A. PIPE CONNECTIONS: New piped connections to existing manhole structures shall be a resilient type connection in accordance with the requirements of ASTM C-923. Resilient type pipe connections shall be Kor-N-Seal boots or approved equal.

B. No other utilities shall be installed inside a sanitary sewer manhole. Utilities discovered inside existing sanitary sewer manholes shall be removed by the owner of that utility.

3.0 SANITARY SEWER PRESSURE PIPES AND FITTINGS

A. Polyvinyl Chloride (PVC) pipe shall be used for pressure pipe 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. High Density Polyethylene pipe shall be used for pressure pipe smaller than 4-inches in diameter. The District shall reserve the right to specify the pipe material for pressure pipes based upon the proposed service or installation method.

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

C. The opening direction for valves 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.

3.1 Polyvinyl Chloride Pipe

A. PVC pipe for pressure pipes 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 pressure pipes 4-inch 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 pressure pipes 14-inches through 16-inches in diameter shall be a minimum of DR18 in accordance with AWWA C905.

C. Restrained joint or fused joint PVC pipe may be used for pressure pipes 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.

3.2 High Density Polyethylene (HDPE) Pipe

A. HDPE pipe for pressure pipes less than 3-inches in diameter shall be DR9 copper tubing size in accordance with AWWA C901. All fittings for low pressure sewer systems shall be brass compression style fittings.

B. HDPE pipe for pressure pipes 3-inches in diameter shall be DR11 iron pipe size in accordance with AWWA C901. All fittings for low pressure sewer systems shall be brass compression style fittings.

C. HDPE pipe materals to be used for sewer service shall be solid black or black marked with a green identification stripe.

3.3 Ductile Iron Pipe

A. Ductile iron pipe for pressure pipes 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.

3.3 Plug Valves

A. Plug valves shall be resilient seated, non-rising stem type, designed for a maximum working pressure of 200 psi, provided in accordance with AWWA C517. Plug valves shall be provided with a 2-inch operating nut.
B. Plug valves shall have a full port area to match the pressure pipe inside diameter.
C. Plug valves shall be DeZurick PEF Plug valve or approved equal.

3.4 Fittings and Joints

A. Fittings shall be 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 C-104.
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.

3.5 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.

3.6 Polyethylene Wrap

A. Ductile iron pipe and fittings shall be wrapped in a minimum 8 mil thick polyethylene tube per AWWA C105. 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.

3.7 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 "SEWER."

3.8 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 "SEWER" 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.

4.0 LOW PRESSURE SEWER MATERIALS AND EQUIPMENT

4.1 Grinder Pumps

A. Grinder Pumps shall be manufactured by Environmental One. Model DH071-93 Station Part Number D200B14E228BJ for single pump applications and Model DH152-93 Station Part Number D200L14B18BJ for duplex pump applications. (Model and Part Numbers as of February 2015)

4.2 Electrical

A. All electrical work performed shall comply with the requirements of all local building codes.

B. Electrical conduit required for the installation of the grinder pump may be run through soffit, crawl space, basements or below grade to comply with manufacturer requirements and in accordance with the requirements of all local building codes.

C. The grinder pump alarm box shall be installed with clear line of sight between the grinder pump and the alarm box. The alarm box also must be installed to be clearly visible from the roadway.

4.3 Private Property Coordination

A. The Contractor shall coordinate with private property owners for installation and verification of existing conditions.

B. The private property owners are not authorized to direct the Contractor to make changes in the work as shown or specified. Any changes requested by the private property owner shall be provided to the District for review. The District shall direct any changes to the work as shown or specified.

5.0 INSTALLATION OF GRAVITY SEWERS

5.1 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.

5.2 Pipe Bedding Material

A. Pipe shall be laid on a properly shaped and firm bedding of the type specified meeting the requirements of ODOT Item 603.05. 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 Item 603.05.

B. Pipe bedding material for flexible pipes 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 of above the crown of flexible pipe. Granular bedding material shall be No. 67 or No. 8 aggregate in accordance with ODOT Item 703.11 unless otherwise approved by the District.

5.3 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.

B. The minimum grades for pipe sewers shall be in accordance with the requirements of Section 33.4 of 10 States Standards. The minimum grade for 6-inch services shall be 1.00%. Pipe sewers shall not be installed with grades less than the minimums listed without the prior review of the District.

5.4 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.

C. DROP CONNECTIONS: A drop pipe shall be required for all pipes entering the manhole at an elevation of 24-inches above the flow line of the manhole. The minimum drop pipe diameter for sanitary sewer manholes shall be 6-inches.
   1. OUTSIDE DROP CONNECTIONS: All new manholes that include drop connections shall be constructed using an outside drop connection.
   2. INSIDE DROP CONNECTIONS: Inside Drop Connections may only be used on existing manholes as approved by the District. The District shall reserve the right to require an outside drop connection to existing manholes. In the event the manhole steps are in conflict with the proposed inside drop connection, the steps shall be relocated as approved by the District.

D. Manhole steps to be relocated or replaced by the Contractor, shall be installed in locations as directed by the District. New step materials shall be provided for all step replacement or relocation.

E. Doghouse type manholes constructed over the existing sewer shall not be permitted. New manholes installed on existing sewers shall be constructed in accordance with the details shown on the plans.

5.4 Connections to Existing Mains

A. New connections to existing PVC sewer mains or services shall be made using solid PVC fittings. Fernco type flexible couplings shall not be permitted.

B. New connections to existing sewers constructed of other materials shall require prior review of the District.

C. All lateral connections on new sewers shall be connected into the sewer main pipe. New lateral pipe connections into existing manholes shall only be made following review of the connection by the District.

5.5 Additional Requirements for Lateral Services

A. All Service Connections must be installed by a District Licensed Sewer Tapper in accordance with the requirements of these specifications.

B. Lateral connections provided for future connections shall be terminated at the public right-of-way with bell end and plug. A treated 2 x 4 board shall be placed at the end of the lateral to within 1-foot of finished grade for future locating purposes. The board shall be marked to indicate that the board is marking the location of a sanitary sewer tap. Service laterals installed to vacant lots shall be installed to a depth no greater than 8-feet below final grade at the public right-of-way unless otherwise approved by the District.

C. A soil dam shall be installed around the lateral to prevent the migration of ground water through the trench. The soil dam shall consist of a non-pervious material place around the pipe along a minimum length of 6-feet between pipe joints. The bell of the pipe shall be properly supported with bedding material as specified.

D. Service laterals shall enter through the basement side wall. Basement floor taps shall not be permitted.

5.6 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 12-inch layers to 90% 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 95% 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.

5.7 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 in the Ohio Department of Transportation right-of-way.

2 WORKING DAYS
BEFORE YOU DIG
CALL TOLL FREE 800-362-2764
OHIO UTILITIES PROTECTION SERVICE

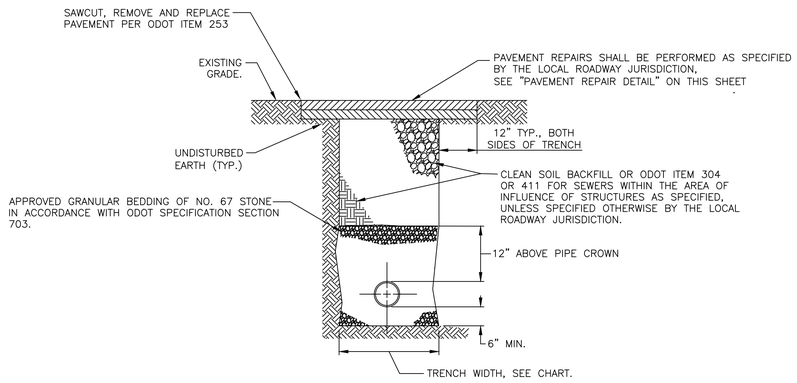
Ohio Utilities Protection Service
Call 811 before you dig

NORTHWESTERN WATER & SEWER DISTRICT
12560 MIDDLETON PIKE, PO BOX 348
BOWLING GREEN, OH 43402
PHONE: (419) 354-9090 1-877-354-9090 TOLL FREE
AFTER HOURS EMERGENCY (419)-354-9001
www.nwwsd.org

SANITARY SEWER
GENERAL NOTES AND SPECIFICATIONS

DRAWN BY: CHECKED BY:

#	DATE	BY	REVISION
	02/12/15	GC	G.P., MODEL AND PART NUMBER
	08/06/18	MD	GRAVITY SAN. SEWER PIPE MATERIAL
	12/12/18	MD	REMOVED 4" TO 10" HDPE PIPE



TRENCH AND BEDDING DETAIL

NOT TO SCALE

STATE HIGHWAY TRENCH AND BEDDING NOTES FOR WORK IN ODOT RIGHT OF WAY

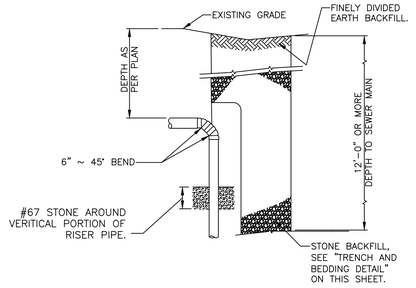
1. BEDDING MATERIAL SHALL BE EXTENDED 6–INCHES ABOVE THE CROWN OF THE PIPE.
2. BACKFILLING ABOVE THE BEDDING MATERIAL AND BELOW THE PAVEMENT SECTION SHAL BE ODOT 613, LOW STRENGH MORTAR BACKFILL.
3. PAVEMENT REPAIRS SHALL BE PERFORMED IN ACCORDANCE WITH THE "ODOT PAVEMENT REPAIR DETAIL."

SIZE	MINIMUM TRENCH WITDH
6"	2'–0"
8"	2'–1"
10"	2'–3"
12"	2'–5"
15"	2'–8"
18"	3'–0"
21"	3'–4"
24"	3'–8"
27"	3'–11"
30"	4'–4"
36"	5'–0"

TRENCH WIDTH SCHEDULE

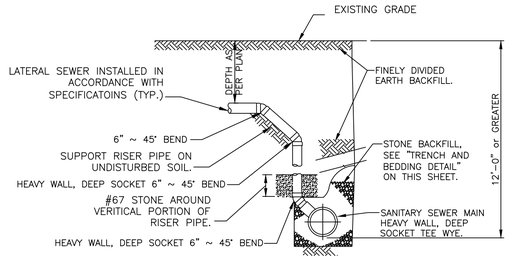
NOTES:

1. TABLE IS FOR ASTM D–3034, SDR 35 PIPE FOR 6"–15" AND ASTM F–679 WALL FOR OTHER FLEXIBLE PIPES, MINIMUM TRENCH WITH SHALL MEET MANUFACTURER'S REQUIREMENTS.
2. MAXIMUM TRENCH WIDTH SHALL BE NO MORE THAN TWO (2') FEET PLUS THE PIPE DIAMETER.
3. WHERE APPLICABLE AND NOT OTHERWISE STATED IN THE SPECIFICATIONS, THE MINIMUM TRENCH WIDTH SHOWN ABOVE SHALL BE THE PAY WIDTH FOR TRENCHING IN ROCK.



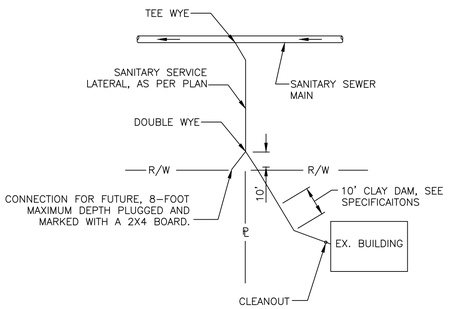
6" RISER WITH VERTICAL TRENCH WALLS

NOT TO SCALE



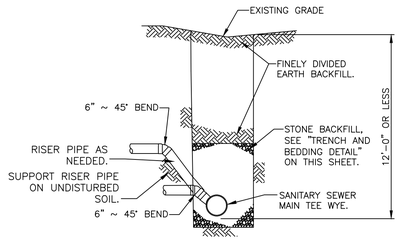
6" SERVICE CONNECTION FOR SEWER MAIN GREATER THAN 12'–0" DEEP

NOT TO SCALE



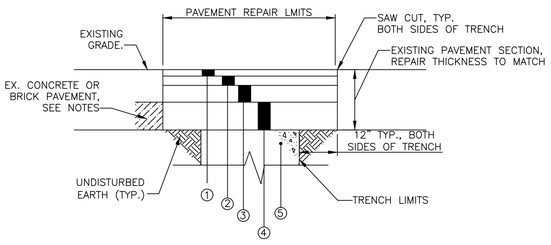
TYPICAL PLAN OF SANITARY SEWER LATERALS

NOT TO SCALE



6" SERVICE CONNECTION FOR SEWER MAIN LESS THAN 12'–0" DEEP

NOT TO SCALE



① 1 1/4" ODOT ITEM 448 ASPHALT CONCRETE SURFACE COURSE, TYPE 1, PG 64–22.
② 1 3/4" ODOT ITEM 448 ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 2, PG 64–22.
③ 6" ODOT ITEM 301 ASPHALT CONCRETE BASE COURSE, PG 64–22. (2 LIFTS)*
④ 12" ODOT ITEM 304 AGGREGATE BASE.
⑤ ODOT ITEM 613 LOW STRENGTH MORTAR BACKFILL.*

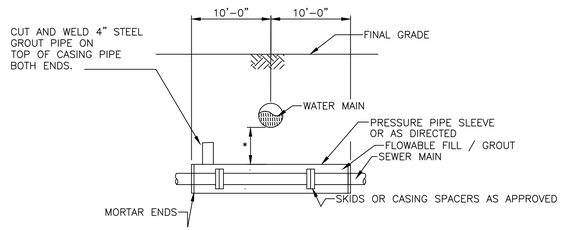
PAVEMENT REPAIR DETAIL

NOT TO SCALE

NOTES

1. THE THICKNESS OF THE PAVEMENT REPAIR SECTION SHALL NOT BE LESS THAN THE EXISTING PAVEMENT SECTION INCLUDING AGGREGATE BASE MATERIAL.
2. CONCRETE OR BRICK BASE MATERIAL SHALL BE REPLACED WITH A MINIMUM OF 8–INCHES OF ODOT ITEM 452, NON–REINFORCED CONCRETE PAVEMENT. THE THICKNESS OF THE CONCRETE BASE REPAIR SHALL NOT BE LESS THAT THE EXISTING BASE MATERIAL. SEE ODOT BP–2.1 AND ODOT BP–2.2.

* ODOT PAVEMENT ONLY



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 CONSTRUCTED USING A PIPE MATERIAL EQUAL TO THE WATERMAIN BEING CROSSED.

GRAVITY SANITARY SERVICE CONNECTION DETAILS

PVC PIPE AIR TEST CHART

MINIMUM TIME FOR A 1.0 PSI PRESSURE DROP FOR SIZE AND LENGTH OF PIPE INDICATED (UNI–6–98)

PIPE DIAMTER (IN)	MINIMUM TIME (MIN:SEC)	TIME FOR LONGER SECTION (SEC)	100	150	200	250	300	350	400	450	500
6	5:40	0.854 L	5:40	5:40	5:40	5:40					
8	7:34	1.520 L	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24	12:40
10	9:26	2.374 L	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48	19:47
12	11:20	3.418 L	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38	28:29
15	14:10	5.342 L	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04	44:31
18	17:00	7.692 L	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41	64:06
21	19:50	10.470 L	19:50	26:10	34:54	43:37	52:21	61:00	69:48	78:31	87:15
24	22:40	13.674 L	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33	113:57
27	25:30	17.306 L	28:51	43:16	57:41	72:07	86:32	100:57	115:22	129:48	144:13
30	28:20	21.366 L	35:37	53:25	71:13	89:02	106:50	124:38	142:26	160:15	178:03

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SANITARY SEWER
GRAVITY SEWER DETAILS

DRAWN BY: CHECKED BY:

#	DATE	BY	REVISION
	02/25/13	TB	CONTENT REVISION
	01/21/13	TB	TRENCH DETAIL
	06/09/11	MD	TRENCH WIDTH NOTES