Professional

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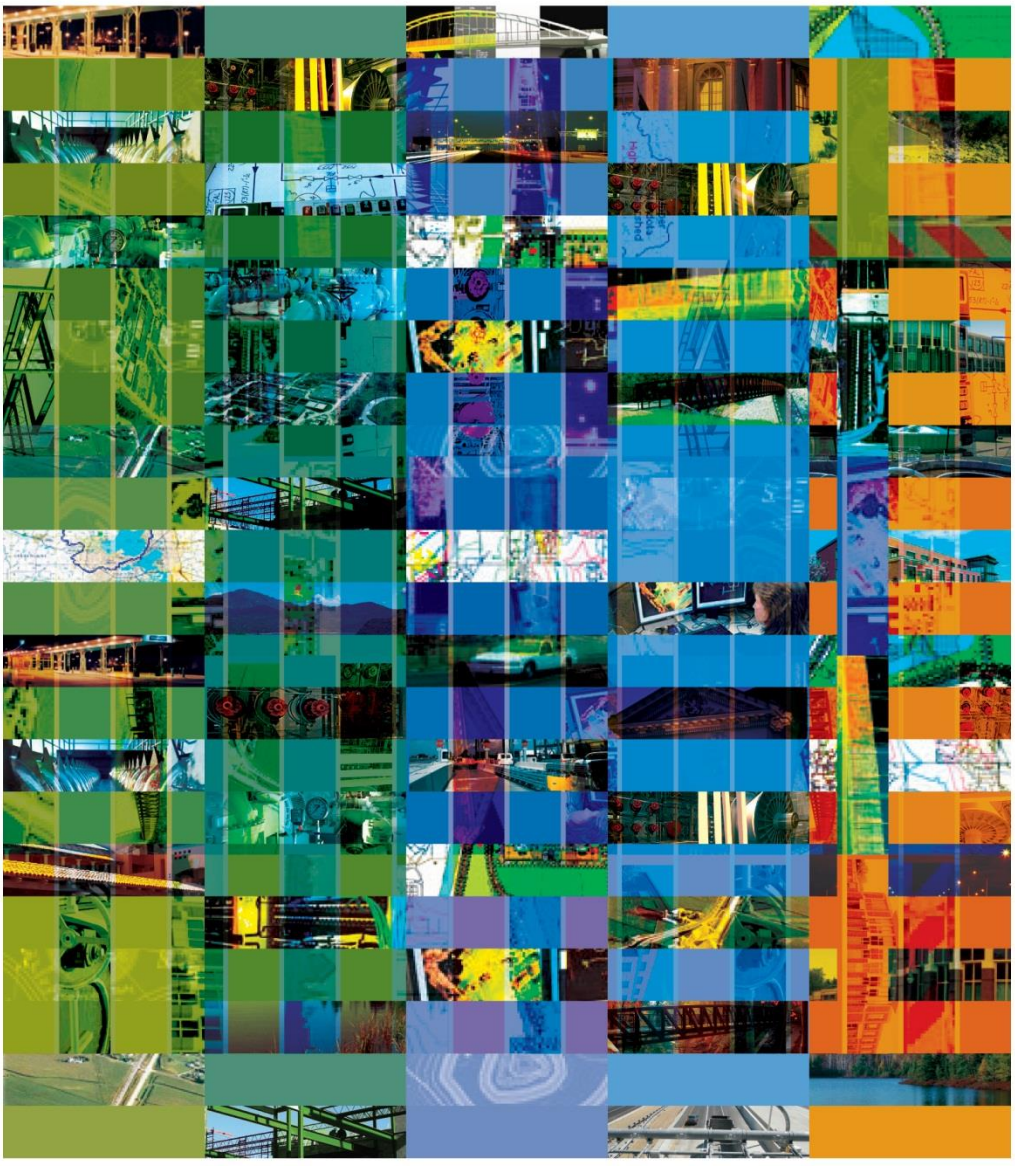
Sanitary Sewer Standards Manual



Report

Florence Regional Sewage District, Indiana

August 2018

Revised May 2023

STRAND ASSOCIATES®

Sanitary Sewer Standards Manual

Florence Regional Sewage District, Indiana

Effective September 2018

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INTRODUCTION

Florence Regional Sewage District (District) Sanitary Sewer Standards Manual (Manual) sets forth minimum standards for design and installation of sanitary sewer improvements. Examples of when the guidelines in this Manual apply include, but are not limited to:

1. The design, construction, and maintenance of a sanitary sewer that will be directly connected to or will become a part of the District's municipal facilities.

2. Sanitary sewer improvements related to development of land located within the District limits, including major and minor subdivisions.

Definitions, formulas, criteria, procedures, and data are presented in this Manual to provide direction to Developers in project planning and design, and to District personnel in permit application and plan review. The intended use of this Manual is a guidance document to assist in achieving compliance with District Ordinances.

This Manual presents minimum design requirements. When unusual or complex scenarios are encountered during the design process, it is the responsibility of the designer to identify such conditions and notify District personnel. In such cases, the Developer shall propose an alternative higher standard, criteria, solution, or methodology consistent with good planning and engineering practice and shall receive approval of the change before finalizing the design. Use of this Manual or issuance of a permit does not release the Developer of design responsibility. In the event of disagreement with other requirements, such as county or state regulations or District ordinances, the more stringent requirement shall apply. Developer is responsible for obtaining all necessary county, state, and federal permits before the start of construction.

DEFINITIONS AND ACRONYMS

ACI-American Concrete Institute

ARV-Air Release Valve

ASTM–Formerly the American Society for Testing and Materials, now ASTM International

AWWA–American Water Works Association

Base Flood–The flooding having a 1 percent probability of being equaled or exceeded in a given year. Also referred to as the 100-year flood.

Developer–A person, homeowner, contractor, or company, who desires to connect to the Florence Regional Sewer District.

District–The Florence Regional Sewer District

Drainage–The collection, conveyance, or discharge of groundwater and/or surface water.

Erosion–The process by which the ground surface is worn away by action of wind, water, gravity, or a combination thereof.

FEMA–Federal Emergency Management Association

FIRM–Flood Insurance Rate Map, a map issued by FEMA that is an official community map, on which FEMA has delineated both the special flood hazard areas and the insurance risk premium zones applicable to the community.

Flood Elevation–The height of the identified flood event in relation to a specified vertical datum, either NGVD29 or NAVD88.

Floodplain–The lowland that borders a stream and is subject to flooding when the stream overflows its banks. Specifically, the area adjacent to and including a body of water with ground surface elevations at or below a specified flood elevation.

Floodway–The channel and that portion of the floodplain adjacent to a stream or watercourse that is reserved to convey the base flood flow as indicated on the FIRM.

GPH–Gallons per Hour

HMA–Hot Mix Asphalt

HRT–Hydraulic Retention Time

IAC–Indiana Administrative Code

IDNR–Indiana Department of Natural Resources

INDOT–Indiana Department of Transportation

NAVD–North American Vertical Datum of 1929

NGVD–National Geodetic Vertical Datum of 1988

PSI–Pounds per Square Inch

PG–Performance Grading

PVC–Polyvinyl Chloride

Sanitary Sewer–A sewer that conveys liquid and water-carried wastes from residences, commercial buildings, industries, and institutions to the Florence Regional Sewage District and to which precipitation, surface waters, and ground waters are not intentionally allowed to enter.

SDR–Standard Dimension Ratio

TDH–Total Dynamic Head

Twenty-five (25) Year Flood–The flooding having a 4 percent probability of being equaled or exceeded in a given year.

USACE–United States Army Corps of Engineers

SUBMITTAL AND REVIEW PROCEDURES

For sanitary sewer improvements, the Developer shall submit a completed permit application (Appendix A), two sets of plans, and all supporting documents to:

Florence Regional Sewage District
6894 Log Lick Road
Florence, IN 47020

Submittal requirements may be waived or modified at the discretion of the District. Submittals will be reviewed for conformance to the requirements of this Manual. Upon completion of its review, the District may approve or deny the submittal. Any applicant may appeal the decision to the Board. All sanitary sewer systems in the District shall be in compliance with the minimum standards set forth in the Manual unless a variance has been granted by the Board.

Applications will be of two types. The following regulations are separated to treat sewer extensions and individual building sewer tap-ins in different manners as explained in the following procedures.

For sewer extensions, the applicant will be responsible for all maintenance and repairs of the sewer extension and appurtenances thereto for a period of three years from the date of completion and acceptance of ownership by the Board. As a condition of acceptance of the completed sewer extension, the applicant shall post with the Board financial guarantees ensuring maintenance of the improvements in good repair. These guarantees shall be in an amount equal to 25 percent of the estimated cost of the improvements and shall be in effect for a period of three years. The form of the financial guarantees must be acceptable to the District's Attorney. All repairs during the three-year maintenance period shall be performed immediately at the expense of the applicant as ordered by the Board and to the satisfaction of the District.

For sewer extensions, the applicant shall furnish proof of insurance of the Board naming the District as additional insured in the following amounts before construction begins:

Bodily Injury Liability	$1,000,000
Property Damage Liability	$1,000,000

SEWER CONNECTION/TAP-IN

Applicant Procedures

All free-standing structures dedicated for individual activity (use) for commercial, industrial, or institutional enterprise will require individual sewer service and a dedicated tap-in connection. This includes every structure, although individual buildings may be connected by a passageway, walkway, tunnel, and so-forth.

All buildings being remodeled, except those designated for single family residential use, must be reviewed for possible additional tap fees. A separate application is required for each building.

Application for sewer service to an individual building, domestic commercial or industrial, shall be processed after payment of tap fee and application fee.

Any proposed installation using lines not previously accepted for maintenance by the utility may be rejected.

Construction Procedures

No sewer from a residence or commercial building shall be tapped or connected to the sewer system without inspection of the connection by the District or a Designated Representative. The Contractor must coordinate cover-up and backfill with such inspection. If the sewer construction has been initiated and covered-up, before informing the District or a Designated Representative, a dig up and startover could be required if the District or the Building Commission require it. A request for inspection shall be made at least one working day before making such connection.

Any expertise for after-hours inspections shall be paid by the Contractor or applicant requiring the special inspection.

The building sewer and tap-in or connection shall be done in a professional manner, preferably by or under the direction of a sewer contractor or plumber.

The entry into the main must be made for a good fit of the wye fitting, using an approved fitting that will not slip through the entry and obstruct the sewage flow.

If the main is damaged, it must be repaired in an approved manner acceptable to the District.

When a tap is to be made at a location requiring construction from the main to the building being served, it must be laid at one time, and will be inspected by the District. Construction must include the wye fitting (if required).

No lateral shall be constructed across the private property of others unless specifically approved and with the proper legal easement agreements.

No tap-ins to laterals will be permitted, except for appurtenant structures associated with a private residence to be used as a guest house, private library, and garage. These can be tapped into the main structure lateral.

No building may have plumbing located from the basement or below first floor level, connected for gravity flow, without positive assurance of adequate gravity flow to the main. Sewage ejectors or pumps with shut-off and backflow valves may be required to direct, control and maintain the proper and prevent backflow through the sewer.

If a tap-in lateral has been abandoned, a new application is required for approval to reconnect. Abandoned or separated laterals are to be plugged at the property line. Property abandoned over five years will be treated as if no previous improvements had ever been made.

Final Inspection

When the applicant considers the sewer is ready for use, a final inspection must be requested of the District. The District will inform the plumber or its representative in writing when the sewer has been approved.

The sewer can be put into service upon final inspection and approval from the Building Commissioner with a certificate of occupancy.

Waivers/Alternatives

A waiver or alternative to the technical specifications required by this manual may be approved by the District on a case-by-case basis. The waiver/alternative must be submitted, in writing, along with the application to the District.

Easements

No fence, wall, or permanent structure shall cross a public or private easement. Any fence, wall, or other permanent structure that encroached upon a District easement may be removed by the District at the Owner's expense.

SEWER MAIN EXTENSION

Procedural Steps

Following this brief outline of the procedural steps that must be followed to install a sanitary sewer within the service area of the District. The applicant is cautioned to read more detailed descriptions of each of these steps that appear later in this Sanitary Sewer Standards Manual. Emergencies will be handled on a case-by-case basis.

1. Applicant/user submits application and three copies of the preliminary drawings and specifications to the District office along with applicable deposit/fees.

2. The District reviews the preliminary drawings and specifications.

3. The District makes comments and sends letter to applicant/user.

4. Applicant/user revises drawings and specifications and submits final copies to the District.

5. The District approves final drawings.

6. Applicant/user can construct sewer system.

7. Applicant/user tests sewer system with the District present.

8. Applicant/user requests inspection of sewer system by the District.

9. When Items to be Completed List are complete, applicant/user requests sewer system final inspection.

10. Upon completion of a satisfactory final inspection, the applicant/user's engineer requests acceptance of ownership of the improvements by the District and submits the requisite financial guarantees to be in effect for a period of three years acceptance of ownership by the District.

11. The District accepts/declines sewer system.

Service Areas

Sewer systems that qualify for acceptance must have the following service areas:

a. Single family residential subdivisions (multiple lots with more than one owner)

b. Commercial and industrial subdivisions (multiple lots with more than one owner)

Sewer systems that do not qualify for acceptance, unless the sewers are built along the perimeter of the property or such that they are designed to serve adjacent property and provide access for maintenance and future extensions, include the following:

a. Apartment complex sewer systems

b. Mobile home/RV park sewer systems

c. Shopping center sewer systems

NOTE: Although these sewer systems do not qualify for acceptance, they must be built to comply with the rules, regulations, and specifications outlined in this booklet.

Application

Drawings submitted with any application for sewer extensions must be complete, including material specifications, estimated flow, elevations, easements, safety devices, and necessary pumping equipment. The drawings must be signed by a professional engineer licensed in the State of Indiana or a Land Surveyor of the sewer is to be a gravity-only type of installation. Drawings and subsequent construction must meet all Federal, State, County, and local standards, rules, and regulations.

Any special construction peculiarities required should be explained in a letter attached to the drawings.

No drawings shall be presented to the District if such drawings include the use of sewer previously installed that have not been accepted by the District.

The application, drawings, specifications and supporting data will be forwarded to the Board. A comprehensive plan, including pumping station requirements and long-term service for future tributaries in the area, shall be developed based on accepted formulas for waste generation, pipe sized and so forth.

If pumping station drawings are required, they will be presented to the District for its review. The District then will prepare a letter noting any and all recommend changes in the drawings.

Under normal conditions, the District will complete its investigation within 30 days. The District shall have the right to modify the proposed extension to increase capacity or service areas beyond development or land owned or controlled by the applicant/user and shall participate in the cost of such modifications as approved by the Board. If the agreed amount is under $50,000, it will be paid to the applicant/user upon completion of the sewer and acceptance for maintenance by the District.

If the agreed amount is over fifty thousand dollars ($50,000), the amount will be paid as follows:

- Upon start of construction–25 percent.
- When project is 50 percent complete (based on District's judgement)–25 percent
- When the sewer is accepted for operation–50 percent balance.

Construction Procedures

Each property being serviced by new sewer services shall provide separate lines for storm and sanitary flows. Sanitary laterals shall have clean-outs and backwater valves and shall be no less than 6-inches in-diameter between the clean-out and main line. When extending mains, lateral stubs shall be installed to known future points of service. Such lateral stubs shall terminate 5 feet beyond the sewer easement and/or right-of-way line onto the property being served. Laterals shall not terminate under a roadway, sidewalk, or drive.

The sewer construction should be started within 180 days from approval by the Board and completed within 365 calendar days from the date of Board approval of the drawings. If not completed or granted an extension on time within the specified time period, the application will expire, and a new application and service fee will be required to reactivate the project.

An extension on time may be granted in reply to a written request to the Board, when request is reviewed and found to be justified.

Construction of any extension of the sewer system shall be done only by a Contractor having a current Bond and Certificate of Insurance on file with the District.

Final Inspection

Upon completion of the installation, a request for inspection of the sewer system by the District should be made by the applicant petitioner in a letter to the District and must include copies of the certified air and mandrel test results.

An Items to be Completed List compiled by the District and forwarded to the applicant/petitioner's engineer. No further action will be taken until sewer construction conforms to the correction is required by the list and the District has been informed in writing that another inspection is requested. the District will make the inspection within ten working days upon receipt of request.

Failure to meet the Items to be Completed List requirements within 90 days may result in disconnection of the sewer service involved. In instances where a letter of credit/bond has been given to the Area Plan Commission, such financial tools may be used to assure proper completion of the project.

Requests to the District for qualifying sewers as operational after passing final inspection must be made in writing to the District and Board. Two complete sets of approved as-built/record drawings and easements. must be submitted along with the request. One electronic copy of the as-built/record drawings in Portable Document Format (PDF) shall also be submitted on CD.

The applicant shall certify in a letter to the Board (submitted through the District) that the sewer system has been completed according to the approved drawings and specifications and shall state that the applicant warrants the system free from structural failures as results of faulty workmanship or materials for three years. Upon acceptance by the Board, the sewer will become property of the District subject to the three year maintenance period during which the applicant is responsible for maintenance and repairs. Thereafter the sewer system will be maintained by the District.

INFORMATION REQUIREMENTS

Unless a variance has been granted by the Board, the following information shall either accompany or be presented on the drawings of all development projects. All drawing sheets and other information and data prepared shall be stamped by a professional engineer licensed by the State of Indiana. Gravity sanitary sewer submittals may also be stamped by a professional land surveyor licensed by the State of Indiana.

1. Title Sheet: shall include project name; location map; name, address, telephone number, and seal of professional engineer; drawing index; structure summary table.

2. Scale: Standard scale such as 1"=10', 20', 30', 50', 100', as appropriate.

3. The North arrow shown in plain view.

4. Existing contours: contour intervals shall be 1 foot and shall include contours within 600 feet of the proposed development.

5. Property boundaries, including right-of-way and easement limits. Adjacent land use shall be identified (e.g., single-family residential, multi-family residential, commercial, industrial, agricultural, and woodland).

6. Benchmarks with elevations referenced to NGVD29 or NAVD88. (NAVD88 preferred)

7. Existing streams, rivers, lakes, and other water bodies, including known Karst features with direct groundwater discharge (e.g., sinkholes). Karst information can be gathered from IndianaMap (http://maps.indiana.edu/).

8. Summary table of elevation, size, slope, and material of proposed sanitary sewers and proposed structures, including information on connection to any existing system.

9. Location (vertical and horizontal) of any existing or proposed water lines, including service laterals, and the location of all drinking water wells. A minimum ten-foot horizontal and 18-inch vertical separation of sewer and water mains are required.

10. If applicable, the extents of floodplains and the locations of the floodway for any stream or channel at the established 100-year flood elevation and a copy of the Federal Emergency Management Agency (FEMA) flood insurance rate map (FIRM) with the project location and property boundaries noted. Provide the 25-year and base flood elevations.

11. The extent and location of any current wetlands located on the subject property: Developer is responsible for all necessary coordination with Indiana Department of Natural Resource (IDNR) and United States Army Corps of Engineers (USACE) regulations. Wetland information can be gathered from IndianaMap (http://maps.indiana.edu/).

12. Proposed sanitary improvements in plan and profile view, including bedding details.

13. Direction of flow for sanitary.

In addition to the drawings, the Developer shall submit a copy of all calculations, including inputs, outputs, and assumptions, used to size the proposed infrastructure.

RECORD DRAWING REQUIREMENTS

Upon completion of construction, the final record drawings shall be submitted to the Superintendent, Florence Regional Sewage District, 6894 Log Lick Road, Florence, IN 47020. The format and copies needed are as follows:

1. One full-size, paper copy.
2. One electronic copy in PDF.

The record drawings shall be prepared and stamped by a professional engineer or surveyor. The paper copy and PDF copy shall be stamped “Record Drawings” with the date. The electronic copies can be submitted via CD or flash drive labeled as record drawings with the project name, date, and name of engineering company.

The drawings shall include, but not be limited to:

1. Pipe size
2. Pipe material
3. Pipe invert elevations
4. Pipe lengths
5. Structure invert elevations
6. Structure rim/top of casting elevations
7. Emergency overflow elevations
8. Locations, sizes, lengths, invert and rim elevations, locations of laterals, and material types of sanitary sewers

SANITARY SEWER DESIGN REQUIREMENTS

A. General Requirements

A sanitary sewer system shall be designed and constructed by the Developer to provide for the proper conveyance of wastewater from the entire developed area. The system shall be constructed and installed in accordance with the plans and specifications approved through the process outlined in this manual.

The local approval process in no way absolves the Developer from obtaining the necessary state permits for construction of the sanitary sewer system.

Sanitary sewers shall be installed a minimum of 10 horizontal feet and 18 vertical inches from any existing or proposed water mains.

General information regarding trench and piping details are provided in Figure 1 for roadway and off-road trenching and in Figure 2 for boring. (See Appendix B for all Figures)

B. Design Flow

Design flows shall be computed for the proposed collection system following the approach outlined in 327 IAC 3-6-11.

C. Infrastructure Requirements

1. Gravity Sewers

Gravity sewers shall be sized to maintain two feet per second (fps) minimum velocity and shall be installed to meet minimum slope requirements in accordance with 327 IAC 3-6-11, with a minimum diameter of 8 inches. Material shall be PVC in accordance with ASTM D3034-89 with a minimum wall thickness designation of SDR 35. PVC piping with a wall thickness designation of SDR 26 may be required for deep installation. PVC pipe shall be grooved bell, spigot end, and gasketed. PVC fittings shall conform to the requirements of ASTM D3034-89. Fittings shall be molded in one piece with standard pipe bells, gasketed elastomeric joints, and spigot ends. Pipe shall be installed according to ASTM D2321-89 with a minimum 10 gauge tracer wire along the entire length of pipe. Contact the District for acceptable alternatives if pressure rated pipe is required in accordance with IAC.

The minimum slope of the sewer is dependent on the size of pipe and is shown in Table 1.

PIPE DIAMETER (inches)	MINIMUM CONSTRUCTED SLOPE (%)
8	0.40
10	0.28
12	0.22
15	0.15
18	0.12

Table 1 Minimum Sewer Slope Guidelines

2. Manholes

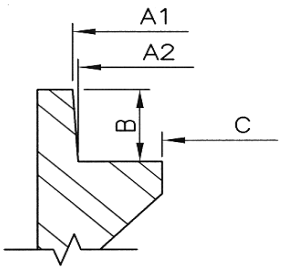
Sanitary sewer manholes shall be precast concrete manholes in accordance with ASTM C478, a minimum diameter of 48 inches with a minimum access diameter of 22 inches. Manhole castings shall be stamped SANITARY SEWER and be self-sealing type. Where watertight castings are required, castings shall be bolt-down. O-rings shall conform to C443. A bench shall be provided on each side of the flow channel if the pipe diameter is less than the manhole diameter. A drop pipe shall be provided inside the manhole for sewers entering at an elevation of 24 inches or more above the manhole invert. Use of adjusting rings shall be limited to 10 inches for adjustment of structure casting elevation. See Figures 3 through 6 for additional installation requirements. (See Appendix B for all Figures)

a. Connecting to Existing Manholes

If during construction the Developer connects into an existing manhole, it shall be the responsibility of the Developer to replace the adjusting rings and casting and cover, if required by the District. Developer shall make sure manhole cover is flush with finished ground elevation. Covers shall fit existing castings using field measurements by Developer.

Developer shall be responsible for accurate sizing of the replacement cover. Before replacing manhole cover, existing casting shall be measured. This includes providing the manhole cover supplier with the following measurements:

(1) Diameter at top of opening (A_1).
(2) Diameter at seat of cover pocket (A_2).
(3) Depth of cover pocket (B).
(4) Diameter of clear opening (C).



The bearing surface of the casting shall be cleaned of all debris and loose scale before installing the new cover.

3. Manhole Exterior Seals

All new sanitary manholes shall be installed with an exterior chimney seal.

a. Exterior seal for adjusting ring sealing, including internal rubber sleeves and extensions, shall be “Cretex External Manhole Chimney Seal,” or equal.

b. External rubber sleeves shall be extruded or molded from rubber compound conforming to the applicable requirements of ASTM C 923.

c. The sleeves shall be double-pleated and shall be capable of vertical expansion of not less than 2 inches when installed.

d. Extensions shall be provided as required to seal the entire section from manhole casting to manhole cone.

e. Expandable stainless steel bands for compressing the sleeve against the manhole shall be minimum 16 gauge thick and shall be fabricated of stainless steel conforming to ASTM C923, type 304. Screws, bolts and nuts used on the band shall be stainless steel conforming to ASTM F593 and ASTM F594, Type 304.

Installation shall conform to manufacturer's published instructions.

Before installing the adjusting ring seals, the surfaces upon which the sleeve will be compressed against shall be clean, smooth, and free from voids or cracks which will prevent the sleeve from sealing. If the masonry surface is rough and would not provide an effective seal, it shall be smoothed by applying hydraulic cement as recommended by manufacturer.

After the seal has been placed between the manhole casting and the manhole cone, the stainless steel compression rings at the top and bottom of the sleeve shall be installed to provide a watertight seal.

Where applicable, Developer shall perform this type of work after Manhole resurfacing, manhole coating, or excavation rehabilitation.

4. Force Mains

Force mains shall be sized to provide a two fps cleansing velocity at the design pumping rate. Air relief valves (ARVs)shall be Val-Matic Model 25, APCO, or equal and shall be installed at intermediate high points and a minimum of every 1,500 feet along the force main. Material shall be PVC SDR 21 or PVC C900. See Figures 7, 8, and 9 for additional installation requirements regarding force main and ARV details. (See Appendix B for all Figures)

All force mains shall be installed with a minimum 10-gauge solid insulated copper tracer wire located 12 inches above the top of the pipe. Wire shall be continuous between, terminate at, and be accessible at valve boxes, manholes, and other risers. Wire shall not be electrically connected to any of these riser types.

5. Pumping Stations

Pumping station shall be package type stations with the mechanical and electrical equipment integral to the station. The package shall be or equal in construction and performance to Hydromatic Pump equipment. Pumps shall be centrifugal, nonclog, solids handling submersible wastewater pumps designed for Class 1 Group C and D, Division 1 Hazardous Locations. The

pump volute, motor and seal housing shall be high quality gray cast iron, ASTM A-48, Class 30. All external mating parts shall be machined, and Buna N Rubber O-ring sealed on a beveled edge. All fasteners exposed to the pumped liquid shall be 300 stainless steel. A swing check valve with external swing arm and an eccentric plug valve shall be installed in each discharge line. The pump station shall be supplied with stand by power or generator plug compatible with the District's generator if required by the District. The pump station shall have a visual alarm.

6. Gravity Laterals

Residential gravity laterals shall be a minimum of 4-inch and commercial laterals shall be a minimum of 6-inch PVC pipe SDR 35 or SDR 26 in accordance with ASTM D3034 or SDR 21 in accordance with ASTM D2241 and shall be installed with a minimum 10-gauge tracer wire from the wye to the terminus. A building cleanout shall be provided no more than 3 feet from the foundation and no more than 100 feet apart for laterals exceeding 100 feet in length. Cleanout shall be provided with a PVC threaded cap that prevents inflow of stormwater. An inline backflow preventer shall be installed on the property owner's side of the cleanout. See Figures 10,11 and 12 for sanitary lateral installation details. (See Appendix B for all Figures)

7. Grinder Pump Systems

Grinder pump laterals shall be a minimum of 1.5 inch HDPE, DR 9 pipe. The lateral shall have a shut off valve and check valve installed at the point of connection to the sewer system as shown in Figure 13. Grinder pump systems shall use Simplex Grinder Packages from Liberty Pumps or approved equal. The single-phase motor shall be a minimum of 1 horse power (hp), 110 or 230 volt, capacitor start/capacitor run, class B insulated NEMA B design, rated for continuous duty. Air filled motors are not acceptable. An upper radial and lower thrust bearing shall be required. The pump shall have a dual seal arrangement consisting of a lower and upper seal to protect the motor from the pumping liquid. All single-phase units shall have a NEMA 4X-ultraviolet protected pedestal mounted enclosure suitable for outdoor use with a visual and audible alarm. Contractor shall provide 100 amp, 120/230 volts, single phase service for grinder pumps systems. See Figures 13 and 14 for additional installation requirements. (See Appendix B for all Figures)

D. Testing Requirements

1. Gravity Sewers

A deflection test (mandrel test) shall be performed on all PVC sanitary sewers no sooner than 30 days after the placement of final backfill. No pipe shall exceed a vertical deflection of 5 percent of the inside pipe diameter. Nonflexible pipes (concrete, ductile iron, and cast iron) will not require a mandrel test. Mandrel testing shall be observed by District personnel.

Gravity sanitary sewers shall also be tested for leakage after installation of laterals and placement of backfill. Leakage testing of PVC pipe shall be in accordance with ASTM F1417. Low pressure air testing shall be observed by District personnel. Allowable leakage rates for sewers up to 18-inches in-diameter are as shown in Table 2; this table is based on pressure loss of 1 psi.

PIPE DIAMETER (inches)	MINIMUM TIME (min:sec)	LENGTH FOR MINIMUM TIME (ft)	TIME FOR LONGER LENGTH (sec)	TIME FOR 1 PSI DROP FOR LENGTH SHOWN (min:sec)							
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft
4	3:46	597	0.380(L)	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	398	0.854(L)	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8	7:34	298	1.520(L)	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24
10	9:26	239	2.374(L)	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48
12	11:20	199	3.418(L)	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38
15	14:10	159	5.342(L)	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04
18	17:00	133	7.692(L)	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41

Table 2 Gravity Sewer Low Pressure Air Testing Guidelines for Sewers up to 18 Inches

Table 3 provides minimum low pressure air testing guidelines for sewers greater than 18 inches in diameter, this table is based on pressure loss of 0.5 psi. Developer shall provide a pressure gauge graduated in 0.1 psi increments for Table 3 to apply. If 0.1-graduated pressure gauge is not used during testing, a 1 psi pressure loss standard shall apply and the minimum times indicated in Table 3 shall be doubled.

PIPE DIAMETER (inches)	MINIMUM TIME (min:sec)	LENGTH FOR MINIMUM TIME (ft)	TIME FOR LONGER LENGTH (sec)	TIME FOR 0.5 PSI DROP FOR LENGTH SHOWN (min:sec)							
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft
21	9:55	114	5.235(L)	9:55	13:05	17:27	21:49	26:11	30:32	34:54	39:16
24	11:20	99	6.837(L)	11:24	17:57	22:48	28:30	34:11	39:53	45:35	51:17
27	12:45	88	8.653(L)	14:25	21:38	28:51	36:04	43:16	50:30	57:42	64:54
30	14:10	80	10.683(L)	17:48	26:43	35:37	44:31	53:25	62:19	71:13	80:07
33	15:35	72	12.926(L)	21:33	32:19	43:56	53:52	64:38	75:24	86:10	96:57
36	17:00	66	15.384(L)	25:39	38:28	51:17	64:06	76:55	89:44	102:34	115:23

Note: If no pressure loss is observed after 1 hour, test may be terminated and

Table 3 Gravity Sewer Low Pressure Air Testing Guidelines for Sewers Greater than 18 Inches

2. Manholes

Manholes shall be air tested for leakage in accordance with ASTM C1244-93, Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test. Leakage testing shall be observed by District personnel. The minimum elapsed times for a pressure change of 1-inch of mercury (Hg) are provided in Table 4. These are based on a preliminary vacuum of 10 inches Hg.

	DIAMETER (inches)				
DEPTH (feet)	48	54	60	66	72
	TIME (seconds)				
</= 8	20	23	26	29	33
10	25	29	33	36	41
12	30	35	39	43	49
14	35	41	46	51	57
16	40	46	52	58	67
18	45	52	59	65	73
20	50	53	65	72	81
22	55	64	72	79	89
24	59	69	78	87	97
26	64	75	85	94	105
28	69	81	91	101	113
30	74	87	98	108	121

Table 4 Sanitary Manhole Vacuum Testing Guidelines

The standard vacuum test should be performed on manholes before backfilling. The test requires that all lift holes, pipes, and other penetrations be plugged before testing and that the test apparatus be applied on top of the concrete surface of the manhole following the manufacturer's recommendations, rather than to the manhole casting.

Vacuum testing after backfilling should only be performed after a successful nonbackfill test has been completed, since repairs after backfilling are more difficult to complete.

For either type of test, all pipes entering the manhole, plugs and seals must be securely braced to prevent them from being dislodged and drawn into the manhole during the vacuum test.

If a manhole fails the vacuum test, repairs shall be completed and the manhole retested. Repairs can often be performed by placing a grout slurry on the exterior of the leak and applying a vacuum to the manhole; the vacuum in the manhole pulls the slurry into the needed area and the manhole is sealed. The process shall be repeated until a satisfactory test result is obtained.

3. Force Mains

Force mains shall be hydrostatic pressure tested for leakage in accordance with AWWA C605 for PVC pipe. Force mains shall be tested to 200 percent of the normal operating pressure in the main, but to no more than the pressure rating of the pipe. Leakage testing shall be observed by District personnel. Allowable leakage rates are based on the following:

$$L = \frac{SD\sqrt{P}}{148{,}000}$$

where: L = Allowable Loss gallons per hour (gph)
P = Test Pressure psi
D = Diameter inch(in)
S = Length of Test Section feet (ft)

Pressure test water may be discharged to the WWTP with approval from the District.

4. Pumps

The Developer shall submit certified pump curves with TDH and flow rate indicated. Start-up certification and warranty information shall be provided to the District upon project completion.

5. Laterals

Laterals shall be tested using a visual leak test. Testing shall be performed after installation and placement of backfill.

SITE RESTORATION REQUIREMENTS

All sanitary sewer projects shall comply with the minimum site restoration requirements provided herein. Developer shall proceed with restoration of property and cleanup of all disturbed areas concurrently with the installation of utilities and street construction. Unless otherwise indicated, all restoration shall conform to standard Indiana Department of Transportation (INDOT) specifications.

All utility trenches constructed shall be backfilled and restored according to the general details provided in Figure 1 (See Appendix B for all Figures).

A. Seeding and Sodding

Seeding or sodding shall be completed in all areas disturbed by construction, other than areas with finished gravel, brick, asphalt, concrete, or decorative landscape treatments. Before seeding or sodding, disturbed areas shall be graded to subgrade for placement of topsoil. All materials and placement for seeding shall conform to Section 621 of the INDOT Specifications.

Topsoil shall consist of salvaged topsoil or hauled-in topsoil provided and placed to a uniform depth of 6 inches in place. Unless otherwise requested by the District, Seed Mixture Type 2 shall be used. Fertilizer and mulching shall also be placed in conformance with Section 621 of the INDOT Specifications. Developer shall not be responsible for watering beyond initial watering.

B. Miscellaneous Restoration Items

Developer shall be responsible for the proper replacement of all damaged street or highway signs and markers at all times during construction. Repair or replacement of signs shall be subject to review of the District and applicable local, state, and federal highway departments before final acceptance of the work.

Developer shall restore all culverts removed, damaged, or disturbed during construction to their original condition or they shall be replaced. Mailboxes shall be restored to their original location. Underground improvements, such as water main, gas main, telephone or electric lines or drain tiles shall be restored to original condition. At all locations where utilities cross, compacted backfill shall be used from the bottom of the excavation to the top of the highest conduit. All street improvements, fences, walkways, and home and yard improvements, if destroyed, damaged, or removed shall be replaced to original condition or better.

Where construction interrupts existing private or public sewer and water systems, it shall be Developers responsibility to maintain these systems or provide alternative means until the new system is placed in operation or until final acceptance of the work, whichever occurs first. No bypassing of untreated wastewater will be allowed.

C. Asphaltic Paving

All asphaltic paving for utility trench restoration and street construction shall be performed in accordance with Section 402 of the INDOT Specifications. Asphaltic concrete pavement shall be hot mix asphalt (HMA) Type B. Asphaltic binder for intermediate course and surface course shall be PG 64-22 in accordance with Section 902. For new construction, the minimum pavement structure shall consist of 2 1/4 inches of asphaltic concrete intermediate course and 1 3/4-inch concrete surface course for street and parking lot construction and 2 1/2 inches of surface material for bike paths, sidewalks, and asphalt driveways. The pavement thickness for trench restoration shall match adjacent pavement thickness or minimum thickness for new construction, whichever is greater.

Developer shall provide tack coat between all layers of new asphalt and on existing pavement to be overlaid with new asphalt. Tack coat shall meet the requirements of Section 406 of the INDOT Specifications.

D. Concrete

All concrete shall conform to the requirements of Section 502 of the INDOT Specifications. All concrete shall be normal set air-entrained concrete with water reducing agent, Grade A-WR with Type IA cement, capable of producing a minimum compressive strength of 3,000 psi in 10 days.

Developer shall erect and maintain suitable barricades to protect the new concrete. Where it is necessary to provide for pedestrian traffic, Developer shall construct adequate crossings. Pedestrian traffic shall not be permitted over new concrete before 72 hours after curing. Vehicular traffic shall not be permitted over newly placed concrete until a minimum compressive strength of 3,000 psi has been achieved.

When atmospheric temperature exceeds 80°F during concrete placement, ACI 305.1 shall apply, in addition to all other requirements.

EROSION AND SEDIMENT CONTROL REQUIREMENTS

The following are the minimum requirements for site restoration for any sanitary sewer construction project.

The local approval process in no way absolves the Developer from obtaining local or state permits for construction.

When vegetation has been removed from a slope and the possibility of soil erosion occurs, the Developer shall be required to seed or otherwise prevent damage to adjacent property or accumulation on street surfaces. These erosion control measures shall be in accordance with the standards and specifications on file with the IDNR and the Switzerland County Soil and Water Conservation District.

The following certification shall be included in the Storm Water Erosion and Pollution Control Plan, which contractor and all subcontractors shall sign:

> "I certify under penalty of law that I understand the terms and conditions of the Rule 5 (Stormwater Pollution Prevention Plan) permit that authorizes the stormwater discharges associated with activities from the construction site. I agree to indemnify and hold the Florence Regional Sewer District harmless from any claims, demands, suits, causes of action, settlements, fines, or judgments and the costs of litigation, including, but not limited to, reasonable attorney fees and costs of investigation arising from a condition, obligation or requirement assumed or to be performed by contractor for stormwater pollution and erosion control."

Erosion Control Plan shall include responsible erosion control party with contact information.

APPENDIX A
SANITARY SEWER PERMIT APPLICATION

Revised 2023

FLORENCE REGIONAL SEWAGE DISTRICT

SANITARY SEWER

SERVICE CONNECTION PERMIT APPLICATION FOR

SINGLE-FAMILY/DUPLEX RESIDENTIAL

MULTI-FAMILY/RESIDENTIAL

INSTITUTIONAL, COMMERCIAL, INDUSTRIAL

Prior to connecting a sanitary sewer service to a Florence Regional Sewage District sewer line, a new customer needs to apply for and receive a SANITARY SEWER SERVICE CONNECTION PERMIT. Please complete the attached application. **THE FOLLOWING STEPS MUST BE TAKEN TO APPLY FOR A PERMIT:**

1. There must be a sanitary sewer owned by Florence RSD for public use at the service address.
2. **FURNISH DETAIL DRAWINGS:** Any commercial, industrial or institutional property owner who is applying for a new sanitary sewer service or revisions to existing sanitary sewer service, prior to sewer piping improvements are installed, shall submit one (1) set of detailed drawings (including plan and profile, proposed and existing topography and all buried utilities) prepared by a licensed professional engineer for approval, along with specifications of all proposed sewer lines on 24"x36" sheets and in PDF format for plan approval.
3. No improvements shall begin until the FRSD has approved the drawings for construction.
4. No permit for connection will be issued until the FRSD has approved the drawings for construction.
5. ALL QUESTIONS on the attached application MUST BE COMPLETED.
6. **CONTRACTOR INSTALLING SERVICE LINE MUST PROVIDE THE FRSD WITH A VALID CERTIFICATE OF INSURANCE PRIOR TO THE PROCESSING OF THIS APPLICATION.**
7. If an existing on-site wastewater system will become obsolete after the new sewer service is installed, it shall be properly abandoned in accordance with the local Health Department requirements.
8. ALL APPLICABLE FEES MUST BE PAID PRIOR TO THE ISSUE OF THE PERMIT.
9. Drop off the application or mail to: ***FLORENCE REGIONAL SEWAGE DISTRICT***
   6894 LOG LICK ROAD
   FLORENCE, IN. 47020
   Office: (812) 427-4000 Fax: (812) 427-9757
10. The application will be reviewed and the applicant will be sent a "User Agreement" within ten (10) working days from project acceptance.
11. **ALL APPLICABLE FEES MUST BE PAID PRIOR TO THE ISSUE OF THE PERMIT.**
12. **CALL THE FRSD AT LEAST 24 HOURS IN ADVANCE TO SCHEDULE AN INSPECTION. IUPPS REQUIRES A MINIMUM NOTICE OF 48 HOURS PRIOR TO DIGGING 1-800-382-5544**

13. **FURNISH RECORD CONSTRUCTION DRAWING:** Upon completion of sewer piping construction improvements by any commercial, industrial or institutional property owner, the Owner shall provide an electronic detail record drawing of the piping improvements, showing any and all changes that took place during construction that differ from the approved detail drawing. The electronic drawing shall be in PDF format and suitable for printing on either 24"x36" or 11"x17" paper and shall be labeled on each page "RECORD DRAWING" and dated and signed by the preparer.
14. You can review the standard requirements and specifications for installation on the FRSD's website at www.florencersd.com.

IF YOU HAVE ANY QUESTIONS, PLEASE CONTACT:

FRSD OFFICE: (812) 427-4000

SHANNON JACKSON/SUPERINTENDENT: (812) 363-0234

SWITZERLAND CO. HEALTH DEPT: (812) 427-3220

SWITZ. CO. BUILDING INSPECTOR, PLANNING, ZONING: (812) 427-4445

FLORENCE REGIONAL SEWAGE DISTRICT ORDINANCE NO. 1-97, AS MAYBE AMENDED, AND IN PART FOR EACH NEW CONNECTION TO THE SEWAGE SYSTEM THERE SHALL BE ASSESSED TO THE USER A CONNECTION FEE OF FIVE HUNDRED AND NO/100 DOLLARS ($500.00) IF CONNECTED WITHIN THIRTY (30) DAYS OF THE NOTICE THAT THE SEWAGE SYSTEM IS AVAILABLE TO THE PROPERTY OWNER, THEREAFTER THE FEE WILL BE TWO THOUSAND FIVE HUNDRED AND NO/100 DOLLARS ($2,500.00).

SCHEDULE OF USER RATES AND CHARGES

USERS	TOTAL FLAT RATE PER MONTH*
RESIDENTIAL	$33.90
MULTIPLE USER	$33.90 (EA. USER)
COMMERCIAL (except Belterra-See below)	CALCULATED (1)*
INSTITUTIONAL	N/A
GOVERNMENTAL	N/A
INDUSTRIAL	TBD (3)
Belterra Resort and Casino Development	$39,514.00
Belterra Resort, Indiana, LLC	

*FLAT RATES ARE BASED ON PROPORTIONAL OPERATION CHARGES, MAINTENANCE CHARGES, REPLACEMENT COSTS, AND IMPROVEMENTS COSTS.

(1) EACH COMMERCIAL USER SHALL HAVE A RATE INDIVIDUALLY CALCULATED USING THE MONTHLY RESIDENTIAL USER FLAT RATE, MULTIPLIED BY THE RESIDENTIAL EQUIVALENCY FACTOR. (2)

(2) RESIDENTIAL EQUIVALENCY FACTOR IS DETERMINED BY TAKING THE ESTIMATED FLOW FOR SAID COMMERCIAL USE (BASED ON IDEM APPROVED SEWAGE FLOW TABLES), DIVIDED BY THE ESTIMATED RESIDENTIAL FLOW.

(3) INDUSTRIAL USER RATES WILL BE DETERMINED ON A CASE BY CASE BASIS.

SANITARY SEWER SERVICE CONNECTION PERMIT APPLICATION

FOR FLORENCE REGIONAL SEWAGE DISTRICT USE ONLY:

APPLICATION RECEIVED:_____

TAP FEE PAID: Y / N TAP FEE AMOUNT PAID: _____

PERMIT ISSUED: _____ PERMIT # _____

INSPECTION DATE: _____

INSPECTION APPROVED: Y / N RE-INSPECTION DATE: _____ APPROVED: Y / N

1. **SELECT TYPE OF APPLICATION YOU ARE APPLYING FOR:**

_____ SINGLE-FAMILY/ DUPLEX RESIDENTIAL _____ MULTI-FAMILY/ RESIDENTIAL _____ INSTITUTIONAL/COMMERCIAL/INDUSTRIAL

2. **APPLICANT'S NAME AND ADDRESS IS WHERE CORRESPONDANCE/BILLING WILL BE MAILED.**

APPLICANT'S NAME: _____
(PLEASE PRINT)

APPLICANT'S ADDRESS: _____

TELEPHONE NO.: _____ CELL: _____ FAX: _____

EMAIL ADDRESS:

3. **PROPERTY OWNER'S NAME AND ADDRESS:**

PROPERTY OWNER'S NAME (IF DIFFERENT FROM 1): _____

PROPERTY OWNER'S ADDRESS (IF DIFFERENT FROM 1): _____

TELEPHONE NO.: _____ CELL: _____ FAX: _____

EMAIL ADDRESS:

4. **ADDRESS WHERE SEWER SERVICE CONNECTION WILL BE INSTALLED:**

_____ _____ _____

LOT NO. HOUSE NO. STREET NAME

_____ _____

CITY STATE / ZIP

SUBDIVISION NAME	BLDG #	UNIT # (s)	PHASE #

5. **PLEASE MARK ONE OF THE FOLLOWING:**

___ NEW HOME / BUSINESS BEING CONSTRUCTED
___ EXISTING HOME / BUSINESS

6. **COMPLETE THIS BOX *ONLY* IF APPLYING FOR SINGLE FAMILY / DUPLEX RESIDENTIAL SERVICE:**

TYPE OF PREMISES TO BE CONNECTED TO SANITARY SEWER (CHECK ONE):

a. ___ SINGLE FAMILY RESIDENCE
b. ___ DUPLEX RESIDENCE
   ___ NUMBER OF ONE (1) BEDROOM UNITS
   ___ NUMBER OF TWO (2) BEDROOM UNITS
   ___ NUMBER OF THREE (3) BEDROOM UNITS

7. **COMPLETE THIS BOX *ONLY* IF APPLYING FOR MULTI-FAMILY / RESIDENTIAL SERVICE:**

TYPE OF PREMISES TO BE CONNECTED TO SANITARY SEWER (CHECK ONE):

a. ___ MULTI-FAMILY RESIDENCE (APARTMENTS)
   ___ NUMBER OF ONE (1) BEDROOM UNITS
   ___ NUMBER OF TWO (2) BEDROOM UNITS
   ___ NUMBER OF THREE (3) BEDROOM UNITS

- **IF APPLYING FOR A RESIDENTIAL CONNECTION PERMIT ONLY, PLEASE COMPLETE A DETAILED LATERAL PROFILE DRAWING FOUND ON PAGE 3 OF THIS APPLICATION. THE PROFILE DRAWINGS MUST INCLUDE THE FOLLOWING:**

A. DIMENSIONS OF LOT.
B. LENGTH AND DIAMETER OF SEWER LATERAL.
C. LOCATION OF CLEAN OUTS.
D. POINT OF LATERAL CONNECTION TO THE MAIN SEWER LINE.
E. NAME OF STREET IN WHICH THE LATERAL IS CONNECTED.
F. PIPING/FITTINGS AND BEDDING MATERIALS USED FOR INSTALLATION.
G. GRINDER PUMP CONNECTION DETAIL IF APPLICABLE

THIS ENTIRE APPLICATION AND REQUIRED DOCUMENTS INCLUDING THE CONTRACTOR'S CERTIFICATE OF INSURANCE MUST BE SUBMITTED FOR PROCESSING OF THIS PERMIT. YOU WILL BE SENT A "USER AGREEMENT" TO COMPLETE AND PAYMENT MUST BE MADE PRIOR TO THE ISSUE OF A PERMIT. **PLEASE MAKE CHECKS PAYABLE TO:**

FLORENCE REGIONAL SEWAGE DISTRICT
6894 LOG LICK RD.
FLORENCE, IN. 47020

APPLICATION FOR SEWERAGE PERMIT

DIAGRAM OF SEWERAGE SYSTEM

8. **COMPLETE THIS BOX *ONLY* IF APPLYING FOR INSTITUTIONAL, COMMERCIAL, INDUSTRIAL SERVICE:**

TYPE OF PREMISES TO BE CONNECTED TO SANITARY SEWER (CHECK ONE):

a. **IF INSTITUTIONAL,** LIST TYPE OF INSTITUTION (i.e. School, medical, dentist, nursing home, church, etc.)

_____

___ NUMBER OF RESIDENTS, STUDENTS, INMATES, ETC.

___ NUMBER OF EMPLOYEES

Attach a copy of site plan signed by a licensed Professional Engineer detailing service line, grease trap/oil interceptor (if required), building dimensions, location of public sewer line to which connection will be made, and all pertinent details. Include floor and plumbing plans showing all plumbing fixtures.

b. **IF COMMERCIAL,** LIST TYPE OF BUSINESS (i.e. restaurant, motel/hotel, store, car wash, greenhouse, other office, etc.)

_____

___ SEATING CAPACITY
___ NUMBER OF EMPLOYEES
___ NUMBER OF UNITS (IF MOTEL/HOTEL)
___ WILL THERE BE A COMMERCIAL KITCHEN? (YES / NO)

Attach a copy of site plan signed by a licensed Professional Engineer detailing sewer service line, grease trap/oil interceptor (if required), building dimensions, location of public sewer line to which connection will be made, and all pertinent details. Include floor and plumbing plans showing all plumbing fixtures.

c. **IF INDUSTRIAL,** LIST TYPE OF BUSINESS (i.e. manufacturing, processing, assembling, etc.)

_____

___ NUMBER OF EMPLOYEES
___ THIS BUSINESS WILL HAVE INDUSTRIAL PROCESS WATER DISCHARGE? (YES / NO)

1. If YES, what type: _____
2. If YES, you will also need to complete the **APPLICATION FOR INDUSTRIAL WASTEWATER PRETREATMENT PERMIT FORM BEFORE THE PERMIT CAN BE ISSUED.**

The Application for Industrial Wastewater Pretreatment permit can be found at:
www.in.gov/idem
Submit completed forms to both the Indiana Dept. of Environmental Management and Florence Regional Sewage District.

Attach a copy of site plan signed by a licensed Professional Engineer detailing sewer service line, grease trap/oil interceptor (if required), building dimensions, location of public sewer line to which connection will be made, and all pertinent details. Include floor and plumbing plans showing all plumbing fixtures.

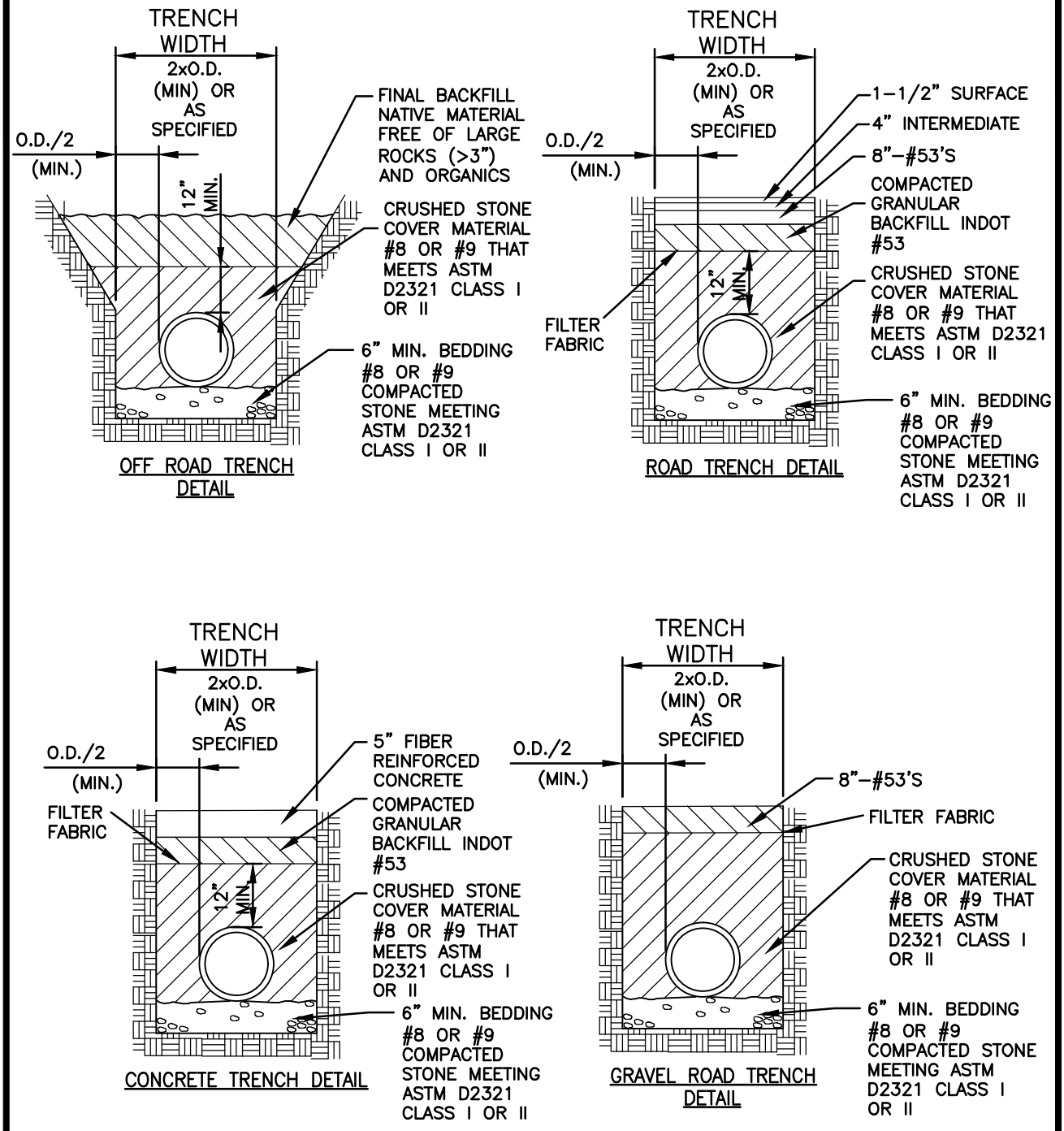
d. ENGINEER'S ESTIMATED WATER USAGE: _____ GPD.

9. **THE UNDERSIGNED HEREBY APPLIES TO FLORENCE REGIONAL SEWAGE DISTRICT FOR A CONNECTION PERMIT AND AGREES TO COMPLY WITH ALL REQUIREMENTS OF CONNECTION:**

SIGNATURE: _____ DATE: _____
(PROPERTY OWNER/AUTHORIZED AGENT)

***DO NOT SEND PAYMENT WITH APPLICATION. ONCE THE APPLICATION IS PROCESSED, YOU WILL BE SENT A "USER AGREEMENT" TO COMPLETE AND PAYMENT MUST BE MADE PRIOR TO THE ISSUE OF A PERMIT.**

APPENDIX B
STANDARD DETAILS



TRENCH AND PIPE INSTALLATION DETAILS

SANITARY SEWER STANDARDS MANUAL
FLORENCE REGIONAL SEWAGE DISTRICT
SWITZERLAND COUNTY, INDIANA

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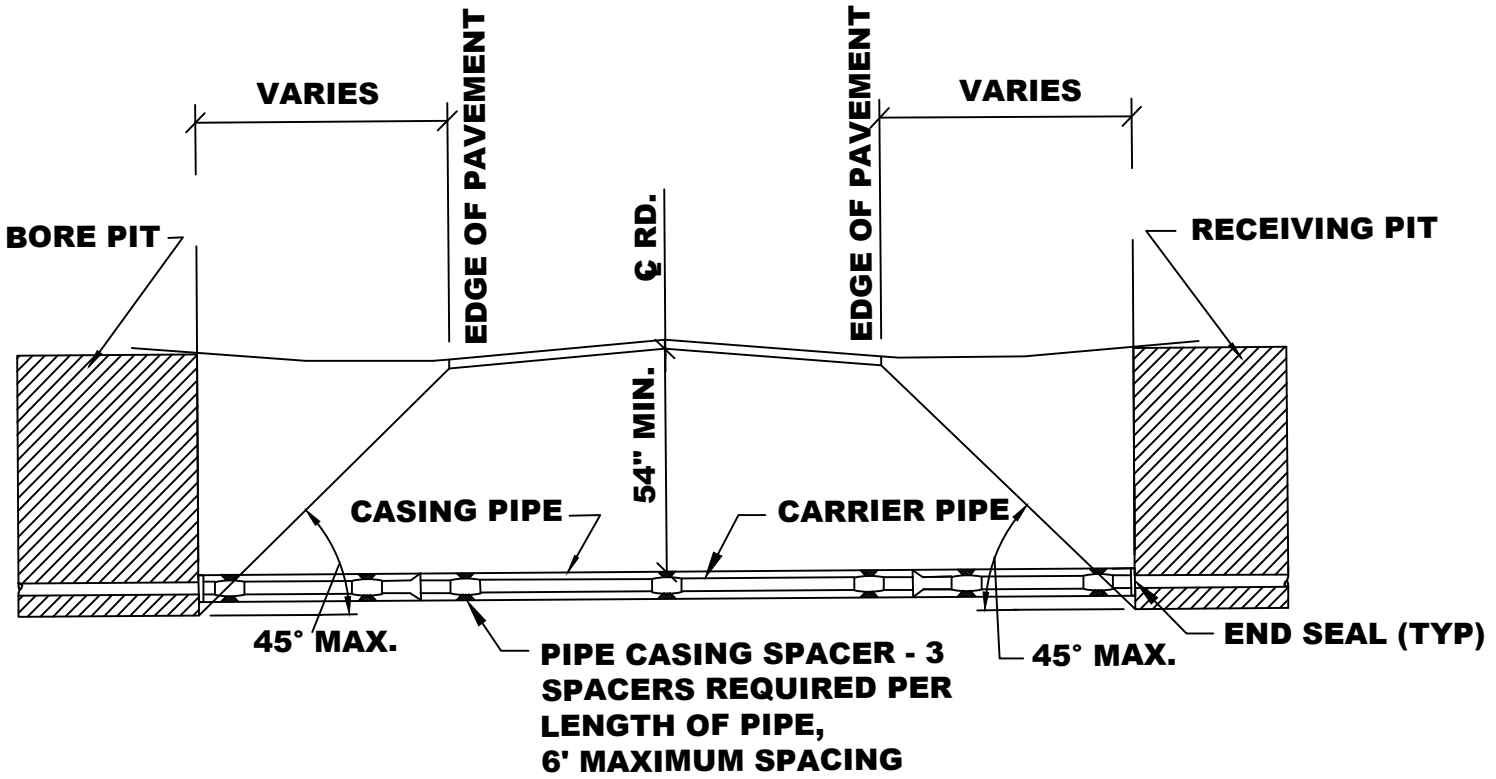
FIGURE 1

JULY 2018

File: \\strand.com\projects\COL\3500--3599\3534\003\Drawings\CAD\Figure 1 - Trench Details.dwg Time: Aug 15, 2018 - 3:34pm

File: \\strand.com\projects\COL\3500--3599\3534\003\Drawings\CAD\Figure 2 - Boring Casing Pipe.dwg Time: Aug 15, 2018 - 3:35pm



TYPICAL BORING CASING PIPE

NO SCALE

TYPICAL BORING CASING PIPE

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FLORENCE REGIONAL SEWAGE DISTRICT
SWITZERLAND COUNTY, INDIANA

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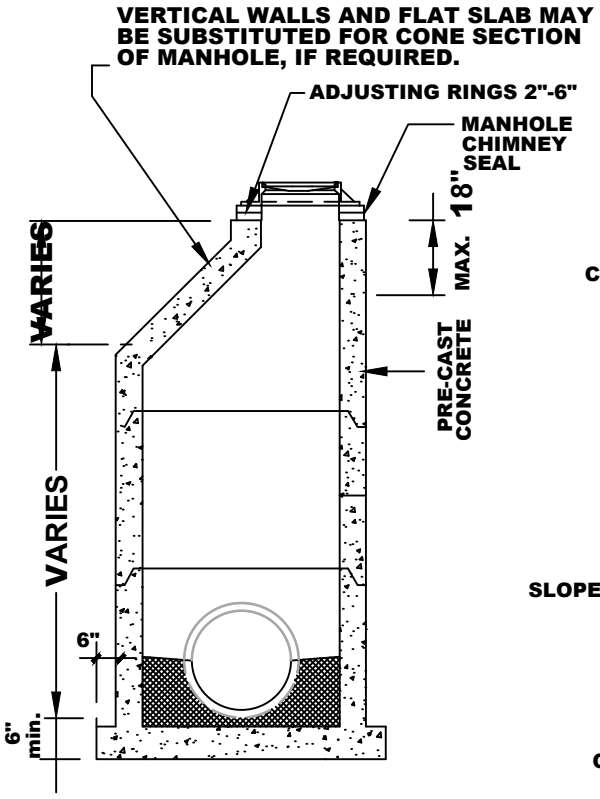
FIGURE 2
JULY 2018

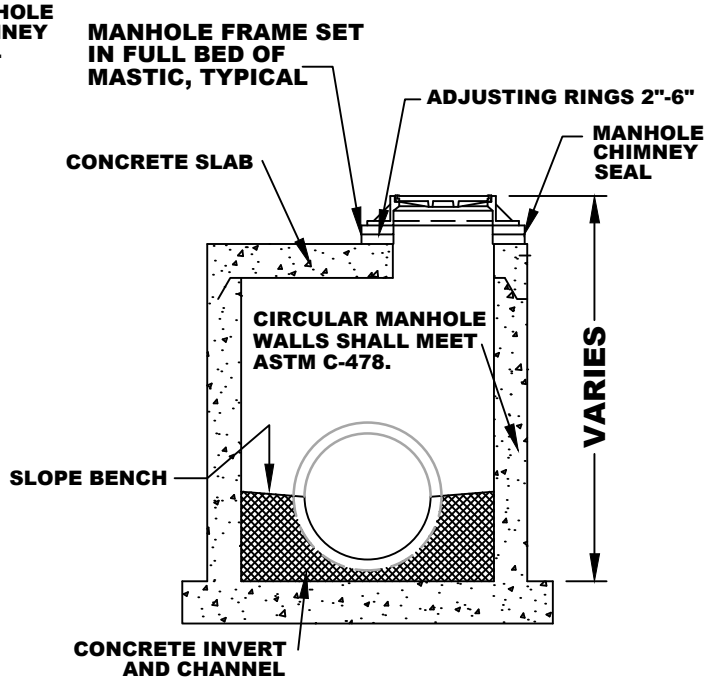
NOTES:

1. Use Neenah Foundry type R–1772 or East Jordan Iron Works type 1022Z1GS manhole frame and cover.
2. Where manholes occur in flood plain use watertight casting and lids, as approved by the City. Watertight castings shall be bolt–down East Jordan Iron Works type 1022Z1PT.
3. All joints to be watertight "O" ring type per A.S.T.M. Specification C–443, latest edition.
4. All precast cones and barrels to be reinforced per A.S.T.M. Specification C–478, latest edition.
5. ½" Mastic to be applied between joints of precast risers and joint between casting and risers.
6. All manhole joints shall be grouted on interior with non–shrinking mortar including the adjustment rings. All exterior joints to have butyl rubber applied over the joints a minimum of 6" above and below the joint.
7. Provide a minimum of 12" of No. 8 crushed stone beneath manholes.



STANDARD DETAIL FOR TYPICAL PRECAST MANHOLE WITH CONE

NO SCALE



FLAT TOP MANHOLE

NO SCALE

SANITARY MANHOLE INSTALLATION DETAIL

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FLORENCE REGIONAL SEWAGE DISTRICT
SWITZERLAND COUNTY, INDIANA

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FIGURE 3

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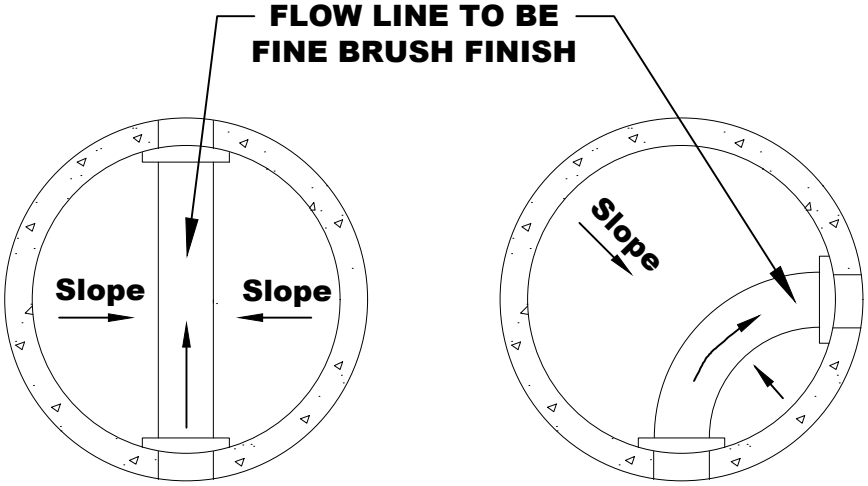
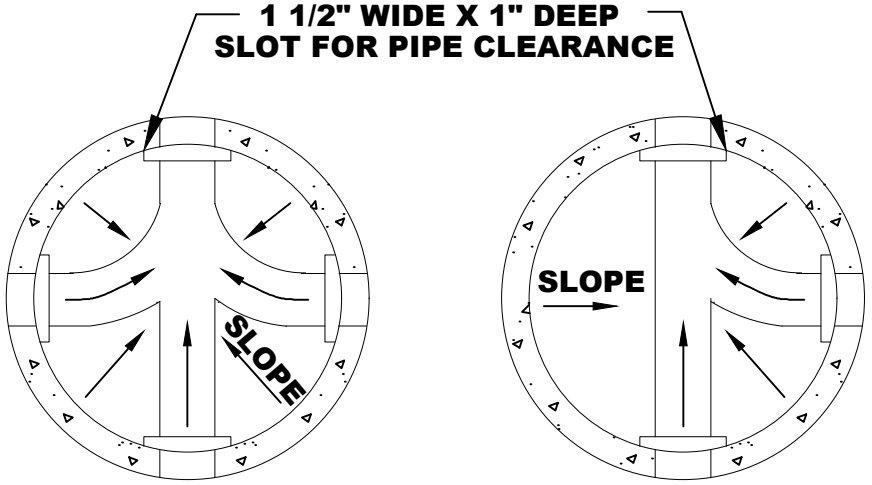


TYPICAL STRAIGHT FLOW

TYPICAL CURVE FLOW



TYPICAL 4-WAY FLOW

TYPICAL 3-WAY FLOW

MANHOLE FLOWLINES

NO SCALE

MANHOLE FLOWLINES DETAIL

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FLORENCE REGIONAL SEWAGE DISTRICT
SWITZERLAND COUNTY, INDIANA

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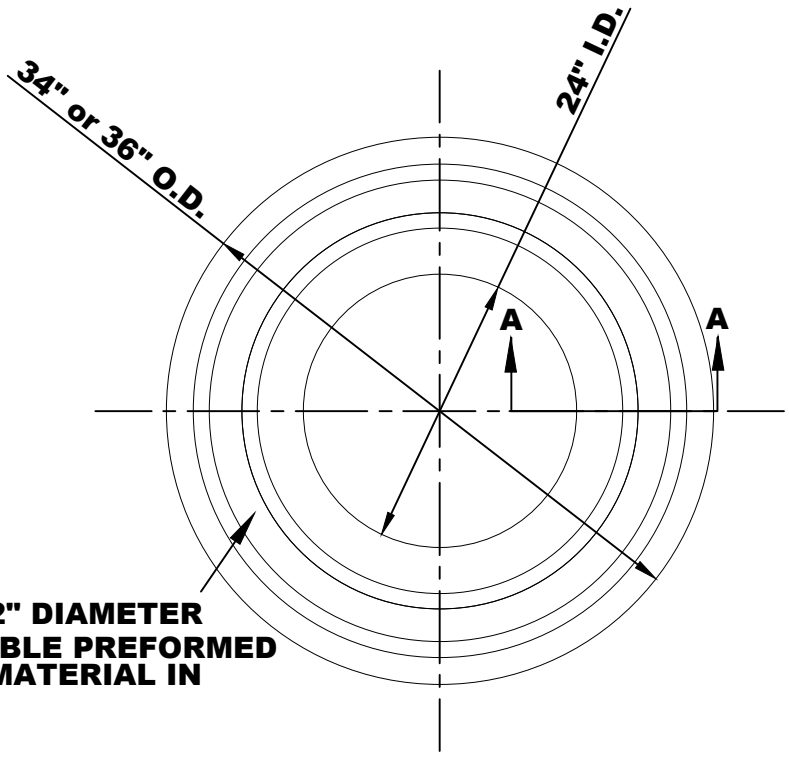
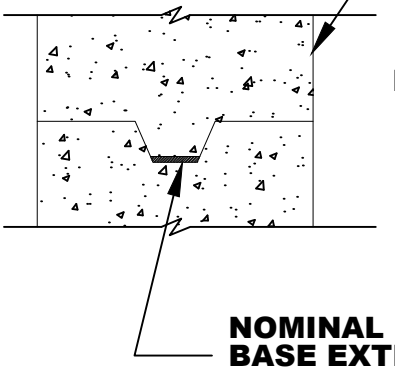
FIGURE 4

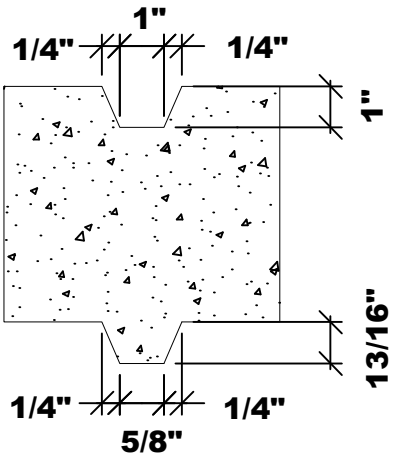
JULY 2018

File: \\strand.com\projects\COL\3500--3599\3534\003\Drawings\CAD\Figure 4 - Flowlines.dwg Time: Aug 15, 2018 - 3:43pm





GASKET DETAIL



SECTION "A-A"

ADJUSTING RING DETAIL

NO SCALE

ADJUSTING RING DETAIL

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FLORENCE REGIONAL SEWAGE DISTRICT
SWITZERLAND COUNTY, INDIANA

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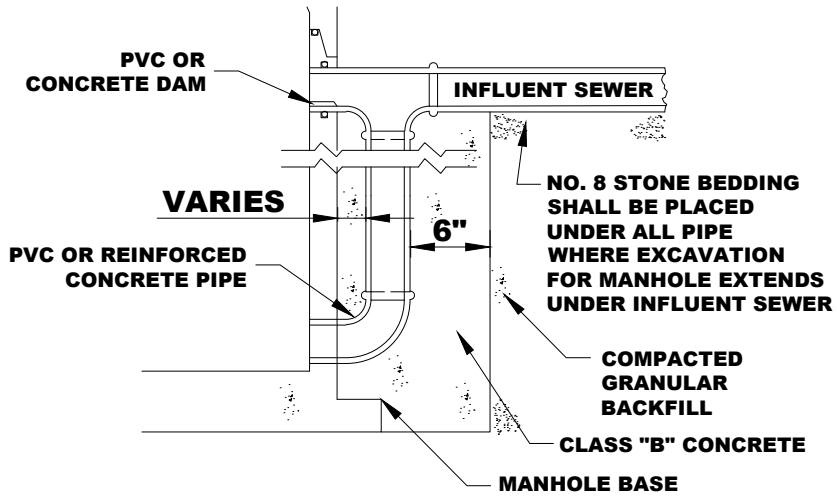
FIGURE 5

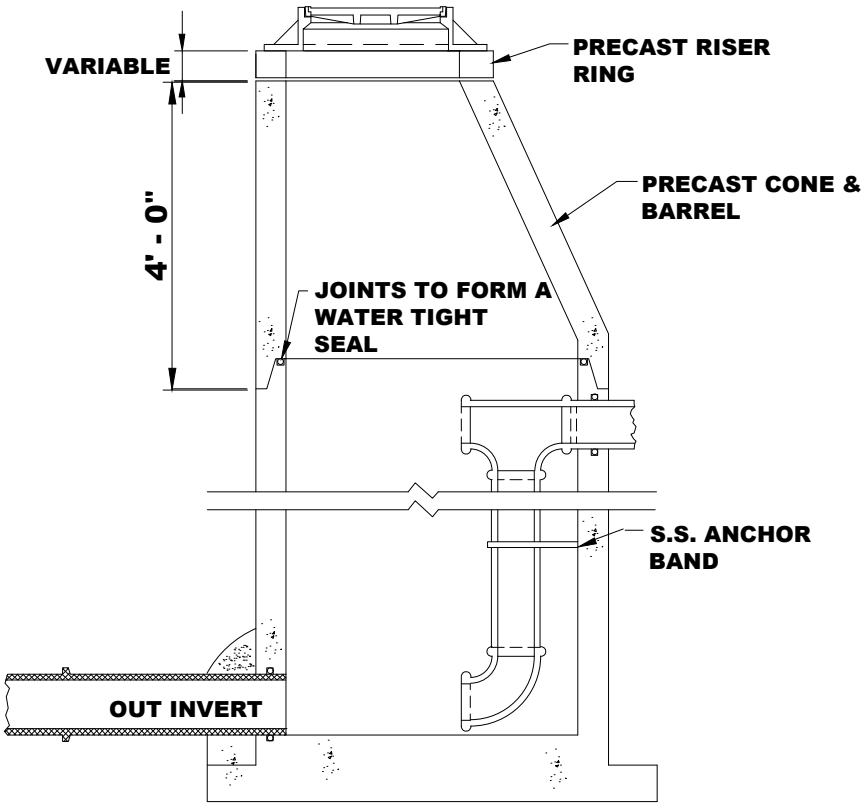
JULY 2018

File: \\strand.com\projects\COL\3500--3599\3534\003\Drawings\CAD\Figure 5 - Adjusting Ring Detail.dwg Time: Aug 15, 2018 - 3:44pm



OUTSIDE DROP MANHOLE

NO SCALE



NOTE:
DROP SHALL BE INSTALLED TO DISCHARGE DIRECTLY INTO FLOW LINE AND NOT ONTO MANHOLE BENCH

INSIDE DROP MANHOLE

NO SCALE

SANITARY DROP MANHOLE INSTALLATION DETAIL

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FLORENCE REGIONAL SEWAGE DISTRCIT
SWITZERLAND COUNTY, INDIANA

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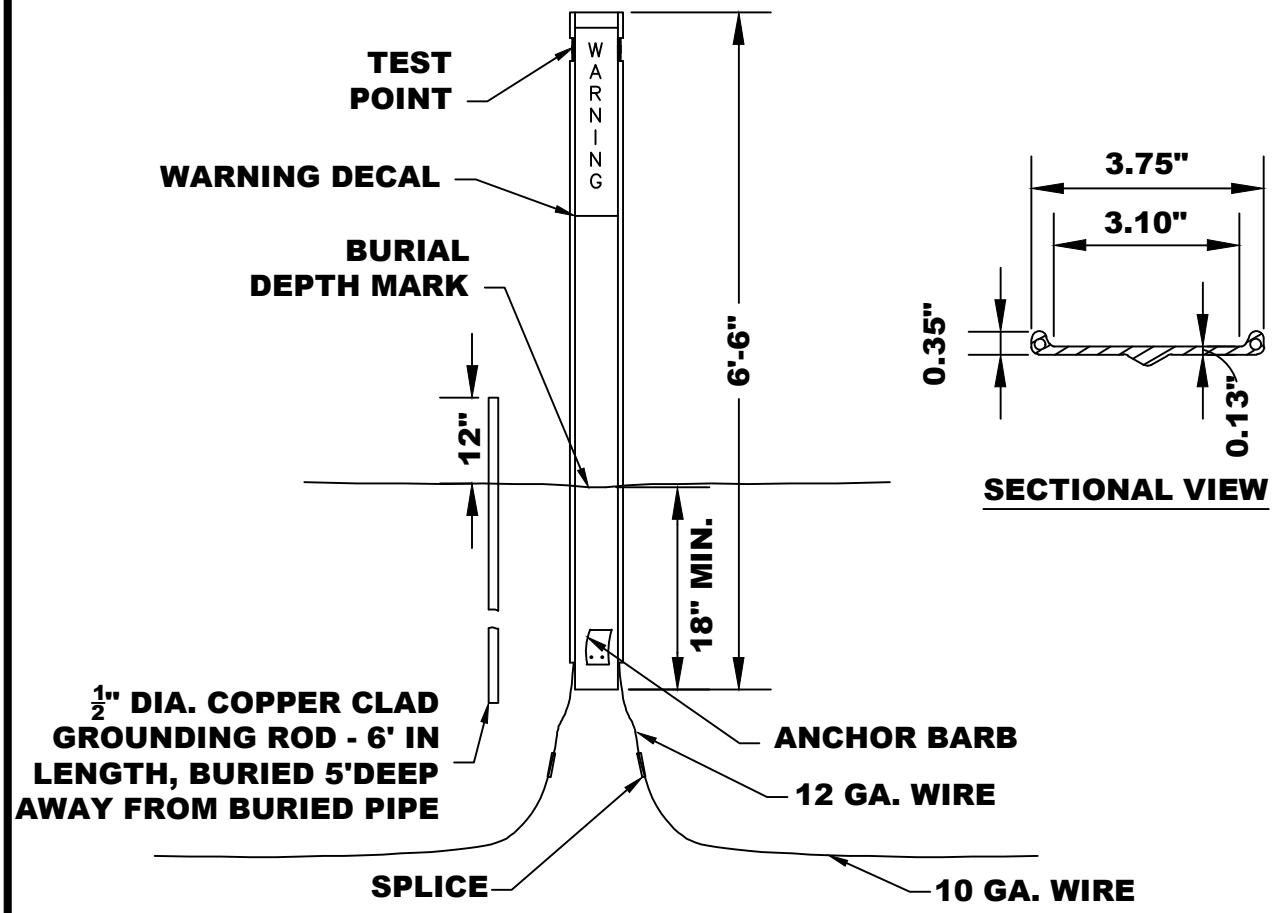
FIGURE 6

JULY 2018

File: \\strand.com\projects\COL\3500--3599\3534\003\Drawings\CAD\Figure 6 - Drop Manhole.dwg Time: Aug 15, 2018 - 3:44pm



NOTES:
THE LOCATOR WIRE SHALL BE INSTALLED 12–INCHES ABOVE THE TOP OF THE PIPE.

ONE (1) TESTING APPARATUS SHALL BE LOCATED EVERY 1000 FEET OF WATER MAIN OR FORCE MAIN AND CONNECTED TO THE LOCATOR WIRE. ANY SPLICES IN THE LOCATOR WIRE SHALL BE SOLDERED AND FITTED WITH HEAT SHRINK, INSULATED WATERTIGHT BOOT.

TRACER WIRE AND TESTING MARKER

NO SCALE

TRACER WIRE AND TESTING MARKER INSTALLATION DETAIL

SANITARY SEWER STANDARDS MANUAL
FLORENCE REGIONAL SEWAGE DISTRICT
SWITZERLAND COUNTY, INDIANA

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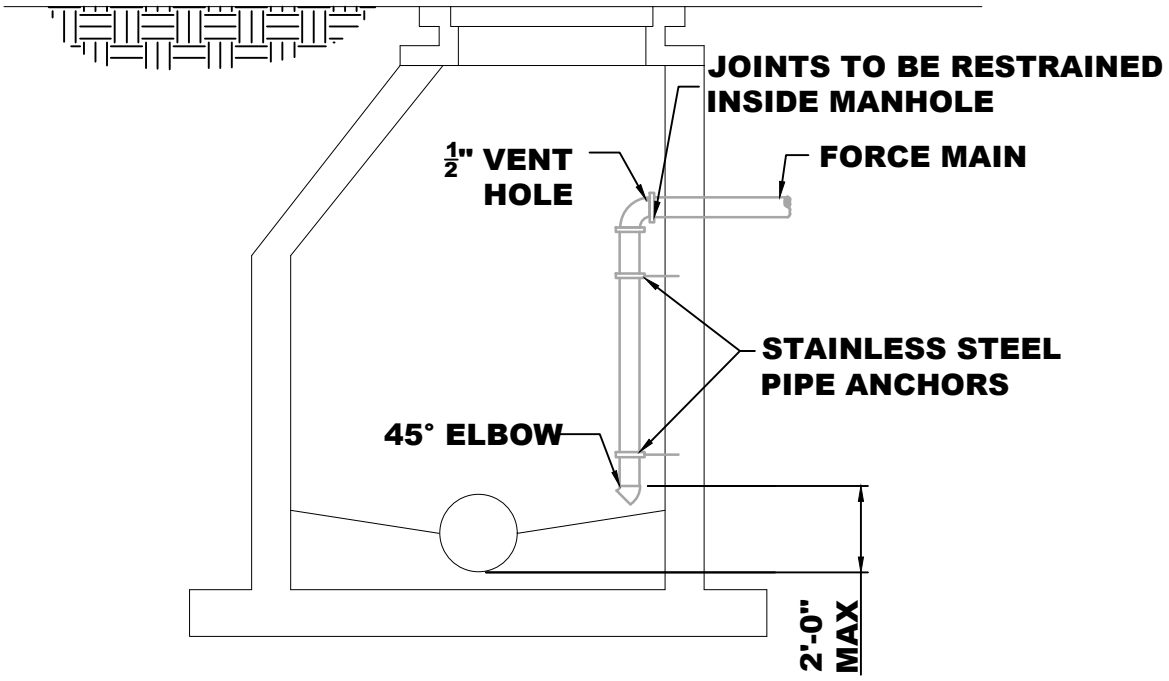
FIGURE 7

JULY 2018

NOTE:
FORCE MAIN SHALL BE INSTALLED TO DISCHARGE DIRECTLY INTO FLOW LINE AND NOT ONTO MANHOLE BENCH.



FORCE MAIN TO MANHOLE CONNECTION

NO SCALE

FORCE MAIN TO MANHOLE CONNECTION

SANITARY SEWER STANDARDS MANUAL
FLORENCE REGIONAL SEWAGE DISTRICT
SWITZERLAND COUNTY, INDIANA

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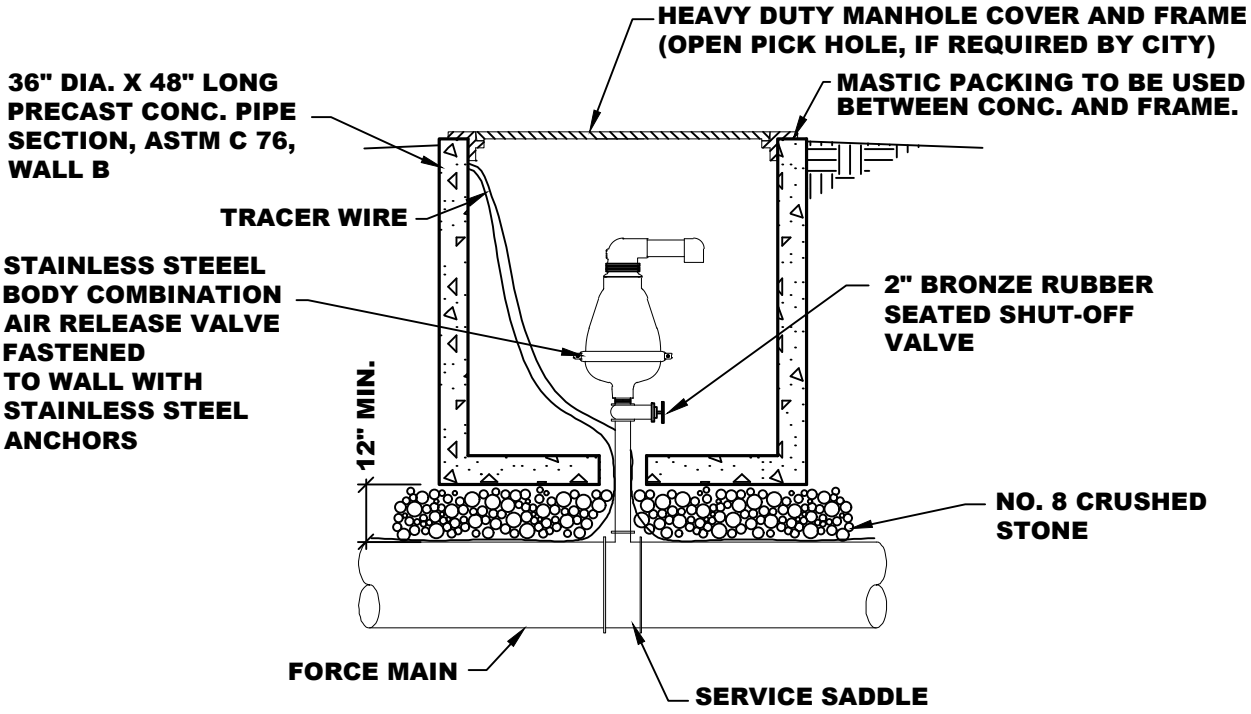
FIGURE 8

JULY 2018

NOTES:
COMBINATION AIR RELEASE VALVES TO BE FIELD LOCATED AT HIGH POINTS.



COMBINATION AIR RELEASE VALVE

NO SCALE

COMBINATION AIR RELEASE VALVE

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SWITZERLAND COUNTY, INDIANA

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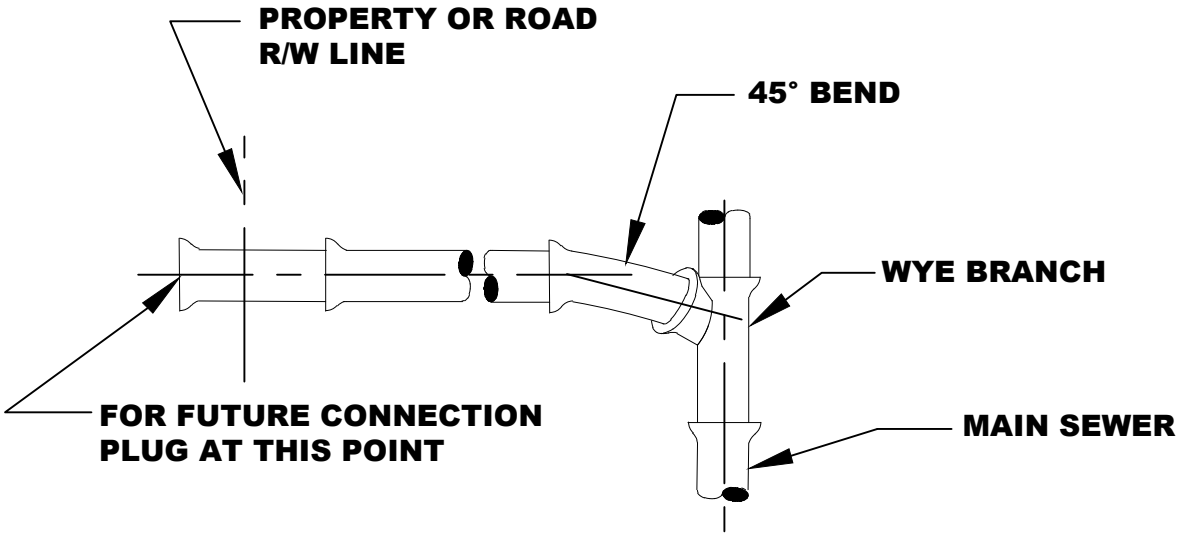
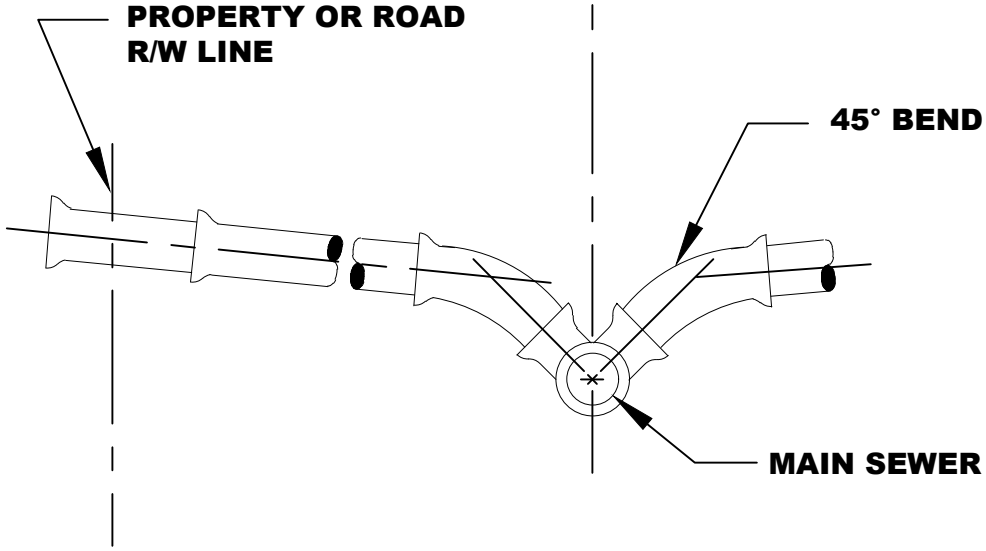
FIGURE 9

JULY 2018



PLAN VIEW



ELEVATION

STANDARD SERVICE CONNECTION

NO SCALE

STANDARD SERVICE CONNECTION

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FIGURE 10

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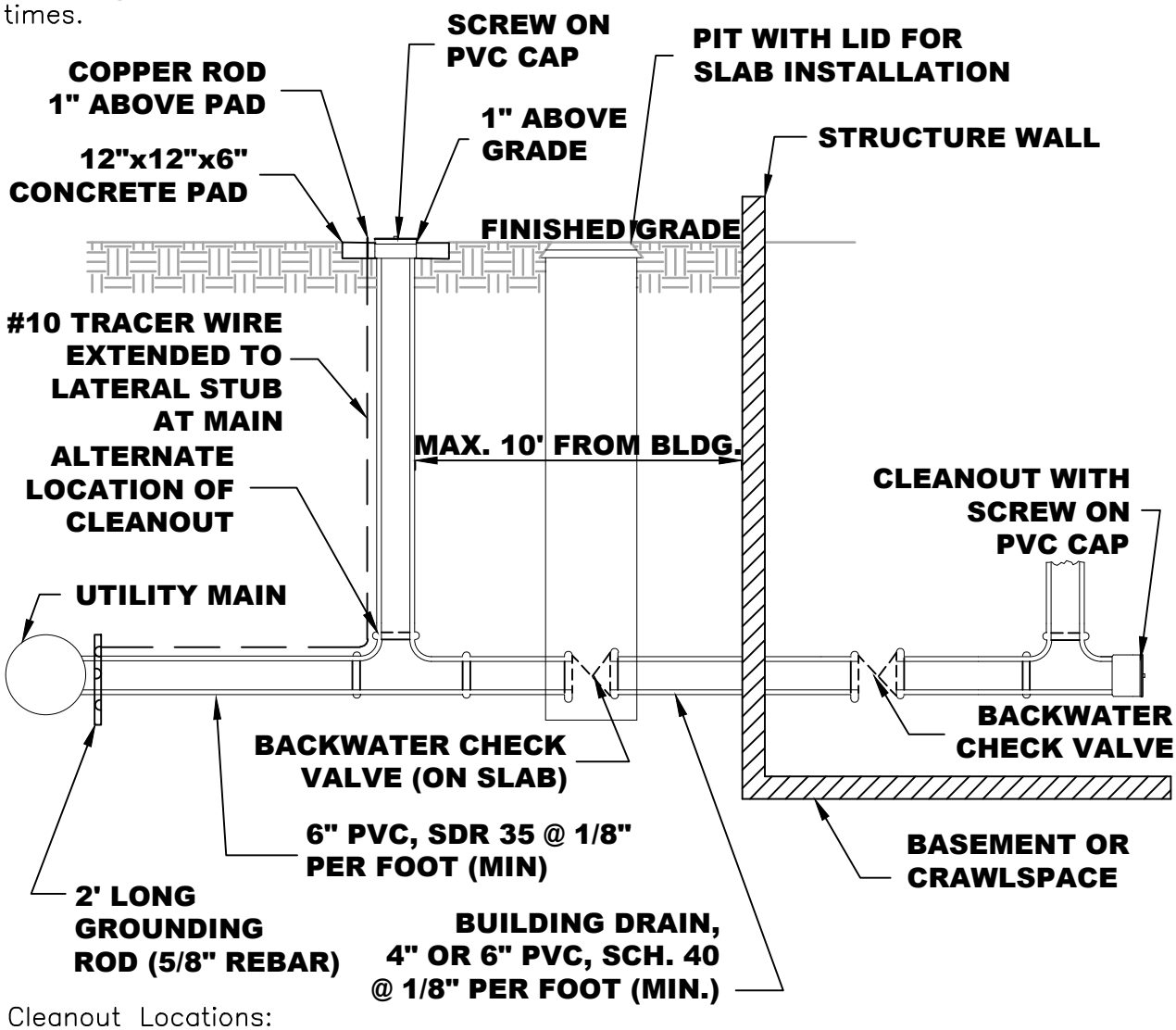
Note:
Tracer wire to be wrapped around ground rod min. 3 times.



Cleanout Locations:

1. At the junction of building drain and building sewer (near exterior face of building).

2. If building sewer is more than 100 feet from main line sewer, additional cleanout will be required. Cleanout spacing shall not exceed 100 feet.

3. A cleanout is required at each bend that is greater than or equal to 45 degrees.

4. There shall be no basement drains or sump pumps connected to service connection

GRAVITY SERVICE LATERAL DETAIL

NO SCALE

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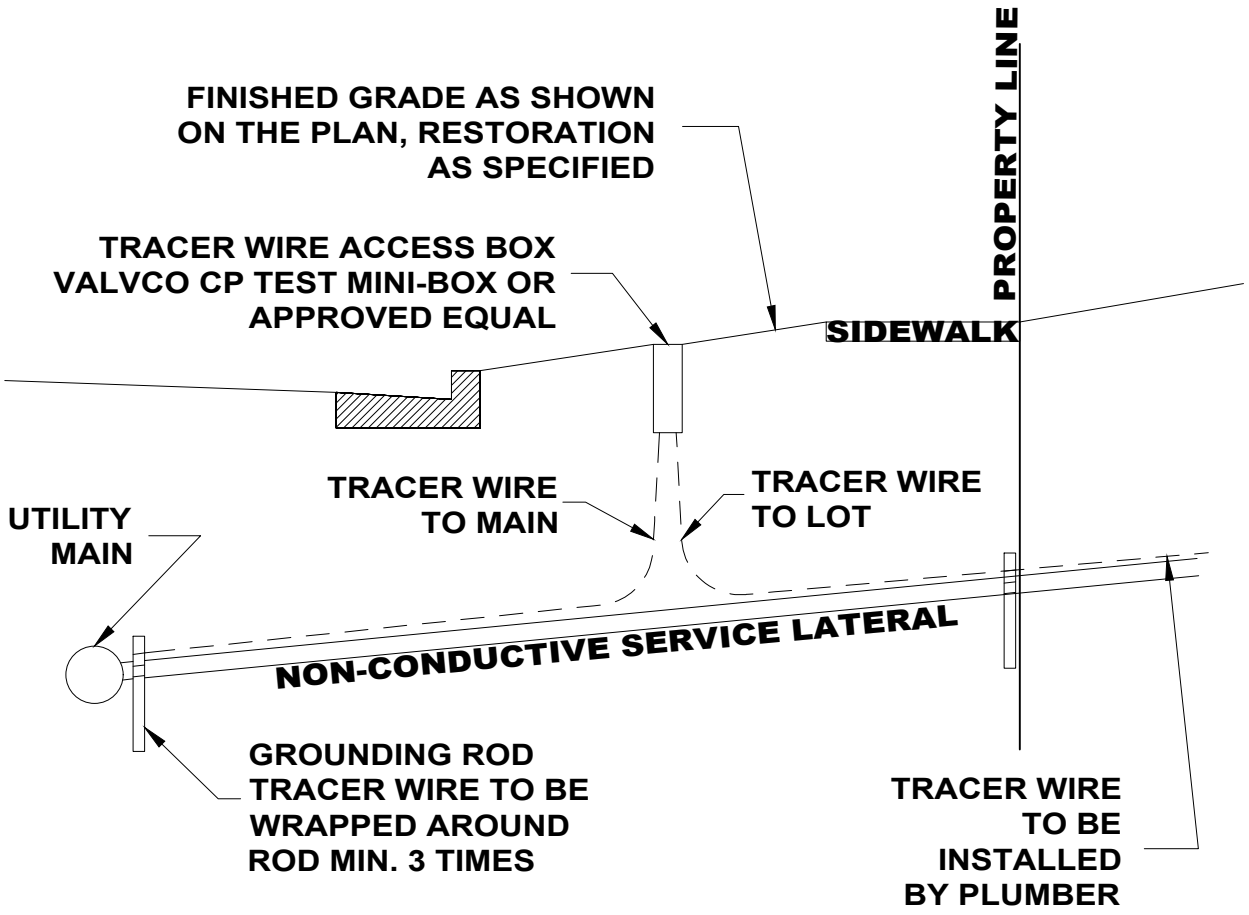
FIGURE 11

JULY 2018

File: \\strand.com\projects\COL\3500--3599\3534\003\Drawings\CAD\Figure 11 - Sanitary Lateral (use this one).dwg Time: Aug 15, 2018 - 3:50pm



TRACER WIRE DETAIL

NO SCALE

NOTES:

1. TRACER WIRE ACCESS BOX TO INSTALLED IN THE TERRACE. EXACT LOCTATION TO BE DETERMINED IN THE FIELD BY OWNER.

2. TRACER WIRE ACCESS BOX COVER TO BE PERMANENTLY ENGRAVED WITH "SEWER" BY THE MANUFACTURER.

3. MINIMUM 18-IN OF WIRE TO BE COILED WITHIN THE ACCESS BOX.

4. GROUNDING ROD TO BE A 2-FT LONG, 5/8-IN DIAMETER STEEL GROUNDING ROD.

5. TRACER WIRE TO BE 10 GAUGE SOLID WIRE

SERVICE TRACER WIRE DETAIL

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FIGURE 12

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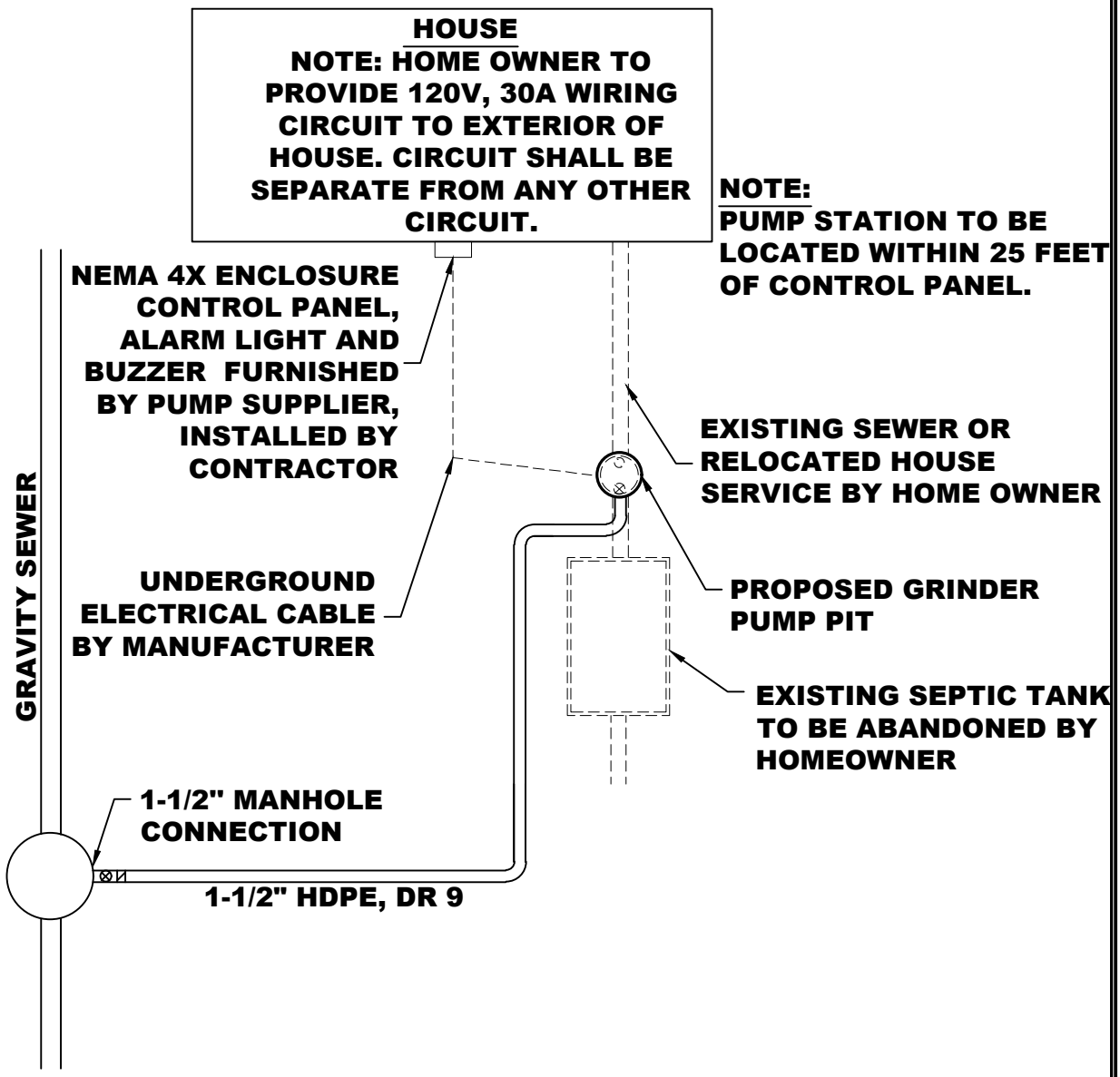

TYPICAL RESIDENTIAL GRINDER PUMPING STATION PLAN

NO SCALE

RESIDENTIAL GRINDER PUMP STATION PLAN

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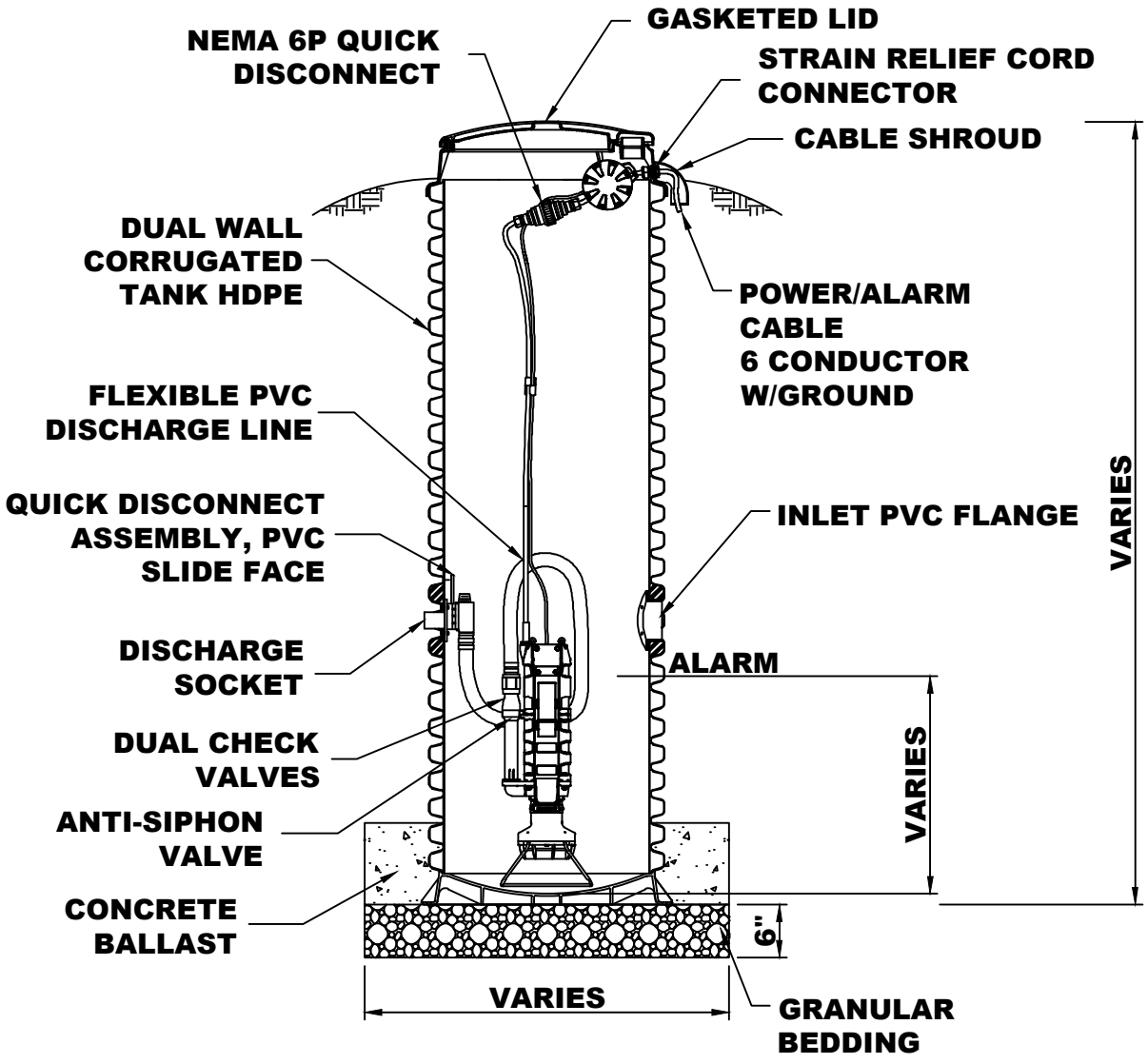
FIGURE 13

JULY 2018

NOTE:
PUMP STATION TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS REQUIREMENTS.



RESIDENTIAL GRINDER PUMPING STATION

NO SCALE

RESIDENTIAL GRINDER PUMP STATION

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FIGURE 14

JULY 2018

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