

INFORMATION AND SPECIAL CONDITIONS – SEWER

GENERAL

It shall be the intent of the South Middleton Township Municipal Authority to have the Developer provide a complete sewer system installation. All work and materials specified or intended shall be supplied by the developer.

DEFINITIONS

“Authority” shall mean the South Middleton Township Municipal Authority.

“Owner” shall mean the South Middleton Township Municipal Authority.

“Developer” shall mean the party or parties constructing improvement to a tract of land, or his agent.

“Contractor” shall mean the agent of the Developer.

“Engineer” shall mean the Engineer of the South Middleton Township Municipal Authority.

DESIGN CRITERIA

The sewerage system including all sewer mains, manholes, pumping stations, force mains, and appurtenances, shall be designed in accordance with the latest revision of the Department of Environmental Protection Guidelines and these specifications.

It shall further be the responsibility of the Developer to comply with all local, county, state and federal regulations.

SPECIAL CONDITIONS

1. These specifications are intended as a guide to the Developer, and the Authority reserves the right to make necessary corrections, additions or deductions to these specifications.
2. The Authority reserves the right to request additional work and materials where, in its opinion, conditions warrant such work and materials.
3. Prior to the start of construction the Developer shall submit shop drawings to the Authority’s Engineer for all materials to be utilized and receive approval of such materials.

AUTHORITY REQUIREMENTS

1. All work on this project shall be done in compliance with all applicable federal, state, county or local laws and regulations whether herein stated or not. In the event of conflict between the requirements herein stated and the rules and regulations of other federal, state, county or local agencies, the more stringent shall apply.
2. Developer and/or Contractor shall obtain insurance in an amount specified by the Authority. See Page ISC-3 for insurance requirements. This insurance should include, but not be limited to, coverage for bodily injury (BI) and property damage (PD) caused by blasting.
3. Proof of all necessary insurance coverages shall be submitted to the Authority in the form of a Certificate of Insurance prior to the inception of any construction activities conducted by the Developer and/or Contractor.
4. Furthermore, the South Middleton Township Municipal Authority, South Middleton Township and the Authority's Engineer shall be listed on the Developer's and/or Contractor's General Liability Policy as an additional insured, in respect to this project.
5. Contractor is responsible for following all Township ordinances regarding noise and dust control.

OSHA REQUIREMENTS

Contractor is responsible for following all applicable OSHA requirements.

INSURANCE

Insurance coverages are required to be written on an "occurrence basis." Furthermore, coverage should be written through an insurance company rated as A- or better by AM Best. The limits of liability for insurance coverages shall be, at the minimum, as follows:

1. Workers' Compensation:

- a. All state requirements for Workers' Compensation coverage shall be met, including:

(1) Employer's liability:

Bodily Injury by Accident:	\$100,000 each accident
Bodily Injury by Disease:	\$500,000 policy limit
Bodily Injury by Disease:	\$100,000 each employee

2. Comprehensive General Liability:

(Includes Premises – Operations, Independent Contractors Protection, Contractual Liability, Products and Completed Operations, Broad Form Property Damage):

a. Bodily Injury (including Completed Operations and Products Liability):

\$1,000,000 each occurrence
\$2,000,000 annual aggregate

b. Property Damage:

\$1,000,000 each occurrence
\$2,000,000 annual aggregate

c. Comprehensive General Liability Insurance will provide coverage at the limits indicated above for the exposures of:

Explosion
Collapse
Underground

d. If operations involve or require the use of blasting, the Contractor will provide blasting coverage to protect bodily injury and property damage per the above minimum general liability limits.

3. Comprehensive Automobile Liability:

Bodily Injury and Property Damage:

\$1,000,000 each person/occurrence

4. Owner's Protective Liability:

Bodily Injury/Property Damage:

\$1,000,000 each occurrence
\$2,000,000 annual aggregate

5. Excess/Umbrella Liability:

Limit of Liability:

\$1,000,000 Products/Completed Operations Aggregate
\$1,000,000 General Aggregate
\$1,000,000 BI/PD Any One Occurrence

6. As stated under Authority requirements:

Prior to the initiation of any construction activities all Developers and/or Contractors shall have submitted an approved Certificate of Insurance outlining the required

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insurance coverages. Submit insurance certificates and Hold-harmless Agreements naming the Authority, Township and Engineer as co-insureds and certificate holders. The certificates shall contain a provision that coverages will not be cancelled or non-renewed unless at least thirty (30) days' written notice has been provided to the Authority.

END OF SECTION

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POLICIES FOR SEWER MAIN EXTENSIONS

1. All mains shall be extended at the sole expense of the person or persons requesting such extension.
2. All mains shall be extended to the furthestmost property lines of the person or persons requesting such extension. The only exception shall be where lines cannot be further extended as determined by the Authority or South Middleton Township.
3. The size and location of the mains shall be determined by the Authority's Engineer so as to comply with the Authority's long-range facilities plan. To the greatest extent possible, all mains shall be placed within the road or road right-of-way, unless otherwise dictate by South Middleton Township.
4. If planning is required, the Developer shall deposit with the Authority ample monies, as directed by the Authority Manager, to cover all costs the Authority may incur in the review of the proposed extension.
5. If a Subdivision or Land Development Plan is approved which will result in an extension to the sewer system, a copy of the Plan, as recorded at the Court House, shall be provided to the Authority in pdf format via email or share site.
6. Design:
 - A. A Developer's Agreement shall be signed and security placed in escrow for the review and any legal costs the Authority may incur in the review of the proposed extension, as more fully discussed in Section 9 below.
7. All Extension Plans shall follow specifications as set forth in Section 01300 of the Technical Specifications.

The Authority's datum (USGS Datum of 1929) must be used for establishing elevations. Developer shall contact the Authority's Engineer to obtain a General Plan for the area encompassing the proposed extension. All Plan Sheets shall be oriented with the north arrow pointing the same direction as the General Plan. In accordance with Act 287 and any subsequent legislation, all existing utilities shall be indicated on the Plans.

A survey data point file shall be provided for all bends, fittings, valves, corporations, curb stops, etc. providing the X,Y and Z coordinates of all facilities.

8. After the proposed extension has been approved by the Authority's Engineer, the Developer will apply for all applicable permits, as required. All permits shall be approved under the name of the Authority in accordance with applicable regulations.
9. A Developer's Agreement shall be signed and security placed in escrow for applicable engineering fees, inspection services, as-constructed drawings and legal fees incurred or reasonable anticipated costs to be incurred in connection with the proposed construction.

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In addition, a “Letter of Credit”, or bond executed by a surety named in the current list of “Companies Holding Certificates of Authority as Acceptable Reinsuring Companies” as published in Circular 570 (amended) by the Audit Staff Bureau of Accounts, U.S. Treasury Department shall be provided. Said security shall be in an amount acceptable to the Authority, to guarantee the satisfactory and timely completion of all sewer facilities as set forth in a cost estimate, as prepared by the Developer’s Engineer, that has been reviewed and approved by Authority’s engineer.

10. Construction:

Construction shall be done under the following procedure:

A. Developer can utilize his own construction forces to perform the work, providing, however, that the following is submitted and approved by the Authority:

- (1) Name of Contractor performing the work.
- (2) Shop Drawings and pipe certifications shall be submitted prior to the start of any construction to the Authority’s Engineer for approval.
- (3) Estimated length of time for construction to be used for estimating the initial amount of security to be placed in escrow.
- (4) Submit insurance certificates and Hold-harmless Agreements naming the Authority, Township and Engineer as co-insureds and certificate holders.
- (5) The limits of liability shall be as determined by the Authority’s insurance carrier.
- (6) Submit a one-and-one-half year (1½ year) Performance and Maintenance Bond to the Authority after construction is complete and final acceptance and certification is received from the Authority and/or Authority’s Engineer.

11. As work proceeds on the project and additional funds may be required by the Developer, the Authority will inform the Developer of any deficiencies, and additional monies must be deposited with the Authority. After completion of the project, if any monies remain in the construction account, all monies will be returned to the Developer.

12. After completion, testing, and preparation of as-built drawings, the utilities shall be dedicated to the Authority and a Deed of Dedication (and easements if applicable) shall be prepared by the Authority for execution by the Authority and the Developer. As a further condition of the Deed of Dedication, any easements and/or rights-of-way through or on private property required for the sewer extension shall be provided by the Developer, or shall be prepared by the Authority at the Developer’s expense.

**SOUTH MIDDLETON TOWNSHIP
MUNICIPAL AUTHORITY
CUMBERLAND COUNTY, PENNSYLVANIA**

**SANITARY SEWERAGE SYSTEM
RATES, RULES AND REGULATIONS**

2025

New Rates Effective 1st Quarter 2025

**SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY
SEWER RATES, RULES AND REGULATIONS**

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SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

CUMBERLAND COUNTY, PENNSYLVANIA

The following Rates, Rules and Regulations shall be and are hereby declared to be the Rates, Rules and Regulations of the South Middleton Township Municipal Authority for the Municipal Sanitary Sewerage System, effective by resolution duly adopted May 11, 1998, and as subsequently amended by resolution of the Board of the Authority.

The Rates, Rules and Regulations are a part of the contract with every consumer who utilizes the sewerage facilities; and every consumer, by utilizing the facilities, agrees to be bound hereby.

No officer, agent for or employee of the Authority or the Township may vary these Rates, Rules and Regulations without action of the Board of said Authority, nor can the Board be bound by any agreement, representation or act except when authorized in writing by action of said Board to do so, executed by the Chairman or Vice Chairman of the Authority.

This Authority reserves the right to adopt, from time to time, such additional Rates, Rules and Regulations as it shall deem necessary and proper in connection with use and operation of the Sewage Collection System and to revise and amend these Rates, Rules and Regulations by resolution with respect to any rates charged or by motion and/or resolution of the Board of the Authority for all other revisions or amendments from time to time.

Under the provisions of South Middleton Township Ordinance No. 4-14-72-A, all occupied properties for which sewer service is available must be connected to the system.

SECTION I – DEFINITIONS

Unless the context specifies and clearly indicates otherwise, the meaning of items and phrases used in these Rates, Rules, and Regulations shall be as follows:

- A. **“Apartment Complex”** means a building or buildings consisting of several one-family living units.
- B. **“Areas 1, 2, 3 and 4”** shall mean the respective geographic areas shown on the General Plans, the official copies of which are kept in the office of the Authority.
- C. **“Authority”** shall mean South Middleton Township Municipal Authority, a Pennsylvania municipality authority, organized and existing under the Authorities Act.”
- D. **“Authorities Act”** means the Municipality Authorities Act of 1945, as amended and supplemented.
- E. **“Building Permit”** means a written statement issued by the appropriate official of the Township, including the Zoning Officer, authorizing building, structures or uses consistent with the terms of Township Ordinance No. 10 - 1989 As Amended.
- F. **“Building Sewer”** means the extension from the sewage drainage system of any structure to the curb line or property line.
- G. **“BOD”** an abbreviation for (“Biochemical Oxygen Demand”) means the quantity of oxygen, expressed in parts per million (“ppm”), utilized in the biochemical oxidation of organic matter, under standard laboratory procedure for five days at twenty degrees centigrade. The standard laboratory procedure shall be that found in the latest edition of Standard Methods For The Examination Of Water and Wastewater, as published jointly by the American Public

Health Association, the American Water Works Association and the Water Pollution Control Federation.

- H. **“Commercial Establishment”** shall mean any structure or any portion thereof intended to be used wholly or in part for the purpose of carrying on a trade, business or profession or for social, amusement religious, education, charitable or public uses, and which contains plumbing for kitchen, toilet or washing facilities, excluding Private Dwelling or Living Units.
- I. **“Commonwealth”** means the Commonwealth of Pennsylvania.
- J. **“Connection Fee”** means a fee based upon the actual cost of the connection of the Building Sewer of an Improved Property extending from the Authority’s lateral to the property line or curb line of the Improved Property so connected, including reasonable costs for inspection and restoration. A Connection Fee shall be considered the fee referred to as a “connection fee” in the Authorities Act.
- K. **“Consumer”** shall mean the Owner of any Improved Property.
- L. **“Domestic Establishment”** means any room, group of rooms, apartment, house trailer, building or other enclosure connected, directly or indirectly, to the Sewerage System, and occupied or intended for occupancy as separate living quarters by a family or any other group of Persons living together, or by a Person living alone, excluding institutional dormitories.
- M. **“EDU”** means an equivalent dwelling unit being the amount of sanitary sewage discharged by an average Domestic Establishment in a day, which is estimated to be 90 gallons per capita per day (GPCD) times the average number of persons per household in South Middleton Township, Pennsylvania according to the most recent United States Census Bureau data. All Non-domestic Establishments shall be assigned a number of EDU’s based upon the estimated or actual sanitary sewage discharged divided by the amount of sewage discharged by an average Domestic Establishment in a day. This result shall be considered an EDU, with such discharge being calculated using the consecutive ninety (90) day period with the highest discharge.
- N. **“Improved Property”** means any property located within this Township upon which there is erected a structure intended for continuous or periodic habitation, occupancy or use by human beings or animals, and from which structure Sanitary Sewage and/or Industrial Wastes shall be or may be discharged.
- O. **“Industrial Wastes”** means any solid, liquid or gaseous substance or form of energy rejected or escaping in the course of any industrial, manufacturing, trade or business process, or in the course of the development, recovery or processing of natural resources, as distinct from Sanitary Sewage.
- P. **“Sewer Lateral”** means the extension from the sewer main to the curb line or property line, or if no such extension shall be provided, that “Sewer Lateral” shall mean that location in a Sewer Main which is provided for connection of any Building Sewer.
- Q. **“mg/l”** means milligrams per liter.
- R. **“Major Industrial Establishment”** means any structure intended to be used wholly or in part for the manufacturing, fabricating, processing, cleaning, laundering or assembly of any product, commodity, or article, in which one hundred (100) or more persons are employed.
- S. **“Minor Industrial Establishment”** means any structure intended to be used wholly or in part for the manufacturing, fabricating, processing, cleaning, laundering or assembly of any product, commodity, or article, in which less than one hundred (100) persons are employed.

- T. **“Mobile Home Court”** Mobile Home Court means large tracts of land used for the prime purposes of parking mobile homes or travel trailers for permanent living purposes.
- U. **“Non-Domestic Establishment”** means any room, group of rooms, building or other enclosure connected, directly or indirectly, to the Sewerage System, including institutional dormitories, which do not constitute a Domestic Establishment.
- V. **“Owner”** shall mean any Person vested with ownership, legal or equitable, sole or partial, of any Improved Property.
- W. **“Person”** shall mean any individual, partnership, estate, trust, association, corporation, municipality, municipal authority or any other group or entity.
- X. **“pH”** means the logarithm of the reciprocal of the concentration of hydrogen ions, expressed in grams per liter of solution, indicating the degree of acidity or alkalinity of a substance.
- Y. **“ppm”** means parts per million by weight.
- Z. **“Plumbing Inspector”** means the person or persons appointed by the Authority to enforce the terms of these Rules and Regulations.
- AA. **“Private Dwelling or Living Unit”** means a structure or dwelling intended to be occupied as a whole by one family or any apartment intended to be occupied by one family or any other one-family unit.
- BB. **“Public Establishment”** means any structure or any portion thereof intended to be used wholly or in part for the purpose of carrying on a Municipal, State or Federal business or any other facility owned and operated as an Instrumentality of the Commonwealth of Pennsylvania, and which contains plumbing for kitchen, toilet, water fountains or washing facilities.
- CC. **“Sanitary Sewage”** means normal water-carried household and toilet wastes from any Improved Property.
- DD. **“School”** means any structure or any portion thereof used or intended to be used as a public or private elementary, secondary or post-secondary school and which contains plumbing for kitchen, toilet, water fountain or washing facilities.
- EE. **“Service Area”** means a designated geographic area of the Township, established by Resolution of the Board of the Authority, which (1) requires the addition of facilities to the Sewerage System, such as a pumping station, to provide adequate service; or (2) is provided with service through an extension of the Sewer System made by a private person who has requested reimbursement from the Authority, in accordance with applicable provisions of the Authorities Act; or (3) is provided with sewer service by an extension of the Sewerage System, financed or paid for by the Authority, and is connected to the Sewerage System by the Authority.
- FF. **“Sewer Main”** means any pipe or conduit constituting a part of the Sewerage System used or usable for sewage collection from multiple South Middleton Township Municipal Authority sewer customers.
- GG. **“Sewerage System”** means a facilities owned or to be owned by the Authority as of any particular time, for collecting, pumping, transporting, treating, or disposing of Sanitary Sewage and Industrial Wastes.
- HH. **“Suspended Solids”** means suspended solids as determined pursuant to the procedure set forth in the latest edition of Standard Methods For The Examination Of Water And Wastewater, published jointly by the American Public Health Association, the American

Water Works Association and the Water Pollution Control Federation, or any successor publication.

- II. **“Tapping Fee”** means a fee imposed and allowed under the authority of the Authorities Act to enable the recovery of the Authority’s equity in the Sewerage System, which shall be composed of a capacity part and a collection part and may, in the future, if warranted, include for some customers a special purpose part and/or a reimbursement part.
- JJ. **“Township”** means the Township of South Middleton, Cumberland County, Pennsylvania, acting by and through its Board of Supervisors or, in appropriate cases, by and through its authorized representatives.
- KK. **“Treatment Plant”** means the sewage treatment plant and related facilities, including sewage transportation facilities, owned by South Middleton Township Municipal Authority, Carlisle Borough Authority, Mt. Holly Springs Borough Authority and to which Sanitary Sewage and/or Industrial Wastes are discharged from the Sewerage System for ultimate treatment and disposal.
- LL. **“Water Supplier”** shall mean a municipal supplier in the case where public water is available to and is furnished to the particular Improved Property.
- MM. **“Water Usage”** shall mean, with respect to any Improved Property and for any particular period in question, the quantity of all water used, as evidenced by (1) in the case of an Improved Property served by a public water supply, meter readings of water meters installed by the Water Supplier for the purpose of measuring water purchased from such supplier, or (2) in the case of an Improved Property not served by a public water supply, such other water meters or measuring devices as may be installed and maintained in accordance with applicable provisions of Township Ordinance or otherwise installed and maintained in a manner satisfactory to the Authority. In the case of an Improved Property served by more than one source of water supply, the “Water Usage” shall be the total measured usage from all water supplies.

SECTION II – REQUIRING CONNECTION TO SEWERAGE SYSTEM

- A. The owner of any Improved Property accessible to and whose principal building is within 150 feet from the sewerage system shall connect such Improved Property with and shall use such sewerage system, in such manner as the Township may require, within (60) days after notice to such Owner from the Township to make such connection, for the purpose of discharge of all Sanitary Sewage and Industrial Wastes from such Improved Property; subject, however, to such limitations and restrictions as shall be established herein or otherwise shall be established by this Authority, from time to time.
- B. The notice by the Authority or the Township to make a connection to a sewage system referred to in Paragraph A of this section shall consist of a written or printed document requiring the connection in accordance with the provisions of this Ordinance and specifying that such connection shall be made within (60) days after the date such notice is given or served. Such notice may be given or served at any time after a sewer is in place, which can receive and can convey Sanitary Sewage and Industrial Wastes for treatment and disposal from the particular Improved Property. Such notice shall be given or served upon the Owner in accordance with law.

SECTION III – BUILDING SEWERS AND CONNECTIONS

- A. No Person shall uncover, connect with, make any opening into or use, alter or disturb in any manner, any Sewer or the Sewerage System without first making application for and

securing a permit, in writing, from the Authority. The cost of the permit shall be in accordance with **Appendix A, Item 1**.

- B. The application for a permit required under Paragraph A of this section shall be made by the Owner of the Improved Property.
- C. No Person shall make or cause to be made a connection of any Improved Property with a Sewer until such Person shall have fulfilled each of the following conditions:
 - 1. Such Person shall have notified the Authority of the desire and intention to connect such Improved Property to a Sewer.
 - 2. Such Person shall have applied for and obtained a permit from the Authority as required in Paragraph A of this section.
 - 3. Such Person shall have given the Authority at least twenty-four hours prior notice of the time when such connection will be made, so that the Authority may supervise and inspect the work of connection and necessary testing.
 - 4. Such Person shall have paid to the Authority any fee charged and imposed by the Authority, as required under of these Rates, Rules and Regulations.
- D. Each Improved Property shall be connected separately and independently with a Sewer through a Building Sewer. Grouping of more than one Improved Property on one Building Sewer shall not be permitted, except under special circumstances and for good sanitary reasons or other good cause shown, and then only after special permission of this Authority, in writing, shall have been secured and subject to such rules, regulations, terms and conditions as may be prescribed by this Authority.
- E. All costs and expenses of construction of Building Sewer and all costs and expenses of connection of a Building Sewer to a Sewer shall be borne by the Owner of the Improved Property to be connected; and such Owner shall indemnify and save harmless the Authority and the Township, from all loss or damage that may be occasioned, directly or indirectly, as a result of construction of a Building Sewer or of connection of a Building Sewer to a Sewer.
- F. A Building Sewer shall be connected to a Sewer at the place designated by this Authority and where the Sewer Lateral is provided.

The invert of a Building Sewer at the point of a gravity connection shall be at the same or higher elevation than the invert of the Sewer. Where any building drainage system is too low to permit gravity flow to the Sewer Lateral, the sewage flow from such building drainage system shall be lifted by an approved means and discharged through the Building Sewer.

- G. Every Building Sewer of any Improved Property shall be maintained in a sanitary and safe operating condition by the Owner of such Improved Property.
- H. Every excavation for a Building Sewer shall be guarded adequately with barricades and lights to protect all Persons from damage and injury. Streets, sidewalks and other public property disturbed in the course of installation of a Building Sewer shall be restored, at the cost and expense of the Owner of the Improved Property being connected, in a manner satisfactory to this Authority and to any other governmental agency having jurisdiction.
- I. If any Person shall fail or refuse to remedy any unsatisfactory condition with respect to a Building Sewer, within sixty (60) days of receipt of notice from this Authority the Authority may refuse to permit such Person to discharge Sanitary Sewage into the Sewerage System until the unsatisfactory condition shall have been remedied to the satisfaction of the Authority.

Building Sewers And Connection To Sewers

- A. Where an Improved Property, at the time connection to Sewer is required, is served by an on-site sewage disposal system or device, the existing house sewer line shall be broken on the structure side of such sewage disposal system or device and attachment shall be made, with proper fittings, to continue such house sewer line, as a Building Sewer. No on-site sewage disposal system shall be emptied into the Municipal Authority Sewer System. The contents of such on-site sewerage disposal system shall be removed by a licensed waste hauler, and the on-site system or device shall be filled with crushed stone.
- B. No Building Sewer shall be covered until it has been inspected and approved by this Authority. If any part of a Building Sewer is covered before so being inspected and approved, it shall be uncovered for inspection at the cost and expense of the Owner of the Improved Property.

Installation Of Building Sewer

Building Sewers or Service Lines shall be subject at all times to the inspection and approval of the Authority or its duly authorized representative who shall have supervision and control over the same.

- A. **Size:** Service Lines shall in no case be less than four inches in diameter. Where double or multiple unit dwellings are permitted to be served by a common line under a special connection permit issued by the Authority, they will be served with a six-inch line, unless a larger line is required by the Operations Manager or his representative. All non-domestic establishments will be serviced with a six-inch line. An approved adapter will be used where the service line connects to the sewer lateral as required.
- B. **Material:** Pipe used for Building Sewers or Service Lines shall conform to SDR 35 soil pipe conforming with HS-67, service weight, bell and spigot joint, or PVC Schedule 40.
- C. **Service Lines:** shall be laid on a grade of not less than one-quarter of one inch per foot of length for four-inch pipes and one-eighth of one inch per foot for six-inch pipes or larger.
- D. **Service Lines:** must be as direct as possible. Changes in direction must be made with approved fittings. Any change in direction greater than 45 degrees shall include a cleanout. Changes in size where the Lateral Sewer is connected to the Service Line shall be made only with approved fittings.
- E. **Cleanouts:** Unless authorized by the Authority or its representative a cleanout shall be placed immediately at the building and at the building lateral connection. The cleanout shall consist of a line size "T" branch with a riser of not less than four inches diameter extending to the surface where it is to be provided with a ferrule and plug for cleaning purposes. Cleanouts shall be provided every seventy-five feet (75') on the Building Sewer. Where a cleanout is located in a paved or concrete area, the cleanout must be protected by a 12-inch cast iron lamp hole frame and cover installed at grade.
- F. Before work begins, the Township Codes Department is to be notified and an appointment made 48 hours in advance for inspection. All pipes and pipe joints must be visible and accessible to the inspector or his representative. If the work is satisfactory, the permit, which must be on site at the time of the inspection, will be endorsed and returned to the Owner.
- G. At the option of the Authority, an air test may be required on any building sewer line. The specifications of the air test shall conform to the requirements of the Authority.
- H. All Non-domestic Establishments must install a control manhole and other devices as shall be approved by this Authority to facilitate observation, measurement, and sampling by this Authority of waste discharged to the sewer system. Any such control manhole, when

required by this Authority, shall be constructed at an accessible, safe, suitable and satisfactory location, in accordance with plans to be approved by this Authority prior to commencement of construction.

- I. Ditches shall be promptly backfilled after inspection and approval by the Operations Manager or his representative. Care shall be taken to prevent damage to the pipe in backfilling and to secure a well-compacted and firm trench.
- J. No other utility line shall be within four (4) feet of the service line trench, unless previous written approval is secured from the Authority or its representative.
- K. The Authority or its representative may permit a building sewer line to be placed in the same trench with a water service line upon the following conditions:
 - 1. The customer service line shall be installed not less than two (2.0) feet below finish grade.
 - 2. The building sewer shall be at least 18 inches below the water service line at all points.
 - 3. The water service line shall be placed on a solid shelf excavated at one side of the common trench.
- L. When a customer desires a change in location or size of an existing service line, the Consumer shall bear the entire cost of the change.
- M. The installation of a building sewer or service line shall be subject to all relative requirements as found in the **South Middleton Township Municipal Authority Subdivision and Land Development Policies and Specifications for Construction of Extensions to the Sanitary Sewer System and Water Distribution System**.
- N. All contractors / plumbers and qualified individuals making connection to the South Middleton Township Municipal Authority Sanitary Sewer System shall comply with all Federal, State, and Township requirements and the requirements of any other governmental agency having jurisdiction thereof.

Maintenance Of Building Sewers & Sewer Laterals

- A. The maintenance of Building Sewers (defined as the extension from the sewage drainage system of any structure to the curb line or property line) and Sewer Laterals (defined as the extension from the Sewer Main to the curb line or property line) shall be the obligation of the property owner except as set forth below. Where the property owner's efforts to maintain or restore service establishes that there is a blockage in or structural failure of the Sewer Lateral which reasonably requires excavation within the street right-of-way to effect repair and/or restoration of service, the Authority will excavate and repair the Sewer Lateral. However, in the event the Authority determines that there is a blockage in, or structural failure of the Sewer Lateral due to the presence of tree roots or any material other than domestic, commercial, or industrial wastewater, in accordance with the Authority's Pretreatment Program and other Rules and Regulations, the Authority shall charge the property owner for all costs of excavation and repair.
- B. In the event that excavation is necessary at the point of connection of the Building Sewer to the Sewer Lateral to effect repair and/or restoration of service, a cleanout shall be installed at such point of connection at property owner's expense in accordance with the specifications and inspection provisions of these Rules and Regulations.
- C. All repairs to or replacement of Building Sewers or Sewer Laterals shall be subject to the specifications and inspection provisions of these Rules and Regulations.

SECTION IV – TAPPING, CONNECTION AND CUSTOMER FACILITIES FEES FOR SEWER SERVICES

No Person shall connect any Improved Property with any part of the Sewerage System without first making application for and securing a permit, in writing, from the Authority. Such application shall be made on a form to be provided by the Authority. The permit fee shall include the Authority's reasonable costs for administration and inspection to insure that the Building Sewer of the Improved Property is connected to the Sewerage System in accordance with the Rates, Rules and Regulations of the Authority. The cost of the permit shall be in accordance with **Appendix A, Item 1**.

A. Connection Fee

A Connection Fee as set forth herein is imposed upon and shall be collected by the Authority from the Owner of each Improved Property connecting to the Sewerage System for the costs of making such connection to the Sewerage System, such charge being authorized under the Authorities Act.

The amount of the Connection Fee for each individual connection to the Sewerage System shall be the actual cost incurred by the Authority, including the cost of inspection and restoration of the property. The Owner of the Improved Property shall deposit with the Authority the sum in accordance with **Appendix A, Item 2**, to be placed in escrow in order to insure reimbursement of the Authority's actual costs in connecting Owner's Improved Property to the Sewerage System. In the event the actual expenses incurred by the Authority in connecting the Owner's Improved Property to the Sewerage System exceed the escrow amount, the Owner shall pay such excess amount within thirty (30) days of receipt of the Authority's invoice for such expenses. In the event that the actual expense incurred by the Authority in connecting the Owner's Improved Property to the Sewerage System is less than the escrow amount, the Authority shall refund such excess amount, without interest, to the Owner.

The Authority may, by Resolution, establish separate Service Areas and impose a Connection Fee for each individual connection within such Service Area. The Service Areas shall be set forth in Appendix B. Connection Fees for each separate Service Area shall be set forth in column form within **Appendix A, Item 2**. All areas of the Township not located within designated Service Areas shall pay the system-wide Connection Fee set forth first in **Appendix A, Item 2**.

All Connection Fees shall be payable to the Authority.

This Authority shall enforce payment of Connection Fees charged by this Authority in any manner appropriate under the laws at the time in effect.

B. Tapping Fee

A Tapping Fee as set forth herein is imposed upon and shall be collected by the Authority from the Owner of each Improved Property, who or which shall physically connect such Improved Property to the Sewerage System, for the use of the Sewerage System, whether such use shall be direct or indirect, such charge being authorized under the Authorities Act. Such Tapping Fee is charged for connection of each Domestic, Commercial, Industrial and Public Establishment as set forth herein.

A Tapping Fee for use of the Sewerage System shall be calculated as follows:

1. The fees for capacity and/or collection-related facilities which provide service to Domestic, Commercial, Industrial and Public Establishments shall be as follow:

Tapping Fee – Capacity Part
Domestic, Commercial, Industrial, and Public Establishment **Appendix A, Item 3**

Tapping Fee – Capacity Part
Porches at Allenberry (for each
EDU or portion thereof) **Appendix A, Item 4**

Tapping Fee – Collection Part
Domestic, Commercial, Industrial, and Public Establishment (for each
EDU or portion thereof) **Appendix A, Item 5**

Tapping Fee – Collection Part
Porches at Allenberry (for each EDU or portion thereof) **Appendix A, Item 6**

The Authority reserves the right to establish, by Resolution, separate Service Areas which may have a capacity and/or collection part of the Tapping Fee different from that imposed throughout the Sewerage System. Any Service Areas, which have been established, are set forth in Appendix B. The Capacity and/or Collection Part of the Tapping Fee for Domestic, Commercial, Industrial and Public Establishments is set forth in column form within **Appendix A, Items 3, 4, 5 and 6** respectively. All areas of the Township not located within designated Service Areas shall pay the system wide Capacity and/or Collection Part of the Tapping Fee Set forth first in **Appendix A, Items 3, 4, 5 and 6**.

2. The Authority reserves the right to establish, by Resolution, Service Areas within the Township. Such Service Areas may require special purpose facilities applicable only to Sewer Customers within that Service Area. Each Service Area so established shall be identified in Appendix A. The special purpose part of the Tapping Fee for each Service Area shall be identified in **Appendix A, Item 7**.
3. Where the extension to the Sewerage System has been made at the expense of a private person, the Authority reserves the right to require payment of a reimbursement part of the Tapping Fee. Each Service Area so established shall be identified in Appendix A. Reimbursement parts of Tapping Fees, which have been established, are listed by Service Area in **Appendix A, Item 8**.
4. In case of a combination of one or more Domestic Establishments each thereof having use of the Sewerage System through one shared sewer connection, then each such Domestic Establishment shall be charged the fee herein provided as though each Domestic Establishment had a direct and separate connection to the Sewerage System. Each Domestic Establishment in a double house, multiple unit dwelling, row or connecting house, and in a Mobile Home Court shall be considered as a separate entity for the purpose of calculating the Tapping Fee. In the case of Apartment Complexes, each apartment unit shall be considered a Domestic Establishment, and one Tapping Fee shall be paid for each Domestic Establishment within the Apartment Complex.
5. The amount of the Tapping Fee for connection of each Non-Domestic Establishment to the Sewerage System shall be based upon each EDU or portion thereof of Sanitary Sewage discharged daily or, in the event flow records are unavailable, for each EDU or portion thereof of Sanitary Sewage estimated to be discharged daily. In no event shall the Tapping Fee for a Non-Domestic Establishment be less than the Tapping Fee for one EDU.

If necessary, Non-Domestic Tapping Fee adjustments may be required and shall be determined in accordance with Resolution 11-10-08-2

- ~~6.~~ All Tapping Fees shall be payable to the Authority.
7. Payment of Tapping Fees charged by this Authority shall be enforced by this Authority in any manner appropriate under the laws at the time in effect.

8. Should any Owner of any Improved Property heretofore connected to the Sewerage System or hereafter connect to the Sewerage System expand the use of said Improved Property, a Tapping Fee, calculated in the manner set forth herein, is hereby imposed upon the expanded portion of such Improved Property. An expansion of the use of an Improved Property shall include, but not be limited to, the installation of an additional dwelling unit or units in an existing dwelling. Any fees shall be due and payable prior to the issuance of a Building Permit.

C. Customer Facilities Fee

When applicable, owners of Improved Properties shall pay to the Authority a Customer Facilities Fee. The Customer Facilities Fee shall reimburse the Authority for its cost relating to the provision and, if not installed by the Owner, the installation of a flowmeter and other monitoring facilities, if necessary to monitor wastewater in accordance with any applicable rules and regulations of the Authority or of federal or state agencies.

1. If the Owner installs the flowmeter or other device, such installation shall comply with all the Authority's rules and regulations for installation of such devices. The Customer Facilities Fee in such instance shall be the actual cost of the flowmeter or monitoring device paid by the Authority.
2. If the Authority installs the flowmeter or other monitoring device, the Customer Facilities Fee in such instance shall be the actual cost of the flowmeter or monitoring device paid by the Authority for the installation. The owner of the Improved Property shall deposit with the Authority the sum in accordance with **Appendix A, Item 2**, to be placed in escrow in order to insure reimbursement of the Authority's actual costs in installing the flowmeter or monitoring device. In the event the actual expenses incurred by the Authority in installing the flowmeter and associated facilities exceed the escrow amount, the Owner shall pay such Authority's invoice for such expenses. In the event that the actual expense incurred by the Authority is less than the escrow amount, the Authority shall refund such excess amount, without interest, to the Owner.
3. The Authority reserves the right to establish, by Resolution, separate Service Areas. Any service area so established shall be set forth in Appendix A. Any Customer Facilities Fee applicable to a Service Area shall be set forth in the Resolution, which establishes the Service Area and shall be listed in Appendix A.

D. Effect Of Receipt Of Grants

If an extension to the Sewerage System is financed in whole or in part by one or more grants awarded to the Authority by any department or agency of the United States, the Commonwealth of Pennsylvania or the County of Cumberland, and if the terms of such grant or grants require that the Authority not impose tapping, connection or other fees for connection to the Sewerage System upon low or moderate income (as such terms are defined in the applicable federal or state regulations) Owners of Improved Properties, the Authority may waive tapping, connection or other fees which would be imposed upon Owners of Improved Properties under the Rates, Rules and Regulations. Such a waiver of fees shall be granted to the extent required by the terms of the grant or grants, and Owners of Improved Properties shall present all necessary documentation to the Authority to prove eligibility under the applicable regulations for the waiver of such fees.

E. Agreements With Developers Who Extend The Sewerage System

The Authorities Act permits the Authority to enter into agreements with developers concerning the extension of the Sewerage System. The Authority may, from time to time, enter into agreements with developers concerning the extension of the Sewerage System,

and may relate to the reimbursement to the developer of the collection portion of the tapping fee, as set forth in Appendix A, Item 8, paid by Owners of Improved Properties who connect to an extension financed by the developer, or other matters as authorized by the Authorities Act. The Authority shall have the right to waive or modify the terms of this Section in any such agreement.

F. **Fees In Addition To Other Charges**

The Connection Fees, Tapping Fees and Customer Facilities Fees imposed hereunder shall be in addition to any rates, fees or charges fixed or imposed by the Authority by reason of the reservation of capacity in the Sewerage System or the use, or availability for use, of the Sewerage System.

SECTION V – SEWER RENTALS OR CHARGES

There is hereby imposed upon the Owner of each Improved Property served by the Sewerage System and having the use thereof sewer rents or charges payable as hereinafter provided for the use, whether direct or indirect, of the Sewerage System, based on the schedules of classifications and rates or charges hereinafter set forth.

- A. In cases where the Improved Property is served by a public Water Supplier, sewer rentals or charges shall be computed in accordance with the following water meter rate schedule and as referenced in the cited sections of Appendix A.

1. **Residential**

- a) A flat rate is imposed per quarter-annual period per **Appendix A, Item 10**. For the Porches at Allenberry customers, the flat rate is listed in **Appendix A, Item 18**.
- b) **Multiple Use:** In case of a combination of one or more Domestic Establishments on an Improved Property with a similar unit or units and each thereto having the use of the Sewerage System through one sewer connection, then each such Domestic Establishment shall be charged the rates herein provided as though each thereof were in a separate structure, and as though each thereof had a direct and separate connection to the Sewerage System.
- c) **Mobile Home Court and/or Apartment Complex:** Each mobile home court or apartment complex shall make one connection to the Authority's Sewerage System, which will be subject to the flat rate per quarter for each mobile home or mobile home pad in the Mobile Home Court, or each apartment located in the Apartment Complex. **Appendix A, item 10**.
- d) For service less than a quarter-annual period, the listed rates will be prorated for the period of usage or prorated on the usage, whichever is greater.

2. **Meter rates for Commercial, Minor Industrial, Public and School Establishments**

The quarterly sewer rentals and charges for Commercial Establishments, Minor Industrial Establishments, Public Establishments and Schools shall be in accordance with Sewer **Appendix A, Items 11 and 12**. For service less than a quarter-annual period, the listed rates will be prorated for the period of usage or prorated on the usage, whichever is greater.

3. **Rates for Major Industrial Establishments**

The quarterly charges for Major Industrial Establishments shall be calculated in accordance with Sewer **Appendix A, Item 13**. For service less than a quarter-annual period, the listed rates will be prorated for the period of usage or prorated on the usage, whichever is greater.

In cases where the Improved Property is not served by a public Water Supplier, a charge is instituted in the amount of **Appendix A, Item 16** per quarter-annual period for residential establishment and **Appendix A, Item 17** per quarter-annual for commercial, industrial and public establishment. Should either the Authority or the Owner feel that these flat charges create an unfair result, then, in said event, the Owner may have a water meter installed, or this Authority may require the installation of a water meter. In circumstances where the Improved Property is not served by a public Water Supplier, and there is currently a water meter installed, billings shall be in accordance with the water meter rate schedule above.

The Authority reserves the right to establish, by Resolution, separate service areas, which may have different sewer rentals or charges than, that imposed throughout the sewerage system. Any service area which may have been established is set forth in **Appendix A**.

SECTION VI – MEASURING VOLUME

A. Methods of Measuring Volume:

1. Whenever a Person purchases all water consumed from a water supplier and discharges Sanitary Sewage and/or Industrial Waste into the Sewerage System, the volume of water used as determined from water meter readings made by or made available to the Authority shall be used in computing the sewer charges.
2. In cases where Persons have sources of water supply in addition to, or other than from the water supplier, and discharge Sanitary Sewage and/or Industrial Waste into the Sewerage System, those Persons shall provide a meter on such additional or other sources of water supply. The total amount of water used as shown by these meter readings will be used in computing the sewer charges. If no such meter is installed, the Authority's Manager shall estimate the total amount of water used for the purpose of determining the sewer charges.
3. In cases where Persons use water from a water supplier and/or from any other source such that all or any part of the water so used is not discharged into the Sewerage System, or in cases where the Improved Property is an Industrial Establishment, which consumes water in the industrial process, the quantity of water used to determine the sewer charges shall be computed by one of the following methods:

Method 1: By installing a meter or measuring device on the sewer connection. The readings from this meter measuring device shall be used in computing the sewer rental.

Method 2: By installing a meter or measuring device on the water usage not discharging into the Sewerage System. The reading from this meter or measuring device will then be deducted from the total water meter readings and the remainder will be used in computing the sewer rentals.

Method 3: When in the opinion of the Authority's Manager, it is not desirable or practical to install devices to continuously determine the quantity of water not discharged to the Sewerage System, the Manager will determine, in such manner and by such method as he may prescribe, the percentage of metered water discharged into the Sewerage System and the quantity of water used to compute the sewer charges shall be the percentage so determined of the quantity measured by the water meter or meters. Any dispute as to the estimated amount shall be

submitted to the Authority for determination and its decision shall be final for the then current calendar year.

- B. **Measuring Devices:** All meters or measuring devices not provided by a water supplier but otherwise used under the provisions of this resolution shall be furnished, installed, and owned by the property Owner at the expense of the property Owner, and shall be under the control of, the Authority and may be tested, inspected or repaired by Authority employees whenever deemed necessary. The Owner of the property upon which such measuring device is installed shall be responsible for its maintenance and safekeeping and all repairs thereto shall be made at the property Owner's expense, whether such repairs are made necessary by ordinary wear and tear or other causes. Bills for such installation and repairs shall be due and payable at the same time and collected in the same manner as are the charges for sewer service; such bills from after their due date shall constitute a lien upon the property upon which such measuring device is installed.
- C. **Meter Reading:** The Authority shall be responsible for the reading of all meters or measuring devices, unless such readings are otherwise made available to the Authority by the water supplier. Meters shall be made available to Authority employees for meter readings at any reasonable time.

SECTION VII – TIME AND METHOD OF PAYMENT

- A. Bills for sewer service shall be rendered quarter-annually on or about the first days of January, April, July and October, respectively, or on such other dates as the Authority shall specify, for service rendered in the applicable quarterly period.
- B. All Bills are payable upon receipt. Every Owner of an Improved Property, which is connected to the Sewer System, shall provide the Authority with and shall thereafter keep the Authority advised of the Owner's correct address. **Failure of any person to receive bills for sewer rentals or charges shall not be considered an excuse for nonpayment, nor shall such failure result in an extension of the period of time during which the net bill shall be payable.**
- C. All bills paid on or before the 30th day following the date of the mailing of the bill shall be payable at the Net Amount indicated on the bill (which Net Amount shall be the charge based upon the appropriate rate set forth above). All bills paid from and after the 31st calendar day following the due date listed on the current printed bill and on or before the 60th day following said date of mailing shall be payable at the Gross Amount indicated on the bill (which Gross Amount shall be the Net Amount plus ten per centum (10%) of said Net Amount). All bills paid from and after the 61st calendar day following the due date listed on the current printed bill shall be payable at Gross Amount plus one and one-half per centum (1 1/2%) per month until paid in full.
- D. All bills remaining unpaid after thirty days have elapsed from the date they are due may be collected by legal action in the name of the Authority against the Owner of the Improved Property charged and/or may be enforced against such Improved Property by filing a municipal claim . Unless exigent circumstances require otherwise, municipal claims shall be filed against delinquent residential and non-residential accounts when the charges for two quarterly billings have not been timely paid. Any municipal claims filed shall bear interest in the amount of six percent (6%) per annum until paid in full.
- E. In accordance with the provisions of the Act of April 14, 1949, P.L. 482, as amended, if any bill for sewer rentals, rates or other charges with respect to any premises served by the Sewer System shall not be paid by or on behalf of the Owner or any occupant of such premises within thirty (30) days from the due date of such bill, this Authority may shut off the water supply to such premises, if such premises are served by the water system owned and operated by this Authority, or may request and direct that any "water utility," as such phrase

is defined in said Act, providing water service to such premises, shut off the supply of water to such premises, all in accordance with said Act and in each case until the overdue rentals, rates and charges, together with any applicable penalties and interest thereon, shall be paid. A disconnection / reconnection fee will be charged according to **Appendix A Item 15**.

- F. Sewer rates and charges shall be due and payable upon delivery by the Authority to the person responsible for payment thereof. In the case of delivery by mail, the receipt thereof shall be presumed to occur on the date following the mailing thereof
- G. Whenever service to any Improved Property shall begin after the first day or shall terminate before the last day of any quarter-annual billing period, sewer rates and charges for such period shall be prorated equitably, if appropriate, for that portion of the billing period during which such Improved Property was served by the Sewerage System.
- H. A fee of \$40.00 or the fee imposed by the financial institution, whichever is greater, will be charged for all returned checks.

SECTION VIII – LIENS FOR CONNECTION FEES AND SEWER RENTALS; FILING AND COLLECTION OF LIENS

- A. Connection fees, sewer rentals and charges shall be liens on the Improved Property connected to and served by the Sewerage System; and any such sewer fee rentals or charges which are delinquent may be filed as liens against the Improved Property so connected to and served by the Sewerage System, which liens shall be filed in the office of the Prothonotary of Cumberland County, Pennsylvania, and shall be collected in the manner provided by law for the filing and collecting of municipal claims.
- B. In addition to enforcement by the lien procedure in paragraph A above, the Authority may enforce collection by any appropriate action at law and/or equity.
- C. Attorney's fees may be assessed and imposed together with costs in the collection of any delinquent account in accordance with 53 P.S. Section 7106 (or any amended or successor provision) in such amounts as may be established from time to time by Resolution of the Board of the Authority.

SECTION IX – PROHIBITED WASTES -

All discharges are subject to and must comply with the procedures and requirements set forth in the most recent amendment of the South Middleton Township Pretreatment Program.

SECTION X – REGULATIONS GOVERNING ADMISSION OF INDUSTRIAL WASTES INTO THE SEWERAGE SYSTEM AND RENTALS AND CHARGES IMPOSED THEREFOR -

All discharges are subject to and must comply with the procedures and requirements set forth in the most recent amendment of the South Middleton Township Pretreatment Program.

SECTION XI – ACCESS

This Authority shall have the right of access at reasonable times to any part of any Improved Property which shall be served by the Sewerage System as shall be required for purposes of inspection, management, sampling and testing, and for performance of other functions relating to service rendered by this Authority through the Sewerage System.

**SECTION XII – ADDITIONS TO AND CHARGES OF SEWER RENTALS OR CHARGES;
ADOPTION OF ADDITIONAL RULES AND REGULATIONS**

- A. This Authority reserves the right to adopt and promulgate, from time to time, additional classifications and sewer rentals or charges therefore, or modifications of the schedule of sewer rentals or charges as set forth in these Rates, Rules and Regulations, which additional classifications and sewer rentals or charges, or modifications, as the case may be, shall be construed as a part of these Rates, Rules and Regulations immediately upon adoption.

- B. This Authority reserves the right to adopt, from time to time, such additional rules and regulations as it shall deem necessary and proper in connection with the use and operation of the Sewerage System, which rules and regulations shall be, shall become and shall be construed as part of the Rates, Rules and Regulations immediately upon adoption.

**APPENDIX A – SEWER RATES RULES AND REGULATIONS
ALL CHARGES LISTED REFER TO 1 EDU**

**APPROVED PER RESOLUTIONS 07-11-2024-01 (TAPPING FEES) AND
12-19-2024-02 (QUARTERLY RATES)**

<u>ITEM NO</u>	<u>SYSTEM WIDE</u>
1. COST OF PERMIT	\$ 50.00
2. CONNECTION AND/OR CUSTOMER FACILITIES FEE ESCROW DEPOSIT	AS ESTIMATED
3. TAPPING FEE – CAPACITY PART DOMESTIC, COMMERCIAL, INDUSTRIAL, PUBLIC ESTABLISHMENT	\$3152.00
4. TAPPING FEE – CAPACITY PART PORCHES AT ALLENBERRY	\$2859.00
5. TAPPING FEE – COLLECTION PART DOMESTIC, COMMERCIAL, INDUSTRIAL, PUBLIC ESTABLISHMENT	\$2258.00
6. TAPPING FEE – COLLECTION PART PORCHES AT ALLENBERRY	\$2433.00
7. SPECIAL PURPOSE PART	\$ 0.00
8. REIMBURSEMENT PART	\$ 0.00
9. FLOW METER	AS ESTIMATED
10. RESIDENTIAL (QUARTERLY CHARGE - FLAT RATE)	\$ 152.00
11. COMMERCIAL, MINOR INDUSTRIAL, PUBLIC AND SCHOOLS (QUARTERLY MINIMUM – FOR UP TO 15,000 GALS)	\$ 163.00
12. EACH ADDITIONAL 1,000 GALLONS	\$ 15.00
13. MAJOR INDUSTRIAL – PER EMPLOYEE	\$41.00/PER EMPLOYEE
14. PENALTIES FOR VIOLATIONS	\$1000.00
15. DISCONNECTION / RECONNECTION FEE	\$ 25.00
16. RESIDENTIAL (PUBLIC WATER SUPPLY NOT AVAILABLE)	\$ 152.00
17. COMMERCIAL / PUBLIC OR MINOR INDUSTRIAL (PUBLIC WATER SUPPLY NOT AVAILABLE)	\$ 163.00
18. RESIDENTIAL / COMMERCIAL (QUARTERLY RATE PORCHES AT ALLENBERRY)	\$ 350.00

PROJECT MANUAL

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DIVISION 03

CONCRETE

Section	03300	Concrete for Utility Construction
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SECTION 01010 – SUMMARY OF WORK

PART 1 – GENERAL

1.1 SITE LOCATION

- A. Project locations are in the sewer service area of the South Middleton Township Municipal Authority, Cumberland County, Pennsylvania.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- A. Without intending to limit or restrict the extent of Work required under these Specifications, the Work generally comprises construction of extensions to the existing wastewater collection system in accordance with these Specifications and Sewer Detail Drawings bound herein.
- B. Drawings: The Sewer Detail Drawings represent the standards of construction of the Authority and are bound in the back of the Specifications.

1.3 PRELIMINARY REQUIREMENTS

- A. Before any work is started; the Developer shall ascertain from the Authority whether or not the latter intends to employ a consultant as Engineer for the Project. If the Authority indicates that no Engineer will be employed, the word “Authority” is substituted for the word “Engineer” throughout these Specifications, and the Developer and Contractor shall be guided accordingly.
- B. Where sewers are to be installed within the limits of existing streets, all removal and protection of street paving, backfilling of trenches, temporary and permanent replacement of street paving, restoration of shoulders and the maintenance and protection of traffic will be performed in strict conformance with the requirements of the South Middleton Township or other governing municipality, or the Commonwealth of Pennsylvania Department of Transportation, as applicable. The cost of inspection by personnel of the Commonwealth of Pennsylvania Department of Transportation or the local municipality, utilities, railroads, etc. shall be paid by the Developer. Perform work within the right-of-way of State Highways in accordance with the requirements of the latest edition of the Commonwealth of Pennsylvania, Pennsylvania Code, Title 67, Transportation, Department of Transportation, Chapter 459, Occupancy of Highways by Utilities. The Regulations are made a part of these Specifications.
- C. When service connections are required as work of this project, construct them from the curb and/or rights-of-way cleanout to the building using materials required by these specifications.
- D. All sewer lines shall be installed in public street rights-of-way. Installation in rights-of-way over private property will only be considered for approval when the Authority determines such installation is in the best interest of the Authority and the Authority is provided with an easement and/or right-of-way agreement acceptable to the Authority Solicitor. If any part of a main extension intended to be dedicated to the Authority is to be

installed anywhere other than in publicly dedicated streets, before the Authority gives its final approval of the plans, the Developer shall provide the Authority with easements and/or rights-of-way in form and substance satisfactory to the Authority and its Solicitor, evidencing the right of the Developer and the Authority to install, maintain and reconstruct lines across private property. Any easement shall have a width of not less than twenty (20) feet. Such easement and/or right-of-way agreement shall be recorded before commencement of construction.

- E. Do not connect storm water or ground water drainage to any sewer extension of the Authority's system. No rain water leaders, roof drainage, area or yard drainage, basement, surface water or water from fire hydrants, ground water or water from underground drainage fields shall be permitted to drain into or be admitted into the sanitary sewer system; nor shall any of these waters be admitted to the sanitary sewer system by the use of pumps of any type. The only exception is for sump pumps in existing homes which may be connected provided they are in a sealed system (solid bottom or other solid enclosure) and are incapable of pumping groundwater from the foundation or any other area of the building. The sanitary sewer system and all extensions are intended to convey sanitary wastewater only.

- F. Interfacing Existing Construction:
 - 1. Do not permit ground or surface water to enter the existing sanitary sewer facilities through the new sewer piping connection.
 - 2. Do not flush, drain or deposit water or debris from the new sewer piping or related construction into the existing sanitary sewer facilities.
 - 3. Install a watertight plug in new sewer piping entering a new manhole. Maintain the plug until all debris and accumulated water has been removed from the new sewer facilities and the new sewer facilities have passed all specified acceptance tests.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

END OF SECTION 01010

SECTION 01015 - CONTRACTOR USE OF PREMISES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Section includes general use of the site including properties inside and outside of rights-of-way, work affecting road, ramps, streets and driveways and notification to adjacent occupants.
- B. Comply with South Middleton Township Ordinance 02 of 2006.

1.2 RIGHTS-OF-WAY

- A. Confine access and operations and storage areas to rights-of-way provided by the Owner; trespassing on abutting lands or other lands in the area is not allowed.
- B. Contractor may make arrangements, at Contractor's cost, for temporary use of private properties, in which case Contractor and Contractor's surety shall indemnify and hold harmless the Authority and the Township against claims or demands arising from such use of properties outside of rights-of-way. Submit copy of agreement between private property owner and Contractor for materials storage prior to use of the area.
- C. Obtain appropriate permits for storage of materials within rights-of-way. Submit copies of permits prior to use of the area.
- D. Restrict total length which materials may be distributed along the route of the construction at any one time as approved in writing by the Authority.

1.3 PROPERTIES OUTSIDE OF RIGHTS-OF-WAY

- A. Altering the condition of properties adjacent to and along rights-of-way will not be permitted.
- B. Means, methods, techniques, sequences, or procedures which will result in damage to properties or improvements in the vicinity outside of rights-of-way will not be permitted.
- C. Any damage to properties outside of rights-of-ways shall be repaired or replaced to the satisfaction of the Authority.

1.4 USE OF SITE

- A. Comply with South Middleton Township Ordinance 02 of 2006.
- B. Obtain approvals of governing authorities (i.e. Township and/or PennDOT) prior to impeding or closing public roads or streets.
- C. Notify Owner 48 hours prior to closing a street or a street crossing. Permits for street closures are required in advance and are the responsibility of the Contractor.
- D. Maintain access for emergency vehicles including access to fire hydrants.

- E. Avoid obstructing drainage ditches or inlets; when obstruction is unavoidable due to requirements of the Work, provide grading and temporary drainage structures to maintain unimpeded flow.
- F. Locate and protect private lawn sprinkler systems which may exist on rights-of-ways within the site. Repair or replace damaged systems to condition equal to or better than that existing at start of Work.
- G. Perform daily clean-up of dirt outside the construction zone, and debris, scrap materials, and other disposable items. Keep streets, driveways, and sidewalks clean of dirt, debris and scrap materials. Do not leave building, roads, streets or other construction areas unclean overnight.

1.5 NOTIFICATION TO ADJACENT OCCUPANTS

- A. Notify individual occupants in areas to be affected by the Work of the proposed construction and time schedule. Notification shall be not less than 72 hours or more than 2 weeks prior to work being performed within 200 feet of the homes or businesses.
- B. Include in notification names and telephone numbers of two company representatives for resident contact, who will be available on 24-hour call. Include precautions which will be taken to protect private property and identify potential access or utility inconvenience or disruption.
- C. Submit proposed notification to the Authority for approval.

1.6 PUBLIC, TEMPORARY, AND CONSTRUCTION ROADS AND RAMPS

- A. Construct and maintain temporary detours, ramps, and roads to provide for normal public traffic flow when use of public roads or streets is closed by necessities of the Work.
- B. Provide mats or other means to prevent overloading or damage to existing roadways from tracked equipment or exceptionally large or heavy trucks or equipment.

1.7 EXCAVATION IN STREETS AND DRIVEWAYS

- A. Avoid hindering or needlessly inconveniencing public travel on a street or any intersecting alley or street for more than two blocks at any one time, except by permission of the Authority and Township.
- B. Obtain Authority and Township approval when the nature of the Work requires closing of an entire street. Permits required for street closure are the Contractor's responsibility. Avoid unnecessary inconvenience to abutting property owners.
- C. Remove surplus materials and debris and open each block for public use as work in that block is complete.
- D. Acceptance of any portion of the Work will not be based on return of street to public use.
- E. Avoid obstructing driveways or entrances to private property.

- F. Provide temporary crossing or complete the excavation and backfill in one continuous operation to minimize the duration of obstruction when excavation is required across drives or entrances.
- G. Provide barricades and signs in accordance with the Pennsylvania Department of Transportation.

1.8 TRAFFIC CONTROL

- A. Comply with traffic regulation as specified by the Authority, Township and/or PennDOT, as applicable.

1.9 SURFACE RESTORATION

- A. Restore site to condition existing before construction to satisfaction of the Authority and Township.
- B. Repair paved areas per the requirements of Section 02575 - Paving and Resurfacing and applicable road opening or highway occupancy permits.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION 01015

SECTION 01060 - REGULATORY REQUIREMENTS

PART 1 – GENERAL

1.1 REQUIREMENTS INCLUDE

- A. Comply with requirements of permits obtained by the Developer or Developer’s Engineer.
- B. Obtain and pay for all other permits required to perform the Work in compliance with applicable local, state and federal laws and regulations.
- C. Pay all inspection fees related to permits or requirements of governing agencies, utilities, railroads, etc.
- D. If, throughout the process of the Work within state highways, it is deemed necessary by the Pennsylvania Department of Transportation to post field inspectors on that portion of the project within their right of way, the Contractor/Developer shall reimburse the Pennsylvania Department of Transportation for the cost of the inspection so applied.

1.2 PERMITS TO BE ACQUIRED BY THE DEVELOPER IN THE NAME OF SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

- A. PennDOT “Highway Occupancy Permit”
- B. South Middleton Township Road Occupancy Permit
- C. Cumberland County Conservation District “Erosion and Sediment Pollution Control Plan” approval
- D. Department of Environmental Protection “Notice of Intent for Coverage under the General NPDES Permit”

NOTICE: The General NPDES Permit will be transferred to the Contractor prior to the beginning of construction.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

END OF SECTION 01060

SECTION 01300 – SUBMITTALS

PART 1 – GENERAL

1.1 SUBMISSIONS REQUIRED FOR AUTHORITY CONTRACTS

- A. Contract Drawings for Authority Contract work shall be submitted by the Engineer.

1.2 SUBMISSIONS REQUIRED FOR NEW SUBDIVISIONS

- A. General: The descriptions under the SUBMITTALS Article in each Specifications Section indicate the type of submission required. In addition, submit copies of Developer’s plans and a construction progress schedule.
 - 1. Make all submissions to the office of the Authority unless otherwise directed by the Authority.
- B. Definition: The term shop drawing used throughout this Section includes manufacturer’s product data in the forms of descriptive literature, specifications and published detail drawings, and also Contractor prepared drawings, certified test records or reports and such other certificates required by the Specifications.

1.3 GENERAL OUTLINE OF STEPS FOR DEVELOPER SEWER EXTENSIONS

- A. All subdivision and/or land development plans regardless of size shall be required to submit digital drawings to the Authority for review and comment.
- B. Planning Phase:
 - 1. Upon notice to the Authority of the intent to propose an extension, Authority staff will provide a preliminary planning conference to provide information about Authority extension approval procedures and to receive general information from the Developer about the proposed extension.
 - 2. The Authority will process its portion of a PADEP Sewage Planning Module if requested.
 - 3. Developer must obtain a copy of the Authority’s “Standard Construction and Material Specifications for Sewer Collection System”.
 - 4. Table 1 contains a checklist to assist the developer in completing the “Proposed Sewer System Extension Feasibility Study.”
- C. Design Phase:
 - 1. The Developer should submit drawings in pdf format via email or share site for each submission to the Authority for review and comment. The initial submission shall be done during the preliminary planning stages at the local municipality.

- a. When the drawings are delivered to the Authority a check for extension review fees should be submitted to cover the initial costs to the Authority for plan review.
 - b. The amount of the fees will be determined by the Authority Manager. No plans will be reviewed without receipt of the extension review fees.
 - c. As the design review progresses and the Authority incurs costs greater than the initial extension review fees deposit, the Authority will request additional escrow deposits from the Developer.
2. The Developer should submit documentation to the Authority indicating permission from neighboring property owners when a right-of-way is required from a property not owned by the Developer, or when the Developer intends to use an easement not explicitly stated to be used by the Authority. These may include gas, electric or phone easements.
 3. If a Highway Occupancy Permit is needed for installation of sewer, the Developer should prepare the permit in the name of the Authority. The Developer should then deliver the application to the Authority for signature and subsequent delivery to PennDOT.
 4. The Developer shall submit sets of drawings to the Authority's Engineer in pdf format via email or share site. These drawings will be stamped approved for construction. During the Preconstruction Meeting, these drawings will be distributed to Developer, Contractor, Authority, Construction Inspector and Authority's Engineer.

D. Agreement Phase:

1. Upon approval of the design drawings, a Developer's Agreement shall be entered into between the Developer and the Authority. Construction agreements apply to both private and public sewer extensions.
 - a. Construction Cost Estimate for Financial Security when constructing a public sewer extension (Not required for Private extensions)
 - (1) The amount of financial security shall be equal to 110% of the cost of the required improvements for which financial security is to be posted. The cost of the required improvements shall be established by submitting to the Authority an estimate of cost by the Developer's engineer.
 - (2) The Developer or contractor performing the work shall submit a construction sequence/schedule at this time to aid in the determination of an adequate inspection escrow amount.
 - (3) The Developer shall then provide a letter of credit, bond or cash using language provided by the Authority's Solicitor.

- b. Upon receipt of the above information, the Authority will develop two (2) original copies of the Developer's Agreement and attach the Developer's financial security.
 - (1) If additional escrow is required, the Developer's Agreement will also indicate that additional money shall be deposited with the Authority for costs to be incurred by the Authority.
 - (2) The Authority Manager will determine the amount of escrow needed.
 - (3) The Authority Manager will then forward the Developer's Agreement to the Developer for execution.
 - 2. The following items must also be submitted to the Authority prior to proceeding with construction:
 - a. Developer shall submit a minimum all Shop Drawings to the Authority's Engineer for review and comment.
 - b. Developer's Engineer shall submit to the Authority's Engineer, in digital format, a complete set of the approved plans prior to construction.
 - c. Developer shall have executed the Developer's Agreement.
 - d. Developer shall have established the escrow account to the dollar amount specified in the Developer's Agreement.
 - (1) If additional escrow money is needed during construction, the Authority will duly notify the Developer that an escrow deposit is required.
- E. Construction Phase:
- 1. The Developer will be approved to proceed with construction when all of the above items are addressed.
 - 2. The Developer is responsible for issuing a ten (10) day notice to the Authority indicating the intent to start construction.
 - a. At this time, a Preconstruction Meeting will be held. Attendees at the Preconstruction meeting include at a minimum, the Contractor, Developer, Authority, Construction Inspector and Authority's Engineer.
 - 3. Developer's Contractor shall install the sewers in accordance with these Specifications.
 - a. The Contractor is responsible for record keeping of lateral locations, final elevations of manholes and final location of all piping.
 - b. The Contractor is responsible for survey and layout of sewer.

4. The Authority's Construction Inspector shall observe testing of the sewer extension.
5. The Authority's Construction Inspector shall prepare a list of punch list items.
6. The Developer's Contractor shall complete all punch list items.

F. Post Construction:

1. Record Drawings as outlined later in Section 01300 – Submittals must be submitted to the Authority at the close of construction. All costs associated with the preparation of these drawings shall be the responsibility of the Developer. No permits to connect to the sewer system will be issued until Record Drawings are submitted and approved by the Authority.
2. After completion of construction, satisfactory inspection by the Authority Engineer of all construction, payment of any outstanding fees or charges owed to the Authority, and approval of the Record Drawings, Developer may request that the Authority accept dedication of the sewer extension. The Authority shall have no obligation to maintain any facilities until such facilities are formally accepted by the Authority at a public meeting. The Developer shall reimburse the Authority for all costs associated with the processing of a request that the Authority accept dedication of the sewer extension.
3. Developer shall submit to the Authority maintenance security in a form acceptable to the Authority Solicitor. The maintenance security shall expire no earlier than 18 months from the date of acceptance of dedication and shall be in the amount of 15% of the actual cost of installation of the improvements. Thirty days prior to the expiration of the maintenance security, the Authority or the Authority Engineer shall inspect the accepted sewer facilities. The Developer shall correct any deficiencies or, if the Developer refuses to correct the deficiencies, the Authority may draw upon the maintenance security and correct the deficiencies.
4. Upon approval of the above information, the Authority will then permit issuance of individual connection permits in accordance with the Developer's Agreement.

1.4 CONTRACT DRAWINGS – DEVELOPER SUBMISSION

A. General:

1. Submit drawings for review in pdf format via email or share site. After review of these drawings, make any corrections required and resubmit corrected sets.
2. If a WQM permit is required from DEP, submit four (4) sets.
3. Sheet Size: 24 × 36 inches.
4. Base all elevations on USGS datum, State Plane Coordinate System and refer to Authority record drawing elevations of the existing sewers and indicate the difference between USGS and Authority datum.

5. Include the following note on each drawing: “All materials used and construction methods employed shall be in accordance with the latest standards of the AUTHORITY STANDARD CONSTRUCTION SPECIFICATIONS.”
 6. Include the following note on each drawing: “For sewer detail drawings, reference the STANDARD CONSTRUCTION SPECIFICATIONS.”
 7. Include the following note on each drawing: “Contractor shall test pit all utility crossings prior to installing any sanitary sewer pipe to verify existing horizontal and vertical elevations to assure no conflict with new sewer.”
 8. Show details of manholes, bedding, encasement, service connections, etc., on drawings.
 9. Bind drawings in sets and number them consecutively.
 10. Include a copy of the design checklist found in Table 1 of this section indicating that all items meet the Authority’s Standards with the initial submission.
- B. Indicate on the design drawings the following general items:
1. Name of the Design Engineer/Surveyor.
 2. Seal of the Design Engineer/Surveyor (on Final Approved Drawings).
 3. Signature of the Design Engineer/Surveyor (on Final Approved Drawings).
 4. Name of the development and the owners.
 5. Original Date and all subsequent revision dates.
 6. Indicate by note on the Index Map(s) or Plan and Profile sheet(s) the Water Quality Management Permit Number, or DEP File Code No. if no WQM permit was required, of the existing facility that the proposed sewers are connecting into.
 7. Act 287 list of utilities, PA One Call Serial Number and Logo (and all subsequent amendments thereto).
- C. Include the following drawings:
1. Location Plan: Showing approximate area of the municipality in which the project is located. No particular scale is required.
 2. Overall: Plan sheet indicating proposed sanitary sewer facilities. All sewers will have flow direction arrows. All designs will be on “State Plan Coordinate System.”
 3. Plan and Profile Drawings: Plan View drawn to a scale of 1” = 50’ and Profile View drawn to a horizontal scale of 1” = 50’ and a vertical scale of 1” = 10’ and having the following items included thereon:

- a. Table 1, at the end of this section, is a checklist of minimum design criteria for sewer extensions. This completed list must be included with each plan submission.
- b. Location of each existing or proposed building with elevation of the existing or proposed basement (Plan View). If proposed basement elevations are not known, the drawings must include a note stating which lots are not intended to be provided with gravity basement drainage.
- c. Sewer ties to existing permanent and semi-permanent features (Plan View).
- d. Top elevations of manholes (Profile View).
- e. Invert elevations of manholes (Profile View).
- f. Manhole numbers corresponding to those on Index Map (Plan View and Profile View). Numbering system to be provided by the Authority.
- g. Distance between manholes (Profile View); maximum 400 lineal feet.
- h. Grade of proposed sewer (Profile View); minimum 0.50 percent on 8-inch main and 1.00 percent for terminal manhole runs (see Section 02700 – Piped Utilities – Sanitary Sewers for minimum slopes for larger pipes and Table 1 below for additional design criteria).
- i. Minimum depth, to top of pipe, of gravity sewer shall be eight (8) feet.
- j. Sewers installed at a depth greater than 20 feet shall be made of Class 52 cement lined ductile iron pipe with Field Lok gaskets and will require prior approval by the Authority.
- k. For sewers installed in fill areas, a note should be placed on the drawings indicating that the “fill shall be compacted to a minimum of 95% of ASTM D698 Standard Proctor.” The Authority may request testing data to verify that at the invert elevation of the sewer main that the compaction requirements have been met. Any sewers located in fill are to be constructed of ductile iron pipe and have Field Lok gaskets.
- l. Size of proposed sewer (Profile View); Minimum 8-inch main with 6-inch Service laterals. All pipes will be SDR-35 PVC unless otherwise approved by the Authority.
- m. Location, size and elevation of all existing and proposed underground utilities (Plan View and Profile View); minimum ten (10) feet horizontal clearance to water mains and five (5) feet to all other utilities.
- n. Service Lateral Installation Location:
 - (1) The measurement to locate sanitary tee or wye branch is the horizontal distance measured along the centerline of the main

sewer from the centerline of downstream manhole to the centerline of tee branch.

- (2) The ties and measurements necessary to locate the upper free end of the service connections are:
 - (a) The horizontal distance measured to the closest tenth of a foot from the downstream and upstream property markers, house corners, to the end of the service connection.
 - (b) The horizontal distance from the centerline of the main sewer to the end of the service connection.
 - (c) Connections to manholes are permissible. Invert "in" will be three tenths (0.3) above the "out" invert.
 - (d) Laterals shall be installed at right angles to the main.
 - (e) Laterals will be 6" diameter and have a minimum slope of one (1) percent.
 - (3) A note should be included indicating that no laterals shall be placed in driveways, sidewalks, 5 feet from a water service, and a minimum of 5 feet from any street tree planting.
 - (4) Locate laterals fifteen (15) feet from the property line on the low side of the lot in relation to the sewer main.
- o. Invert elevations of manholes having greater than 24 inches difference between influent and effluent shall require construction of an inside drop connection.
- (1) Manholes having less than 24 inches of fall shall have smooth flow transitions (channel) from influent to effluent pipes.
 - (2) Manholes requiring drop connections shall be a minimum of five (5) feet in diameter and shall be of the inside variety.
- p. Manholes with the flow angle less than 90° will be a 5 foot diameter manhole.
- q. All manholes shall be a minimum diameter of 4 feet. All manholes regardless of diameter shall have a minimum 6" anti-flotation toe.
- r. All force mains 4 inches in diameter and larger shall be constructed of Class 52 ductile iron pipe. Force mains less than 4 inches in diameter shall be constructed of HDPE or DR pipe rated for a minimum of 200 PSI. Force mains with long detention times shall be glass lined ductile iron pipe. All fittings shall be epoxy lined.

- s. All pump station lots will be a developable lot in accordance with the municipal requirements. All pumping stations will have a minimum building size of 20 feet × 20 feet, constructed of (split face block) and similar in design to Pumping Station #8.
- t. All sewers will be extended to the furthest edge of the property, in all directions when applicable.
- u. Low pressure systems will not be permitted.
- v. All Rights-of-Way for sewers and force mains will be a minimum of thirty (30) feet with an additional ten (10) foot buffer set on either side restricting the construction of any structures, houses, buildings, sheds, decks, pools, any underground and/or overhead facilities, etc. within that area. Also, no trees, shrubs, bushes, fences, etc. will be constructed within the Rights-of-Way.

Table 1			
Technical Review for Sanitary Sewer Extensions			
Item No.	Item	Acceptable	Unacceptable
1	Base Datum on existing sewers	_____	_____
2	Plans on State Plane Coordinate System	_____	_____
3	Note on each Drawing “All materials used and construction methods employed are to be in accordance with the latest standard of Construction Specifications.”	_____	_____
4	Note on each Drawing “For sewer detail drawings reference Standard Construction Specifications.”	_____	_____
5	Note on Drawings “Contractor shall test pit all existing utility crossings prior to installing any sanitary sewer pipe to verify existing horizontal and vertical elevations to assure no conflict with new sewer.”	_____	_____
6	Note on Drawings when sewer is installed through Authority rights of way including planter ‘islands’, “No trees, landscape walls, etc. shall be installed within easement limits in accordance with the Authority’s Standard Deed of Dedication.”	_____	_____
7	Note on Drawings “Lateral locations to be placed outside driveway and sidewalk areas, five (5) feet from any water service and five (5) feet from any street tree.”	_____	_____
8	Name of Engineer/Surveyor	_____	_____
9	Seal of Engineer/Surveyor	_____	_____
10	Signature of Engineer/Surveyor	_____	_____
11	Name of Development and Owner	_____	_____
12	Act 287 Utility List and Serial Number	_____	_____

13	Location of building(s), including curb cuts.		
14	Note indicating those lots not having basement service		
15	Elevation of Basements shown on Plan or if no basement service then show first floor elevation		
16	Minimum depth of cover to the top of the gravity main will be 8'.		
17	Minimum depth of cover to the top of force main will be 5'		
18	Minimum slope across manhole 0.1 feet		
19	Check Prefix and number system		
20	Check for clearance with water (10')		
21	Check for clearance with storm water (5')		
22	Do the plans indicate electric to be installed in the sewer easement? Minimum distance = 5'		
23	Exclusive 30-foot minimum Rights-Of-Way with the Right-Of-Way beginning a minimum of 10' from proposed buildings		
24	Constructability		
25	Maintenance		
26	Maximum run length of 400'		
27	Locate manholes outside of wheel paths. All sewers will be a minimum of 5' from the front face to curb lines.		
28	Placement of manholes in parking lots. Are they in the parking space?		
29	Minimum slope of 0.5% for 8-inch pipe (see Section 02700 – Piped Utilities for additional slope criteria)		
30	Terminal run minimum slope of 1.0%		
31	Invert Ins, Invert Outs, Rim Inverts shown on drawings		
32	Sanitary sewer laterals will be located fifteen feet from the property line and cleanouts will not be located within 5' of the driveway		
33	Where the easement is located between properties, sanitary sewer and laterals will be ductile iron pipe. This location must be discussed with the Authority prior to plan submission.		
34	Size of Laterals Shown, should be 6-inch		
35	Lateral Length		
36	Inside drops with 5-foot diameter manholes are required for inverts greater than 24-inches		

37	If steep slopes (4% to 9%), the inverts across manholes shall be 4-inches for constructability		
38	If steep slopes (9% to 20%), the inverts across manholes shall be 6-inches for constructability		
39	If steep slopes (greater than 20%), the inverts across manholes shall be 12-inches for constructability		
40	Verify depth of sewer doesn't exceed Authority requirements		
41	Where there is fill beneath proposed sewer, a note about 95 percent compaction should be on the drawings.		
42	If sewer is deep, greater than 20 feet, DIP pipe will be used.		
43	Sheet Size 24 by 36		
44	Revision Date Shown		
45	Correct slopes and lengths		
46	Curb cuts when sewer extends off of streets so that there is right-of-way access for vehicles		
47	Is a right-of-way gate needed?		
48	If on-lot grinder pumps are needed, does the design comply with the Specifications?		
49	Indicate those manholes that require watertight covers		
50	Indicate those manholes that have private frames and covers		
51	Indicate all utilities on the plans and profiles		
52	Stream crossings meet County and DEP standards for use of ductile iron pipe (DIP) or concrete encase		
53	Provide copies of all permits		
54	Pumping Stations, provide:		
	1) Hydraulic Study		
	2) Geotechnical Report		
	3) Civil Drawings		
	4) Architectural Drawings		
	5) Mechanical Process Drawings		
	6) Structural Drawings		
	7) Plumbing/HVAC Drawings		
	8) Electrical Drawings		

D. Final Acceptance Submissions:

1. Record Drawings:
 - a. Before Sewer Connection Permits will be issued and the work will be accepted by the Authority, submit a digital copy of the plans and profiles containing pipe sizes and horizontal and vertical location, including elevations, of all manholes, cleanouts, vaults, reconnection fittings and other appurtenances. The information will be provided digitally and consistent with the Plan Datum and Control as shown on the drawings. The contractor will employ the services of a Registered Professional Surveyor licensed in the Commonwealth of Pennsylvania to provide the information. Information will be provided in AutoCAD format.
 - b. The Authority intends to use prints of the reproducibles to provide information to designers and contractors as required by the Commonwealth of Pennsylvania Act 287 and its amendments thereto.
 - c. Record drawings shall indicate:
 - (1) Sheet size 24" × 36".
 - (2) Lot lines and lot number adjacent to sewer easement or roadway. When available use street addresses in place of lot numbers.
 - (3) All information as identified in Section 01300.1.4.C.3. - Plan and Profile Drawings.
 - (4) Name of Design Engineer/Surveyor including seal and signature.
 - (5) Name of Developer including address.
 - (6) Name of Owner if different than Developer.
 - (7) All manhole numbers as provided by the Authority.
 - (8) Sewer laterals to be shown with station number, length from main to cleanout, and depth at cleanout (Ex: 1+23, L=15', D=6.2').
2. Straight Line Diagrams: Contractor shall prepare and submit one copy of the lateral locations to the Authority and one copy to the Owner/Developer. Forms are available from the Authority. Sewers including manhole numbers shall be indicated.
3. Final Acceptance Tests, as specified under the various Sections, completed and successful.

<p>Table 2 Record Drawings</p>
--

Technical Review Checklist

Job Number _____

Developer _____

Development _____

Date _____

Submittal No. _____

Job Number _____

Item Number	Item	Acceptable	Unacceptable
1	Drawings Titled "Record Drawings" ("As Built" is not acceptable)	_____	_____
2	Base Datum existing sewers	_____	_____
3	Name of Engineer/Surveyor	_____	_____
4	Seal of Engineer/Surveyor	_____	_____
5	Signature of Engineer/Surveyor	_____	_____
6	Name of Development and Owner	_____	_____
7	Locations of building(s)	_____	_____
8	Plan 1"=50' Profile 1"=10'	_____	_____
9	Check prefix and number system	_____	_____
10	Right-Of-Way – 30'	_____	_____
11	Invert Ins, Invert Outs, Rim Inverts shown on drawings	_____	_____
12	Lateral Stationing from downstream manhole	_____	_____
13	Size of Laterals shown	_____	_____
14	Lateral Length – from Main to R/W line	_____	_____
15	Lateral depth at end of service lateral	_____	_____
16	Sheet Size 24"x36"	_____	_____
17	Correct slopes	_____	_____
18	Type of sewer pipe	_____	_____

4. Video Documentation: Video documentation shall be provided for all sanitary sewers. Documentation shall be in accordance with NAASCO requirements.

5. Final Acceptance Affidavits: An affidavit and such other satisfactory evidence as is required that all labor, material, rentals, contractors and subcontractors, and indebtedness arising out of performance of the sewer contract work have been paid; and that all other claims against the Owner/Developer, Contractor or Subcontractors arising out of performance of the sewer contract work either have been paid or that the Owner/Developer, Contractor or Subcontractor has and will maintain in force such Public Liability and Property Damage Insurance as will

fully protect them and the Authority from any such claims as may be pending or that may thereafter arise, to include any work performed during or at the end of the Contractor's Guarantee period of 18 months. Such guarantee work as may be required as a result of the Authority's Guarantee Reinspection which will take place at the end of the 18 month Guarantee time period.

6. Deed of dedication/Bill of Sale of all sewer mains and manholes to the Authority. All laterals, grinder pumps, private pressure pipe systems and off-street sewers not covered by a right-of-way shall remain with the property owner, Developer or by a homeowners association where required by Township regulations.
7. Submit the Table 3 Technical Review Checklist for Record Drawings when submitting the Record Drawings to the Authority.

1.5 RIGHT-OF-WAY DRAWINGS

- A. Provide 3 copies of all required descriptions of Right-of-Ways. Proposed generic form for Deed of Easement shall be provided by the Authority. The Authority shall record all Rights-of-Way in the courthouse.
- B. Provide Deed of dedication/Bill of Sale of all water mains and appurtenances to the Authority. All services, and off-street water mains not covered by a right-of-way shall remain with the property owner, Developer or by a homeowner's association where required by Township regulations.

1.6 CONSTRUCTION PROGRESS SCHEDULE – CONTRACTOR SUBMISSION

- A. Contractor shall submit a letter to the Authority indicating its intent to start construction at least ten (10) days prior to the desired start date.
- B. At least seven (7) days before work is commenced, submit a practicable and feasible progress schedule showing the order in which the Work is to be carried on, the dates on which salient features will start (including procurement of materials and equipment), and the contemplated dates for completing same.
- C. Prepare the schedule in chart form and of a suitable scale so as to appropriately indicate the percentage of Work completed at any time.
- D. At the end of each month, or more frequently, update the Construction Progress Schedule, if requested, by entering the actual progress of the Work on the schedule. Deliver copies of the updated Construction Progress Schedule immediately after its completion.

1.7 SHOP DRAWINGS – CONTRACTOR SUBMISSION

- A. Submit all shop drawings in pdf format electronically with such promptness as to avoid delay in the work.
- B. Each submission of shop drawings must be accompanied by a letter of transmittal listing the items in the submission. Each shop drawing must be marked with the name of the Project and the name of the Contractor and be numbered consecutively.

- C. When making a submission for approval, the Contractor shall do so with the understanding that he is considered to have checked the items in the shop drawing before submitting them and that he is satisfied that, in their present state, they not only meet the requirements of the Specifications, but will present no difficulties in erection and completing his Contract, and shall clearly note his approval on all shop drawings prior to their submission to the Engineer. Failure of the Contractor to note his approval will be reason for the Engineer to return such submission to the Contractor unchecked.
1. If it appears that shop drawings submitted by the Contractor to the Engineer have not been properly checked, even though the Contractor's approval has been noted thereon, it will also be considered reason for the Engineer to return such submission to the Contractor unchecked.
 2. Markings, written or otherwise, made by the Contractor or by his suppliers or manufacturers must be made on the Submittal in a color other than red. RED is reserved for the exclusive use of the Engineer in marking Submittals.
- E. If shop drawings show variations from the Specifications requirements because of standard shop practice or other reasons, the Contractor shall make specific mention of such variations in his letter of submission in order that (if accepted) suitable action may be taken for proper adjustment in the Contract; otherwise the Contractor will not be relieved of the responsibility for executing the Work in accordance with the Specifications even though the shop drawings have been approved.
- F. The approval of shop drawings will be general and shall not relieve the Contractor from the responsibility for proper fitting and construction of the Work nor from furnishing materials and work required by the Specifications which may not be indicated on the shop drawings when approved.
- G. After review by the Engineer, shop drawings will be returned marked as follows: Approved, Approved As Noted, Revise and Resubmit or Not Approved.
1. Approved: When shop drawings are returned "Approved", that means the shop drawings have been found to be in conformance with the Specifications. The Engineer's approval of the shop drawings does not relieve the Contractor from responsibility for errors or discrepancies in such shop drawings.
 2. Approved As Noted: When shop drawings are returned "Approved As Noted" that means the shop drawings have been found to be in conformance with the Specifications, provided the changes noted by the Engineer are incorporated in the shop drawings. Shop drawings returned "Approved As Noted" will not require resubmission.
 3. Revise and Resubmit: When shop drawings are returned noted "Revise and Resubmit" that means the Contractor shall make the required corrections and resubmit corrected shop drawings digitally to the Engineer.
 4. Not Approved: When shop drawings are returned "Not Approved" that means the Contractor shall make completely new shop drawings and submit digital copies to the Engineer for review.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

END OF SECTION 01300

SECTION 01500 – TEMPORARY FACILITIES AND CONTROLS

PART 1 – GENERAL

1.1 TEMPORARY SERVICES

- A. General: Provide temporary services at the site of the Work throughout the entire period of construction and until the Work of the Contract is completed and the new facilities are placed in operation of the Authority’s personnel.
- B. Temporary Water Control:
 - 1. At all times during the construction of work of this Contract maintain the flow of storm water, naturally occurring water and wastewater in existing facilities and channels affected by the Work. Bypass pumping may be required to accommodate existing sanitary sewer flows.
 - 2. Particular attention is directed to above requirement in regard to the maintenance of flow in existing sewer service connections during removal and replacement of the sewer main.
 - 3. Contractor assumes risk from floods or other causes, and any damages done to the work in progress or to work completed under Contract. Make repairs and replacements to the satisfaction of the Engineer.
 - 4. Contractor assumes responsibility for damages to property caused by flooding or back flooding of property due to blocking or restriction of storm water passages, natural waterways and wastewater facilities capacity during normal or excessive periods of water flow.
 - 5. At any time do not permit wastewater flow from existing sewers to flow into nearby waterways or to flow on surface areas. Furthermore, should an accidental discharge occur, notify Department of Environmental Protection immediately.
 - 6. The means and methods the Contractor employs to meet above requirements are at his discretion but will be subject to the Engineer’s approval.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

3.1 REMOVAL

- A. Contractor shall dismantle (if required) and remove such temporary facilities as required during construction of the project.

END OF SECTION 01500

SECTION 01570 – TRAFFIC REGULATION

PART 1 – GENERAL

1.1 DESCRIPTION

- A. Purpose: The purpose of this Section is to provide the Contractor with general guidelines for the control of traffic while the work of the Project within street right-of-way is being performed. The goal is to help ensure safe and efficient traffic movement through work areas and provide safety for the Contractor’s work force.

1.2 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies

1. Furnish, erect and maintain at closures, intersections and throughout the Project, the necessary approved barricades, suitable and sufficient lights, approved reflectors, danger signals, warning, detour and closure signs. Provide a sufficient number of watchmen and take the necessary and legal precautions for protection of work and safety of the public. Barricades, danger signals, signs and obstructions shall be illuminated from sunset until sunrise. Materials and safety devices (i.e., barricades, flashing warning lights, torches, reflectors and signs) shall conform to the State Department of Transportation Specifications.
2. Traffic regulation on Authority service area streets shall conform in all respects to the requirements for traffic control on State Highways except enforcement, which will also be by the State police.
 - a. Provide a traffic control plan (modeled after a state Highway plan) to the Authority prior to start of work and also keep a copy of the plan at the site of the work at all times.
3. State Highways
 - a. The Contractor is advised that he is required to provide traffic control in complete compliance with the rules and regulations of the Pennsylvania Department of Transportation (PADOT), including but not necessarily limited to the following:
 - (1) PA Code Title 67, Transportation: Chapter 212 – Official Traffic Control Devices.
 - (2) PA Code Title 67, Transportation: Chapter 441 – Access to and Occupancy of Highways by Driveways and Local Roads.
 - (3) PA Code Title 67, Transportation: Chapter 459 – Occupancy of Highways by Utilities.
 - (4) Section 901 “Maintenance and Protection of Traffic During Construction” of the Commonwealth of Pennsylvania Department

of Transportation Specifications Publication 408, as supplemented, and such other sections therein which complement this Section.

- b. Fines and related costs resulting from the Contractor's failure to provide adequate traffic control shall be borne solely by the Contractor.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Materials, flagman and safety devices such as barricades, flashing warning lights, reflectors and signs, provided for the purpose of protecting the work and the safety of the public, and for maintaining and protecting traffic, must conform to the requirements specified in Section 901 of the current edition of the Commonwealth of Pennsylvania Department of Transportation Specifications Publication 408 (as supplemented) and to requirements specified in the current edition of PA Code Title 67, Transportation: Chapter 212 – Official Traffic Control Devices which complements Section 901.
- B. Provide danger signals and warning signs in the approved color.

PART 3 – EXECUTION

NOT USED

END OF SECTION 01570

SECTION 02010 – SUBSURFACE EXPLORATION

PART 1 – GENERAL

1.1 DESCRIPTION

A. Digging Test Pits:

1. In locations where new sewers are to be connected to existing sewers, the Contractor will not be permitted to proceed with new construction until he has dug test pits and determined the exact location and elevation of any existing facilities.
2. All appropriate approvals (i.e. street cut permits) must be obtained by the contractor from the Township or PennDOT prior to any subsurface exploration.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

3.1 SINK HOLES

- ##### A.
- Should the Developer or Developer's contractor encounter a sinkhole during construction, Developer or Developer's contractor shall employ the services of a registered professional geo-technical firm to assist in abatement of sinkholes.

END OF SECTION 02010

SECTION 02211 - ROCK REMOVAL

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Rock Removal- Mechanical Method
- B. Rock Removal- Explosive Method

1.2 RELATED WORK

- A. Section 02221 – Trenching, Backfilling and Compacting, comply with paragraph 1.04.B Protection of existing utilities and structures as applicable.

1.3 QUALITY ASSURANCE

- A. Contractor: Contractor shall have five years documented experience with the use of explosives for disintegration of subsurface rock.
 - 1. Blaster shall be licensed in accordance with all applicable Federal, State and/or local laws, ordinances and regulations.

1.4 REGULATORY REQUIREMENTS

- A. Conform to applicable Federal, State and/or local laws, ordinances and regulations for explosive disintegration of rock.
- B. Obtain and display permits on site from authorities having jurisdiction before explosives are brought to site or drilling is started.
- C. Contractor to obtain blasting permit from Township.

1.5 REFERENCES

- A. NFPA-495-Code for the Manufacturer, Transportation, Storage, and Use of Explosive Materials.
- B. PA Code- Chapter 211 – Storage, Handling and Use of Explosives.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Rock Definition: Solid mineral material with a volume in excess of 1/3 cu. yd., that cannot be machine excavated as determined by the ENGINEER.
- B. Explosives: Type recommended by explosives firm and required by authorities having jurisdiction.

- C. Delay Devices: Type recommended by explosives firm.
- D. Blasting Mat Materials: Type recommended by explosives firm.

PART 3 EXECUTION

3.1 INSPECTION

- A. Verify site conditions and note irregularities affecting work of this Section.
- B. Beginning work of this Section means acceptance of existing condition.

3.2 ROCK REMOVAL - MECHANICAL METHOD

- A. Excavate for and remove rock by the mechanical method.
- B. Cut away rock at excavation bottom to form level bearing.
- C. Remove shaled layers to provide sound and unshattered base for footings, slabs and embankments.
- D. In utility trenches, excavate to 8 inches below invert elevation of pipe and 24 inches wider than pipe diameter.
- E. Remove excess or unsuitable materials from site.
- F. Correct unauthorized rock removal in accordance with backfilling and compaction requirements of Section 02221 – Trenching, Backfilling and Compacting.

3.3 ROCK REMOVAL - EXPLOSIVES METHODS

- A. If rock is uncovered requiring the explosives method for rock disintegration, notify the Engineer and execute as follows:
- B. Advise owners of adjacent building or structures in writing and conduct pre-blast survey of wells and structures on adjacent properties, as applicable.
- C. Provide seismographic monitoring during progress of blasting operations or limit charges as prescribed in regulations of the Pennsylvania Department of Environmental Protection.
- D. Disintegrate rock and remove from excavation:
 - 1. Conduct blasting operations to avoid injury to persons and property.
 - 2. Use explosive quantity and strength required to break rock approximately to intended lines and grades and yet leave rock in unshattered condition.
 - 3. Cover rock with logs or mats, or both where required.
 - 4. Issue sufficient warning to all persons prior to detonating a charge.

5. Store caps and exploders separately from explosives.
 6. Remove all explosives from site at completion of blasting operations.
- E. Provide the Engineer with copies of daily blasting Records as prescribed in Chapter 211 *"Storage, Handling and Use of Explosives"*, Section 211.46 of the Pennsylvania Department of Environmental Protection regulations.
 - F. Repair any damage to structures, walls, paving, etc. resulting from blasting activities to satisfaction of property owners.
 - G. The Owner reserves the right to prohibit blasting and the right to require that rock be removed by drilling and/or drilling and wedging.

3.4 FIELD QUALITY CONTROL

- A. Provide for visual inspection of bearing surfaces and cavities formed by removed rock.

END OF SECTION 02211

SECTION 02221 - TRENCHING, BACKFILLING AND COMPACTING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. The Work of this section includes, but is not limited to:
1. Cutting paved surfaces.
 2. Trench excavation, backfill and compaction.
 3. Support of excavation.
 4. Pipe bedding requirements.
 5. Control of excavated material.
 6. Rough grading.
 7. Restoration of unpaved surfaces.
- B. Related Work specified elsewhere:
1. Section 02300 - Boring, Tunneling and Jacking.
 3. Section 02485 - Finish Grading and Seeding.
 4. Section 02575 - Paving and Resurfacing.
- C. Applicable Standard Details:
1. Pipe embedment and trench backfilling.
 2. Typical trench width at top of pipe.
- D. Definitions:
1. Subgrade: Trench or excavation bottom prepared as specified herein to receive pipe bedding, concrete cradle or encasement, or structures.
 2. Unclassified Excavation: Excavation of all material encountered including soil, shale, rock, boulders, fill or other material on-site.
 3. Rock Excavation: Excavation of solid mineral rock greater than one-half cubic yard in volume requiring, with the Authority's Engineer's approval, drilling, blasting and wedging for its removal.
 4. Pipe Bedding: Placement of material as specified herein for full trench width from the subgrade a minimum of six (6) inches or one-fourth the internal diameter of

the pipe, whichever is greater, below the pipe invert to half-way up the outside diameter of the pipe.

5. Pipe Embedment: Placement of material as specified herein for full trench width from the top of the pipe bedding (halfway up pipe) to a point a minimum of six (6) inches above the pipe.
6. Backfill: Placement of material as specified herein for full width of excavation from the top of the pipe embedment to the ground surface or, in the case of paved areas, to the bottom of replacement base course or paving.

1.2 QUALITY ASSURANCE

A. Testing Agency:

1. Compaction testing shall be performed by a Soils Testing Laboratory engaged and paid for by the Contractor and approved by the Engineer.

B. Reference Standards:

1. Pennsylvania Department of Transportation:
 - a. Regulations Governing Occupancy of Highways by Utilities (67 PA Code, Chapter 459).
 - b. Publication 408 Specifications.
 - c. Pennsylvania Test Method, PTM 106.
 - d. Pennsylvania Test Method, PTM 402.
 - e. Publication 203, Work Zone Traffic Control.
2. American Society for Testing and Materials (ASTM):
 - a. ASTM C33 Specifications for Concrete Aggregates.
 - b. ASTM D698 Tests for Moisture-Density Relations of Soils.
 - c. ASTM D2922 Test for Density of Soil and Soil Aggregate in Place by Nuclear Methods.

C. Compaction Testing:

1. Conduct one test for each 100 linear feet of pipeline. Conduct compaction tests at locations as directed by the Authority's Engineer during backfilling operations.
2. Determine compaction in state highways and shoulders by the testing procedure contained in Pennsylvania Test Method PTM 106, Method B or PTM 402.

3. Determine compaction in areas other than state highways and shoulders by the testing procedure contained in ASTM D698 or ASTM D2922.

1.3 SUBMITTALS

A. Certificates:

1. Submit certification attesting that the composition analysis of pipe bedding and select backfill materials meet specification requirements.
2. Submit certified compaction testing results from the soils testing laboratory.

B. Compaction Equipment List:

1. Submit a list of all equipment to be utilized for compacting, including manufacturers' lift thickness limitations.

1.4 JOB CONDITIONS

A. Control of Traffic:

1. Employ traffic control measures in accordance with Pennsylvania Department of Transportation Publication 203, "Work Zone Traffic Control." Refer to Section 01570 – Traffic Regulation of the Specifications.
2. Comply with all local authorities. Obtain approval of traffic control plan from the Authority and Township prior to start of excavation.

B. Protection of Existing Utilities and Structures:

1. Take all precautions and utilize all facilities required to protect existing utilities and structures. Advise each Utility at least 3 working days in advance of intent to excavate, do demolition work or use explosives and give the location of the job site. Request cooperative steps of the Utility and suggestions for procedures to avoid damage to its lines.
2. Advise each person in physical control of powered equipment or explosives used in excavation or demolition work of the type and location of utility lines at the job site, the Utility assistance to expect, and procedures to follow to prevent damage.
3. Immediately report to the Utility and the Authority any break, leak or other damage to the lines or protective coatings made or discovered during the work and immediately alert the occupants of premises of any emergency created or discovered.
4. Allow free access to Utility personnel at all times for purposes of maintenance, repair and inspection.
5. The Contractor shall be held liable for any damage done by reason of breaking of water, sewer, gas, telephone, electrical, or other utility service. In case, during the course of his work, he shall damage any of the aforementioned utilities, he shall immediately begin to repair the same and send notice to the proper authorities.

Whenever the Contractor, during the progress of the excavation shall uncover service pipes or lines, which because of age or injury, are in poor condition, he shall immediately notify the proper Authority in order that steps may be taken for replacement or repair. To prevent dispute with property owners as to cause of damages, the Contractor shall notify his foreman to carefully note and properly report such damage.

6. Keep all fire hydrants, water valves, gas valves, fire alarm boxes, and letter boxes accessible for use.

PART 2 - PRODUCTS

2.1 PIPE BEDDING MATERIAL

A. Standard Pipe Bedding:

1. AASHTO No. 8 (formerly 1B) crushed stone or gravel aggregate, Table C, Section 703.2, Publication 408 Specifications. Do not use slag or cinders.

B. Alternate Pipe Bedding only where Approved by the Engineer:

1. AASHTO No. 57 (formerly 2B) crushed stone or gravel aggregate, Table C, Section 703.2, Publication 408 Specifications. Do not use slag or cinders.

2.2 PIPE EMBEDMENT MATERIAL

A. Standard Pipe Embedment:

1. AASHTO No. 8 crushed stone or gravel aggregate. Do not use slag or cinders.

B. Alternate Pipe Embedment (Only where approved by the Authority's Engineer):

1. AASHTO No. 57 crushed stone or gravel aggregate. Do not use slag or cinders.

2.3 BACKFILL MATERIAL

A. Native Backfill (Not permitted within existing paved road areas):

1. Material excavated from the site if free of stones larger than 6" in size and free of wet, frozen, and organic materials and refuse.

B. Clean Earth Backfill:

1. Material excavated from the trench if free of stones larger than 2" in size and free of wet, frozen, or organic materials and refuse.

C. Select Backfill:

1. Type 2A aggregate shall be limestone or shall demonstrate a weight in pounds per cubic foot equivalent to or greater than limestone.

PART 3 - EXECUTION

3.1 MAINTENANCE AND PROTECTION OF TRAFFIC

- A. Coordinate the work with the Authority and the Township to ensure the least inconvenience to traffic and maintain traffic in one or more unobstructed lanes unless closing the roadway is authorized.
- B. Maintain access to all streets and private drives by hauling of excavated and backfill materials, if necessary, in suitably covered and leakproof trucks.
- C. Provide and maintain signs, flashing warning lights, barricades, markers, and other protective devices as required to conform with construction operations and to keep traffic flowing with minimum restrictions.
- D. Comply with state and local codes, permits and regulations.

3.2 STRIPPING

- A. The Contractor shall remove all paving, subpaving, curbing, gutters, brick, paving block, granite curbing or flagging, or grub and clear the surface over the area to be excavated and shall properly classify the materials removed, separating them as required. Where pipe trenches underlie permanent resurfacing, the surface material shall be machine cut before excavation is begun.
- B. **The Contractor** shall properly store, guard, and preserve material as may be required for future use in backfilling, surfacing, repaving, etc. All materials which may be removed and all rock, earth, and sand taken from the excavation shall be stored, if practical, in certain parts of the roadway or such other suitable place and in such manner as the Authority shall approve. The Contractor shall be responsible for any loss or damage to the said materials because of careless removal or neglectful or wasteful storage, disposal, or use of these materials.
- C. In case more materials are created from any trench that can be backfilled over the completed pipe or stored in the street, leaving space for traffic, the excess material shall be removed to some convenient place provided by the Contractor or as directed by the Authority. The Contractor shall bring back as much of the material so removed as may be required to properly refill the trench, if of the proper kind, or if so directed by the Authority, he shall furnish such other material as may be necessary.

3.3 TEST PITS

- A. The Contractor shall excavate test pits at such points and of such dimension and depths as indicated on the Drawings or as the Authority's Engineer may direct. It is understood that the purpose of these test pits is to verify, so far as practical, the location of various subsurface structures or utilities.

3.4 CUTTING PAVED SURFACES

- A. Where installation of pipelines, miscellaneous structures, and appurtenances necessitate breaking a paved surface, make saw cuts using a diamond wheel or similar instrument in a

neat uniform fashion forming straight lines parallel with the centerline of the trench. Cut offsets at right angles to the centerline of the trench.

- B. Protect edges of cut pavement during excavation to prevent raveling or breaking; square edges prior to pavement replacement.

3.5 TRENCH EXCAVATION

A. Depth of Excavation:

1. Gravity Pipelines:

- a. Excavate trenches to the depth and grade required for the invert of the pipe plus a minimum excavation of six (6) inches or one-fourth the internal pipe diameter, whichever is greater, for placement of pipe bedding material.
- b. Excavation for laterals shall provide a straight uniform grade from the main pipeline or riser stack to the elevation at the right-of-way line, plus that excavation necessary for placement of pipe bedding material as above.

2. Pressure Pipelines:

- a. Excavate trenches to the minimum depth necessary to place required pipe bedding material as above and to provide 5' from the top of the pipe to the finished ground elevation, except where specific depths are otherwise shown on the drawings.

- 3. Care shall be taken not to excavate below the depths required. Any such excessive excavation shall be refilled with crushed stone and compacted to the satisfaction of the Authority's Engineer.

- 4. When the material encountered at subgrade is unsuitable and in the opinion of the Authority's Engineer does not afford a sufficiently firm foundation, the Contractor shall excavate to such increased depth as directed. The bottom of the trench shall be brought to the required elevation with crushed stone compacted to the satisfaction of the Engineer.

- 5. When the pipe is to be laid in fill, the embankment shall be brought to a height of at least nine inches above the proposed top of the pipe before the trench is excavated.

- 6. If rock below the specified grade is shattered due to excessive drilling or blasting or other negligence of the Contractor, and if in the opinion of the Engineer it is unfit for foundations, such shattered rock shall be removed and the area backfilled to the proper grade with crushed stone.

B. Width of Excavation:

1. Pipe trenches shall be sufficiently straight between designated angle points to permit the pipe to be laid true to line in the approximate center of the trench. The trench widths shall be such as to provide a free working space on each side of the pipe as laid, but shall not exceed the outside diameter of the barrel of the pipe plus sixteen inches at a point one foot above the top of the pipe.
2. Where sheeting and shoring are used, the maximum allowable width shall be measured between the closest interior faces of the sheeting or shoring as placed. Whenever, for any reason, the maximum trench width is exceeded, the Contractor may be ordered by the Engineer to encase the pipe in a concrete cradle.
3. For pressure pipeline fittings, excavate trenches to a width that will permit placement of concrete thrust blocks. Provide earth surfaces for thrust blocks that are perpendicular to the direction of thrust and are free of loose or soft material.
4. If the Contractor is required to excavate the trench to a width greater than that specified above, because of slides, caves, obstructions or by reason of the condition and character of the material, he shall refill any cavities so caused with suitable and satisfactory material, including concrete or other masonry if so directed.

C. Length of Open Trench:

1. The Engineer reserves the right to limit the length of distance that a trench may be opened in advance of the pipe laid at all times.
2. Do not advance trenching operations more than 200 feet ahead of completed pipeline, except where approved by the Engineer or otherwise specified in the State Highway Occupancy Permit.
3. Where rock excavation is encountered, all trenches must be opened at least 30 feet in advance of any pipe being laid.
4. If the work is stopped on the whole or any part of the trench and the same is left open for an unreasonable length of time in advance of the construction of the pipe line, the Contractor shall, when directed, refill such trench and he shall not again open the trench or part thereof until he is ready to proceed with construction of the pipe line.

3.6 SUPPORT OF EXCAVATION

- A. Support excavations with sheeting, shoring, and bracing or a "trench box" as required to comply with Federal and State laws and codes.
- B. Install adequate excavation supports to prevent ground movement or settlement to adjacent structures, pipelines or utilities. Damage due to settlement because of failure to provide support or through negligence or fault of the Contractor in any other manner, shall be repaired by the Contractor.

- C. Withdraw shoring, bracing, and sheeting as backfilling proceeds unless otherwise directed by the Engineer.
- D. All voids caused by withdrawal shall be immediately filled with concrete, sand, current ASTM Designation C-33 or other satisfactory material and compacted by ramming or other methods satisfactory to the Engineer.

3.7 CONTROL OF EXCAVATED MATERIAL

- A. Keep the ground surface, within a minimum of 2' of both sides of the excavation free of excavated material.
- B. Provide temporary barricades to prevent excavated material from encroaching on private property, walks, gutters, and storm drains.
- C. Maintain accessibility to all fire hydrants, valve pit covers, valve boxes, curb boxes, fire and police call boxes, and other utility controls at all times. Keep gutters clear or provide other satisfactory facilities for street drainage. Do not obstruct natural water courses. Where necessary, provide temporary channels to allow the flow of water either along or across the site of the work.
- D. In areas where pipelines parallel or cross streams, ensure that no material slides, is washed, or dumped into the stream course. Remove cofferdams immediately upon completion of pipeline construction.
- E. Conform to all applicable soil erosion and sediment control regulations.

3.8 DEWATERING

- A. Keep excavations dry and free of water. Dispose of precipitation and subsurface water clear of the work.
- B. Maintain pipe trenches dry until pipe has been jointed, inspected, and backfilled, and concrete work has been completed. Prevent trench water from entering pipelines under construction.
- C. Intercept and divert surface drainage away from excavations. Design surface drainage systems so that they do not cause erosion on or off the site, or cause unwanted flow of water.
- D. Comply with Federal and State regulations for dewatering to any watercourse, prevention of stream degradation, and erosion and sediment control.

3.9 PIPE BEDDING AND EMBEDMENT

- A. Prepare trench bottom as shown on Standard Detail.
- B. Place and compact Standard Pipe Bedding of AASHTO No. 8 in accordance with Standard Detail and specifications.
- C. Shape bedding recesses for joints and bells to assure pipe is supported on barrel for entire length.

- D. Lay pipe as specified in Section 02700 – Piped Utilities – Sanitary Sewers of these Specifications.

3.10 THRUST RESTRAINT

- A. Provide pressure pipe with concrete thrust blocking or use restrained joint fittings at all bends, tees, valves, and changes in direction, in accordance with the Specifications and Standard Details.

3.11 BACKFILLING TRENCHES

- A. Unless otherwise directed by the Authority’s Engineer, backfilling shall be started immediately after preliminary alignment inspection is made and shall continue without interruption to completion.

- B. The satisfactory compaction of all backfills shall be the responsibility of the Contractor regardless of the methods used and he shall protect the Authority from any loss, damage, or claims occasioned by trench settlement.

- C. Compaction:

1. From the height of 6" inches above the top of the pipe, the backfill material shall be placed in 6" inch vibrator layers mechanically tamped to obtain maximum compaction.
2. Tamping shall proceed from the center of the trench to the sides to prevent arcing.
3. Backfill shall be compacted to a dry density at least equal to 95 percent of the maximum dry density obtained in the modified reactor tests, ASTM D1557-70.
4. Backfill shall be placed and compacted to within 6 ½ inches of the existing road grad, unless otherwise directed by the Authority. Refer to Section 02575 - Paving and Resurfacing.

- D. Open Fields or Grassed Areas:

1. The initial backfill above the pipe embedment shall be a minimum of one foot in depth and shall be filled with clean earth placed in six-inch layers and carefully compacted with pneumatic hand tampers, except in rock where a suitable material approved by the Engineer shall replace the excavated rock. Above this point to a depth of 18 inches below the finished grade, the backfill material may contain small stones not larger than six inches in their greatest dimension in an amount not greater than 20 percent of the volume of backfill and well-distributed throughout the mass. The remaining 18 inches of backfill shall consist of clean earth. Clean earth shall be considered the original material taken from the ditch less any stones, rocks or foreign materials.
2. In open fields or grass areas, the trench shall be mounded as shown on the Standard Details.

- E. Streets(State Highways and other than State Highways):
1. The entire depth of trench above the pipe embedment to a point six and one-half (6 ½”) inches below the existing surface (two inches if temporary resurfacing is to be used), or as directed by the Authority’s Engineer shall be filled with Select Granular Material in conformance with PENNDOT 408 Specifications, Section 703.3. Such backfill shall be placed for the entire width of the trench in six-inch (6”) maximum layers and well compacted by approved vibratory compactor, in conformance with Section 601.3(e).
- F. Unsuitable Backfill Material:
1. Where the Authority’s Engineer deems backfill material to be unsuitable and rejects all or part thereof due to conditions prevailing at the time of construction, remove the unsuitable material and replace with suitable backfill material at Contractor's expense.

3.12 BACKFILLING AND GRADING AROUND STRUCTURES

- A. The ground around structures shall be brought to the grades shown on the plans or as directed by the Authority’s Engineer. Generally, backfilling shall be made in accordance with the specifications for trench backfilling to open fields or grass areas, except where practical, compacting may be performed by rolling. Grading shall be done by ploughing, harrowing, scraping, or by other methods to bring the ground to the required elevations in preparing the ground for the deposition of the topsoil. When the site has been properly graded to provide drainage, the topsoil shall be placed to a depth of four inches and then harrowed to provide a reasonably smooth surface, ready for seeding. Where compaction is made by rollers, the rollers shall weigh not less than ten tons and shall not be permitted within eight feet of any wall or structure or where, in the opinion of the Engineer, damage may result to existing underground piping.
- B. The Contractor shall be responsible for the stability of the fill and shall replace any portion thereof damaged by natural causes, or by careless or negligent work.
- C. Sufficient grading shall be done during the progress of the work so that no water is allowed at any time to flow toward the wall or structures or to accumulate in large puddles on the project site.

3.13 DISPOSAL OF EXCAVATED MATERIAL

- A. Excavated material remaining after completion of backfilling shall remain the property of the Contractor, removed from the construction area, and disposed of in accordance with Section 01564.

3.14 ROUGH GRADING

- A. Rough grade areas disturbed by construction to a uniform finish. Form the bases for terraces, banks, lawns and paved areas.
- B. Grade areas to be paved to depths required for placing sub-base and paving materials.

- C. Rough grade areas to be top-soiled and seeded to 3" below indicated finish contours.

3.15 FINAL LEVELING AND CLEANUP

- A. Whenever the trenches have not been properly filled, or if settlement occurs, they shall be refilled, compacted, leveled, and finally graded to conform to the surface of the ground. Trenches in streets, sidewalks, alleys, etc., shall be refilled with crushed stone, graded as shown on the plans. Trenches in open fields or unpaved plant areas shall be mounded with clean earth to a minimum depth of three inches.
- B. As the work is completed, the Contractor shall remove and dispose of all surplus earth, stone, or other material on-site or distant from the work in such manner and at such point or points as he may select or provide, subject to the approval of the Authority's Engineer, and shall leave all roads, sidewalks, and other places free, clear, and in good order.
- C. The level of trench fill is to be maintained for a period of one year within dedicated and pre-existing legal roads and right-of-ways.

3.16 DUST CONTROL

- A. Where dust or wind erosion is a problem, the unstable surface shall be lightly sprinkled with water or a dust suppressor shall be applied as necessary or as directed by the Authority's Engineer. Care shall be taken so as not to cause any water erosion to the unstable surface.

END OF SECTION

SECTION 02270 – EROSION AND SEDIMENT POLLUTION CONTROL

PART 1 - GENERAL

1.1 DEVELOPER SEWER EXTENSIONS

- A. The Developer and Developer's Engineer and Contractor assume all responsibility for design and implementation of the Erosion and Sedimentation Control Plan.

1.2 REQUIREMENTS OF REGULATORY AGENCIES

- B. Erosion and Sediment and Pollution Control Plan:
 - 1. Conduct soil erosion and sediment pollution control work in accordance with rules, regulations and requirements adopted by the Pennsylvania Department of Environmental Protection (DEP).
 - 2. Detail requirements for the control plan are described in an Erosion and Sediment Pollution Control Program Manual that may be obtained from the Bureau of Soil and Water Conservation, Division of Soil Resources and Erosion Control, Harrisburg, Pennsylvania.
- C. Fines and related costs resulting from failure to provide adequate protection against soil erosion and sediment pollution control are the obligation of the Contractor.
- D. Erosion and sediment pollution control measures employed will be subject to approval and inspection by the Pennsylvania Department of Environmental Protection and/or County Conservation District.

PART 2 - PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION 02270

SECTION 02300 – TUNNELING, BORING AND JACKING

PART 1 – GENERAL

1.1 RELATED WORK

- A. Section 02211 - Rock Removal.
- B. Section 02221 - Trenching, Backfilling and Compacting.
- C. Section 02700 - Piped Utilities-Sanitary Sewers.
- D. Section 02720 - Service Lateral and Building Sewer Installation.

1.2 QUALITY ASSURANCE

- A. Workmen Qualifications:
 - 1. Employ in the work only personnel thoroughly trained and experienced in the skills required.
 - 2. Have welds made only by welders, tackers and welding operators who have been previously qualified by tests as prescribed in the Structural Welding Code AWS D1.1 of the American Welding Society to perform the type of work required.
- B. Design Criteria:
 - 1. Provide encasing conduit under highways of sufficient strength to support all superimposed loads, including an American Association of State Highway and Transportation Officials H-20 Loading with 50 percent added for impact.
- C. Requirements of Regulatory Agencies:
 - 1. Work of this Section within State Highway right-of-way will be subject to inspection by representatives of the Commonwealth of Pennsylvania Department of Transportation, and the work must be performed in accordance with the requirements of the latest edition of the Commonwealth of Pennsylvania, Pennsylvania Code, Title 67, Transportation, Department of Transportation, Chapter 459, Occupancy of Highways by Utilities.
 - 2. Inspection, insurance or other charges demanded by the Commonwealth of Pennsylvania Department of Transportation, or other authority having jurisdiction shall be paid for by the Developer.
- D. Source Quality Control:
 - 1. Shop Tests: In accordance with Article 1.06 of the General Instructions, factory test pipe materials listed in the following. Each pipe manufacturer must have facilities to perform listed test. The Engineer reserves the right to require the

manufacturer to perform such additional number of tests as the Engineer may deem necessary to establish the quality of the material offered for use.

- a. Smooth steel wall casing pipe conforming to ASTM A-252 Grade 2 or ASTM A-139 Grade B, minimum plate thickness 0.312-inches for 10-inch casing and 0.375-inches for 36-inch casing. Casing shall be uncoated. Minimum yield strength of 35,000 psi.
2. Laboratory Tests: The Engineer reserves the right to require that laboratory tests also be conducted on materials that are shop tested. Furnish labor, materials, and equipment necessary for collecting, packaging, and identifying representative samples of materials to be tested and the shipping of such samples to the Testing Laboratory.
3. Minimum casing diameter will be 36" for main lines.
4. Casing for service laterals will be on a case by case basis. Minimum casing size for service laterals is 10".

1.3 REFERENCES

- A. American Association of State Highway and Transportation Officials (H-20): (AASHTO) Loading for Conduits Installed Under Streets, Road, or Highways.
- B. American Society for Testing and Materials:
 1. ASTM A 53, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 2. ASTM A 123, Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 3. ASTM A 139, Specification for Electric-Fusion (Arc)-Welded Steel Pipe (NPS 4 in. and Over).
 4. ASTM A 307, Specification for Carbon Steel Externally Threaded Standard Fasteners.
 5. ASTM A 569, Specification for Steel, Carbon (0.15 Maximum Percent, Hot-Rolled Sheet and Strip, Commercial Quality.
 6. ASTM A 615, Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
 7. ASTM C 32, Specification for Sewer and Manhole Brick (Made from Clay or Shale.)
 8. ASTM C 33, Specification for Concrete Aggregates.
 9. ASTM C 150, Specification for Portland Cement.
 10. ASTM C 270, Specification for Mortar for Unit Masonry.

- C. American Welding Society: AWS D1.1 Structural Welding Code.
- D. Commonwealth of Pennsylvania Department of Transportation (PDT), Specifications Publication 408, as supplemented.
 - 1. PDT Section 703.2 Coarse Aggregate.

1.4 SUBMITTALS

- A. Shop Drawings and Products Data: Furnish completely dimensioned shop drawings, cuts or other data as required to provide a complete description of Products to be installed.
- B. Certificates: Certified records or reports of results of shop tests, such records or reports to contain a sworn statement that shop tests have been made as specified.
- C. Furnish PennDOT for approval, detail drawings, accompanied by design calculations, for the tunneling shield, tunneling pits, including sheeting and bracing therefore, tunnel liner plate and tunneling procedure and grouting method and all such drawings and computations shall bear the seal of a Registered Professional Engineer.
- D. Furnish PennDOT for approval, detail drawings, accompanied by design calculations, for boring or jacking pits including sheeting and bracing therefore, steel pipe and boring or jacking procedure and grouting method and all such drawings and computations shall bear the seal of a Registered Professional Engineer.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Transport, handle and store materials and Products specified herein in a manner recommended by the respective manufacturers of such to prevent damage and defects.

1.6 SITE CONDITIONS

- A. Scheduling:
 - 1. Perform tunneling, boring or jacking operations continuously on a 24-hour basis if required by PennDOT or railroad company.
- B. Protection: As specified in Section 02221 – Trenching, Backfilling and Compacting, and such added requirements included herein.
 - 1. Adequately support and protect utilities and facilities that are encountered in, or may be affected by, the work.
 - 2. Accommodation of Traffic: As specified in Section 01570 – Traffic Regulation.
 - 3. Explosives and Blasting: Not permitted in performance of work of this Section.
 - 4. Excavation Conditions: As specified in Section 02221 – Trenching, Backfilling and Compacting.
 - 5. Excess Materials: As specified Section 02221 – Trenching, Backfilling and Compacting.

6. Borrow Material: As specified in Section 02221 – Trenching, Backfilling and Compacting.

PART 2 - PRODUCTS

2.1 ENCASING CONDUIT

- A. Steel Tunnel Liner Plate: Cold formed, steel, four flanged liner plates.
 1. Minimum Inside Neutral Axis Diameter: As shown on the Drawings or as indicated by the Engineer.
 2. Minimum Thickness: U.S. Standard Gauge 8, marked on each liner plate by manufacturer.
 3. Steel: Structural quality hot rolled carbon steel; ASTM A 569.
 4. Provide tapped grout holes and plugs (minimum 1 ½ inch diameter) in every third plate.
 5. Hot Dipped Galvanized: ASTM A 123.
 6. Nuts and Bolts: Minimum ½ inch diameter, coarse thread, conforming to ASTM A 307, Grade A.
 7. Coating: Factory coat inside and outside with asphaltic material to a minimum thickness of 0.05 inch.
 8. Acceptable Manufacturers:
 - a. Armco Drainage and Metal Products, Inc.
 - b. Republic Steel Corp.
 - c. Commercial Shearing and Stamping Company.
 - d. Or equal.
- B. Steel Pipe: ASTM A 139, Grade B or ASTM A 53, Grade B:
 1. Minimum Diameter for Main Line Sewers: 36" Diameter.
 2. Minimum Diameter for Service Laterals (Case by Case Basis): 10" Diameter.
 3. Minimum Wall Thickness: As required by design criteria.

2.2 SEWER PIPE AND FITTINGS

- A. SDR-35 PVC Pipe: As specified in Section 02700 – Piped Utilities – Sanitary Sewers.

- B. Ductile Iron Pipe (DIP): As specified in Section 02700 – Piped Utilities – Sanitary Sewers.

2.3 MISCELLANEOUS MATERIAL

A. Casing Spacers:

1. Spacers shall be made of Stainless Steel and UHMW polymer plastic runners.
2. Shall be supplied by Advance Products & Systems, Inc., PO Box 53096, Lafayette, LA 70505-3096. 1-318-233-6116.

B. End Seals:

1. 1/8” thick synthetic rubber with S.S. Bands.
2. Model AC Pull on End Seal by Advance Products & Systems, Inc.

C. Aggregate Backfill:

1. AASHTO No. 8 (PennDot 1B stone) Coarse Aggregate conforming to PDT Section 703.2.

D. Sand: ASTM C 33, fine aggregate.

E. Hold Down Rod: Reinforcement bar, ASTM A 615, Grade 60, deformed:

1. Field coat with Bitumastic No. 300-M as manufactured by Koppers Company, Inc., or equal.

2.4 CONTRACTOR OPTIONS IN PRODUCTS

- A. The Contractor may install a larger diameter encasing conduit than is shown on the Drawings, provided that the Contractor has secured the prior written approval of the applicable agencies having jurisdiction. If the Contractor elects to install a larger diameter encasing conduit than is shown on the Drawing, all necessary clearances under the roadways, pipe lines or other structures shall be maintained.

PART 3 – EXECUTION

3.1 INSPECTION

- A. Inspect Materials and Products before installing in conformance with the inspection requirements of the appropriate referenced standard.
- B. Remove rejected Materials and Products from the Project.

3.2 PREPARATION

- A. As specified in Sections 02221 – Trenching, Backfilling and Compacting and 02211 – Rock Removal.

3.3 PERFORMANCE

- A. Excavation: As specified in Sections 02221 – Trenching, Backfilling and Compacting and 02211 – Rock Removal and such added requirements included herein:
 - 1. Should the Contractor in constructing any tunneling, boring or jacking pit excavate below the subgrade for the pipe sewer, he will be required to backfill the area excavated below the subgrade with Aggregate Backfill or with concrete as required by the Engineer.

- B. Tunneling:
 - 1. Tunneling shall conform to the applicable requirements of Section 02221 – Trenching, Backfilling and Compacting and all applicable requirements of PennDOT.
 - a. Install the tunnel liner plate to the limits indicated on the Drawings or required by the Engineer or PennDOT.
 - b. Tunneling pits shall be as shown on the Sewer Detail Drawing entitled “Tunnel Work Pit and Tunnel Liner Plate”.
 - c. Exercise care in trimming the surface of the excavated section in order that the steel liner plates fit snugly against undisturbed material.
 - d. Do not advance excavation ahead of the previous installed liner plates any more than is necessary for the installation of the succeeding liner plate.
 - e. Support vertical face of the excavation as necessary to prevent sloughing. Completely bulkhead the heading at any interruption of the tunneling operation.
 - f. Paint field bolt heads and nuts.
 - 2. Grouting:
 - a. Place a uniform mixture of grout under pressure behind the liner plate and the undisturbed material.
 - b. Provide grout holes tapped for no smaller than 1 ½ inch pipe, spaced at approximately 3 feet around the circumference of the tunnel liner plates in every third ring.
 - c. Start grouting at the lowest hole in each grout panel and proceed upwards simultaneously on both sides of the tunnel.
 - d. Install a threaded plug in each grout hole as the grouting is completed at that hole.
 - e. Proceed with grouting as required by the Engineer, but in no event shall more than six linear feet of tunnel be progressed beyond the grouting.

C. Boring:

1. Boring shall conform to the applicable requirements of the regulatory agency and additional requirements specified herein.
 - a. Install the encasing conduit by the boring method to the limits indicated on the Drawings or such additional limits required by the Engineer or regulatory agency.
 - b. Excavate and sheet boring pit.
 - c. Provide devices at the front of the pipe to prevent auger and cutting heads from leading the encasing conduit. Unsupported excavation ahead of pipe is prohibited.
 - d. Over-cut by cutting head not to exceed the outside diameter of the encasing conduit by more than one-half inch.
 - e. The use of water or other liquids to facilitate casing placement and spoil removal is prohibited.
 - f. If voids develop or if bored hole diameter is more than 1 inch greater than the outside diameter of the encasing conduit, place Grout to fill voids.
 - g. Check conduit alignment in a manner and at times required by Engineer. Check alignment and grade at least once per shift as the work progresses.
 - h. Completely bulkhead heading at interruptions in boring operation.
 - i. Completely weld joints around the circumference between sections of steel pipe encasing.

D. Jacking:

1. Jacking shall conform to all applicable requirements of the regulatory agencies and additional requirements specified herein. This operation shall be conducted without hand mining ahead of the pipe and without the use of any type of boring, auguring, or drilling equipment.
 - a. Install the encasing conduit by the jacking method to the limits indicated on the Drawings or such additional limits required by the Engineer or the regulatory agencies.
 - b. Preliminary work shall consist of excavating and sheeting an acceptable shaft on the downstream side of the crossing and the installation of a backstop and guide timbers.
 - c. Design: Bracing and backstops shall be so designed and jacks of sufficient rating used so that the jacking can be progressed without stoppage except for adding lengths of pipe.

- d. Accurately place guide timbers on line and grade.
 - e. Support: The vertical face of the excavation shall be supported as necessary to prevent sloughing.
 - f. Use poling boards and bulkheads as required if subgrade conditions in the heading are unstable.
 - g. Jacking and excavation within the pipe shall proceed simultaneously with the ground being cut no more than 2 inches outside the pipe at the top and sides and not less than 2 inches above subgrade at the bottom.
 - h. The use of water or other liquids to facilitate casing placement and spoil removal is prohibited.
 - i. If voids develop or if jacked hole diameter is more than 1 inch greater than the outside diameter of the encasing conduit place grout to fill voids in manner approved by the regulatory agencies.
 - j. Check conduit alignment in a manner and at times required by Engineer. Check alignment and grade at least once per shift as the work progresses.
 - k. Completely bulkhead heading at interruptions in jacking operation.
 - l. Completely weld joints around the circumference between sections of steel pipe encasing.
- E. Laying and Testing Pipe:
- 1. Lay and test pipe in encasing conduit as specified in Section 02700 – Piped Utilities – Sanitary Sewers and such added requirements included herein.
 - 2. Support and maintain the alignment and grade of sewer piping until the concrete cradle is installed and concrete has cured.
 - 3. Provide concrete cradle as indicated on Detail Drawings.
 - 4. Paint exposed portion of hold down rod if used.
- F. Encasing Conduit Filling and Closing:
- 1. After the pipe sewer has been installed in the encasing conduit and has been tested, fill the encasing conduit with sand or AASHTO No. 8 stone. Concrete is not considered acceptable fill material.
 - 2. Close one end of encasing conduit with rubber boot before filling encasing conduit. Close other end of encasing conduit with rubber boot after filling encasing conduit or as operation dictates.
- G. Cleanup: As specified in Section 02221 – Trenching, Backfilling and Compacting.

3.4 FIELD QUALITY CONTROL

A. Testing:

1. After laying pipe in encasing conduit and before filling conduit conduct line acceptance testing as specified in Section 02700 – Piped Utilities – Sanitary Sewers.

END OF SECTION 02300

SECTION 02485 - FINISH GRADING AND SEEDING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. The work of this section includes, but is not limited to:
 - 1. Placing topsoil.
 - 2. Soil conditioning.
 - 3. Finish grading.
 - 4. Seeding.
 - 5. Maintenance.
- B. Restore unpaved surfaces to a condition similar to that prior to excavation as specified and indicated on the Drawings.
- C. Seeding and restoration to be in accordance with approved E & S Plan.

1.2 QUALITY ASSURANCE

- A. Reference Standards:
 - 1. Pennsylvania Department of Transportation Publication 408 Specifications.
 - 2. Pennsylvania Seed Act of 1965, Act 187, as amended.
 - 3. Agricultural Liming Materials Act of 1978, P.L. 15, No. 9 (3P.S. 132-1), as amended.
 - 4. Pennsylvania Soil Conditioner and Plant Growth Substance Law, Act of December 1, 1977, P.L. 258, No. 86 (3P.S. 68.2), as amended.
 - 5. Rules for Testing Seeds of the Association of Official Seed Analysts.

1.03 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Seed:
 - 1. Deliver seed fully tagged and in separate packages according to species or seed mix. Seed which has become wet, moldy, or otherwise damaged in transit or storage will not be accepted.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

END OF SECTION 02485

SECTION 02575 - PAVING AND RESURFACING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. The Work of this section includes, but is not limited to:
 - 1. Temporary Paving.
 - 2. Permanent Paving.
 - 3. Shoulder Restoration.
- B. Paving and resurfacing requirements for project roads are as indicated on the resurfacing schedules and miscellaneous details provided on the Standard Details sheets. All paving shall comply with the local ordinances and PennDOT Specifications, where applicable.
- C. Related work specified elsewhere:
 - 1. Section 02221 - Trenching, Backfilling and Compacting.
 - 2. Section 03300 - Concrete for Utility Construction.

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. Pennsylvania Department of Transportation:
 - a. Publication 408 Specifications.
 - b. Publication 27 - Specification for Bituminous Materials (Bulletin 27).
 - c. Publication 37 - Specification for Bituminous Materials (Bulletin 25).
 - d. Publication 203 - Work Zone Traffic Control (See Special Conditions - Section 01570 – Traffic Regulation).
 - e. Chapter 459 - Occupation of Highways by Utilities (See Supplemental General Conditions - Section OHU).
- B. South Middleton Township Ordinance No. 02 of 2006.

1.3 SUBMITTALS

- A. Certificates:
 - 1. Submit certification from bituminous and aggregate suppliers attesting that materials conform to the state specifications.

1.4 JOB CONDITIONS

- A. Control of Traffic:
 - 1. Take measures to control traffic during repaving operations. Do not allow traffic on repaved areas until authorized by the Authority and the Township.
 - 2. Employ traffic control measures in accordance with Publication 203 - "Work Zone Traffic Control."
- B. Restore existing paving outside the limits of the work that is damaged by the Contractor's operations to its original condition.

PART 2 - PRODUCTS

2.1 CONCRETE

- A. See Section 03300 – Concrete for Utility Construction.

2.2 BITUMINOUS PAVING MATERIALS AND AGGREGATES

- A. Refer to Publication 408 Specifications and Township Ordinance No. 02 of 2006. All bituminous materials and aggregates used in paving and resurfacing are designated in these Specifications by and shall conform to the applicable portions of the Publication 408 Specifications and Township Ordinance No. 02 of 2006.

PART 3 - EXECUTION

3.1 WORK WITHIN STATE HIGHWAY RIGHT-OF-WAY

- A. Inspection: If throughout the progress of the work within state highways, it is deemed necessary by the Pennsylvania Department of Transportation (PennDOT) to post field inspectors on that portion of the project within their right-of-way, the Developer shall reimburse PennDOT for the cost of the inspection so applied.
- B. Blasting if necessary: All blasting shall be conducted in accordance with applicable PennDOT, state and local regulations.
- C. Detour: If a state highway detour is required, application must be made to District Office Traffic Unit and approval received for rerouting traffic before detour is put into effect.

3.2 TEMPORARY PAVING

- A. Place 3" compacted thickness temporary paving immediately upon completion of trench backfilling.
- B. Shape and compact subgrade material, then place and compact crushed stone base course to the required thickness.

- C. Place temporary paving material. Compact to 3" minimum thickness with trench roller having minimum 300 pounds per inch-width of compaction roll.
- D. Continuously maintain temporary paving to the satisfaction of the Township's Engineer and the state and local road departments. Temporary paving on state roads must remain in place for a minimum of ninety (90) days. On Township roads, permanent restoration must be completed within thirty (30) days after substantial completion of piping work, unless otherwise approved by the Township Engineer.

3.3 PERMANENT PAVING

- A. The Authority and/or Township reserve the right to delete any and all permanent paving from the Contract.
- B. Saw cut back 12" from the limit of the trench using a diamond wheel or similar instrument. Cut straight joint lines and right angle offsets.
- C. Remove temporary paving material. Construct permanent base and surface courses to the required compacted thicknesses shown on the standard details and in accordance with Publication 408 Specifications and Township Ordinance No. 02 of 2006.
- D. Maintain permanent paving to the satisfaction of the Authority and the local and state road departments throughout the contract maintenance period.

3.4 BITUMINOUS OVERLAY

- A. Where indicated on the Drawings, standard details, Surface Restoration Tables or directed by PennDOT, the Authority Engineer or Township, place a bituminous overlay.
- B. Construct in accordance with Section 401.3, Publication 408 Specifications.

3.5 PAVED SHOULDER RESTORATION

- A. At the expiration of the appropriate time period, unless otherwise directed by the Pennsylvania Department of Transportation or the Township Engineer, the temporary restoration and the compacted trench fill shall be removed to a minimum depth of six and one-half inches (6 ½") below the surface of the roadway. A Super Pave base course with a minimum depth of five inches (5") shall be constructed and shall be topped with one-and-one-half inch (1½") minimum of Super Pave wearing course.
- B. All Paved Shoulder Restoration shall be in accordance with the Pennsylvania Department of Transportation, Form 408.
- C. All edges of the existing roadway surface disturbed during construction shall be cut in a straight line. Cutting of edges shall be done prior to placing of the wearing surface and shall be as directed by the Pennsylvania Department of Transportation on state roads and Township Ordinance No. 02 of 2006 on Township roads.

3.6 BITUMINOUS TACK COAT

- A. Bituminous Tack Coat shall conform to PennDOT Form 408 for materials and construction

requirements, including all revisions.

- B. Bituminous Tack Coat shall be applied on the surface of the base course prior to the construction of a bituminous binder course and/or bituminous wearing course.

3.7 SCRATCH COAT

- A. Scratch Coat or leveling course placement shall consist of Super Pave wearing course and shall be placed on a roadway where it is necessary to remove any irregularities, at the locations and depth as determined by PennDOT or the Township Engineer.

3.8 MILLING OF ROADWAY

- A. Paving shall be removed to a depth below the roadway surface to allow construction of the specified pavement course. Milling shall be performed to a depth as shown on the "Construction Details" and in accordance with requirements of PennDOT Publication 408, Specifications, current edition.
- B. Prior to Milling, all edges of existing roadway surface that are to be disturbed shall be cut or sawed in a straight line with a diamond wheel or similar instrument, as directed by the Authority Engineer.

3.09 SEAMS

- A. When the road surface is disturbed all seams shall be sealed with PG 64-22 in accordance with PennDOT Form 408.

3.10 PAINT IDENTIFICATION

- A. Upon completion of temporary and permanent resurfacing, the resurfacing date shall be painted on the pavement immediately adjacent to the cut. The painted date shall indicate the month and year numerically. The numerals shall be at least six inches in height. The paint shall be of a durable wearing quality and shall be green in color.
- B. All new pavement shall be re-stripped by the Contractor where previously painted. All traffic lines and markers shall be in accordance with applicable requirements of PennDOT Publication 408, current edition.

3.11 DRIVEWAYS

- A. Trim concrete and bituminous driveway surfaces to removed damaged areas. Saw cut straight joint lines parallel to the centerline of the trench. Cut offsets at right angles to the trench centerline.
- B. Restore existing concrete driveways trenched through with a 6" layer of concrete reinforced with 6 X 6 10/10 wire mesh.
- C. Restore existing blacktop driveways trenched through in kind or with minimum 1 1/2" layer wearing course over 6" layer of 2A aggregate.
- D. Restore earth driveways with a 6" layer of 2A stone backfill.

E. Restore stone or gravel driveways in kind.

END OF SECTION 02575

SECTION 02605 - MANHOLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provision of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.
- B. Section 02700 - Piped Utilities – Sanitary Sewers.

1.2 WORK INCLUDED

- A. Installation of Manholes, etc.

1.3 QUALITY ASSURANCE

- A. Manhole Acceptance Tests:

- 1. General:

- a. After the manhole has been completely constructed, the frame bolted thereon, and the trench backfilled, a vacuum test shall be performed. A manhole acceptance test shall be conducted after backfilling and bituminous concrete base course or binder course has been completed unless otherwise directed by the Inspector. This test will be done from the rim of the manhole frame.
 - b. Any damage caused to properties due to sewage handling and/or sewage backup while vacuum testing shall be the responsibility of the DEVELOPER/CONTRACTOR.

- 2. Vacuum Testing Equipment:

- a. Furnish testing equipment as specified in the manufacturer's written instructions. Pressure gauge, for this procedure, MUST read in inches of mercury, not in PSI.

- 3. Vacuum Test Procedures:

- a. Perform vacuum testing in accordance with the testing equipment manufacturer's written instructions.
 - b. Draw a vacuum of ten inches of mercury and close the valves.
 - c. Manhole will be acceptable when vacuum does not drop below nine inches of mercury for the following manhole sizes and times:
 - (1) Four foot diameter - 60 seconds.
 - (2) Five foot diameter - 75 seconds.

(3) Six foot diameter - 90 seconds.

d. Repair or replace defective manholes and retest.

1.4 SUBMITTALS

- A. Submit shop drawings or catalogue cuts, as appropriate, for materials listed under Article 2.1 of this Section. Submit only those materials that are actually to be used in the work. These will usually be as follows:
 - 1. Precast Concrete Manholes.
 - 2. Manhole Grade Rings.
 - 3. Manhole Steps.
 - 4. Manhole Castings.
 - 5. Gaskets / Boots, Adapters, and Other Appurtenances.
 - 6. Inside Drop Bowl and associated stainless steel hardware.
- B. Submit manufacturer's Certification of Compliance in accordance with Section 01300 - Submittals.
- C. Make submittals prior to start of construction. Make submittals to ENGINEER with digital copies via email.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store and handle manholes, manhole frames and covers and appurtenances in accordance with the manufacturer's recommendations, and in such manner as to protect the materials from damage.
- B. Manholes and related materials shall be loaded and unloaded by lifting with hoists so as to avoid damage. Under no circumstances shall such material be dropped or skidded against material already on the ground.
- C. Manholes and related materials shall at all times be handled with care to avoid damage. The interior shall be kept free from dirt and foreign matter. All manholes, manhole frames and covers and appurtenances shall be carefully lowered or raised into place with suitable equipment in a manner that will prevent damage to the material. Under no circumstances shall manholes or accessories be dropped or dumped.
- D. Manholes, and all related materials, shall be thoroughly inspected for defects prior to their being installed. Any defective, damaged, or unsound material, shall be repaired or replaced as directed.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Manholes:

1. Precast Concrete Manhole Base, Top and Riser Sections:
 - a. Precast Concrete manholes shall be of the design and dimensions shown on the sewer Detail Drawings. Precast concrete bases shall be manufactured in accordance with the requirements of ASTM C478 except as follows:
2. Portland Cement: Composition and compressive strength conforming to ASTM C478 except use ASTM C150, Type I or Type III with Xypex Concentrate Admix C-2000 (for sulphate resistance), or ASTM C150 Type II cement in manhole components and increase compressive strength to 4500 psi (at 28 days) in precast bases:
 - a. Openings in precast concrete manholes to accommodate the connection of piping shall be custom preformed for each manhole at the time of manufacture. Openings for connection of the piping shall be of the size and shape required for the particular type of pipe seal provided.
 - b. All precast concrete manholes shall be designed to accommodate AASHTO highway load class HS-25 .
 - c. The tops of the precast concrete bases shall be accurately formed to receive the tongue of the bottom precast concrete manhole section of the wall.
 - d. Precast top sections shall have hold down bolt inserts factory cast in the top section. Each top shall have four (4) three quarter (3/4) inch threaded inserts or slotted inserts to accommodate manhole frame hold down bolts. Insert types designed for an ultimate load in tension of 12,500 pounds. Coordinate insert locations in the top section to match the bolt hole locations on the manhole frame. All inserts shall be factory plugged before shipping.
3. Monolithic Poured-In-Place Concrete Manhole Bases. (Approval must be obtained from the Authority to use this type of base.):
 - a. Monolithic poured-in-place concrete bases are permitted for use on a case-by-case basis, with prior written approval of the Authority.
 - b. Portland cement: Composition and compressive strength conforming to ASTM C478 except use ASTM C150, Type I or Type III with Xypex Concentrate Admix C-2000 (for sulphate resistance), or ASTM C150 Type II cement in manhole components and increase compressive strength to 4500 psi (at 28 days) in precast bases.
 - c. Concrete used for poured-in-place manhole bases shall be of a 4,000 psi mix design.

- d. Consistency: The concrete shall be of uniform consistency. The maximum allowable slump shall be 2-inches.
 - (1) This strength requirement shall be verified by tests. At least one test shall be made per day or one test per structure. A test shall consist of at least two cylinders whose 28-day compressive strengths shall be determined by an approved laboratory.
- 4. Concrete used for channels inside precast manhole bases shall be of a 3500 psi Mix Design with a 5/8" diameter maximum allowable aggregate size:
 - a. Consistency: The mixed concrete shall be of uniform consistency. The maximum allowable slump shall be 1-inch.
 - b. Portland cement: Composition and compressive strength conforming to ASTM C478 except use ASTM C150, Type I or Type III with Xypex Concentrate Admix C-2000 (for sulphate resistance), or ASTM C150 Type II cement in manhole components and increase compressive strength to 4500 psi (at 28 days).
- 5. Precast Reinforced Concrete Manhole Riser and Top Sections:
 - a. As previously specified.
- 6. Steel Reinforcement:
 - a. Steel reinforcement used in the manufacture of precast concrete manhole bases and precast concrete riser and top sections shall conform to the requirements specified in Section 6 of ASTM C478.
- 7. Gasket for Sealing Precast Concrete Manhole Joints:
 - a. Manhole section joint gasket materials specified herein shall be used in accordance with the Detail Drawings. Only one method of joint sealing and gasketing will be permitted for all manholes:
 - (1) Preformed Plastic Gaskets for Manhole Joints:
 - (a) Flexible plastic gasket-type sealant for manhole joints shall be butyl rubber (plastic) sealant shall meet the requirements of Federal Specification SS-S-210A (3.4 Adhesion & Hydrostatic Pressure) and shall conform with the applicable requirements specified in Section 5.7 of ASTM C361.
 - (b) The sealing compound shall not leak at the joints (while being tested at 10 psi) for a period of 24 hours. Requirements for sag and flow resistance (vertical and overhead 1"-wide joints) shall be such that no sagging is detected (while being tested at 135 degrees F) for a period of 5 days. Requirements for chemical resistance shall be

such that no visible deterioration of the sealing compound occurs (when immersed separately in a solution of acid, alkalis and saturated hydrogen sulfide) for a period of 30 days.

- (c) The sealing compound shall be supplied in extruded rope form of suitable cross-section. The size of the sealing compound shall be in accordance with the manufacturer's recommendations and sufficient to obtain squeeze-out of the material around the entire interior and exterior circumference when the joint is completed. The sealing compound shall be protected by a suitable removable two-piece wrapper. The two-piece wrapper shall be so designed that one-half may be removed longitudinally without disturbing the other half to facilitate application of the sealing compound. The sealing compound contained within the joint shall be the sole element utilized in sealing the joint from internal and external hydrostatic pressure. Joint surfaces shall be primed, sealing compound applied, and joint made in strict conformance with the written specifications of the sealing compound manufacturer.

8. Pipe Openings and Seals:

- a. Openings shall be preformed during manufacturing in each base and riser section requiring a pipe opening. Each opening shall accommodate the type of pipe and pipe seal required.
- b. Pipe opening seals shall meet the requirements specified in ASTM C923.
- c. Pipe opening seals integrally cast with holes for pipe in precast concrete manhole walls shall be all-rubber composition, flexible, pliable, and provide up to 15 degrees lateral, diagonal or vertical pipe deflection. Gaskets shall be leak-proof tested to 20 psi. and shall meet or exceed rubber quality standards of ASTM C-443.
- d. Pipe opening seals not cast with holes for pipe shall be pliable and permit deflection. A strong rubber coated steel center compression ring and a long rubber sleeve with a deep groove secured stainless steel clamp shall be used to create a positive seal.
- e. Rubber adapter ring for use on PVC pipe in poured-in-place manhole bases shall be recommended by the manufacturer. To be used on a case by case basis with prior approval from Engineer.
- f. Manhole adapters shall be provided for all PVC pipe in cut-in pipe opening and shall be as recommended by the pipe manufacturer.

9. Frame Hold Down Bolts:
 - a. Bolts, nuts and washers shall be stainless steel in accordance with ASTM A307 and ASTM A276.

10. Manhole Steps:
 - a. Aluminum Step: Aluminum alloy 6061-T6, tensile 38,000 psi., yield 35,000 psi. Manhole steps shall be installed in the reinforced concrete walls of the riser and eccentric top sections. Coat the portion of aluminum step being embedded in concrete with bituminous paint.
 - b. Reinforced Plastic Step: Composed of a 3/8-inch Grade 60 ASTM A615 deformed steel reinforcing bar completely encapsulated in Grade 49108, ASTM D4104 polypropylene copolymer compound Type II.
 - (1) MA Industries, Inc.: Type PS-2-B or Type PS 4.
 - (2) Or equal.
 - c. Field installation of manhole steps shall not be permitted.
 - d. Steps shall be aligned vertically and spaced so as to be on equal centers in the assembled manhole, a maximum distance apart 16 inches. Steps shall be located the minimum distance from the ends of riser and top sections as shown on the Detail Drawing. Each step shall be embedded in the riser section at least three and one-half (3 1/2) inches but not more than four (4) inches.

11. Manhole Castings:
 - a. Castings for manhole frames and covers shall be heavy duty cast iron.
 - b. Ferrous Castings shall be of uniform quality, free of blow holes, shrinkage distortion, or other defects.
 - c. Metal shall conform to ASTM A-48 Class 30 for gray iron. Designed for AASHTO highway loading class HS-25.
 - d. All castings shall be manufactured true to pattern; component parts shall fit together in a satisfactory manner. Frames and covers shall have continuously machined bearing surfaces to prevent rocking.
 - e. As-cast dimensions may vary one half the maximum shrinkage characteristic of the metal or $\pm 1/16$ inch.
 - f. Manhole Casting Schedule.
 - (1) Standard frame and cover.
 - (a) Total weight, 255 pounds minimum.

- (b) Provide two stainless steel recessed lifting eyes. Lifting eyes extending through the cover will not be permitted.
 - (c) The word "SANITARY SEWER" shall be cast appropriately in the center of the cover. Lettering shall be a minimum of 2-inches high.
 - (d) Two concealed pick holes shall be provided.
 - (e) Provide machined dovetail groove centered in lip seat of cover for 1/4-inch diameter continuous loop polyisoprene or neoprene rubber gasket (40 durometer).
 - (f) Drill four 7/8-inch diameter holes in frame flange equally spaced.
- (2) Watertight frame and cover.
- (a) Total weight 600 pounds minimum.
 - (b) The word "SANITARY SEWER" shall be cast appropriately in the center of the cover; lettering shall be a minimum of 2-inch high.
 - (c) Two concealed pick holes shall be provided.
 - (d) The inner lid shall be provided with a machined dovetail groove for a self-sealing 1/4-inch diameter continuous loop polyisoprene gasket (40 durometer).
 - (e) Drill four 7/8-inch diameter holes in frame flange.
 - (f) Cover shall have bolt holes for 1/2" stainless steel bolts and lock washers.
- g. Manhole frames and covers shall be as shown on the Detail Drawings.
- h. Low profile frames and covers of the same model to be used as directed by Engineer.
- i. Manufacturer.
- (1) East Jordan Iron Works, Inc., Middletown, DE (no substitutes allowed):
 - (a) Frame Model Number: 1835Z1.
 - (b) Cover Model Number: 1835A1GS.
 - (2) Watertight model number: 1310 APT & 1310 ZPT.

12. Grade Rings:

a. General:

(1) Grade adjustment for a manhole shall not exceed six (6) inches.

b. Precast Concrete Grade Rings:

(1) Precast concrete grade rings for leveling units shall be manufactured in compliance with the requirements of the Specifications for Precast Reinforced Concrete Manhole Sections, ASTM Designation C478; and shall be as thick as necessary to provide the required grade adjustment, but not less than 1 ½ inches in thickness. Split grade rings are unacceptable. Broken or cracked concrete grade rings will not be acceptable.

c. Poured in Place Concrete Risers:

(1) Poured in place concrete risers to be constructed as per detail. Concrete to have minimum compressive strength of 3,500 psi at 28 days.

d. Rubber Grade Rings (For use in ROW only):

(1) Rubber grade rings (rubber adjustment riser) for leveling units shall comply with the following:

PHYSICAL PROPERTIES	TEST RESULTS	TEST METHOD
Density	±1.098 g/cm ³	ASTM C 642 - 90
Durometer Hardness		Based on ASTM D 2240
- Molded surface	75A±10 points	
- Interior surface	73A±10 points	
Tensile Strength	1.6 MPa (232 psi) (not less than 1 MPa)	ASTM D 412 – 87
Compression	under 1 MPa	Based on ASTM D 575
Deformation	(145 psi)	
- Initial deformation	6±4%	
- Final deformation	6±4%	
Compression Set	0.4% (no more than 4%) under 1 MPa (145 psi)	Based on ASTM D 395
Freeze and Thaw when exposed to Deicing Chemicals	No loss after 50 cycles	ASTM C 672 - 91

Coefficient of Thermal Expansion	1.08 x 10 ⁻⁴ mm/mm/ °C (6 x 10 ⁻⁵ in/in/°F)	ASTM C 531 – 85
Weathering (70 hours at 70° C)		ASTM D 573 – 88
- Hardness retained	100%±5%	
- Compressive strength retained	100%±5%	
- Tensile strength retained	100%±5%	
- Elongation retained	100%±5%	

- (2) Rubber grade rings shall only be used in paved areas.
- (3) Tapered rubber grade rings shall be used to accommodate sloped paved surfaces.

13. Cement Grout:

- a. Cement grout shall be non-shrink non-metallic.
- b. Use Type I cement where grout is not in contact with sewage.
- c. Use Type II (Sulfate Resistant) where grout is in contact with sewage.

14. Waterproofing Mortar:

- a. Material composition meeting the requirements of ASTM C270, Type M with waterproofing admixture included.
- b. Apply in accordance with manufacturer's instructions.
- c. Acceptable Manufacturers.
 - (1) Medusa Waterproofing Paste or Powder; Medusa Cement Company
 - (2) Hydralite, Grace Construction Material.
 - (3) Hydrolox, Chem Master Corporation.

15. Epoxy Bonding Compound: (For bonding new concrete to existing concrete)

- a. Provide a high-modulus, low viscosity, moisture insensitive epoxy adhesive having the following characteristics:
 - (1) Mix Ratio: 100 percent solids, two components; mixed one part by volume component B to two parts by volume component A.

- (2) Ultimate Compressive Strength: 13,000 psi after cure at 73°F and 50 percent relative humidity determined in accordance with ASTM D695.
- (3) Acceptable Manufacturers:
 - (a) Sikadur Hi-Mod; Sika Corporation.
 - (b) Epoxite Binder; A. C. Horn, Inc.
 - (c) 452 Epoxy System; Euclid Chemical Company.

16. Manhole Lining System (force main discharges):

a. General Design/Installation Characteristics:

- (1) A minimum of three (3) manholes downstream of any force main or grinder pump discharge shall be lined.
- (2) Lining of the manhole shall result in a monolithic structure conforming to the shape and contour of the existing manhole.
- (3) The liner shall be designed with independent structural hoop strength for full height hydrostatic pressure as if the liner were a secondary vessel inside the existing manhole. The manufacturer shall design adequate liner thickness into the system with or without additional fiberglass layers.
- (4) The liner shall be completely watertight, free of any joints or openings other than influent and effluent pipes and cover frame opening.
- (5) The liner shall protect the existing manhole surfaces from hydrogen sulfide corrosion.

b. Structural Properties:

- (1) The liner shall have as a minimum the structural properties listed below:

Compressive Strength	ASTM D-695	8,699psi
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c. Liner Materials:

- (1) The liner shall consist of multiple layers of non-woven and woven materials capable of carrying resin and withstanding installation pressures and curing temperatures. The liner shall be compatible with the resin system used. The liner shall be able to stretch to fit irregularities in the existing manhole. The liner shall be fabricated to a size that, when installed, will tightly fit the internal shape and contour of the existing manhole.

- d. Resin:
 - (1) Resin that is compatible with the liner materials and installation process shall be used.
 - (2) The resin shall have proven resistance to municipal wastewater, sulfuric acid corrosion, and hydrogen sulfide gas.
- e. Acceptable Manufacturers:
 - (1) Poly-Triplex® Technologies, Inc., Panama City Beach, FL.
 - (2) Terre Hill Composites, Terre Hill, PA.
 - (3) Sprayroq Protective Lining System.
 - (4) OWNER/ENGINEER approved equal.

(Note: To be considered an approved equal, liner products must be demonstrated to the OWNER/ENGINEER to meet the design/installation specifications and acceptance vacuum testing criteria described in this Section.)

2.2 MANHOLE INSERTS

A. Material and Design (*To be used only when specified by owner*):

1. The insert shall be manufactured from corrosion proof material suitable for atmospheres and conditions commonly found in wastewater collection systems. The insert shall be made from High Density Polyethylene Copolymer material that meets ASTM Specification Designation D-1248 Class A, Category 5, Type 111. This material shall have superior stress crack resistance, combined with a high impact strength and rigidity. The insert shall have a minimum impact brittleness temperature of 105° F in accordance with ASTM D746-70. Softening temperature shall be 254° F, meeting all requirements of ASTM D 1525-70. The insert will have a tensile strength of 3700 psi, and an elongation factor 800%, meeting all requirements of ASTM D 638-71A. The thickness of the insert shall be a uniform 1/8". The insert shall be manufactured to a dimension of approximately 24" diameter to be field verified by the Contractor prior to ordering.
2. The insert shall have a corrosion resistant nylon strap installed for easy removal and reinstallation into the manhole frame.
3. The insert shall be manufactured specifically for use in collection system manholes, and shall be supplied by Parson Environmental Products, Reading, Pennsylvania, 1-800-356-9023 or approval equal.

2.3 INSIDE DROP CONNECTIONS

- A. Inside drops are the only drop style connections permitted. NO OUTSIDE DROPS PERMITTED. In new construction, inside drop manholes are to be a minimum of five (5) feet in diameter.
- B. Pipe penetrations through the manhole shall be sealed with a rubber boot.
- C. A drop bowl with stainless steel hardware shall be installed for the drop and piped from the bowl to the channel with a ninety (90) degree bend at the bottom directing flow into the channel. All drops must be directed into the manhole channel ,or a new channel must be formed. Flow from drop connections is not permitted to splash or diffuse over the bench in the manhole.

PART 3 - EXECUTION

3.1 MANHOLE CONSTRUCTION

- A. General:
 - 1. Manholes shall consist of precast reinforced concrete round riser sections and eccentric or flat slab top sections on concrete bases, complete with cast iron frames and covers and aluminum steps.
 - 2. Contractor shall provide precast reinforced concrete bases for manholes. Manholes with drop connections shall be provided with poured-in-place concrete bases or approved alternate.
 - 3. Manholes shall conform to the design and dimensions shown on the Detail Drawings and to the requirements specified herein.
 - 4. Manhole tops installed within streets and ground surfaces of residential areas shall be set to match existing grade and slope.
 - 5. Where the Drawings show manhole tops to be above existing ground in undeveloped areas and in open country, manhole shall be set at the top elevations called for on the plans, unless otherwise directed by Engineer.
 - 6. Manholes installed in undeveloped areas shall be marked with a reflector provided by developer/contractor.
- B. Manhole Bases (precast concrete and monolithically poured concrete):
 - 1. All manhole bases shall be installed on a 6-inch layer of coarse aggregate as indicated on the Detail Drawings.
- C. Concrete Channels:
 - 1. Channel configurations shall be as indicated on the Detail Drawings.
 - 2. In manholes with more than one influent line the channels shall be properly formed as to direct the flow into the main channel and downstream.

3. All channels shall be molded in the concrete base and shall be of proper size, cross section, and to required grade; all bends in channels shall be built with the maximum possible radius. Channels shall be finished smooth in a neat and workmanlike manner with steel trowels.

D. Precast Concrete Riser and Top Sections:

1. All precast reinforced concrete risers and top sections necessary to build a completed manhole shall be furnished, and the different sections shall fit together readily to permit effective jointing. Jointing shall be in accordance with the Detail Drawings.
2. Rubber gasket joints between adjacent sections shall be carefully made in accordance with the written instructions of the manufacturer of the precast concrete manhole sections. After the joints have been made, the annular spaces which remain on the inside and outside of the joints shall be completely filled with non-shrink grout.
3. Preformed plastic sealing compound joints between adjacent sections shall be carefully made in accordance with the written instructions of the manufacturer. After the joints have been made, the preformed plastic sealing compound shall be cut or troweled smooth across the joint on the inside of the manhole wall. Where required on the Detail Drawings, joints shall also be sealed with non-shrink grout.
4. Lifting holes shall be sealed with properly designed tapered rubber plugs. The plugs shall be driven into the lifting holes to make the holes completely water and air tight. Sealing of lifting holes with non-shrink grout will also be permitted.
5. Adjoining riser and conical top sections shall be fitted together to assure true vertical alignment of manhole steps.

E. Manhole Steps:

1. The manhole steps shall be as shown on the Detail Drawings and shall be set in a straight line on the side of the manhole and spaced as set forth on the Detail Drawings.

F. Manhole Frames and Covers:

1. Where required, final adjustment of frame to elevation shall be made using precast concrete grade rings or rubber adjustment riser. Grade elevation adjustments shall not be permitted to exceed six (6) inches.
2. Joints between precast concrete grade rings for leveling units shall be made with preformed plastic sealing compound, and shall be 1/2 inch thick and troweled or trimmed smooth on the inside of the manhole. In addition, the leveling units shall be sealed on the outside surface using non-shrink grout.
3. Joints between rubber grade rings for leveling units shall be made with Sikaflex compound.
4. The joint between the bottom of the frame and the top of grade ring leveling units, or the top manhole section as applicable, shall be made with preformed plastic sealing compound and shall be sealed on the outside surface using non-shrink grout.

5. Frames for all manholes shall be bolted to the manhole as shown on the Detail Drawings. Studs, nuts, and washers shall be of stainless steel. Bolts shall have a sufficient number of proper sized threads for proper connection.
6. Bolt frames to top manhole section in rights-of-ways only. DO NOT bolt frames in roadway areas.
7. Secure covers to frame as shown on the Detail Drawings.
8. Manhole frames and covers placed in paved areas shall be set a minimum of ¼” and maximum of ½” below finished blacktop grade as measured from the highest point on the manhole frame and/or cover.

END OF SECTION 02605

SECTION 02700 - PIPED UTILITIES-SANITARY SEWERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provision of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 WORK INCLUDED

- A. Installation of Sanitary Sewers, Manholes, Specials, etc.

1.3 QUALITY ASSURANCE

- A. Piping and specials specified herein shall be essentially the standard products of manufacturers who have been regularly engaged in the successful production of high quality materials of this type for at least ten years, have supplied such materials for at least five years of the ten year period, and have at least five installations in successful operation for at least five years.

- B. Repair or replace defective piping or specials.

- C. Sewer Line Acceptance Tests.

1. General:

- a. All sewers and plugged laterals shall be air tested. Sewer lines will be tested for leakage between manholes as the work progresses. The allowable leakage rates shall apply to each reach of sewer line, manhole-to-manhole, manholes included.
- b. PVC sewers installed shall be tested for deflection.
- c. All sewers, including manholes, shall be inspected prior to air testing, and all visible or detectable leaks shall be repaired before testing begins. The line acceptance tests shall be made after backfilling has been completed.
- d. The Contractor shall repair all visible or detectable leaks or defects of any nature.
- e. Any damage caused to properties due to sewage handling and/or sewage backup while air testing shall be the responsibility of the DEVELOPER/CONTRACTOR.

2. Testing equipment (Provided by Contractor):

a. Air Testing:

- (1) Air testing shall be performed utilizing testing equipment consisting of an air-compressor and storage tank of adequate capacity; an air control panel equipped with all necessary piping, valves and

pressure gauges to control the rate at which the air flows to the test section and to monitor the air pressure inside the test section; and all required plugs. In order to prevent overloading the test section with the full pressure of the compressor, the test equipment must be provided with an approved pressure relief device set to blow out at 10 psi. An extra pressure gauge of known accuracy shall also be provided so that the gauges of the test equipment can be frequently checked. All gauges shall be oil filled and shall read to the half (1/2) P.S.I. increment.

b. Deflection Testing:

- (1) Deflection testing shall be performed using a rigid "Go-No-Go" device. A hydro-cleaner or blower/parachute device, complete with string lines, shall be provided for attaching pull lines.
- (2) All sewer lines shall be tested. Testing shall be performed after the line as been backfilled for a minimum of thirty (30) days.

3. Cleaning:

- a. No debris, silt, or other material shall enter existing sewers. It shall be the responsibility of Contractor to have the pipe clean at the time of air testing and deflection testing. If required, the pipe shall be cleaned by hydro-flushing with water or by passing through the pipe a full gauge squeegee.
- b. All cleaning must be done in a manor to prevent debris from passing down stream of the construction area.
- c. The Authority requires all sewers be televised after they have been cleaned.

4. Air Testing Procedure:

- a. All wyes, tees, or end of side sewer stubs placed for future connections shall be plugged with flexible-joint caps, or acceptable alternate, securely fastened to withstand the internal test pressure. Plugs or caps shall be readily removable.
- b. Testing of any sewer may not be conducted until backfill and compaction are completed. Each pipe section shall be tested with low pressure air at 4.0 psi greater than the average back pressure of any groundwater that may submerge the pipe. At least two minutes shall be allowed for temperature stabilization, adding only the amount of air required to maintain pressure.
- c. The pipe shall hold the required test pressure for the duration prescribed in the air test table (Table 1) attached to this section.
- d. Repair and retest sections of sewer not meeting test requirements.

5. Deflection Testing Procedure:
 - a. Use Go-No-Go device in accordance with pipe manufacturer's requirements.
 - b. Unless specified otherwise by Engineer, long term pipe deflection (reduction in vertical inside diameter) shall not exceed 5 percent.
 - c. Repair and retest sections of sewer not meeting test requirements. (Repair: Removal and replace section that does not meet test requirements.)

- D. Minimum Testing Requirements:
 1. Securely fasten and brace all line plugs in the pipe section being tested so that none of the plugs is suddenly released when the compressed air is applied to the pipe section. Limit the internal pressure in the sewer line to 5 psi greater than the average back pressure of any ground water that may submerge the pipe.
 2. All gauges, air piping manifolds and valves of the air testing equipment shall be located above ground at the top of the trench.
 3. No one shall be allowed in the manhole during testing.
 4. Special care shall be exercised during removal of plugs; and the pressure in the piping of the test section shall be completely relieved before any plug shall be removed.

- E. Pressure Testing of Force Main:
 1. All completed pipe shall be tested for leakage between valves, bulkheads to encompass the entire length of the force main.
 2. Piping shall hold the test pressure for 2 hours without pumping. Repair any visible leaks.
 3. Hydrostatic pressure tests shall not be made until at least seven (7) days after concrete thrust blocks are installed. The Contractor, at his option and expense, may use high early strength concrete for thrust blocks in which case hydrostatic pressure tests shall not be made until at least three (3) days have elapsed.
 4. The section of force main being tested shall be filled with water a minimum of 24 hours before the main is tested. The Contractor shall insure that air is expelled from the pipeline in accordance with AWWA C-600, Section 4.1.3. Any taps necessary to release air or water from the main during testing shall be made at the Contractor's expense. Taps shall then be plugged after the test has been completed.
 5. After the pipeline has been filled with water for 24 hours, the Contractor shall conduct a hydrostatic or pressure test. Each section of force main shall be tested at 1 1/2 times the maximum pump shut off head for two (2) hours. The Contractor shall not employ a test pressure, which exceeds the allowable pressure of any installed pipe, valve, or appurtenance.

F. Leakage Tests:

1. The leakage test shall be in accordance with AWWA C-600, Section 4.1, except that the Contractor shall provide an approved means for measuring the leakage. The leakage test may be conducted at the same time as the pressure test, provided leakage is suitably measured during the pressure test and a two (2) hour record is kept of water added to the pipeline.
2. All testing must be witnessed by Authority's representative. Documentation of all testing must be submitted to Authority and Engineer.

1.4 SUBMITTALS

- A. Submit shop drawings or catalogue cuts, as appropriate, for materials listed under Article 2.1 of this Section. Submit only those materials that are actually to be used in the work. These will usually be as follows:
 1. Pipe and Fittings.
 2. Stone Certifications.
 3. Gaskets, Adapters, Cleanout Covers and Accessories and Other Appurtenances.
 4. Detection Tape.
- B. Submit manufacturer's Certification of Compliance in accordance with Section 01300 - Submittals.
- C. Make submittals prior to start of construction. Make submittals to ENGINEER.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store and handle the piping, manholes, manhole frames and covers and appurtenances in accordance with the manufacturer's recommendations, and in such manner as to protect the materials from damage.
- B. Pipe and related materials shall be loaded and unloaded by lifting with hoists or skidding so as to avoid shock or damage. Under no circumstances shall such material be dropped or skidded against pipe already on the ground.
- C. Pipe and related materials shall at all times be handled with care to avoid damage. The interior shall be kept free from dirt and foreign matter. All pipe, manholes, manhole frames and covers and appurtenances shall be carefully lowered or raised into place with suitable equipment in a manner that will prevent damage to the material. Under no circumstances shall pipe or accessories be dropped or dumped.
- D. Manholes, and all related materials, shall be thoroughly inspected for defects prior to their being installed. Any defective, damaged, or unsound material, shall be repaired or replaced as directed.

- E. All lumps, blisters, and excess coating shall be removed from the ends of each pipe. The joints shall be wire brushed and wiped clean, dry and free from oil and grease before the pipe is installed.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Ductile Iron Pipe (Gravity Sewer and Force Mains):
 - 1. Pipe:
 - a. Ductile iron pipe shall be centrifugally cast, annealed ductile iron manufactured in accordance with ANSI A21.51.
 - b. Pipe joints shall be push-on or mechanical joint and shall conform to ANSI specification A21.11. Furnish joints with all required accessories. Number of joints to be restrained shall be determined by the pipe manufacturer for the conditions encountered (minimum of four (4) joints on each side of the fitting and/or bend shall be restrained). Restrained joint pipe shall be as manufactured by U. S. Pipe, Clow, Griffin, American or approved equal. The use of mechanical joint pipe with retainer glands may also be used.
 - c. Gaskets for restrained joints shall be Field Lok 350 gaskets as manufactured by U. S. Pipe or approved equal.
 - d. Ductile Iron pipe used in force mains shall be coated with Protecto 401 epoxy lining system.
 - 2. Fittings:
 - a. Furnish fittings in accordance with ANSI 21.10 250 psi rating or ANSI 21.53, 350 psi rating.
 - b. Joints shall be mechanical joint in accordance with ANSI A21.11. Furnish joints with required accessories.
 - c. Fittings used on ductile iron piping in force mains shall be coated with Protecto 401 epoxy lining system.
 - 3. Cement and Mortar Lining:
 - a. Cement and Mortar line all pipe and fittings in accordance with ANSI A21.4.
 - b. Paint seal coat in accordance with ANSI A21.4.
 - 4. Tar Coat exterior of ductile iron pipe and fittings.
 - 5. Furnish gaskets in accordance with ANSI A21.11.
 - 6. All pipe shall be Class 52 unless otherwise specified

B. PVC Pipe (Gravity Sewers Only):

1. 4" - 15" Diameter. (Only smooth wall exterior pipe allowed in these diameters):

- a. Unplasticized polyvinyl chloride (PVC) gravity sewer pipe and fittings with integral wall bell and spigot joints meeting ASTM D-3034 specification for Type PSM Poly Vinyl Chloride (PVC) Sewer Pipe and Fittings, Standard Dimension Ratio (SDR) 35, or ASTM F789.
- b. The pipe shall be joined with an integral bell, bell-and-spigot type rubber gasketed joint. Rubber gasket shall conform to ASTM F 477. The rubber gasket shall be compressed radially on the pipe spigot to form a watertight seal in accordance with ASTM D 3212.
- c. Fittings shall be made of PVC having a cell classification of 12454B or 12454C or as defined in ASTM D 1784. Fabricated fittings with solvent cemented components shall be made in accordance with ASTM D 2855 and taking cognizance of ASTM F 402.
- d. Pipe stiffness at 5% deflection shall be 46 PSI for all pipe diameters when tested in accordance with ASTM D 2412.
- e. Air testing and deflection testing to be performed in accordance with the requirements of this section.

2. 18" - 36" Diameter:

- a. Unplasticized polyvinyl chloride (PVC) gravity sewer pipe and fittings with integral wall bell and spigot joints meeting ASTM F 679 specification for "Poly Vinyl Chloride (PVC) Large Diameter Plastic Gravity Sewer Pipe and Fittings", or ASTM 794 specification for Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter.
- b. The pipe shall be joined with an integral bell, bell-and-spigot type rubber gasketed joint. Rubber gasket shall conform to ASTM F477. The rubber gasket shall be compressed radially on the pipe spigot to form a watertight seal in accordance with ASTM D 3212.
- c. Fittings shall be made of PVC having a cell classification of 12454B or 12454C (only) as defined in ASTM D 1784. Fabricated fittings with solvent cemented components shall be made in accordance with ASTM D 2855 and taking cognizance of ASTM F402.
- d. Pipe stiffness at 5% deflection shall be 46 PSI for all pipe diameters when tested in accordance with ASTM D 2412.
- e. Air testing and deflection testing to be performed in accordance with the requirements of this section.

3. Greater Than 36" Diameter:
 - a. Shall be manufactured in accordance with ASTM 1803 for Closed Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter.
 - b. PVC cell classification of 12364A as per ASTM D 1784
 - c. The pipe shall be joined with an integral bell, bell-and-spigot type rubber gasketed. Gaskets shall be factory installed and chemically bonded to the bell end of the pipe.

- C. Fusible PVC: Force Main (HDD):
 1. Fusible polyvinylchloride pipe shall meet the requirements of AWWA C900 Standard for Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4" through 12", ASTM D1784 Rigid Poly (Vinyl Chloride)(PVC) Compounds and Chlorinated Poly (Vinyl Chloride)(CPVC) Compounds, ASTM D2152 Test Method for Degree of Fusion of Extruded Poly (Vinyl Chloride)(PVC) Pipe and Molded Fittings by Acetone Immersion, ASTM D2241 Poly (Vinyl Chloride)(PVC) Plastic Pipe (SDR-PR).
 2. Pipe for force main piping shall be DR 9. Manufacturers shall verify the suitability of pipe for the intended applications.
 3. Fitting for connection to Ductile Iron Pipe will be a flanged fitting.
 4. All pipe sizes are to be minimum inside diameters for Fusible PVC pipe. All pipe inside diameters shall be a nominal 8-inch diameter. Pipe outside diameter shall DIPS sizing. Pipe shall be green in color or have green color stripes.
 5. Materials used for the manufacturer of the polyvinylchloride pipe shall conform to cell classification 12454 per ASTM D1784.

- E. Pipe Couplings and Adapters:
 1. All couplings and adapters shall be restrained solid sleeve.
 2. Constructed of materials which will pass the strength and chemical requirements of ASTM C954.
 3. Approved manufacturers:
 - a. Mission, Corona, CA.
 - b. Calder, Gardner, CA.
 - c. Dresser, Bradford, PA.

- F. Flexible Pipe Coupling with Anti-Shear Stainless Steel Collar:

1. Provide flexible pipe couplings with anti-shear stainless steel collar designed for differing pipe material connection: and for transition/reducing conditions of differing pipe material connections.
2. Coupling will be PVC material which meets the performance requirements of Commercial Standard Specification CS 226-59. Couplings designed for pipe outside diameter coupling shall incorporate recesses to contain the stainless steel bands. Couplings provided with pre-assembled type 305 stainless steel bands.
3. Use flexible pipe couplings only where directed by the Engineer.
4. Approved manufacturers:
 - a. FERNCO Inc., Distributed by the General Engineering Company.

G. Wye Connections:

1. PVC material to be ASTM D 3034, SDR-35.
2. All wyes shall bear the manufacturer's identifying mark and size.

H. 2 Way-Cleanout:

1. PVC material to be ASTM D 3034, SDR-35.
2. On new lateral construction, 2 way-cleanouts, intermittent cleanouts shall be installed as indicated on the Detail Drawings. Cleanouts shall be installed at all changes in vertical and horizontal directions greater than 45 degrees. Where changes in direction are less than 45 degrees, cleanouts shall be located every 90 feet. Cleanouts to be installed in accordance with the most recent edition of the International Plumbing Code requirements. 2 Way-Cleanouts will be as manufactured by:
 - a. Plastic Trends, MI.
 - b. GPK Products, ND.
3. All cleanout piping (vertical stack piping) shall be a minimum of six (6) inches in diameter. Cleanouts shall have a threaded cap. Glued caps or plugs are not acceptable.
4. All cleanouts will have a protective cover. Cover will be capable of carrying vehicular traffic loads. Acceptable manufacturers:
 - a. General Engineering Company, Frederick, MD.
 - b. East Jordan Iron Works, Delaware, MD
5. Connection between ductile iron pipe and SDR-35 PVC will be made with a MJ x SDR-35 Transition Gasket as manufactured by Romac Industries, Inc. No substitutions permitted.

I. Detection Tape, Tracer Wire and Detection Cable:

1. Detectable marking tape shall be 5 mil overall thickness, aluminum center core with permanent printing under a mylar layer. Minimum width will be 6-inches. Tape shall be color coded and stamped according to its application.
2. Non-Detectable marking tape shall be 4 mil overall thickness, with permanent printing under a mylar layer. Minimum width will be 4-inches. Tape shall be color coded and stamped according to its application.
3. Manufacturer will be Omega Marking Company
4. Tracer wire will be SoloShot Extreme as manufactured by Copperhead Industries. Wire will have a 50 mil jacket and a 4700 lb break load and 7x7 stranded copper clad steel. Wire will be GREEN in color. To be used for HDD pipe installation.
5. Detection cable shall 12 gage multi-strand stainless steel cable. Detection cable is be required for PVC force mains. Valve boxes will be placed every 450 feet. To be use for PVC force main installation.

PART 3 - EXECUTION

3.1 LAYING PIPE

A. General:

1. All new gravity sewers are to have a minimum depth of 8 feet, from top of pipe, unless approval is granted by the Authority. All new force mains are to have a minimum depth of 5 feet, from top of pipe, unless approval is granted by the Authority. Maximum depth for sewers is to be twenty (20) feet unless prior approval is obtained from the Authority.
2. Following trench excavation, pipe laying shall proceed upgrade with pipe laid carefully, hubs upgrade, spigot ends fully centered into adjacent hubs, and true to lines and grades given.
3. Each section of pipe shall rest upon 6" of approved stone pipe bedding for the full length of its barrel, with recesses excavated to accommodate bells and joints. Each pipe shall be firmly held in position so that the invert forms a continuous grade with the invert of the pipe previously placed.
 - a. Utilize portable laser to establish grades of sewers, laser shall be used in accordance with manufacturer's written instructions.
 - (1) Grade shown on Drawings is that of Sewer invert. Tolerance \pm 1/4-inch.
4. Under no conditions shall pipe be laid in water, on subgrade containing frost, and/or when trench conditions are unsuitable for such work. In all cases, water shall be kept out of the trench until concrete cradles, supports, encasement, or saddles, where used, and materials in the joints have hardened.

5. Any pipe that has its grade or joint disturbed after laying shall be taken up and relaid. Any section of pipe already laid and found to be defective shall be taken up and replaced with new pipe.
6. Walking or working on top of the completed pipeline, except as may be necessary in backfilling or tamping, shall not be permitted until the trench has been backfilled to a height of at least 2 feet over the top of the pipeline.
7. Maintain pipelines free and clear of debris during the progress of the work.
8. At times when pipelaying is not in progress, the open ends of the pipe shall be closed by watertight plug.
9. Diversion of Sewage during Construction.
 - a. Sewage flowing in existing sewer shall be temporarily plugged or diverted around or through the construction by means of by-pass pumping, fluming, or any other means acceptable to Engineer.
 - (1) If by-pass pumping is required, provide stand-by pump equivalent to the largest by-pass pump in service.
 - b. At completion of each work day tie sewage back into existing sewer. Tie-in shall be covered so there is no visible sewage.
 - c. Prior to beginning work, Contractor shall have on hand all required materials necessary to accomplish the work.
 - d. Contractor shall be responsible for any property damage caused by sewage handling.
10. Contractor shall maintain a log of service connection locations and lateral pipe lengths, sizes, AND DEPTHS. The locations shall be based upon sewer line stationing and shall indicate if the lateral is in service or plugged.

B. PVC Pipe:

1. Inspect pipe and fittings for defects or damage prior to lowering into the trench.
2. Install PVC pipe and fittings in accordance with manufacturer's written instructions.
3. Do not kick or throw PVC pipe and fittings into the trench.
4. Use of hydrohammer for compaction will not be permitted within four (4) feet of the top of the pipe.

3.2 TWO WAY CLEANOUTS

A. Service Laterals and Building Sewers:

1. All service laterals and building sewers shall have cleanouts located not more than 90 feet apart.
- B. Change in Direction:
1. Cleanouts shall be installed in accordance with the most recent edition of the International Plumbing Code. requirements. Access shall be provided to all cleanouts. MAXIMUM SPACING BETWEEN CLEANOUTS WILL BE 90 FEET.
- C. Traffic Boxes:
1. Traffic boxes shall be installed on all cleanout stacks located in grass areas or paved areas.

3.3 CONCRETE FOUNDATIONS

- A. Where required by ENGINEER, or where shown on the Drawings, pipe shall be placed on a formed concrete cradle, or unformed concrete shall be placed around pipes for bedding and encasement.
- B. Concrete cradles shall consist of structures requiring forms and be composed of concrete, built-in trenches to support pipes, and to the dimensions shown on the Detail Drawings.
- C. Concrete bedding and encasement shall be composed of concrete placed in trenches, without forms as pipe bedding, or encased around pipes, to the dimensions and in the locations indicated on the Detail Drawings.

3.4 AUTHORITY

- A. The Authority reserves the right to retest at the Developer's expense, any piping throughout the duration of the Construction Period.
- B. Make repairs to piping found defective by such Authority conducted tests.
- C. The Authority or Authority's Representative will make a final inspection of the installed sewer system upon completion of the street construction, including paving. This inspection will be made to verify final grade of manhole frames and covers and that the interior of the manholes are clean and free from leaks. *The Contractor will clean and televise the sanitary sewers and provide video documentation to the Authority.*
- D. The warranty period will begin with all conditions being satisfactory to the Authority in its final inspection and Dedication.
- E. Before eighteen (18) months has passed since the Authority's final inspection and approval of developer-installed sewer extension, a re-inspection will be performed to verify that the manholes and sewer mains continue to be free of leaks and defects. Defects found shall be repaired as if under the terms of the original contract.

END OF SECTION 02700

TABLE 1													
AIR TEST TABLE													
SPECIFICATION TIME REQUIRED													
FOR SIZE AND LENGTH OF PIPE INDICATED													
Pipe Diameter (in.)	Minimum Time (min:sec)	Length for Minimum Time (ft.)	Time for Longer Length (sec x Length, ft.)										
				100 ft.	150 ft.	200 ft.	250 ft.	300 ft.	350 ft.	400 ft.	450 ft.		
4	1:53	597	0.19 x Length	1:53	1:53	1:53	1:53	1:53	1:53	1:53	1:53	1:53	1:53
6	2:50	398	0.427 x Length	2:50	2:50	2:50	2:50	2:50	2:50	2:50	2:51	3:12	
8	3:47	298	0.76 x Length	3:47	3:47	3:47	3:47	3:48	4:26	5:04	5:42		
10	4:43	239	1.187 x Length	4:43	4:43	4:43	4:57	5:56	6:55	7:54	8:54		
12	5:40	199	1.709 x Length	5:40	5:40	5:42	7:08	8:33	9:58	11:24	12:50		
15	7:05	159	2.671 x Length	7:05	7:05	8:54	11:08	13:21	15:35	17:48	20:02		
18	8:30	133	3.846 x Length	8:30	9:37	12:49	16:01	19:14	22:26	25:38	28:51		
21	9:55	114	5.235 x Length	9:55	13:05	17:27	21:49	26:11	30:32	34:54	39:16		
24	11:20	99	6.837 x Length	11:24	17:57	22:48	28:30	34:11	39:53	45:35	51:17		
27	12:45	88	8.653 x Length	14:25	21:38	28:51	36:04	43:16	50:30	57:42	46:54		

SECTION 02720 – SERVICE LATERAL AND BUILDING SEWER INSTALLATION

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Installation of sanitary sewer service laterals and building sewers.

1.2 DEFINITIONS

- A. Service Lateral – That part of the sewer pipe extending from the sewer main to a point near the end of right-of-way. **SMTMA requires this pipe to be a minimum of six (6) inches in diameter.**
- B. Building Sewer – That part of the sewer pipe that extends from the end of the building to the upstream end of the service lateral. **SMTMA requires this pipe to be at least four (4) inches in diameter.**
- C. Service Connection - The point between the service lateral and the building sewer pipes. This connection is typically at the right-of-way line.
- D. All pipe material will be SDR 35 PVC.
- E. If lateral piping has less than three (3) feet of cover, Ductile Iron pipe must be used.

1.3 QUALITY ASSURANCE

- A. Piping and specials specified herein shall be essentially the standard products of manufacturers who have been regularly engaged in the successful production of high quality materials of this type for at least 10 years, have supplied such materials for at least 5 years of the 10-year period, and have at least 5 installations in successful operation for at least 5 years.
- B. Repair or replace defective piping or specials.
- C. Pipe Acceptance Tests:
 - 1. General:
 - a. Laterals shall be tested for leakage between test tees after lateral installation has been completed. The allowable leakage rate shall be zero.
 - b. All laterals shall be inspected prior to air testing. All visible or detectable leaks shall be repaired before air testing begins. The line acceptance tests shall be made after backfilling has been completed.
 - c. The Contractor shall repair all visible and detectable leaks or defects of any nature.

2. Testing Equipment. (Supplied by Contractor):
 - a. Air Testing:
 - (1) Air testing shall be performed utilizing test equipment consisting of an air compressor and storage tank of adequate capacity; an air control panel equipped with all necessary piping, valves and pressure gauges to control the rate at which the air flows to the test section and to monitor air pressure inside the test section; and all required plugs. To prevent overloading the test section with the full pressure of the compressor, the test equipment must be provided with an approved pressure relief device set to blow out at 10psi. An extra pressure gauge of known accuracy shall also be provided to frequently check the test equipment gauges. The air testing equipment and all accessories shall be subject to approval of Authority.
 - b. Hydrostatic testing of low pressure service laterals:
 - (1) Contractor will fill the line from the tie in location at the 6" clean-out or curb stop to the grinder pump connection with water.
 - (2) Using a pump and the necessary fittings, contractor will pump the service to a pressure of 100 psi.
 - (3) Test must hold this pressure for a minimum of 2 hours with no drop.
3. Cleaning. (Performed by Contractor):
 - a. No debris, silt or other material shall enter the lateral. It shall be the responsibility of the Contractor to have the pipe cleaned at the time of air testing. If required, the pipe shall be cleaned by hydro flushing with water or by passing through the pipe a full gauge squeegee in a manner approved by the Authority.
4. Air Testing Procedure:
 - a. All wyes, tees, sweeping tees or end of lateral and/or building sewer placed for future connection shall be plugged with flexible caps, or acceptable alternate, securely fastened to withstand the internal test pressure. Plugs or caps shall be readily removable.
 - b. Testing of any sewer may not be conducted until the entire line has been completed. Each pipe section shall be tested with low pressure air at 4 psi greater than the average back pressure of any groundwater that may submerge the pipe. At least two (2) minutes shall be allowed for temperature stabilization, adding only the amount of air required to maintain pressure. Test shall be allowed to run for five (5) minutes, excluding the two (2) minutes stabilization, if any air had to be added.

- c. Repair and retest sections of lateral not meeting test requirements.
- d. Air testing shall be performed utilizing test equipment consisting of an air compressor and storage tank of adequate capacity; an air control panel equipped with all necessary piping, valves and pressure gauges to control the rate at which the air flows to the test section and to monitor the air pressure inside the test section; and all required plugs. The pressure gauge for measuring internal pipe pressure shall be an oil-filled gauge measuring from zero to 20 psi, in one-pound increments. To prevent overloading the test section with the full pressure of the compressor, the test equipment must be provided with an approved pressure relief device set to blow out at 10 psi. An extra pressure gauge of known accuracy shall also be provided to frequently check the test equipment gauges. The air testing equipment and all accessories shall be subject to approval by Authority.

D. Minimum Testing Requirements:

- 1. Contractor shall take care to securely fasten and brace all line plugs in the pipe section being tested so that none of the plugs are suddenly released when the compressed air is applied to the pipe section.
- 2. Contractor shall be responsible for any damages caused by the internal pressurizing of the sewer line.
- 3. All gauges, air piping manifolds and valves of the air testing equipment shall be located above ground at the top of the trench.
- 4. Special care shall be exercised during removal of plugs. The pressure in the piping of the test section shall be completely relieved before any plug shall be removed.

1.4 SUBMITTALS

A. Submit shop drawings or catalog cuts, as appropriate, for materials listed under Article 2.1 of the Section. Submit only those materials that are actually to be used in the Work. These materials generally include the following:

- 1. Pipe and Fittings.
- 2. Cleanout caps.
- 3. Cast Iron Protection Castings.
- 4. Curb stops and curb boxes (low pressure laterals).
- 5. HDPE piping and fittings for low pressure laterals.
- 6. Gaskets, couplings, adapters and other appurtenances.
- 7. Detectable marking tape or multi-strand detection cable.

B. Make submittals to Authority's Engineer prior to start of construction.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle piping, fittings and appurtenances in accordance with manufacturer's recommendations, and in such manner as to protect the materials from damage.
- B. Pipe and related materials shall be loaded and unloaded by lifting with hoists or skidding so as to avoid shock or damage. Under no circumstances shall such material be dropped or skidded against pipe already on the ground.
- C. Pipe and related materials shall at all times be handled with care to avoid damage. The interior shall be kept free from dirt and foreign matter. All pipe and appurtenances shall be carefully lowered or raised into place with suitable equipment in a manner that will prevent damage to the material. Under no circumstances shall pipe or accessories be dropped or dumped.
- D. All lumps, blisters and excess coating shall be removed from the ends of each pipe. The joints shall wire brushed and wiped clean and dry, and free from oil and grease before the pipe is installed.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. PVC pipe (4, 6 or 8 inch Diameter):
 - 1. Pipe and Fittings:
 - a. Unplasticized polyvinyl chloride (PVC) gravity sewer pipe and fittings with integral wall bell and spigot joints meeting ASTM D3034 specification for Type PSM PVC Sewer Pipe and Fittings, Standard Dimension Ratio (SDR) 35, or ASTM F 789. (For gasket joints only)
 - b. The pipe shall be joined with an integral bell, bell-and-spigot type rubber gasketed joint. Rubber gasket shall conform to ASTM F 477. The rubber gasket shall be compressed radially on the pipe spigot to form a watertight seal in accordance with ASTM D3212.
 - c. Fittings shall be made of PVC having a cell classification of 12454B or 12454C (only) as defined in ASTM D1784.
 - d. Pipe stiffness at 5 percent deflection shall be 46 psi for all pipe diameters when tested in accordance with ASTM D2412.
 - 2. Saddles:
 - a. Approval from the Authority for the use of a saddle must be obtained prior to installation. The use of saddles will be on a case by case basis.
 - b. All holes cut into the mainline shall be cored by using a coring machine.

- c. Gasketed PVC bell inlet connection with stainless steel bands, clamps, bolts and fittings.
 - d. PVC material shall conform to ASTM D3034, SDR 35.
 - e. All tee saddles shall bear the manufacturer's identifying mark and size.
 - f. Approved products and manufacturers.
 - (1) "Sealtite" by General Engineering Company, Frederick, MD.
 - (2) Engineer approved equal.
- B. Schedule 40 PVC with Solvent Weld Joints (Schedule 40 PVC will only be used when directed by the Authority):
- 1. Pipe and Fittings:
 - a. Unplasticized polyvinyl chloride (PVC) gravity sewer pipe and fittings shall conform to ASTM D1785 and ASTM D 2466 respectively. Jointing shall conform to ASTM D2672.
 - b. Pipe joints shall be made in accordance with ASTM D2855. Cement shall be in accordance with ASTM D2564.
 - c. All joints shall have a minimum set time prior to backfilling. Minimum set times are as follows.
 - (1) 30 minutes min. @ 60 to 100 degrees F.
 - (2) 1 hour min. @ 40 to 60 degrees F.
 - (3) 2 hours min. @ 20 to 40 degrees F.
 - (4) 4 hours min @ 0 to 20 degrees F.
 - 2. Schedule 40 pipe shall only be used to repair existing schedule 40 pipe.
- C. Ductile iron pipe: To be used when lateral has less than 3 feet of cover :
- 1. Pipe:
 - a. Ductile iron pipe shall be centrifugally cast, annealed ductile iron manufactured in accordance with ANSI A21.51.
 - b. Pipe joints shall be push-on or mechanical joint with retainer glands and shall conform to ANSI specification A21.11. Furnish joints with all required accessories. Number of joints to be restrained shall be determined by the pipe manufacturer for the conditions encountered (minimum of four (3) joints on each side of the fitting and/or bend shall be restrained). Restrained joint pipe shall be as manufactured by U. S. Pipe, Clow, Griffin, American or approved

equal. The use of mechanical joint pipe with retainer glands may also be used.

- c. Mega lugs shall also be provided at each fitting and/or bend.
- d. Furnish Class 52 pipe.
- e. Gaskets for restrained joints shall be Field Lok 350 gaskets as manufactured by U. S. Pipe or approved equal.

2. Fittings:

- a. Furnish fittings in accordance with ANSI 21.10 250 psi rating.
- b. Joints shall be push-on or mechanical joint with retainer glands in accordance with ANSI A21.11. Furnish joints with required accessories.
- c. If restrained joint pipe is furnished, furnish fittings of the same type and manufacturer as pipe furnished.
- d. Compact fittings may be used.

3. Cement and Mortar Lining:

- a. Cement and Mortar line all pipe and fittings in accordance with ANSI A21.4.
- b. Paint seal coat in accordance with ANSI A21.4.
- c. Tar Coat exterior of ductile iron pipe and fittings:

4. Furnish gaskets in accordance with ANSI A21.11.

D. Rigid Pipe Couplings

- 1. SDR 35 PVC in-line rigid pipe couplings with rubber gaskets
- 2. Fittings manufactured in accordance with ASTM D3034 and D1784.
- 3. Rubber gaskets for fitting shall conform to ASTM F477.
- 4. Approved manufacturers.
 - a. GPK Products, Inc., ND.
 - b. Plastic Trends, Inc, MI.
 - c. Or equal.

E. Flexible Pipe Couplings with Anti-Shear Stainless Steel Collar: Provide flexible pipe couplings with anti-shear stainless steel collar designed for differing pipe material connection; and for transition/reducing conditions of differing pipe material connections. **Flexible rubber**

couplings without an anti-shear stainless steel collar are NOT permitted. Flexible rubber couplings are not permitted for use in re-connecting SDR 35 PVC pipe to SDR 35 PVC pipe.

1. Coupling Construction: Virgin PVC material which meets the performance requirements of Commercial Standard Specification CS 226-59. Couplings designed for pipe outside diameter coupling shall incorporate recesses to contain the stainless steel bands. Couplings provided with pre-assembled type 305 stainless steel bands.
2. Acceptable Manufacturers:
 - a. FERNCO Inc., Distributed by the General Engineering Company.
 - b. Or equal.

F. PE Pipe Low Pressure Force Main:

1. Polyethylene pipe shall be manufactured in accordance with AWWA C901 for sizes ½” through 3”. Pipe will DR 11. Pipe shall be PE 3608 high density polyethylene meeting cell 345464E for stripes per ASTM D 3350. Pipe shall also be listed by the Plastic Pipe Institute (PPI) TR-4. The strip color shall be “GREEN” for all pipe sizes.
2. Polyethylene fittings shall be made from material meeting the same requirements as the pipe. Polyethylene fittings shall be molded or fabricated by the manufacturer of the pipe.
3. Where applicable, fittings shall meet the requirements of AWWA C906.
4. Molded fittings shall be manufactured in accordance with either ASTM D2683 (socket fused) or ASTM D3261 (butt fused) and shall be so marked. Fittings you service lateral connections will by a WYE 2x2x2 – inch in size.
5. Curb Stop and Box (Only on Low Pressure System)

G. Curb Stop and Curb Box:

1. Curb stop will be Ford for PVC inlet and outlet (B77-666). Stop will be provided with stiffeners.
2. Box: Extension type arch pattern base curb box with 1” steel pipe upper section, stainless steel stationary rod, coated inside and out with asphalt base paint. Lid shall be pentagon head plug. (Type PS). Lid will have the letter “S” on it.
3. Curb stop will have an alignment device as manufactured by Vadle, or approved equal.

H. Cleanouts:

1. Construction shall be in accordance with the latest edition of the International Plumbing Code.
2. Cleanouts shall be installed as indicated on the Building Sewer Detail and the appropriate Service Lateral Detail.

3. Cleanouts shall be installed at all changes in vertical and horizontal directions greater than 45 degrees. Where changes in direction are less than 45 degrees cleanouts shall be located every ninety (90) feet.
 4. On new service lateral construction and/or lateral replacement test tees shall be installed as indicated on the Detail Drawings.
 5. All cleanout piping (vertical stack piping) shall be the same pipe size as the service lateral and/or building sewer. (i.e. 6" service lateral = 6" vertical stack piping, 4" building sewer = 4" vertical stack piping)
 6. Cleanouts shall have a threaded cap or plug.
 7. All cleanouts shall have a cast iron cleanout box and cover plate over it.
- I. Detection Tape, Tracer Wire and Detection Cable:
1. Detectable marking tape shall be 5 mil overall thickness, aluminum center core with permanent printing under a mylar layer. Minimum width will be 6-inches. Tape shall be color coded and stamped according to its application.
 2. Non-Detectable marking tape shall be 4 mil overall thickness, with permanent printing under a mylar layer. Minimum width will be 4-inches. Tape shall be color coded and stamped according to its application.
 3. Manufacturer will be Omega Marking Company
 4. Tracer wire will be SoloShot Extreme as manufactured by Copperhead Industries. Wire will have a 50 mil jacket and a 4700 lb break load and 7x7 stranded copper clad steel. Wire will be GREEN in color. To be used for HDD pipe installation.
 5. Detection cable shall 12 gage multi-strand stainless steel cable. Detection cable is be required for PVC force mains. Valve boxes will be placed every 450 feet. To be used for PVC force main installation.

PART 3 - EXECUTION

3.01 LAYING PIPE

- A. **There shall be a 10 foot horizontal separation between water service and service lateral/building sewer.** Sanitary sewer laterals shall be located a minimum of fifteen (15) feet from the property line unless otherwise approved.
- B. Service Laterals shall be installed a minimum of five (5) feet from any street tree or street light.
- C. Where building sewer penetrates foundation wall, a wall sleeve 2 times the diameter of the building sewer shall be used. The gap between the wall sleeve and building sewer shall then be made watertight.
- D. Pipe to pipe connections shall be made in accordance with Pipe Reconnection Detail.

- E. Following trench excavation, pipe laying shall proceed upgrade with pipe laid carefully, hubs upgrade, spigot ends fully centered into adjacent hubs, and true lines to grades given.
- F. Provide test tees as indicated on Detail Drawings.
- G. Each Section of pipe shall rest upon the pipe bed for the full length of its barrel, with recessed excavated to accommodate bells and joints. Each pipe shall be firmly held in position so that the invert forms a continuous grade with the invert of the pipe previously placed.
 - 1. Lateral pipe having an inside diameter of 4 inches shall be laid at a grade not less than $\frac{1}{4}$ inch per foot.
 - 2. Lateral pipe having an inside diameter of 6 inches shall be laid at a grade not less than $\frac{1}{8}$ inch per foot.
- H. Under no conditions shall pipe be laid in water, on subgrade containing frost and/or when trench conditions are unsuitable for such work. In all cases, water shall be kept out of the trench until concrete cradles, supports, encasements or saddles, where used, and materials in the joints, have hardened.
- I. Any pipe that has its grade or joint disturbed after laying shall be taken up and relaid. Any section of pipe already laid and found to be defective shall be taken up and replaced with new pipe.
- J. Walking or working on top of the completed pipeline, except as may be necessary in backfilling or tamping, shall not be permitted until the trench has been backfilled to a height of at least 2 feet over the top of the pipeline.
- K. Maintain pipelines free and clear of debris during the progress of the Work.
- L. At time when pipe laying is not in progress, the open ends of the pipe shall be closed by watertight plug.
- M. Inspect pipe and fittings for defects or damage prior to lowering in the trench.
- N. Install pipe and fittings in accordance with manufacturer's written instructions.
- O. Use of a hydro-hammer for compaction shall not be permitted within a minimum of 4 feet of the top of the pipe.
- P. Install pipe couplings and adapters in accordance with manufacturer's written instructions.
- Q. When placing a stub out of the two way cleanout located at the Right-of-Way line, to be behind future utilities, terminate with a bell end and plug.

3.02 CONNECTION OF NEW SERVICE LATERAL TO EXISTING SEWER MAIN

- A. Connection of the service lateral to the sewer main shall be made by removing a section of the sewer main and replacing it with an SDR 35 PVC wye branch connection or sanitary tee and then reconnecting this to the sewer main with rigid PVC gasketed couplings.

- B. Pipe to pipe connections shall be made in accordance with Pipe Reconnection Detail.
- C. Test tees for air testing the service lateral and/or building sewer shall be installed at the service connection between the building sewer and the service lateral and at the right-of-way line.
- D. All sewer laterals shall pass an air test before Authority acceptance.

3.03 CLEANOUTS

- A. All service laterals and building sewers shall have cleanouts located not more than 90 feet apart. The first one located at the curb line and/or at the edge of the Right-of-way.
- B. Changes in direction:
 - 1. Cleanouts shall be installed in accordance with latest International Plumbing Code. Access shall be provided to all cleanouts.
 - 2. All cleanouts are to have a cast iron protection casting installed regardless of location in paved areas or unpaved areas.

3.04 CLEANING

- A. No debris, silt or other material shall be allowed in the lateral. If required, the pipe shall be cleaned by hydro-flushing with water or by passing through the pipe a full gauge squeegee in a manner approved by the Authority.

3.05 AIR TESTING

- A. All piping is to be air tested in accordance with 1.03 Quality Assurance.

3.06 CONNECTION OF SUMP PUMPS TO THE SANITARY SEWER

- A. Any device, including sump pumps, roof leaders, etc. capable of transmitting ground or surface water into the sanitary sewer system is prohibited.
- B. Any sump pump connected to the sanitary sewer system must be a sealed sump. The sump must have a solid concrete base, or be enclosed in a PVC or Fiberglass enclosure that makes the sump pump incapable of pumping groundwater. Sump pumps used for drainage of washing machines, dehumidifiers, air conditioning units, etc. may be connected to the sanitary sewer system provided the owner can demonstrate that it is a sealed system with no chance of groundwater infiltration. (This connection is only permitted for existing homes connecting to the sanitary sewer.)

END OF SECTION 02720

SECTION 02721 - GREASE INTERCEPTOR

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Installation of Building Sewer Grease Interceptor.

1.2 RELATED WORK

- A. Section 02221 – Trenching, Backfilling and Compacting.
- B. Section 02720 - Service Lateral and Building Sewer Installation.

1.3 QUALITY ASSURANCE

- A. Grease interceptors specified herein shall be essentially the standard products of manufacturers who have been regularly engaged in the successful production of high quality materials of this type for at least ten years, have supplied such materials for at least five years of the ten year period, and have at least five installations in successful operation for at least five years.
- B. Repair or replace defective grease interceptor components and piping.

1.4 SUBMITTALS

- A. Submit shop drawings or catalog cuts, as appropriate, for materials listed. Submit only those materials that are actually to be used in the work. These will usually be as follows:
 - 1. Manufacturer shop drawing of grease interceptor.
 - 2. Gaskets, couplings, adapters and other appurtenances.
 - 3. Manhole covers and frames.
 - 4. Stone certification.
- B. Make submittals prior to start of construction. Make submittals to Engineer.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle the grease interceptor and appurtenances in accordance with the manufacturer's recommendations, and in such manner as to protect the materials from damage.
- B. The grease interceptor shall be loaded and unloaded by lifting with hoists or skidding so as to avoid shock or damage. Under no circumstances shall the grease interceptor be dropped or skidded against materials already on the ground. The grease interceptor shall at all times be handled with care to avoid damage. The interior shall be kept free from dirt and foreign matter. The grease interceptor shall be carefully

lowered or raised into place with suitable equipment in a manner that will prevent damage to the material. Under no circumstances shall the grease interceptor be dropped or dumped.

- C. The grease interceptor and appurtenances shall be thoroughly inspected for defects prior to being installed. Any defective, damaged or unsound material shall be repaired or replaced.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Grease Interceptors:

1. Grease interceptors shall be constructed of reinforced concrete in accordance with ASTM C478.
2. Manhole entry shall have cast iron frame and cover with reinforced concrete base and risers in accordance with the latest edition of the Authority's Standard Construction and Material Specifications for Sewer Collection System.
3. Sizing of grease interceptors shall be based on wastewater flows and grease retention capacity. The minimum size of a grease interceptor is 1,000 gallons.
4. Inlet and outlet of grease interceptors shall be properly baffled.
5. Inlet and outlet of grease interceptors shall be designed to prohibit access by insects and vermin.
6. The detail drawing for the standard minimum size commercial grease trap is provided at the end of these Standard Specifications.
7. Acceptable manufacturers.
 - a. Monarch Products Company, Inc.
 - b. Or equal.

PART 3 - EXECUTION

3.1 GREASE INTERCEPTOR INSTALLATION

- A. Grease interceptors shall be located within 20 to 30 feet from the plumbing fixtures to be served. Grease interceptors shall be located outside the rear of the building and in non-traffic areas. Where an interceptor must be located in a traffic area, the interceptor shall have a cover designed for heavy traffic loading.
- B. Grease interceptors shall be buried so as to intercept the Service Lateral. Toilets, urinals and other similar fixtures shall not discharge to the grease interceptor and

sampling manhole.

- C. The manhole entry of the grease interceptor shall be finished to grade.
- D. The inlet, outlet and baffle fittings shall be of a Tee design with a vertical extension of 12 inches from the tank floor and reaching well above the water line.
- E. A sampling manhole shall be placed after the grease trap discharge and after the domestic waste but before any public or private wastewater is combined with the proposed establishment's wastewater. The sampling manhole will be used to sample the discharge of the wastewater leaving the proposed establishment to determine if the grease and oil concentration is in excess of the limits set forth by the Pretreatment Ordinance. For sampling manhole requirements, refer to the Detail Drawings attached and the Authority's Standard Construction and Material Specifications for Sewer Collection System.
- F. The interceptor shall be accessible at all times to the respective Township Plumbing Inspector and Authority personnel.

END OF SECTION 02721

SECTION 03300 - CONCRETE FOR UTILITY CONSTRUCTION

PART 1 – GENERAL

1.1 DESCRIPTION

A. The Work of this section includes, but is not limited to:

1. Cast-in-place cement concrete construction.
2. Reaction and support blocking.
3. Cradles and encasement.

B. Related Work Specified Elsewhere:

1. Section 02221 - Trenching, Backfilling and Compacting.
2. Section 02575 - Paving and Resurfacing.

C. Applicable Standard Details:

1. Concrete Encasement.
2. Concrete Cradle.
3. Thrust Blocks.
4. Concrete Pipe Anchor.
5. Stream Crossing.

1.2 QUALITY ASSURANCE

A. Reference Standards:

1. Pennsylvania Department of Transportation:
 - a. Publication 408 Specifications
2. American Society for Testing and Materials (ASTM):
 - a. C31 Making and Curing Concrete Test Specimens in the Field.
 - b. C39 Test for Compressive Strength of Cylindrical Concrete specimens.
 - c. C42 Obtaining and Testing Drilled Cores and Sawed Beams of concrete.
 - d. C172 Sampling Fresh Concrete.

1.3 SUBMITTALS

A. Certificates:

1. Submit certification from the concrete producer attesting that the cement concrete conforms to Section 704, Publication 408 Specifications for the class of concrete being used.
2. Submit certified results of compressive strength tests performed by an independent testing laboratory.

B. Shop Drawings:

1. Submit detailed shop drawings of reinforcing steel.

PART 2 – PRODUCTS

2.1 CEMENT CONCRETE

A. Ready-mixed, conforming to Section 704, Publication 408 Specifications:

1. Requirements for state approved batch plants, design computations and plant inspection shall not apply. The acceptability of concrete will be based on conformance with the cement concrete criteria specified below and the results of the specified tests.

B. Cement Concrete Criteria:

1. Class A:
 - a. 28-day compressive strength: 3300 psi.
 - b. Slump: 1 to 3 inches.
2. Class C:
 - a. 28-day compressive strength: 2000 psi.
 - b. Slump: 2 to 6 inches.
3. High Early Strength:
 - a. 3-day compressive strength: 3000 psi.
 - b. Slump: 1 to 3 inches.
4. Cement factor and maximum water-cement ratio conforming to Table A. Section 704.1(b), Publication 408 Specifications.

2.2 REINFORCEMENT STEEL

A. Reinforcement Bars:

1. New billet-steel conforming to Section 709.1, Publication 408 Specifications.
2. Deformed, Grade 40.

B. Steel Wire Fabric:

1. Conforming to Section 709.3, Publication 408 Specifications.

PART 3 – EXECUTION

3.1 CONSTRUCTION

- A. Comply with Section 1001, Publication 408 Specifications for construction requirements including formwork, curing, protection and finishing of cement concrete.
- B. Excavate and shape trench bottoms and sides to accommodate thrust block forms, encasement, manhole bases, inlets and vaults.
- C. Support pipe, valves and fittings at the required elevation with brick or concrete block. Do not use earth, rock, wood or organic material as supports.
- D. Construct reaction and support blocking, cradles, encasements, and miscellaneous mass concrete of Class A concrete.
- E. Construct cast-in-place vaults, inlets, endwalls, curbs, sidewalks and miscellaneous reinforced structures of Class A concrete.
- F. Construct reinforced and plain cement concrete pavements and base courses of High Early Strength concrete as specified in Section 02575 - Paving and Resurfacing.
- G. Provide spacers, chairs, bolsters, ties and other devices for properly placing, spacing, supporting and fastening reinforcement in place.
- H. Place concrete utilizing all possible care to prevent displacement of pipe or fittings. Return displaced pipe or fittings to line and grade immediately.
- I. Ensure tie rods, nuts, bolts and flanges are free and clear of concrete.
- J. Do not backfill structures until concrete has achieved its initial set, forms are removed and concrete work is inspected by the Engineer.
- K. Perform backfilling and compaction as specified in Section 02221 – Trenching, Backfilling and Compacting.

3.2 FIELD TESTS OF CONCRETE DURING CONSTRUCTION

- A. Test each 50 cubic yards or fraction thereof of each class of concrete for compressive strength. Retain an independent testing laboratory to test cylinders:
 - 1. Sample concrete in accordance with ASTM C172.
 - 2. Prepare and cure two test cylinders in accordance with ASTM C31.
 - 3. Test cylinders in accordance with ASTM C39.
- B. If test cylinders fail to meet strength requirements, the Engineer may require additional core tests in accordance with ASTM C42.

END OF SECTION 03300

INFORMATION AND SPECIAL CONDITIONS – SEWER

GENERAL

It shall be the intent of the South Middleton Township Municipal Authority to have the Developer provide a complete sewer system installation. All work and materials specified or intended shall be supplied by the developer.

DEFINITIONS

“Authority” shall mean the South Middleton Township Municipal Authority.

“Owner” shall mean the South Middleton Township Municipal Authority.

“Developer” shall mean the party or parties constructing improvement to a tract of land, or his agent.

“Contractor” shall mean the agent of the Developer.

“Engineer” shall mean the Engineer of the South Middleton Township Municipal Authority.

DESIGN CRITERIA

The sewerage system including all sewer mains, manholes, pumping stations, force mains, and appurtenances, shall be designed in accordance with the latest revision of the Department of Environmental Protection Guidelines and these specifications.

It shall further be the responsibility of the Developer to comply with all local, county, state and federal regulations.

SPECIAL CONDITIONS

1. These specifications are intended as a guide to the Developer, and the Authority reserves the right to make necessary corrections, additions or deductions to these specifications.
2. The Authority reserves the right to request additional work and materials where, in its opinion, conditions warrant such work and materials.
3. Prior to the start of construction the Developer shall submit shop drawings to the Authority’s Engineer for all materials to be utilized and receive approval of such materials.

AUTHORITY REQUIREMENTS

1. All work on this project shall be done in compliance with all applicable federal, state, county or local laws and regulations whether herein stated or not. In the event of conflict between the requirements herein stated and the rules and regulations of other federal, state, county or local agencies, the more stringent shall apply.
2. Developer and/or Contractor shall obtain insurance in an amount specified by the Authority. See Page ISC-3 for insurance requirements. This insurance should include, but not be limited to, coverage for bodily injury (BI) and property damage (PD) caused by blasting.
3. Proof of all necessary insurance coverages shall be submitted to the Authority in the form of a Certificate of Insurance prior to the inception of any construction activities conducted by the Developer and/or Contractor.
4. Furthermore, the South Middleton Township Municipal Authority, South Middleton Township and the Authority's Engineer shall be listed on the Developer's and/or Contractor's General Liability Policy as an additional insured, in respect to this project.
5. Contractor is responsible for following all Township ordinances regarding noise and dust control.

OSHA REQUIREMENTS

Contractor is responsible for following all applicable OSHA requirements.

INSURANCE

Insurance coverages are required to be written on an "occurrence basis." Furthermore, coverage should be written through an insurance company rated as A- or better by AM Best. The limits of liability for insurance coverages shall be, at the minimum, as follows:

1. Workers' Compensation:

- a. All state requirements for Workers' Compensation coverage shall be met, including:

(1) Employer's liability:

Bodily Injury by Accident:	\$100,000 each accident
Bodily Injury by Disease:	\$500,000 policy limit
Bodily Injury by Disease:	\$100,000 each employee

2. Comprehensive General Liability:

(Includes Premises – Operations, Independent Contractors Protection, Contractual Liability, Products and Completed Operations, Broad Form Property Damage):

a. Bodily Injury (including Completed Operations and Products Liability):

\$1,000,000 each occurrence
\$2,000,000 annual aggregate

b. Property Damage:

\$1,000,000 each occurrence
\$2,000,000 annual aggregate

c. Comprehensive General Liability Insurance will provide coverage at the limits indicated above for the exposures of:

Explosion
Collapse
Underground

d. If operations involve or require the use of blasting, the Contractor will provide blasting coverage to protect bodily injury and property damage per the above minimum general liability limits.

3. Comprehensive Automobile Liability:

Bodily Injury and Property Damage:

\$1,000,000 each person/occurrence

4. Owner's Protective Liability:

Bodily Injury/Property Damage:

\$1,000,000 each occurrence
\$2,000,000 annual aggregate

5. Excess/Umbrella Liability:

Limit of Liability:

\$1,000,000 Products/Completed Operations Aggregate
\$1,000,000 General Aggregate
\$1,000,000 BI/PD Any One Occurrence

6. As stated under Authority requirements:

Prior to the initiation of any construction activities all Developers and/or Contractors shall have submitted an approved Certificate of Insurance outlining the required

ISC-3

insurance coverages. Submit insurance certificates and Hold-harmless Agreements naming the Authority, Township and Engineer as co-insureds and certificate holders. The certificates shall contain a provision that coverages will not be cancelled or non-renewed unless at least thirty (30) days' written notice has been provided to the Authority.

END OF SECTION

ISC-4

POLICIES FOR SEWER MAIN EXTENSIONS

1. All mains shall be extended at the sole expense of the person or persons requesting such extension.
2. All mains shall be extended to the furthestmost property lines of the person or persons requesting such extension. The only exception shall be where lines cannot be further extended as determined by the Authority or South Middleton Township.
3. The size and location of the mains shall be determined by the Authority's Engineer so as to comply with the Authority's long-range facilities plan. To the greatest extent possible, all mains shall be placed within the road or road right-of-way, unless otherwise dictate by South Middleton Township.
4. If planning is required, the Developer shall deposit with the Authority ample monies, as directed by the Authority Manager, to cover all costs the Authority may incur in the review of the proposed extension.
5. If a Subdivision or Land Development Plan is approved which will result in an extension to the sewer system, a copy of the Plan, as recorded at the Court House, shall be provided to the Authority in pdf format via email or share site.
6. Design:
 - A. A Developer's Agreement shall be signed and security placed in escrow for the review and any legal costs the Authority may incur in the review of the proposed extension, as more fully discussed in Section 9 below.
7. All Extension Plans shall follow specifications as set forth in Section 01300 of the Technical Specifications.

The Authority's datum (USGS Datum of 1929) must be used for establishing elevations. Developer shall contact the Authority's Engineer to obtain a General Plan for the area encompassing the proposed extension. All Plan Sheets shall be oriented with the north arrow pointing the same direction as the General Plan. In accordance with Act 287 and any subsequent legislation, all existing utilities shall be indicated on the Plans.

A survey data point file shall be provided for all bends, fittings, valves, corporations, curb stops, etc. providing the X,Y and Z coordinates of all facilities.

8. After the proposed extension has been approved by the Authority's Engineer, the Developer will apply for all applicable permits, as required. All permits shall be approved under the name of the Authority in accordance with applicable regulations.
9. A Developer's Agreement shall be signed and security placed in escrow for applicable engineering fees, inspection services, as-constructed drawings and legal fees incurred or reasonable anticipated costs to be incurred in connection with the proposed construction.

EXT-1

In addition, a “Letter of Credit”, or bond executed by a surety named in the current list of “Companies Holding Certificates of Authority as Acceptable Reinsuring Companies” as published in Circular 570 (amended) by the Audit Staff Bureau of Accounts, U.S. Treasury Department shall be provided. Said security shall be in an amount acceptable to the Authority, to guarantee the satisfactory and timely completion of all sewer facilities as set forth in a cost estimate, as prepared by the Developer’s Engineer, that has been reviewed and approved by Authority’s engineer.

10. Construction:

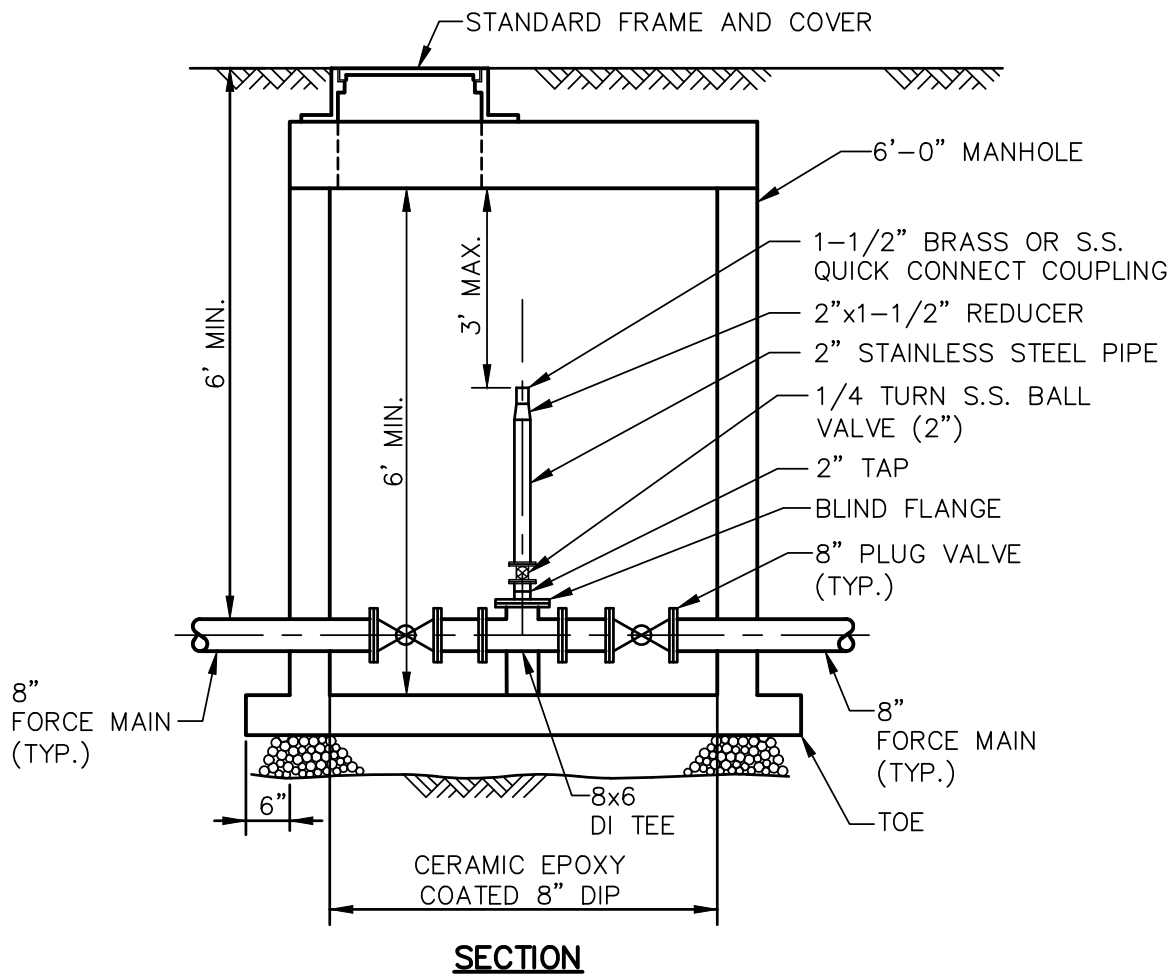
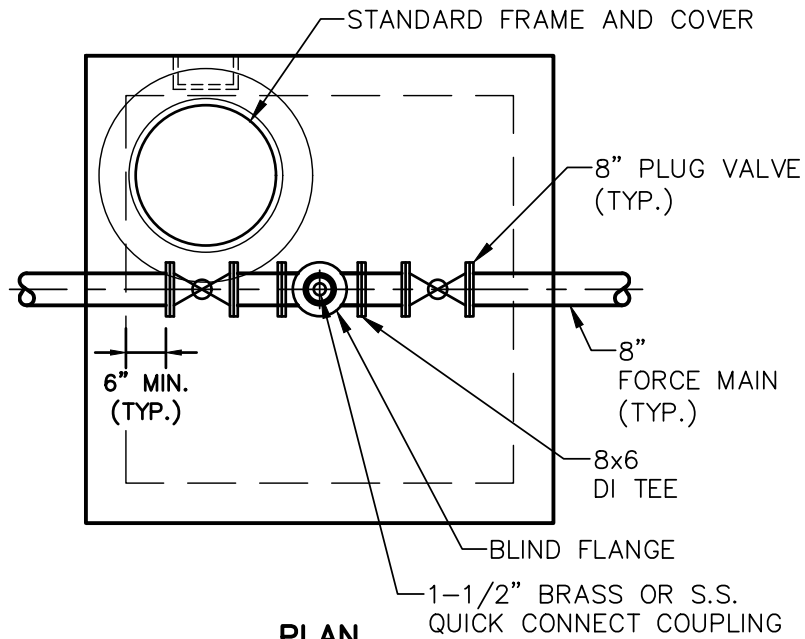
Construction shall be done under the following procedure:

A. Developer can utilize his own construction forces to perform the work, providing, however, that the following is submitted and approved by the Authority:

- (1) Name of Contractor performing the work.
- (2) Shop Drawings and pipe certifications shall be submitted prior to the start of any construction to the Authority’s Engineer for approval.
- (3) Estimated length of time for construction to be used for estimating the initial amount of security to be placed in escrow.
- (4) Submit insurance certificates and Hold-harmless Agreements naming the Authority, Township and Engineer as co-insureds and certificate holders.
- (5) The limits of liability shall be as determined by the Authority’s insurance carrier.
- (6) Submit a one-and-one-half year (1½ year) Performance and Maintenance Bond to the Authority after construction is complete and final acceptance and certification is received from the Authority and/or Authority’s Engineer.

11. As work proceeds on the project and additional funds may be required by the Developer, the Authority will inform the Developer of any deficiencies, and additional monies must be deposited with the Authority. After completion of the project, if any monies remain in the construction account, all monies will be returned to the Developer.

12. After completion, testing, and preparation of as-built drawings, the utilities shall be dedicated to the Authority and a Deed of Dedication (and easements if applicable) shall be prepared by the Authority for execution by the Authority and the Developer. As a further condition of the Deed of Dedication, any easements and/or rights-of-way through or on private property required for the sewer extension shall be provided by the Developer, or shall be prepared by the Authority at the Developer’s expense.



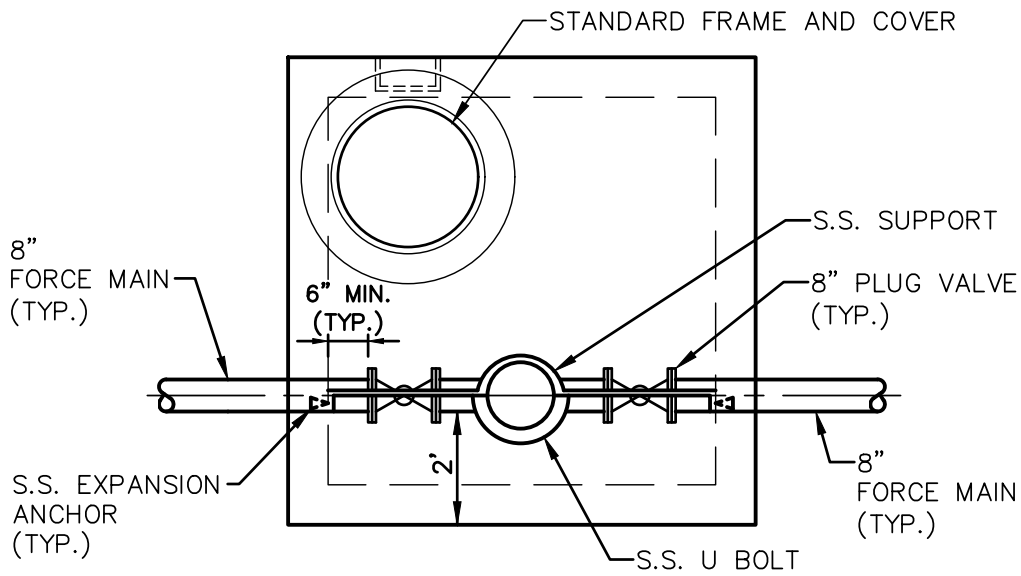
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STANDARD DETAILS

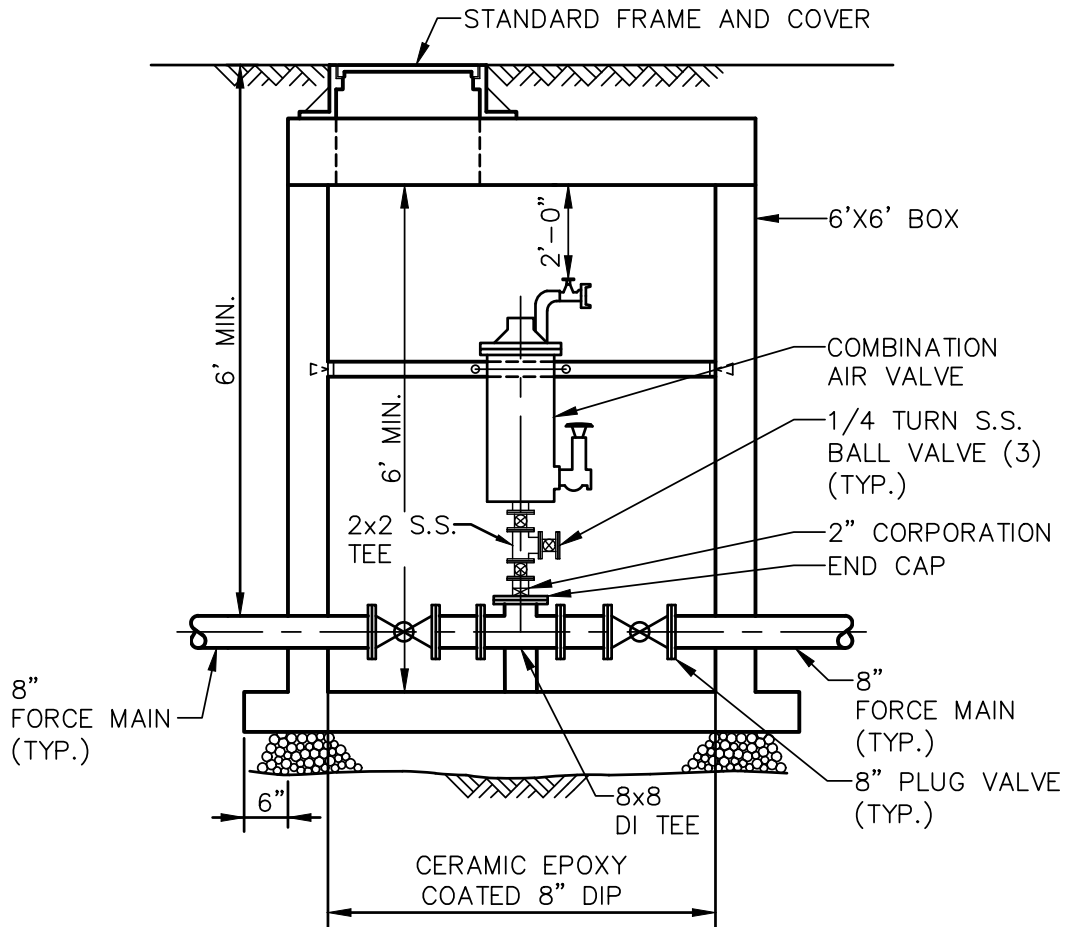
FLUSH CHAMBER

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DATE	REVISIONS
2/18	DWG. CREATED
SCALE NO SCALE	DWG. NO. FM-1



PLAN



SECTION

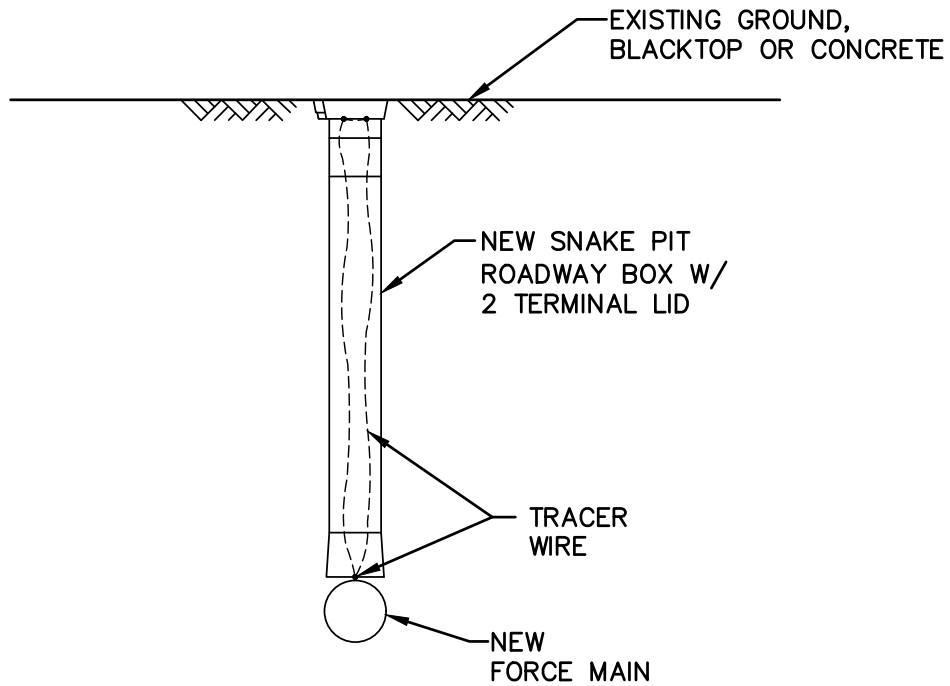
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STANDARD DETAILS

AIR RELEASE VALVE CHAMBER

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DATE	REVISIONS
2/18	DWG. CREATED
SCALE NO SCALE	DWG. NO. FM-2



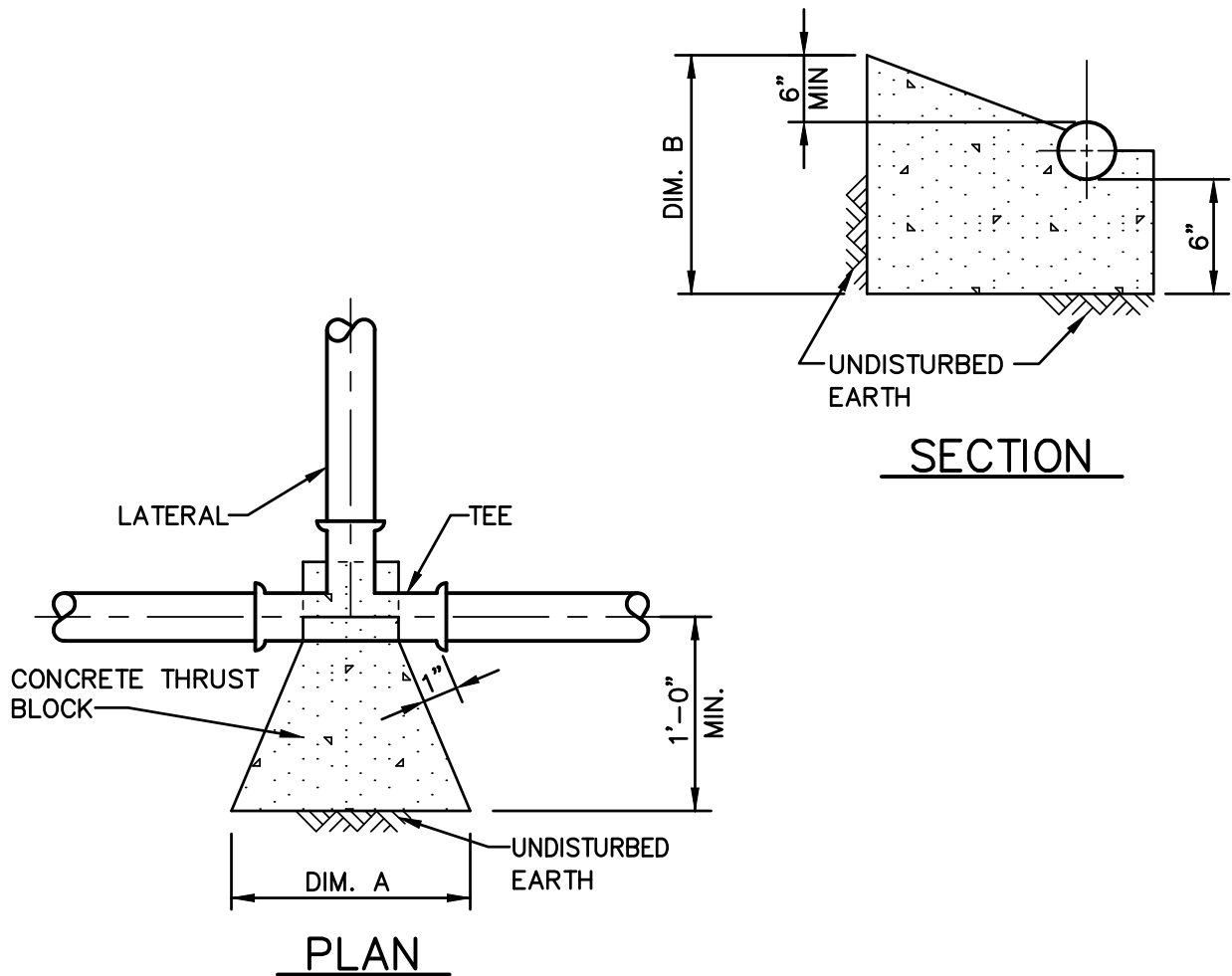
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STANDARD DETAILS

FORCEMAIN LOCATOR ASSEMBLY

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DATE	REVISIONS
2/18	DWG. CREATED
6/21	DWG. REVISED
SCALE NO SCALE	DWG. NO. FM-3



TEE DIMENSION SCHEDULE				
LATERAL SIZE				
DIM.	1-1/2"	2"	2-1/2"	3"
A	14"	16"	18"	20"
B	14"	14"	15"	15"

FILE NAME: FM-4-HTHRUSTLOWPRS.dwg

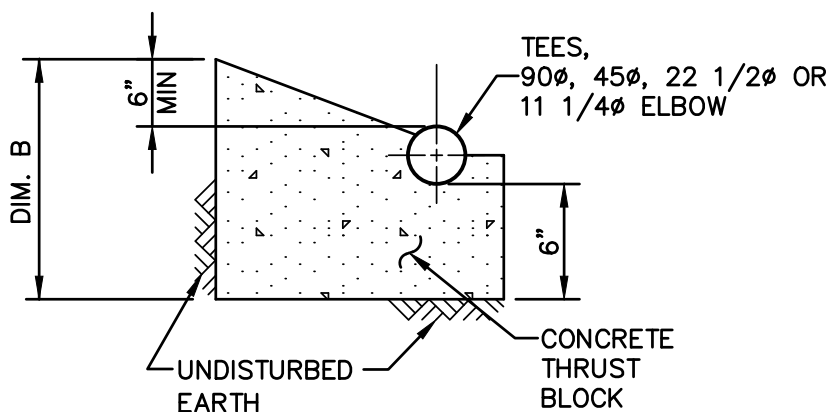
STANDARD DETAILS
HORIZONTAL THRUST BLOCK DETAILS
FORCE MAIN

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

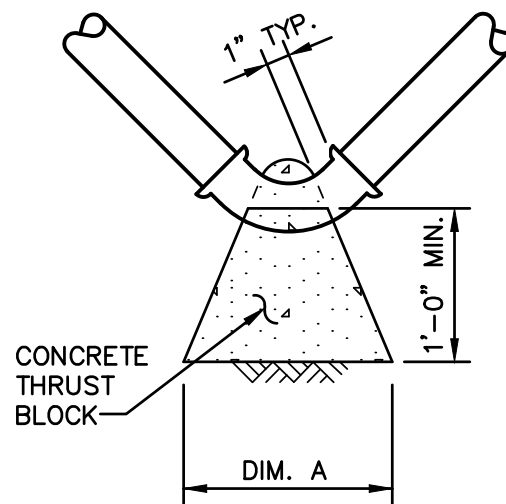
DATE	REVISIONS
2/18	DWG. CREATED
SCALE NO SCALE	DWG. NO. FM-4

ELBOW DIMENSION SCHEDULE

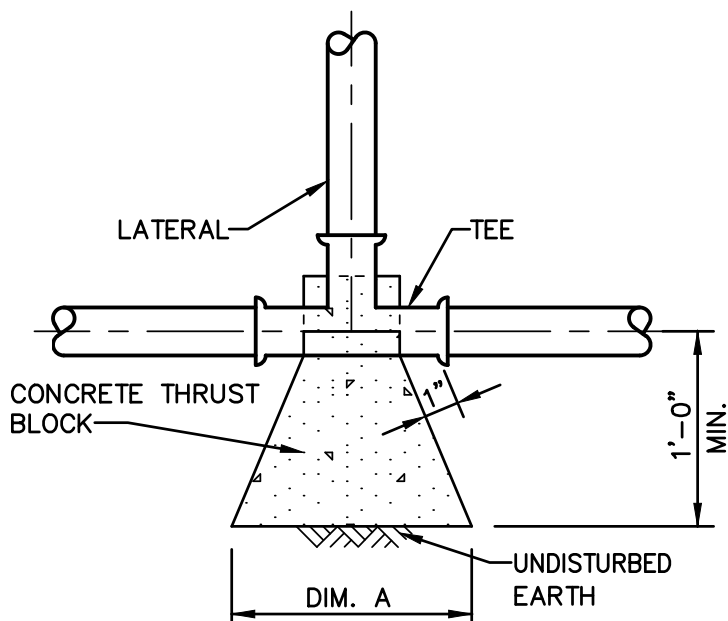
DIM.	3"-90°	3"-45°	3"-22 1/2°	3"-11 1/4°	2 1/2"-90°	2 1/2"-45°	2 1/2"-22 1/2°	2"-90°	2"-45°	1 1/2"-90°	1 1/2"-45°
A	20"	18"	16"	12"	18"	16"	14"	16"	14"	14"	12"
B	15"	15"	15"	14"	15"	15"	15"	14"	14"	14"	14"



SECTION



BENDS



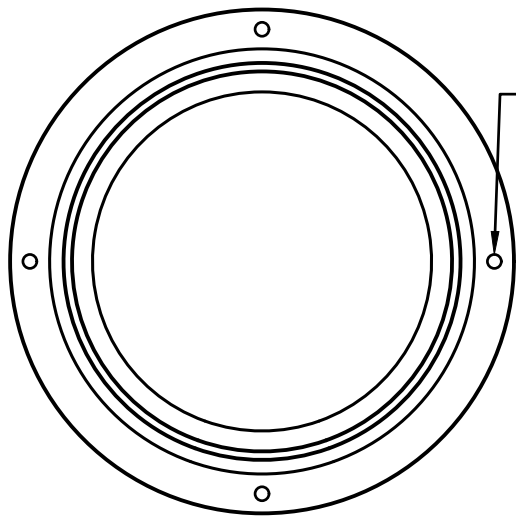
TEES

TEE DIMENSION SCHEDULE LATERAL SIZE				
DIM.	1-1/2"	2"	2-1/2"	3"
A	14"	16"	18"	20"
B	14"	14"	15"	15"

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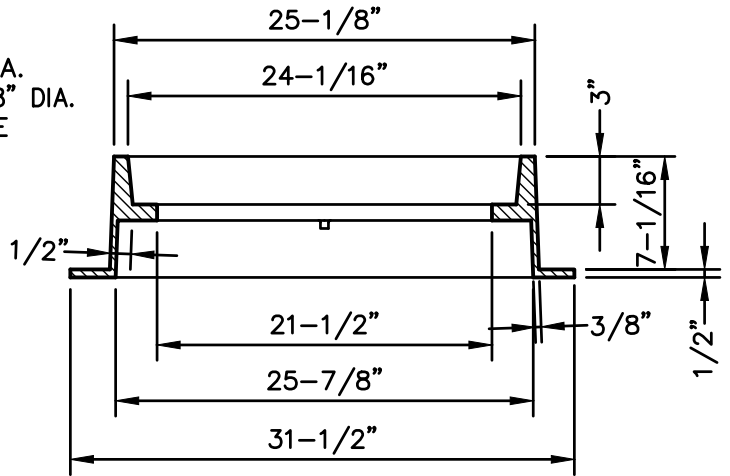
STANDARD DETAILS
CONCRETE THRUST BLOCK DETAILS
FORCE MAIN
 SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DATE	REVISIONS
2/18	DWG. CREATED
SCALE NO SCALE	DWG. NO. FM-5



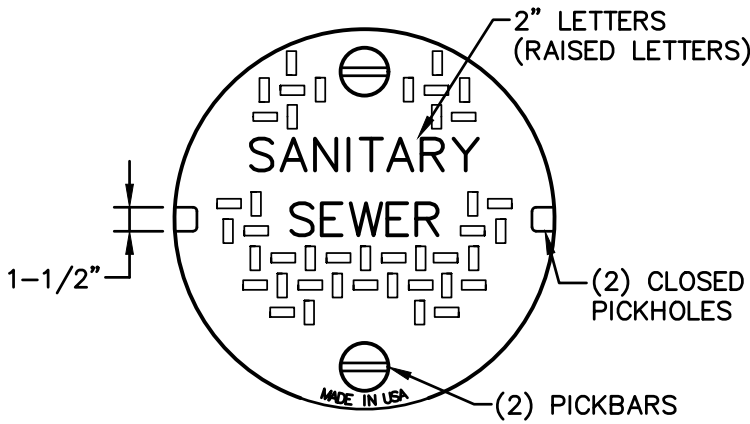
(4) 7/8" DIA.
HOLES ON 28" DIA.
BOLT CIRCLE

PLAN

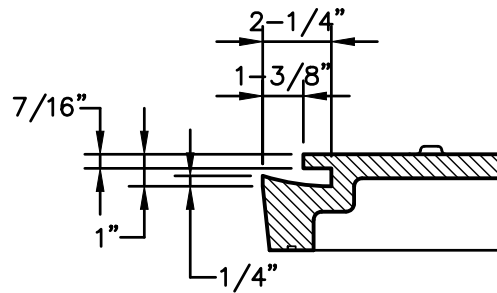


SECTION

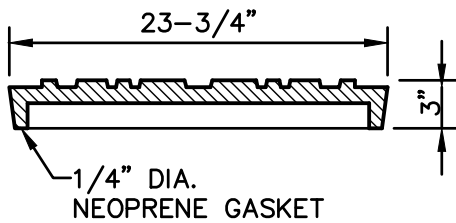
MANHOLE FRAME DETAIL



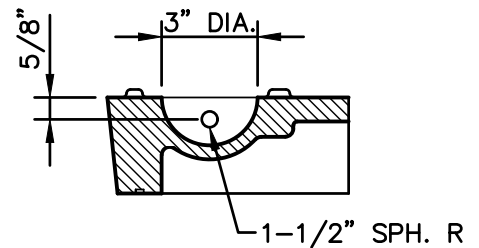
PLAN



PICKHOLE DETAIL



SECTION



PICKBAR DETAIL

MANUFACTURER: EAST JORDON IRON WORKS - FRAME 1835Z1, COVER 1835A1GS

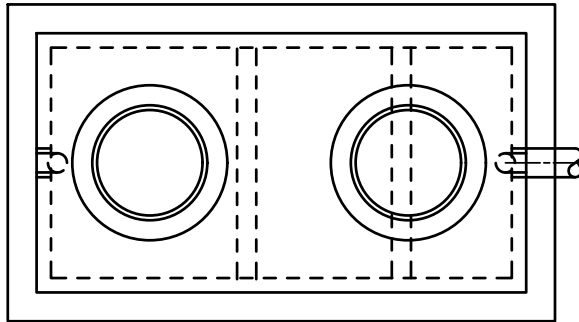
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STANDARD DETAILS

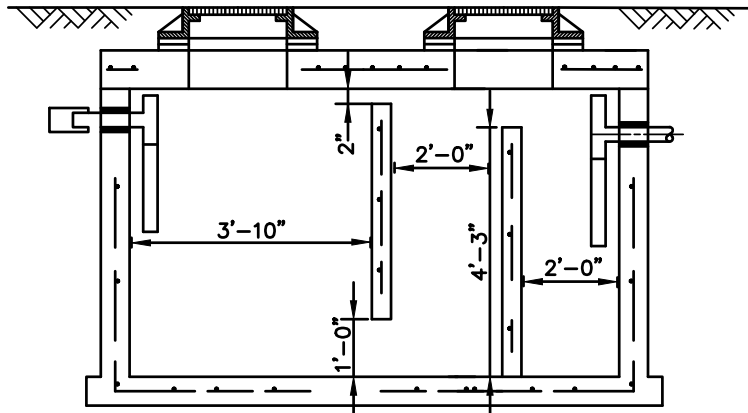
VALVE PIT COVER DETAIL

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DATE	REVISIONS
2/18	DWG. CREATED
SCALE NO SCALE	DWG. NO. FM-6



PLAN



SECTION

NOTES:

1. MINIMUM SIZE OF OF GREASE TRAP PERMITTED IS 1,000 GALLONS.
2. GREASE INTERCEPTOR SIZE AND DESIGN SHALL BE THE RESPONSIBILITY OF THE DESIGN PROFESSIONAL OF RECORD.
3. ACCEPTABLE MANUFACTURERS: MONARCH PRODUCTS OR APPROVED EQUAL.
4. CONCRETE FOR SLOPE TO BE 3500 psi MIX DESIGN MEETING SECTION 2605 PART 2.01 OF THE STANDARD SPECIFICATIONS
5. FLOW CHANNEL NECESSARY.

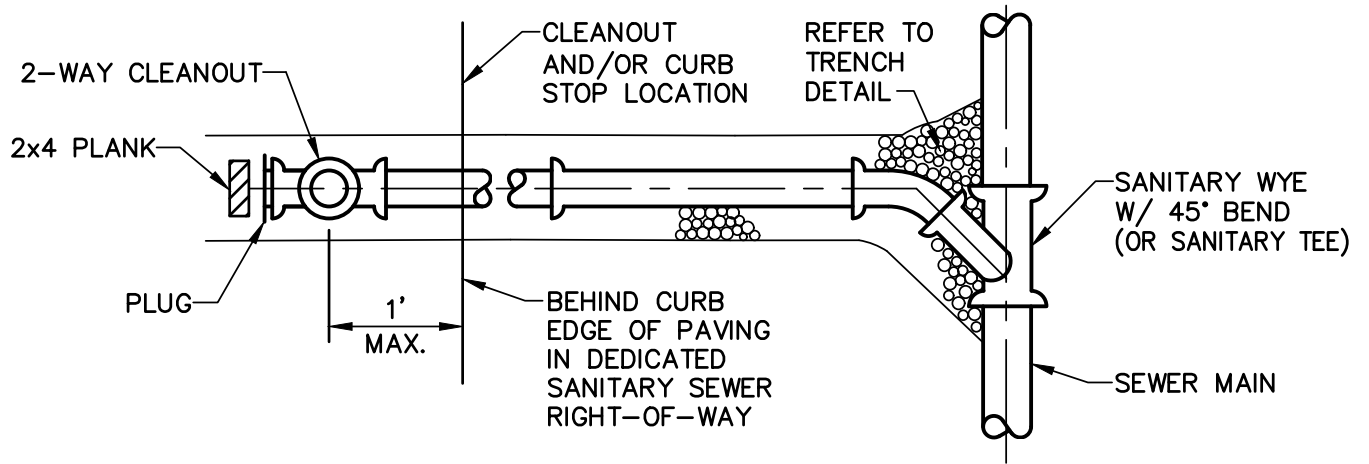
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STANDARD DETAILS

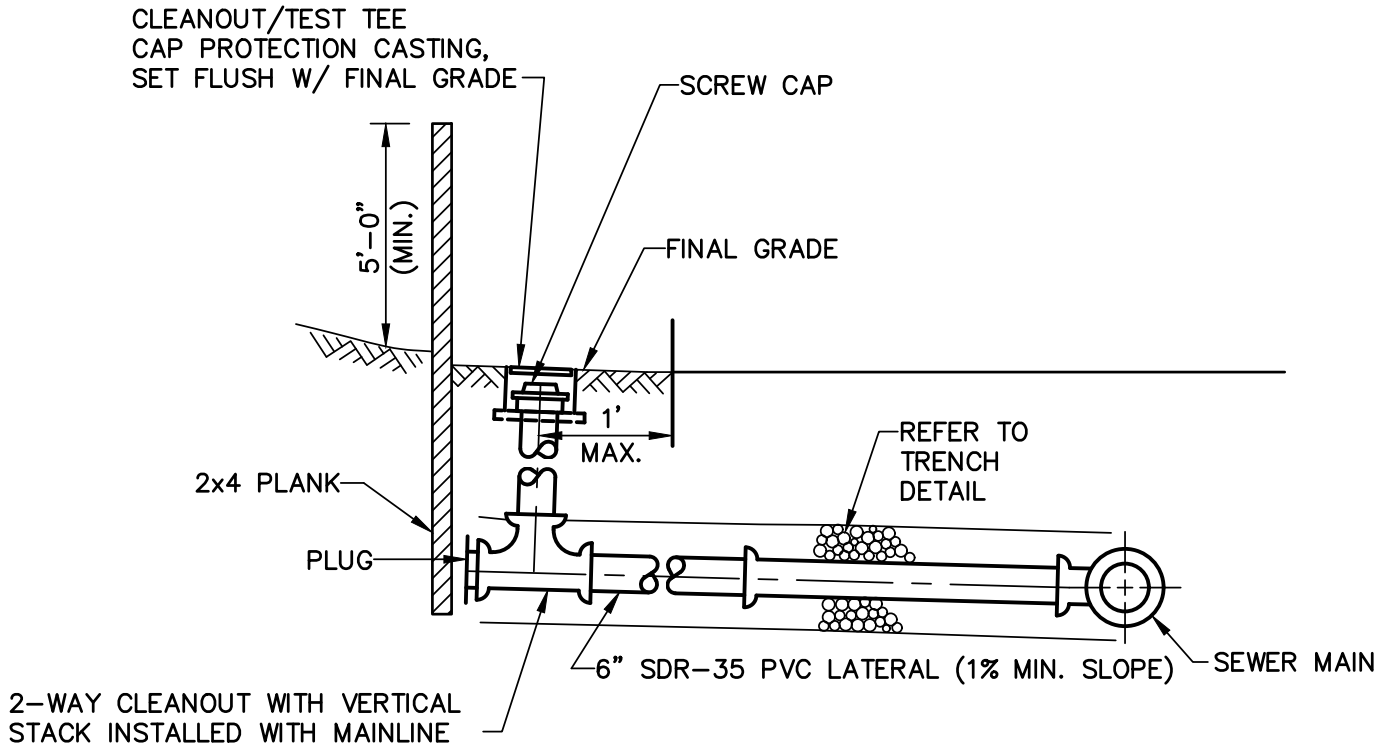
TYPICAL GREASE INTERCEPTOR

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DATE	REVISIONS
2/18	DWG. CREATED
SCALE NO SCALE	DWG. NO. GR-1



PLAN



SECTION

NOTES:

1. CURB CLEANOUT NOT TO BE LOCATED IN SIDEWALK, DRIVEWAYS OR BENEATH OTHER CURBLINE UTILITIES.

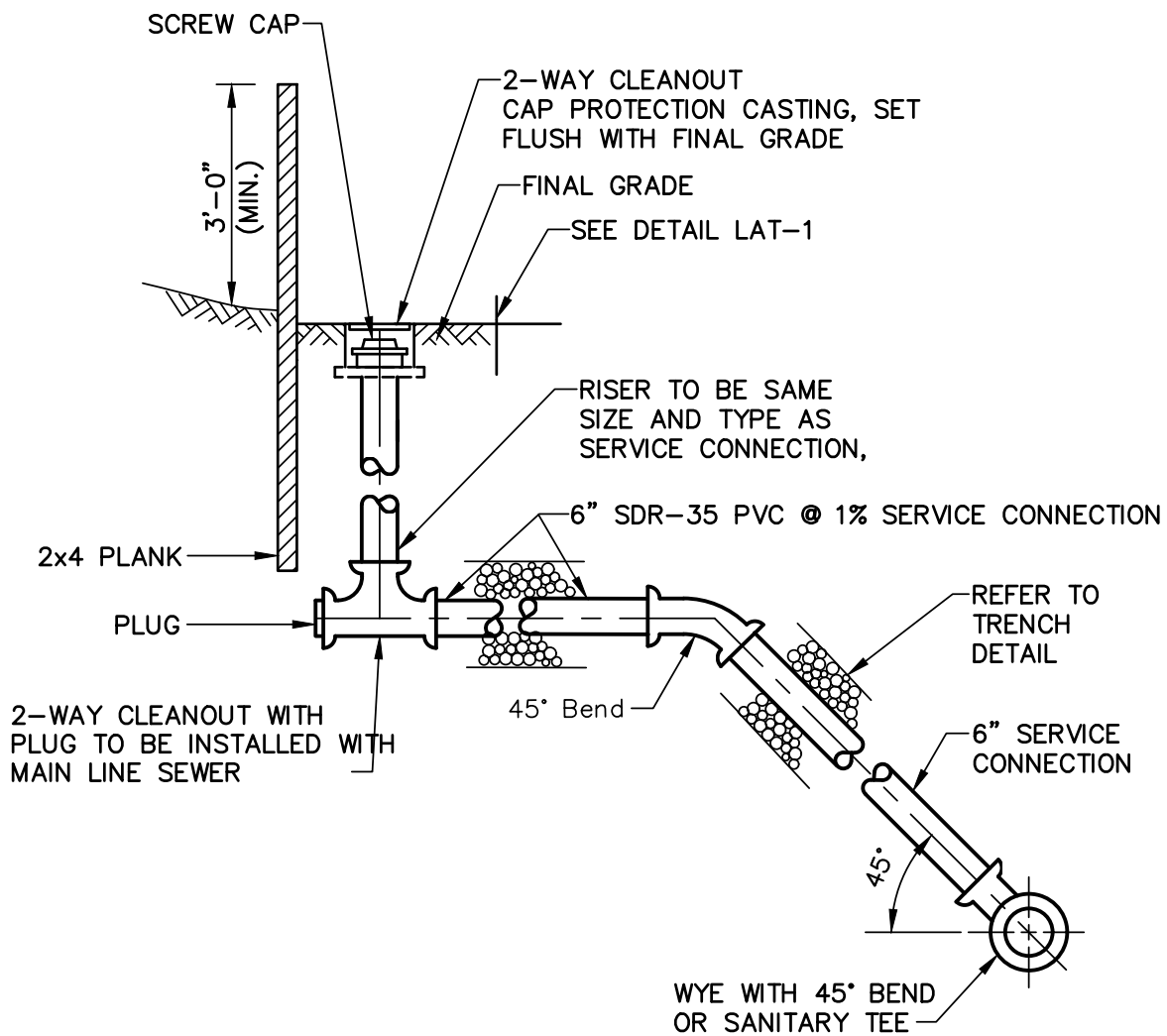
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STANDARD DETAILS

SERVICE LATERAL – SHALLOW SEWER

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DATE	REVISIONS
2/18	DWG. CREATED
SCALE NO SCALE	DWG. NO. LAT-1



ELEVATION

NOTES:

- 1. CURB CLEANOUT NOT TO BE LOCATED IN SIDEWALK, DRIVEWAY OR BENEATH OTHER CURBLINE UTILITIES.

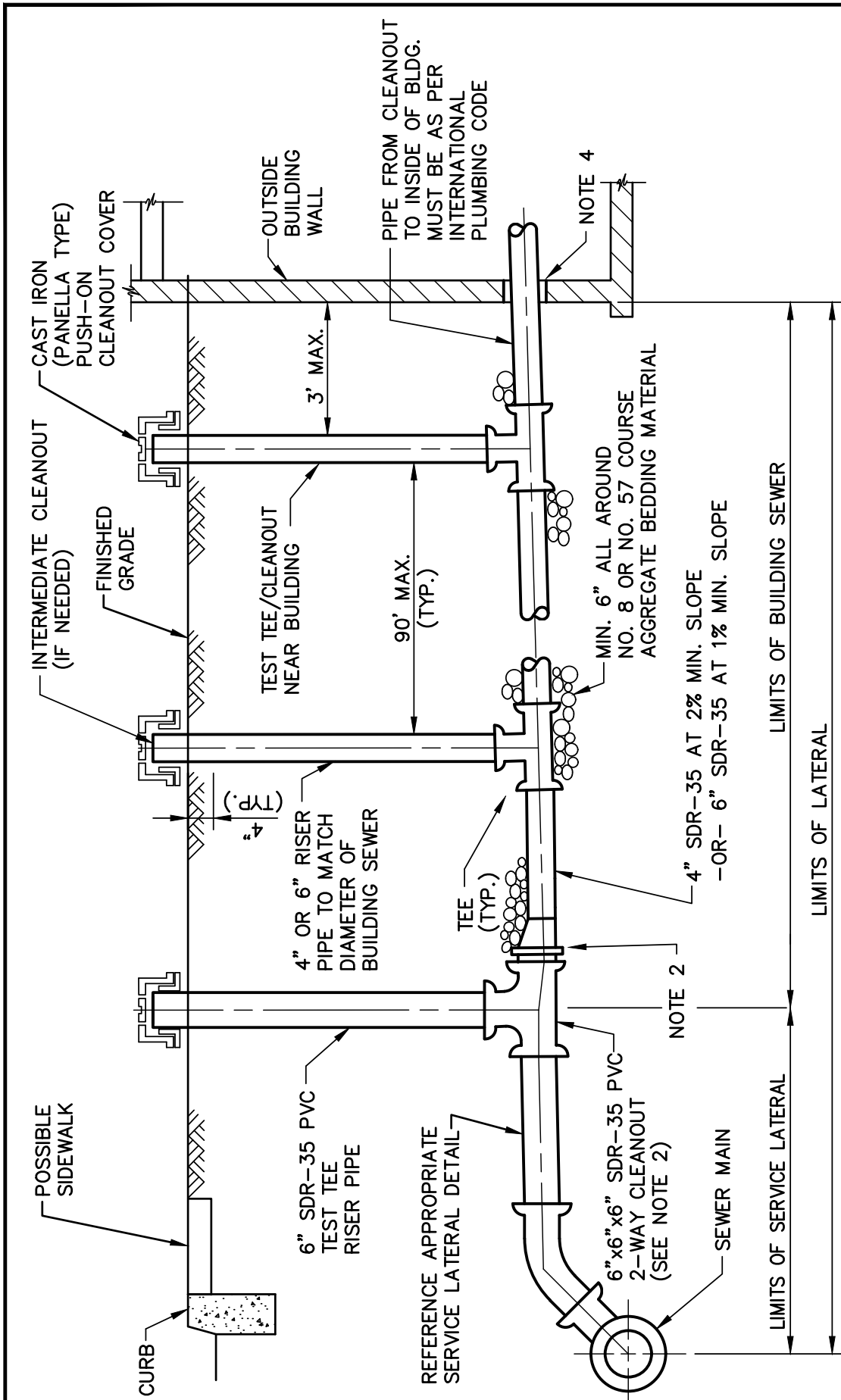
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STANDARD DETAILS

SERVICE LATERAL – DEEP SEWER

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DATE	REVISIONS
2/18	DWG. CREATED
SCALE NO SCALE	DWG. NO. LAT-2



ELEVATION

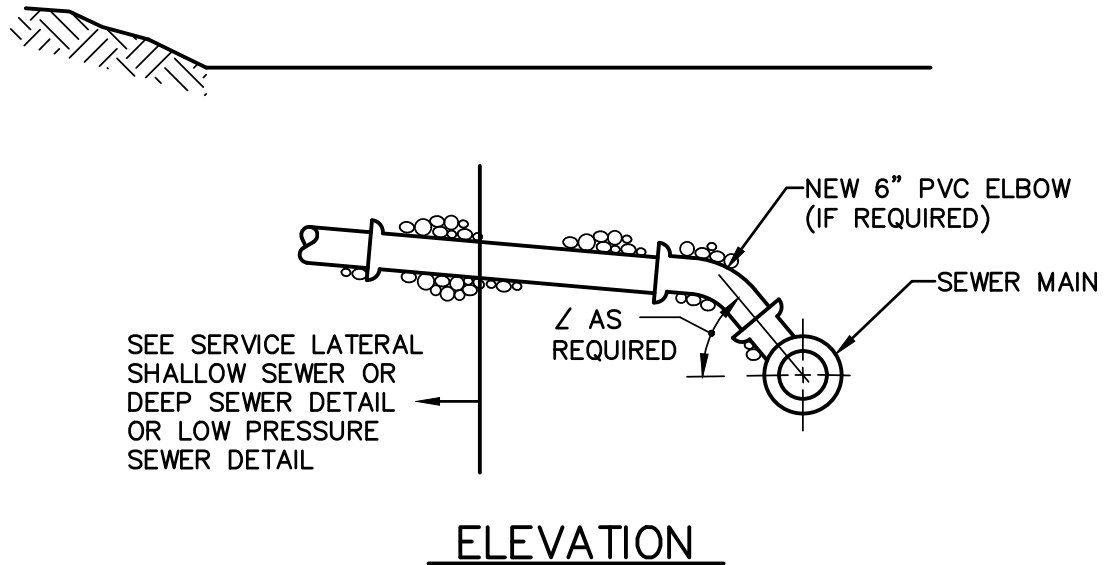
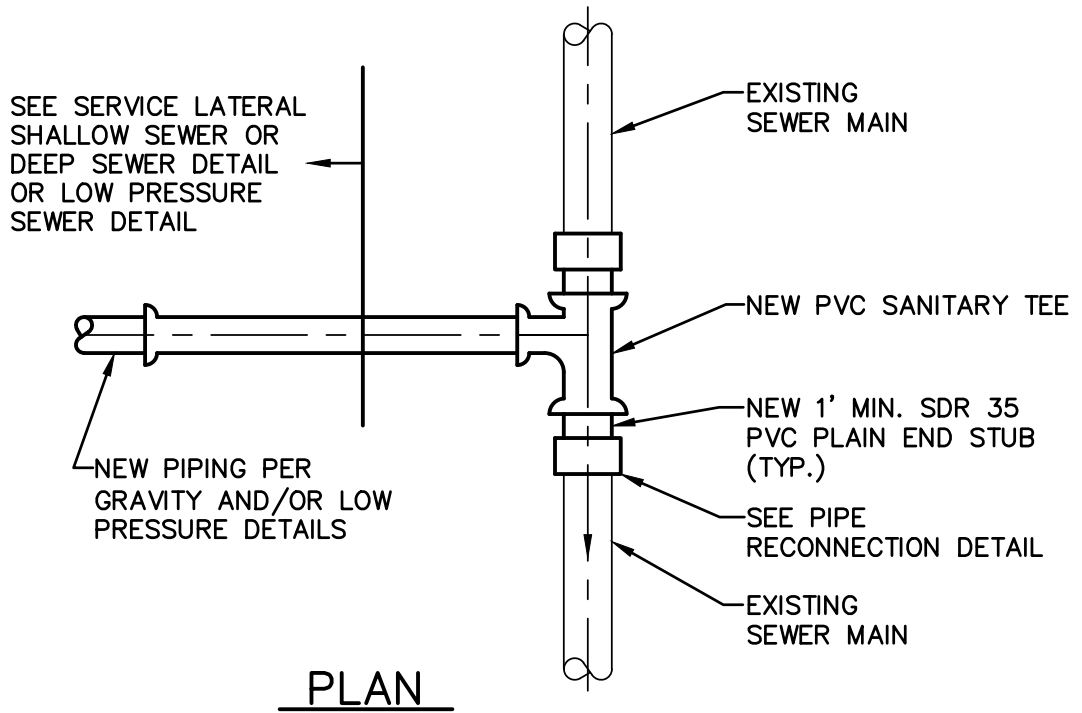
NOTES:

1. PIPE SIZES AND MATERIALS TO BE IN ACCORDANCE WITH AUTHORITY REQUIREMENTS.
2. FOR 4" BUILDING SEWER, USE ECCENTRIC 4"x6" ADAPTER FITTING FOR TRANSITION TO TEST TEE (4"x6" FLEXIBLE COUPLING NOT ALLOWED).
3. CLEANOUT/TEST TEE SPACING IS 90' MAXIMUM.
4. WALL SLEEVE (REFER TO PAGE 615 P2603.4 OF THE IRC.
5. ANY PIPE LESS THAN 3 FEET OF COVER SHALL BE DUCTILE IRON.
6. REFER TO PAGE 645 AND 646 P2905.4.2 OF THE IRC.

FILE NAME: LAT-3-BLDGSEWER.dwg

STANDARD DETAILS
BUILDING SEWER
 SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DATE	REVISIONS
2/18	DWG. CREATED
SCALE NO SCALE	FILE LAT-3



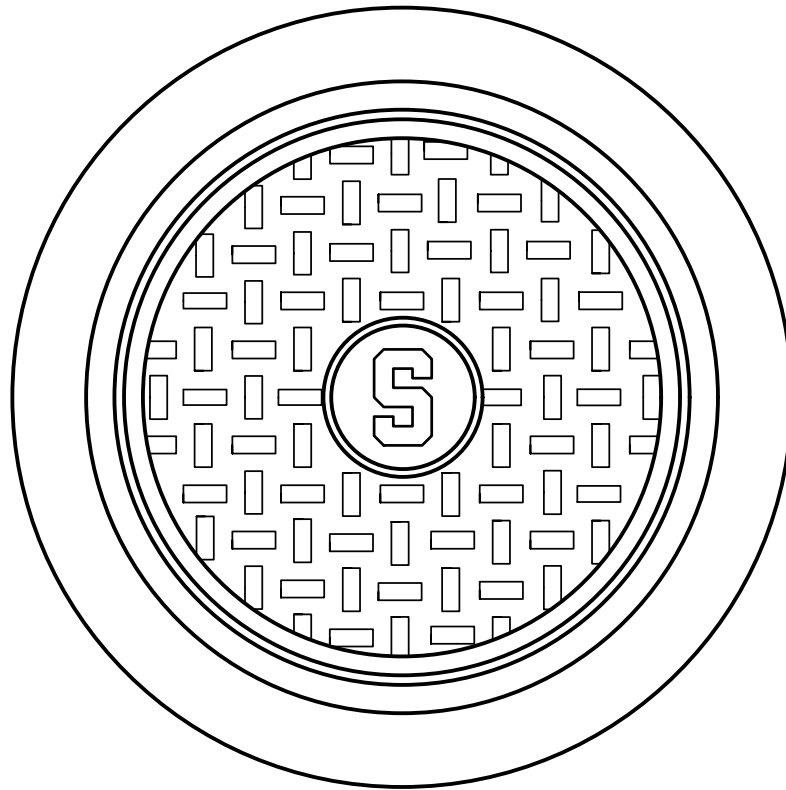
NOTES:

1. EXISTING MAIN SEWER TO BE SAW CUT.

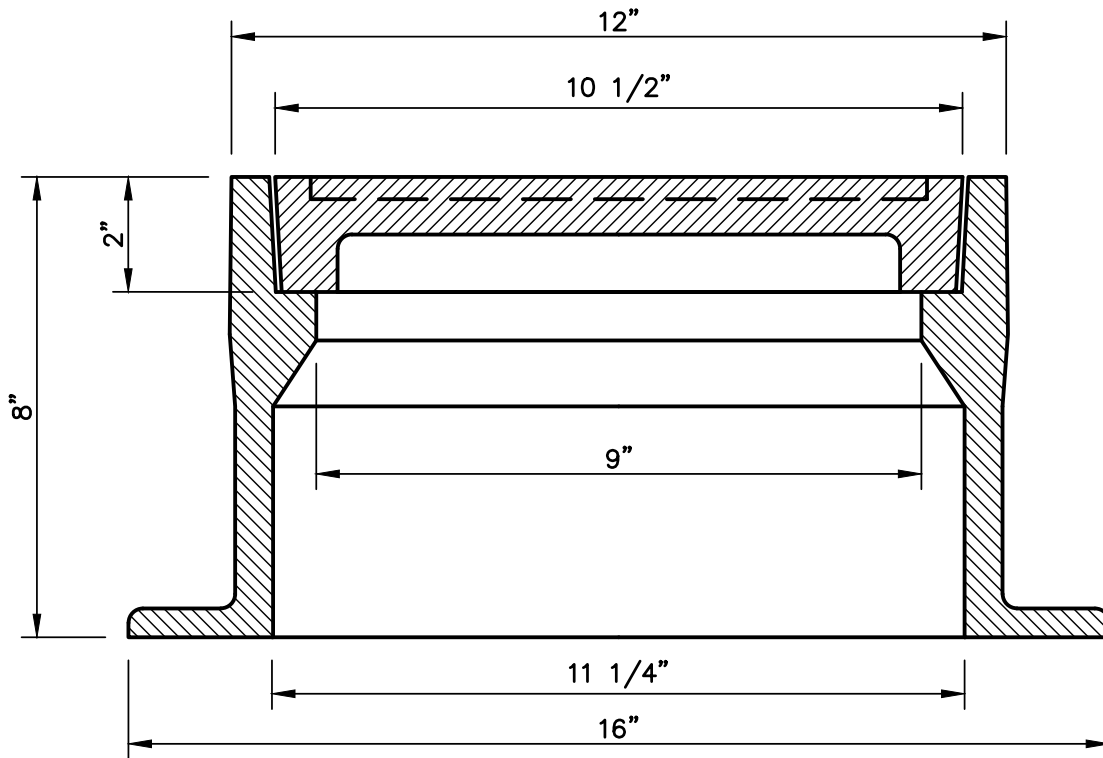
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STANDARD DETAILS
**SERVICE LATERAL CONNECTION
 TO EXISTING SEWER MAIN**
 SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DATE	REVISIONS
2/18	DWG. CREATED
SCALE NO SCALE	DWG. NO. LAT-4



PLAN



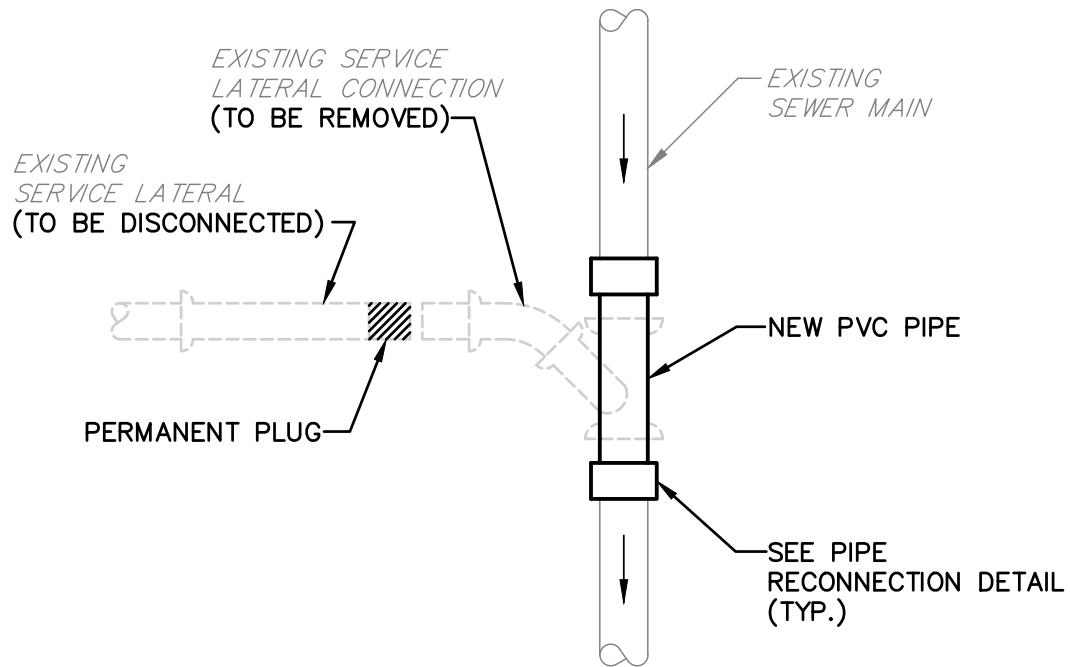
SECTION

FILE NAME: LAT-5-CLEANOUTCAP.dwg

STANDARD DETAILS
**CLEANOUT/TEST TEE
 CAP PROTECTION CASTING**

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DATE	REVISIONS
2/18	DWG. CREATED
SCALE NO SCALE	DWG. NO. LAT-5



PLAN

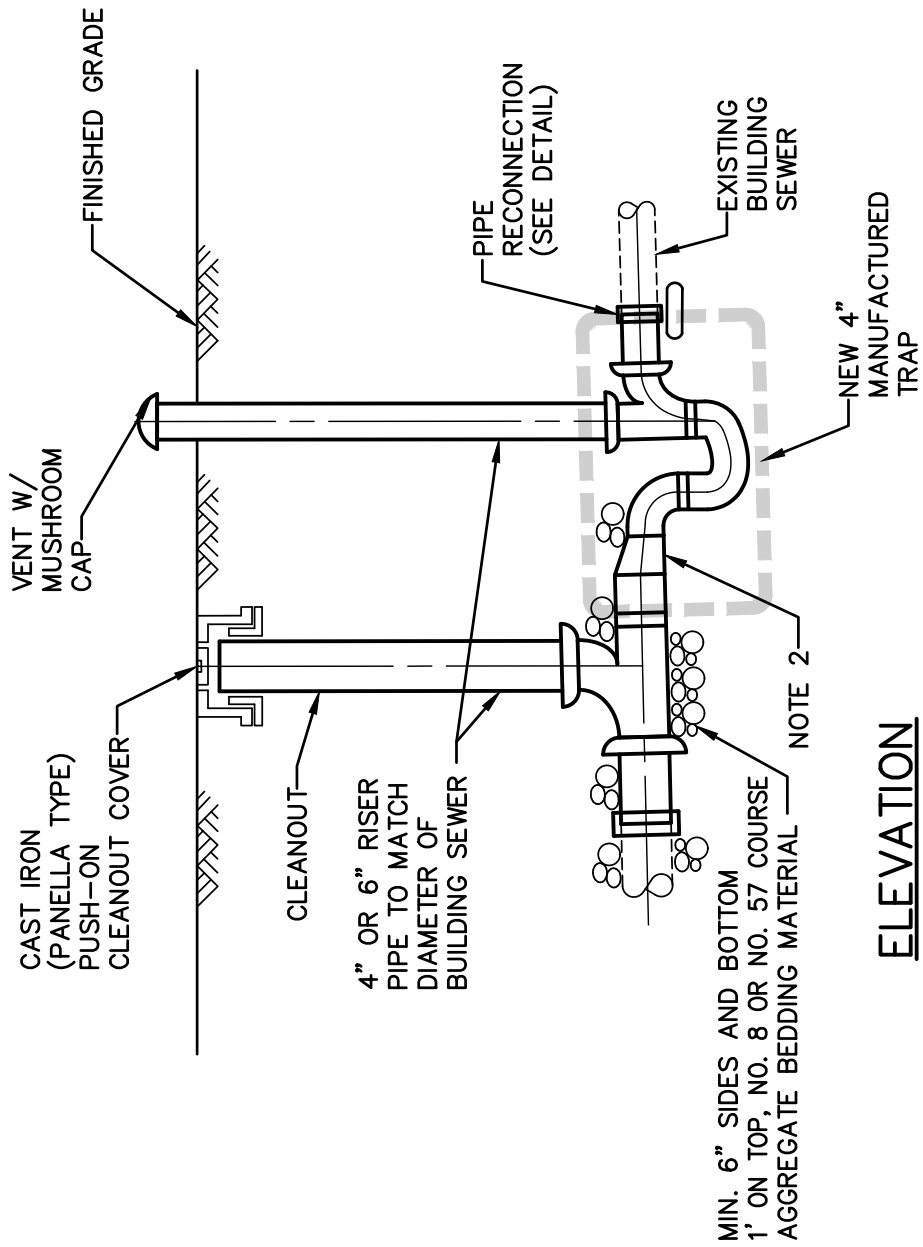
NOTES:

1. EXISTING MAIN SEWER TO BE SAW CUT.

FILE NAME: LAT-6-DISCONNECTION.dwg

STANDARD DETAILS
**SERVICE LATERAL DISCONNECTION
 FROM EXISTING SEWER MAIN**
 SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DATE	REVISIONS
2/18	DWG. CREATED
SCALE NO SCALE	DWG. NO. LAT-6



ELEVATION

- NOTES:**
1. PIPE SIZES AND MATERIALS TO BE IN ACCORDANCE WITH AUTHORITY REQUIREMENTS.
 2. FOR 4" BUILDING SEWER, USE ECCENTRIC 4"x6" ADAPTER FITTING FOR TRANSITION TO SWEEPING TEE (4"x6" FLEXIBLE COUPLING NOT ALLOWED).
 3. ANY PIPE LESS THAN 3 FEET OF COVER, LOCATED IN A TRAFFIC OR DRIVEWAY AREA, SHALL BE CAST IRON OR DUCTILE IRON.

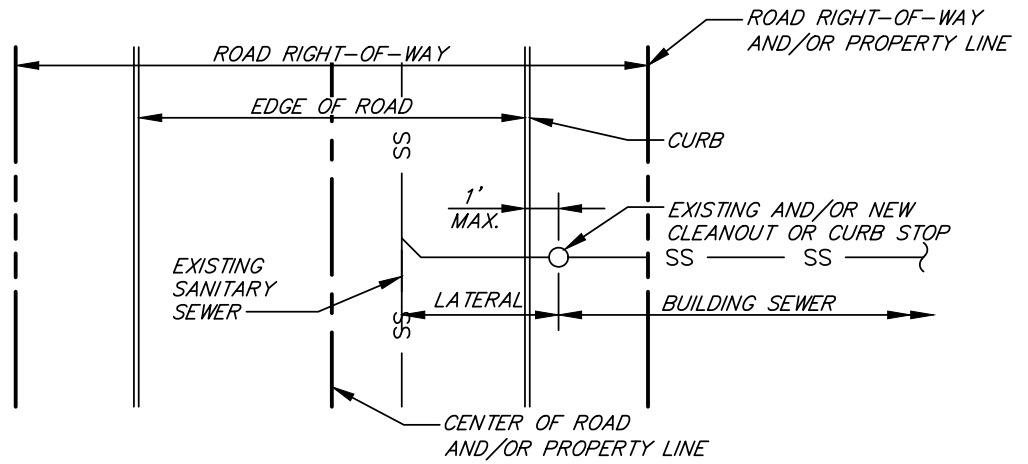
FILE NAME: LAT-7-CO-TRAP-VENT.dwg

STANDARD DETAILS

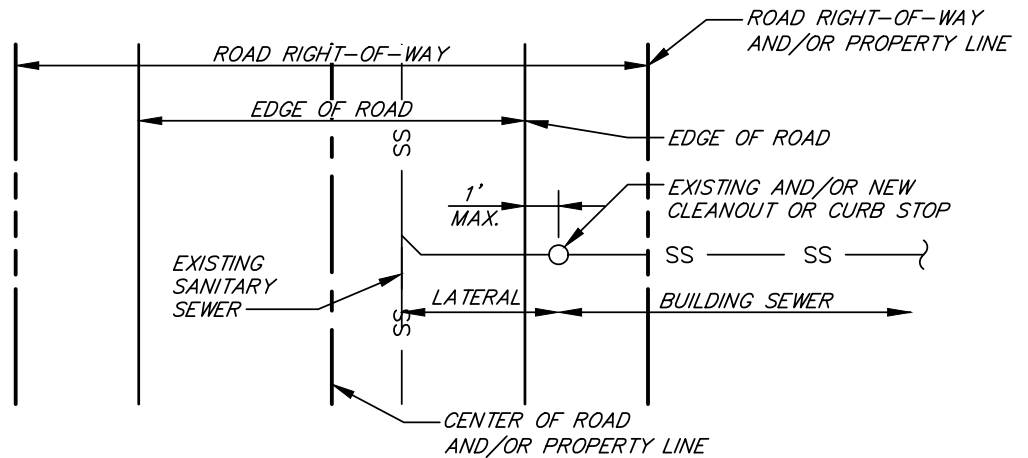
CLEANOUT/TRAP/VENT DETAIL

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

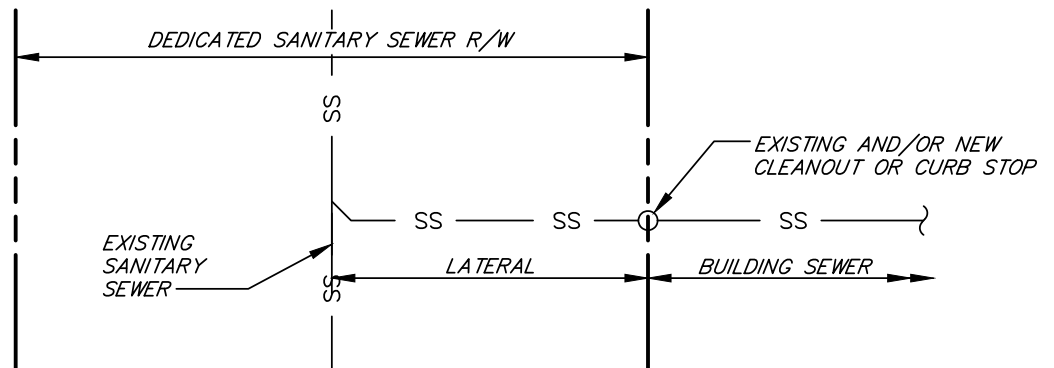
DATE	REVISIONS
2/18	DWG. CREATED
SCALE NO SCALE	DWG. NO. LAT-7



TYPICAL PLAN - CLEANOUT WITH CURB



TYPICAL PLAN - CLEANOUT WITH EDGE OF ROAD



TYPICAL PLAN - CLEANOUT IN DEDICATED SANITARY SEWER R/W

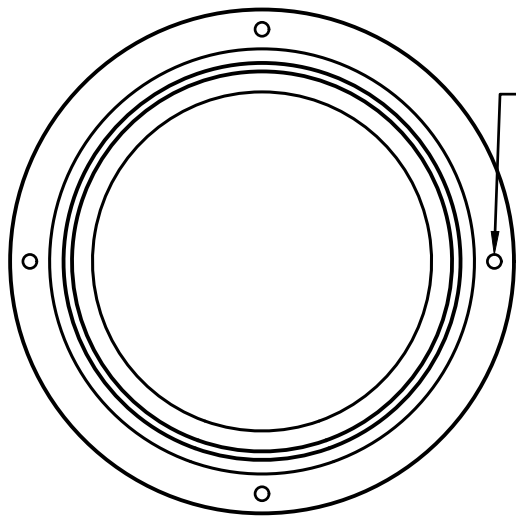
FILE NAME: LAT-8-CLEANOUT-LOC.dwg

STANDARD DETAILS

CLEANOUT LOCATION PLAN

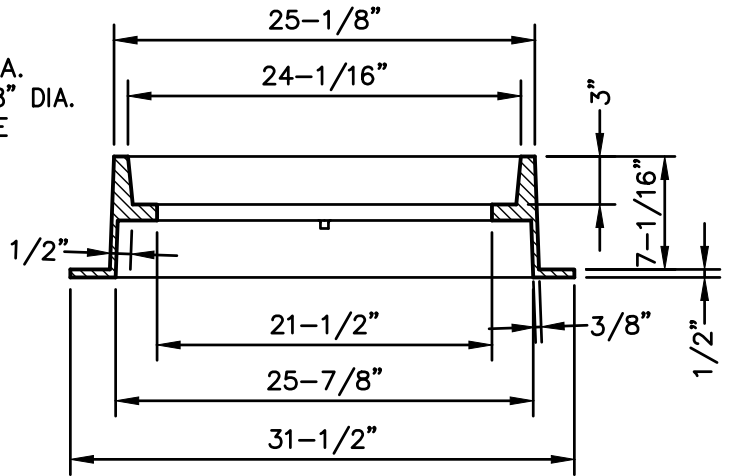
SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DATE	REVISIONS
2/18	DWG. CREATED
SCALE NO SCALE	DWG. NO. LAT-8



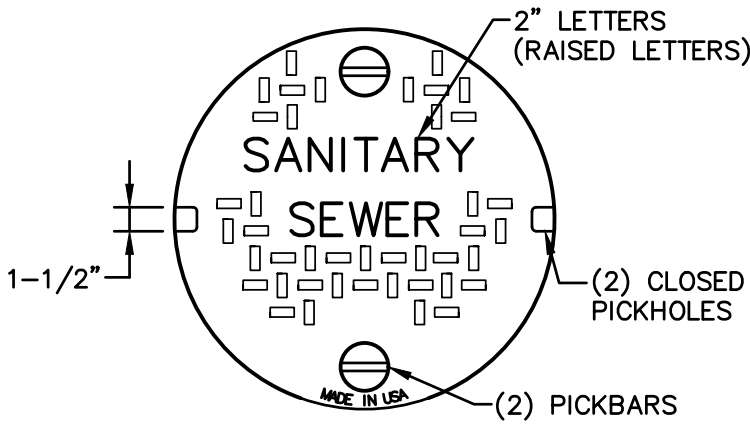
(4) 7/8" DIA.
HOLES ON 28" DIA.
BOLT CIRCLE

PLAN

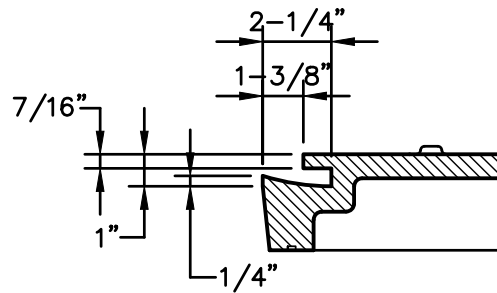


SECTION

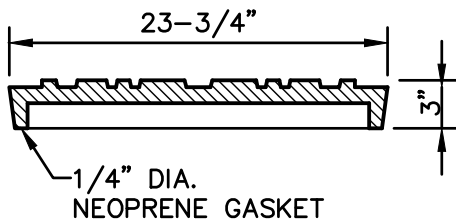
MANHOLE FRAME DETAIL



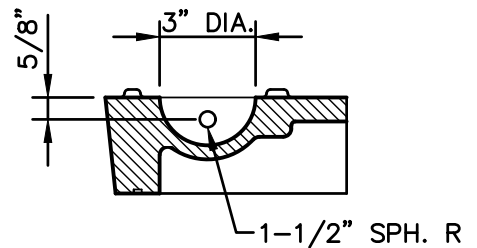
PLAN



PICKHOLE DETAIL



SECTION



PICKBAR DETAIL

MANUFACTURER: EAST JORDON IRON WORKS - FRAME 1835Z1, COVER 1835A1GS

FILE NAME: MH-1-FRAME&COVER.dwg

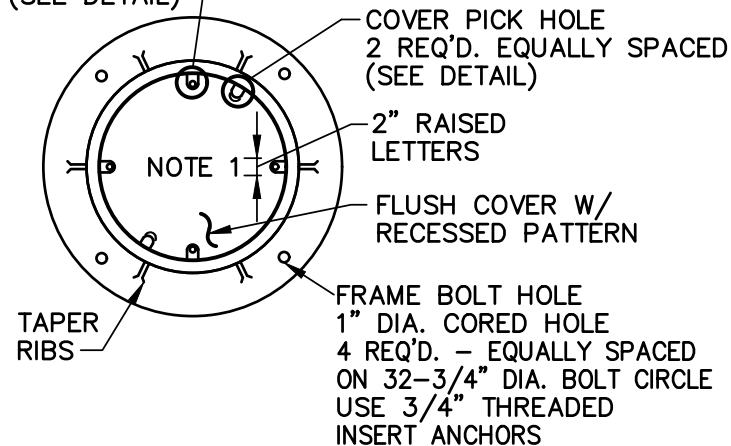
STANDARD DETAILS

**HEAVY DUTY SELF SEALING
MANHOLE FRAME AND COVER**

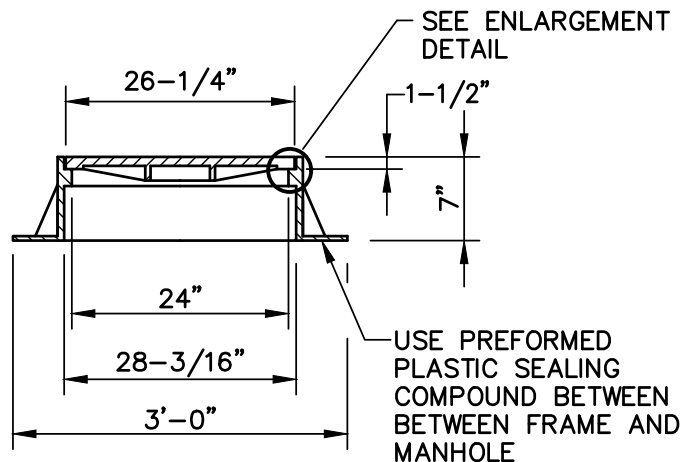
SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DATE	REVISIONS
2/18	DWG. CREATED
SCALE NO SCALE	DWG. NO. MH-1

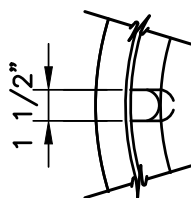
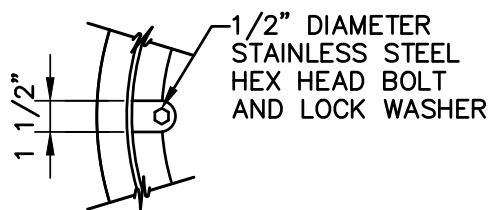
COVER BOLT HOLE—FOR WATERTIGHT COVERS
 4 REQ'D. EQUALLY SPACED—NOT REQUIRED
 WHEN USING STANDARD COVERS
 (SEE DETAIL)



PLAN

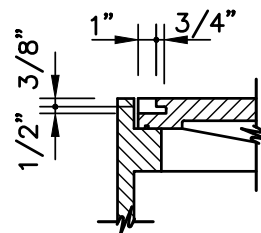


SECTIONAL ELEVATION

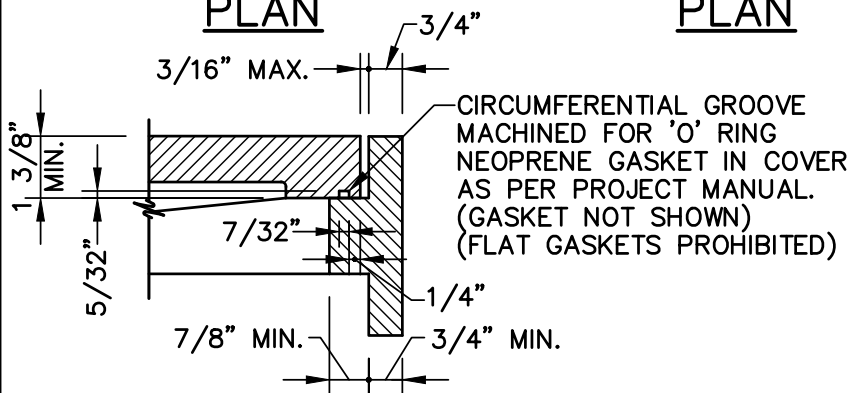


PLAN

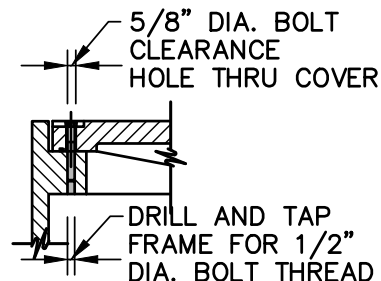
PLAN



SECTIONAL ELEVATION
 COVER PICK HOLE



ENLARGEMENT DETAIL



SECTIONAL ELEVATION
 COVER BOLT HOLE

NOTES:

1. LETTERING SHALL BE "SANITARY SEWER".
2. ALL MANHOLE FRAMES AND COVERS SHALL BE FOR HEAVY DUTY TRAFFIC, AASHTO HIGHWAY LOADING CLASS HS-20.
3. MANUFACTURER: EAST JORDAN IRON WORKS: FRAME - NO. 1045ZPT; COVER - NO. 1040APT (4 BOLT).
4. FRAME AND COVER TO HAVE BLACK ASPHALTIC COATINGS.

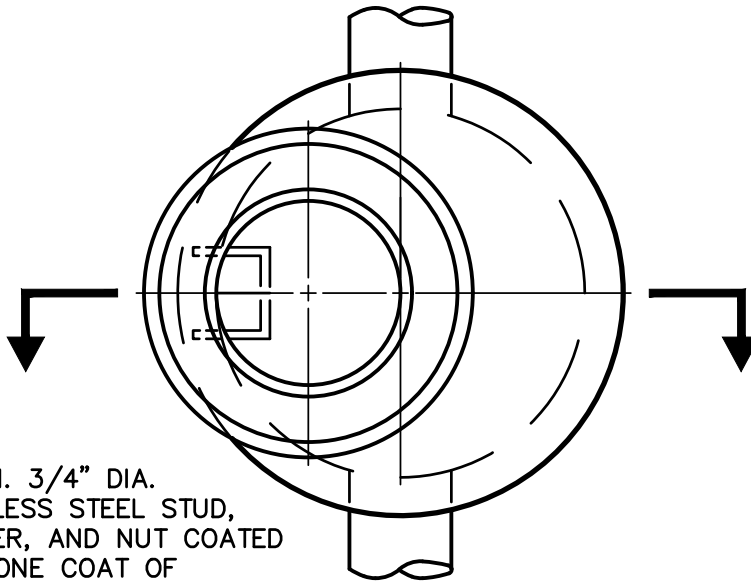
FILE NAME:MH-6-CASTIRON_WT.dwg

STANDARD DETAILS

**HEAVY DUTY WATER TIGHT
 MANHOLE FRAME AND COVER**

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DATE	REVISIONS
2/18	DWG. CREATED
SCALE NO SCALE	DWG. NO. MH-6

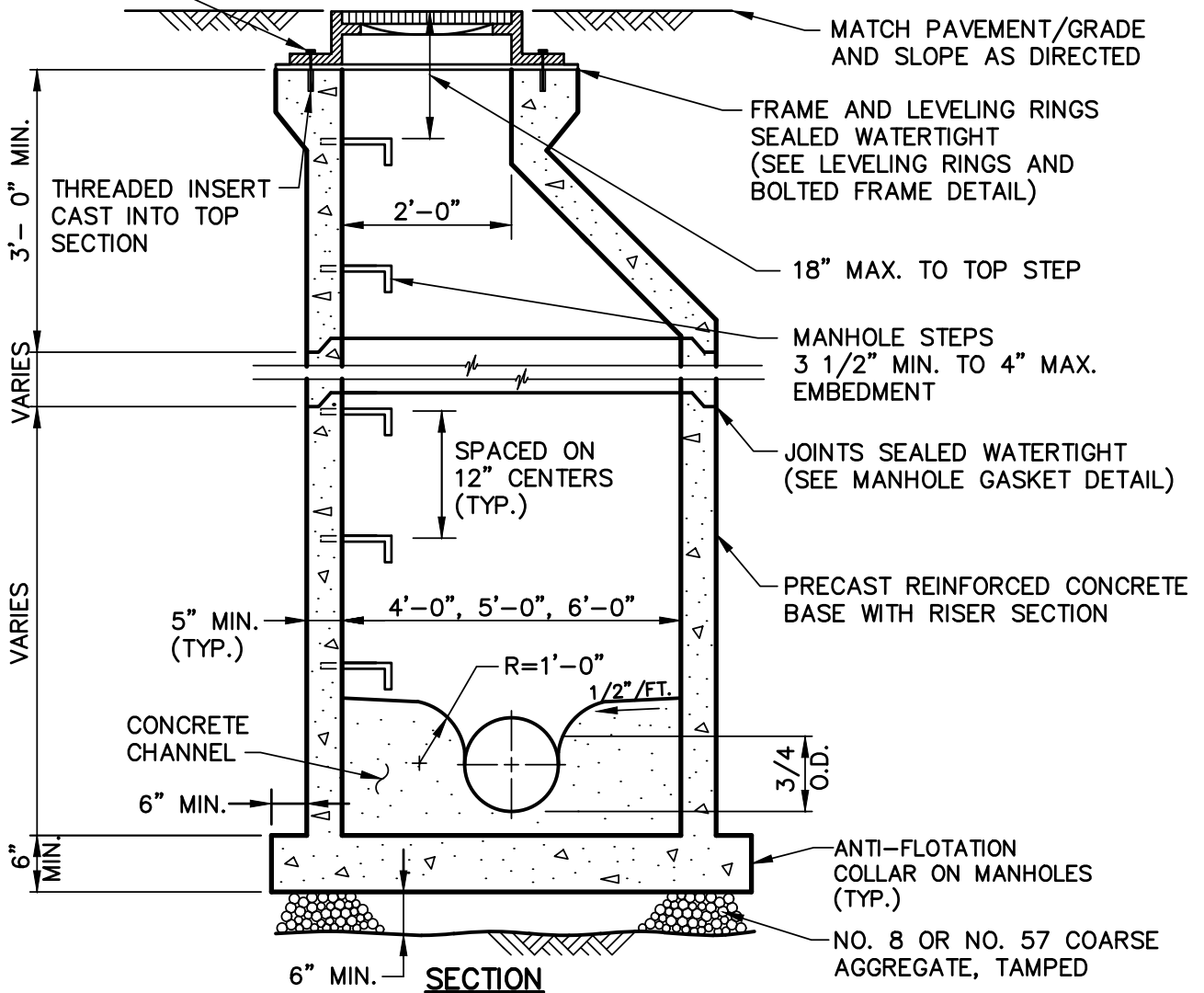


4" MIN. 3/4" DIA.
STAINLESS STEEL STUD,
WASHER, AND NUT COATED
WITH ONE COAT OF
STANDARD ASPHALT
INSTALLATION

PLAN

NOTES:

1. BOLTING OF MANHOLE FRAME AND COVER NOT REQUIRED FOR MANHOLES INSTALLED IN PAVED SURFACES.
2. ALL STONE GRADATIONS ARE AASHTO CLASSIFICATION.
3. PIPES SHALL PROTRUDE 2" INSIDE MANHOLE WALL.
4. MANHOLE FRAMES SHALL BE SET WITH PREFORMED PLASTIC GASKET (RUB-R-NEK) PRIOR TO RESTORATION TO PREVENT FILTRATION.
5. MINIMUM DEPTH TO TOP OF PIPE WILL BE 8 FEET.



SECTION

FILE NAME:MH-3-PRECAST.dwg

STANDARD DETAILS

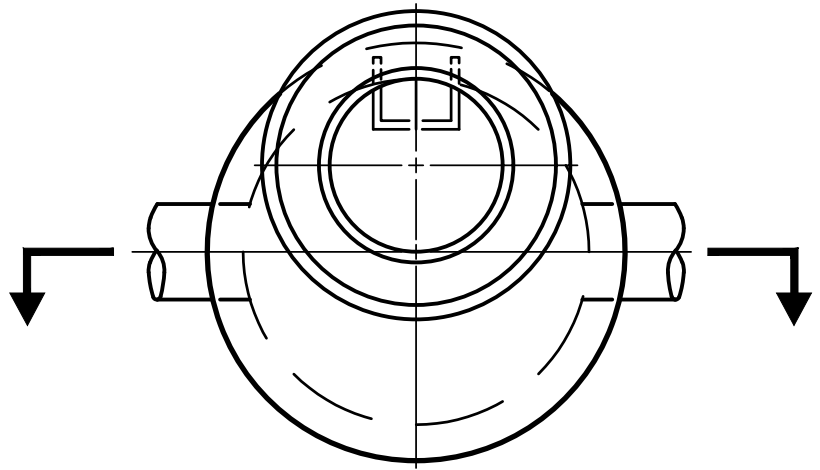
**PRECAST CONCRETE MANHOLE
WITH PRECAST CONCRETE BASE**

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DATE	REVISIONS
2/18	DWG. CREATED
SCALE NO SCALE	DWG. NO. MH-3

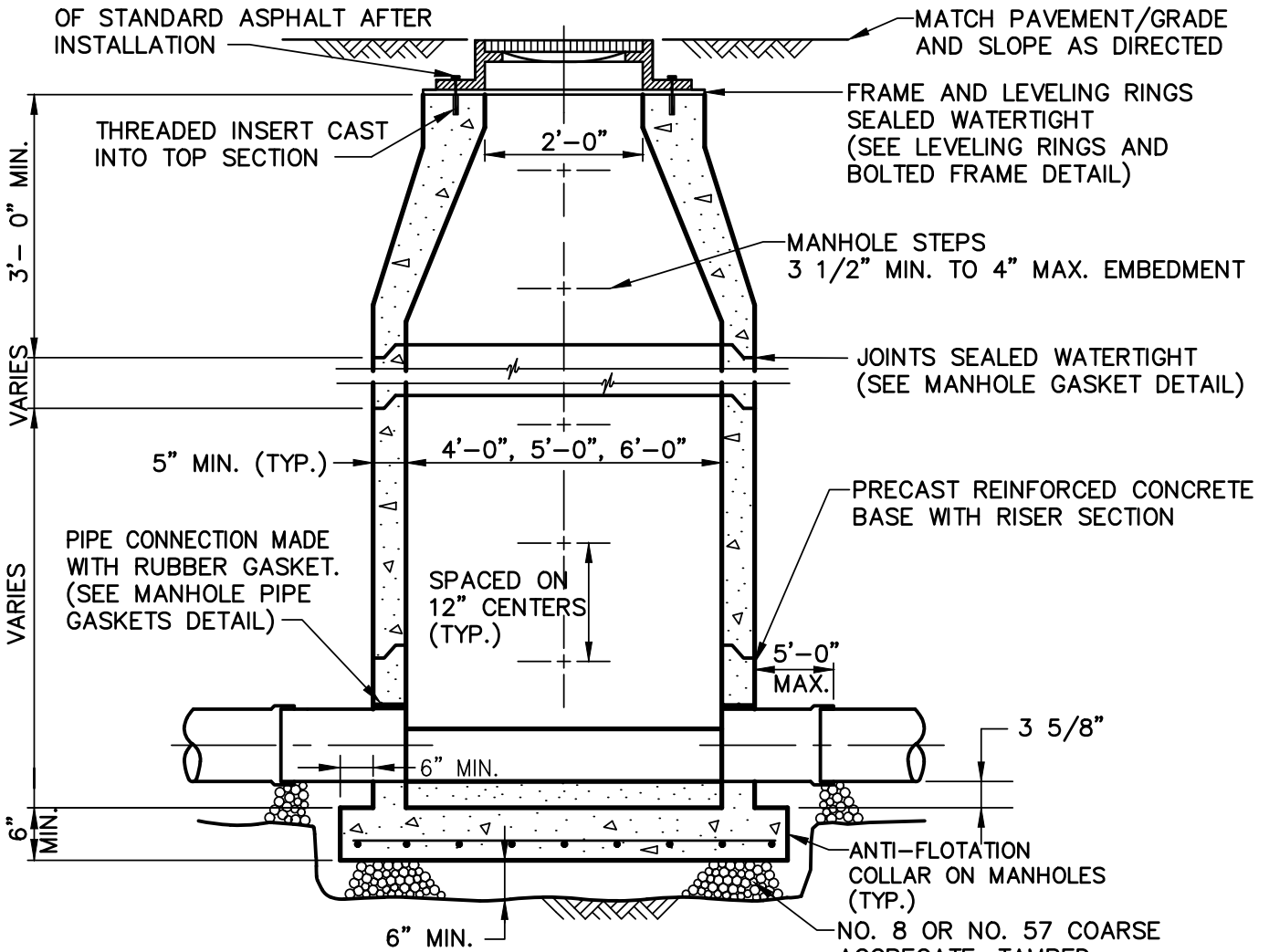
NOTES:

1. BOLTING OF MANHOLE FRAME AND COVER NOT REQUIRED FOR MANHOLES INSTALLED IN PAVED SURFACES.
2. ALL STONE GRADATIONS ARE AASHTO CLASSIFICATION.
3. PIPES SHALL PROTRUDE 2" INSIDE MANHOLE WALL.
4. MANHOLE FRAMES SHALL BE SET WITH PREFORMED PLASTIC GASKET (RUB-R-NEK) PRIOR TO RESTORATION TO PREVENT FILTRATION.
5. MINIMUM DEPTH TO TOP OF PIPE WILL BE 8 FEET.



PLAN

4" MIN. 3/4" DIA. STAINLESS STEEL STUD, WASHER, AND NUT COATED WITH ONE COAT OF STANDARD ASPHALT AFTER INSTALLATION



SECTION

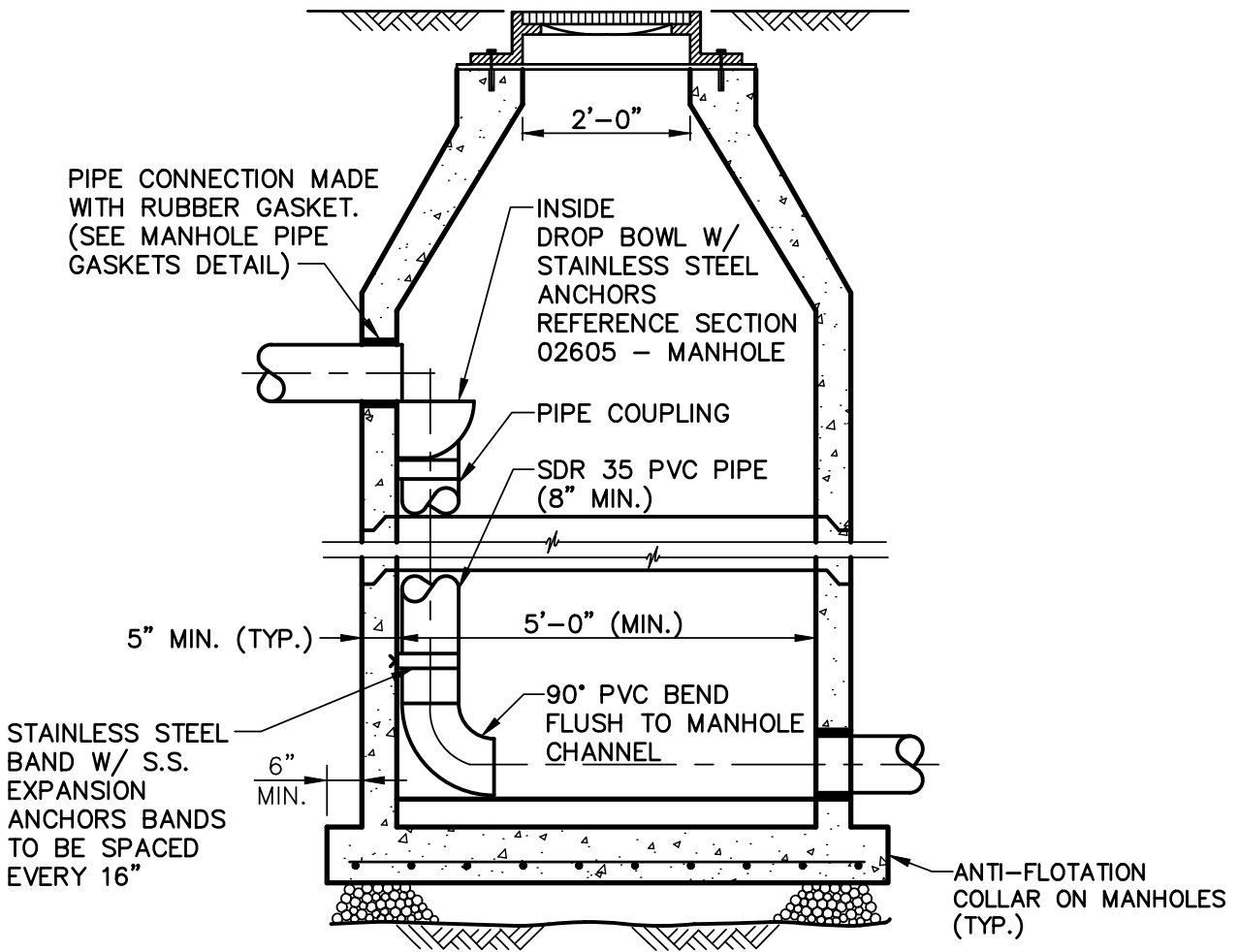
FILE NAME:MH-4-PRECAST.dwg

STANDARD DETAILS

PRECAST CONCRETE MANHOLE WITH PRECAST CONCRETE BASE

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DATE	REVISIONS
2/18	DWG. CREATED
SCALE NO SCALE	DWG. NO. MH-4



SECTION

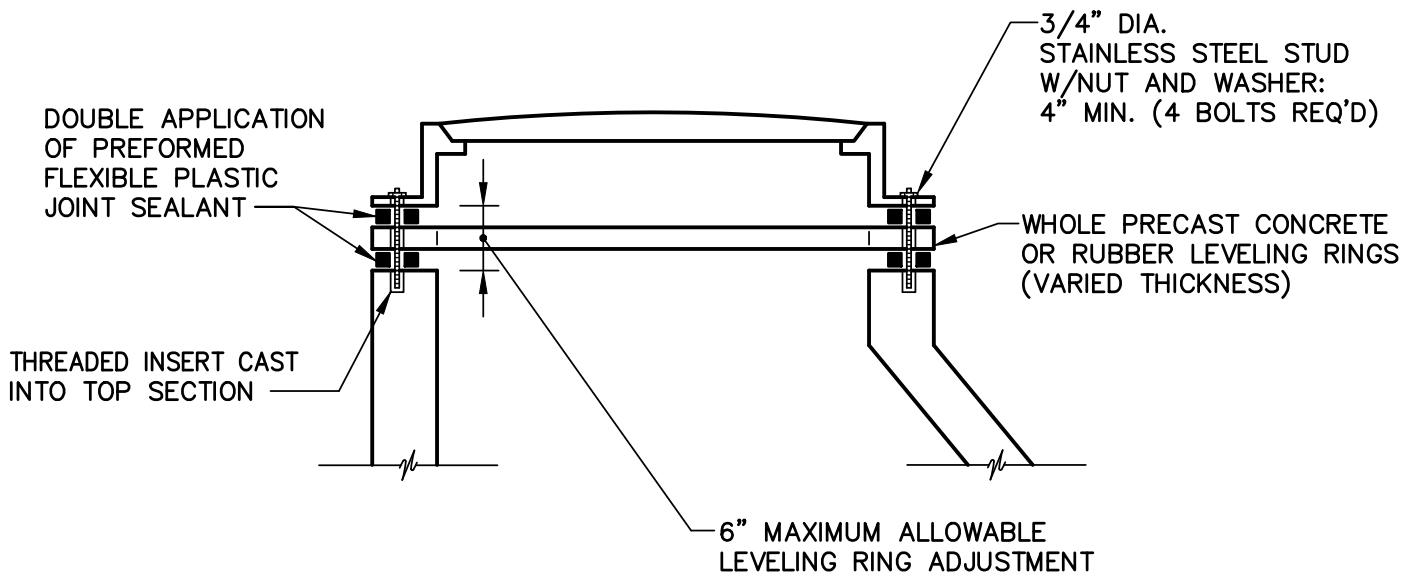
FILE NAME: MH-5-INSIDEDROP.dwg

STANDARD DETAILS

INSIDE DROP MANHOLE

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DATE	REVISIONS
2/18	DWG. CREATED
SCALE NO SCALE	DWG. NO. MH-5



SECTION

NOTES:

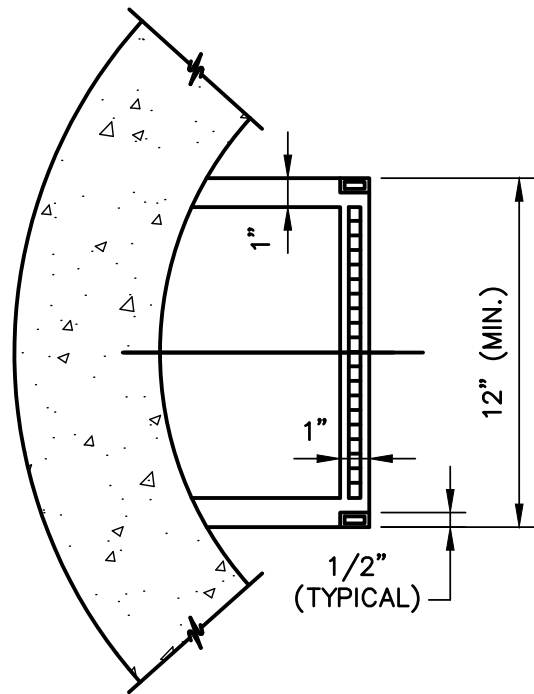
- 1. TO BE USED ONLY IN ROW AREAS. NOT TO BE USED IN PAVED AREAS.

FILE NAME: MH-6-BOLTEDFRAME.dwg

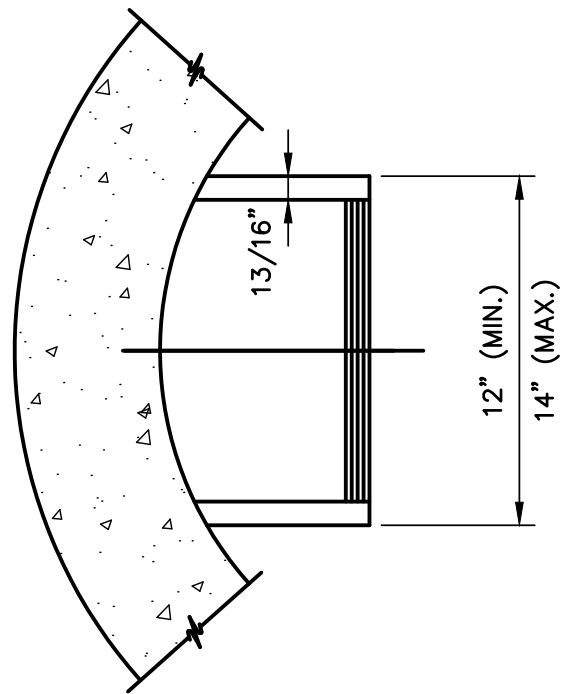
STANDARD DETAILS
**LEVELING RINGS AND BOLTED
 FRAME DETAILS**

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

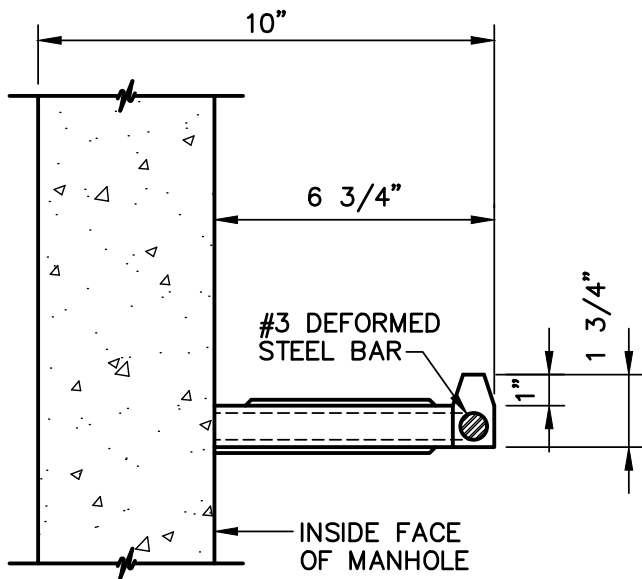
DATE	REVISIONS
2/18	DWG. CREATED
SCALE NO SCALE	DWG. NO. MH-6



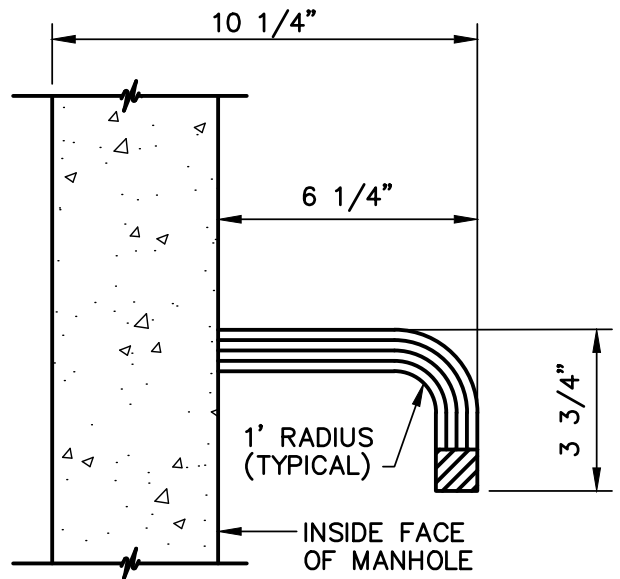
PLAN



PLAN



SECTIONAL ELEVATION
REINFORCED PLASTIC



SECTIONAL ELEVATION
ALUMINUM

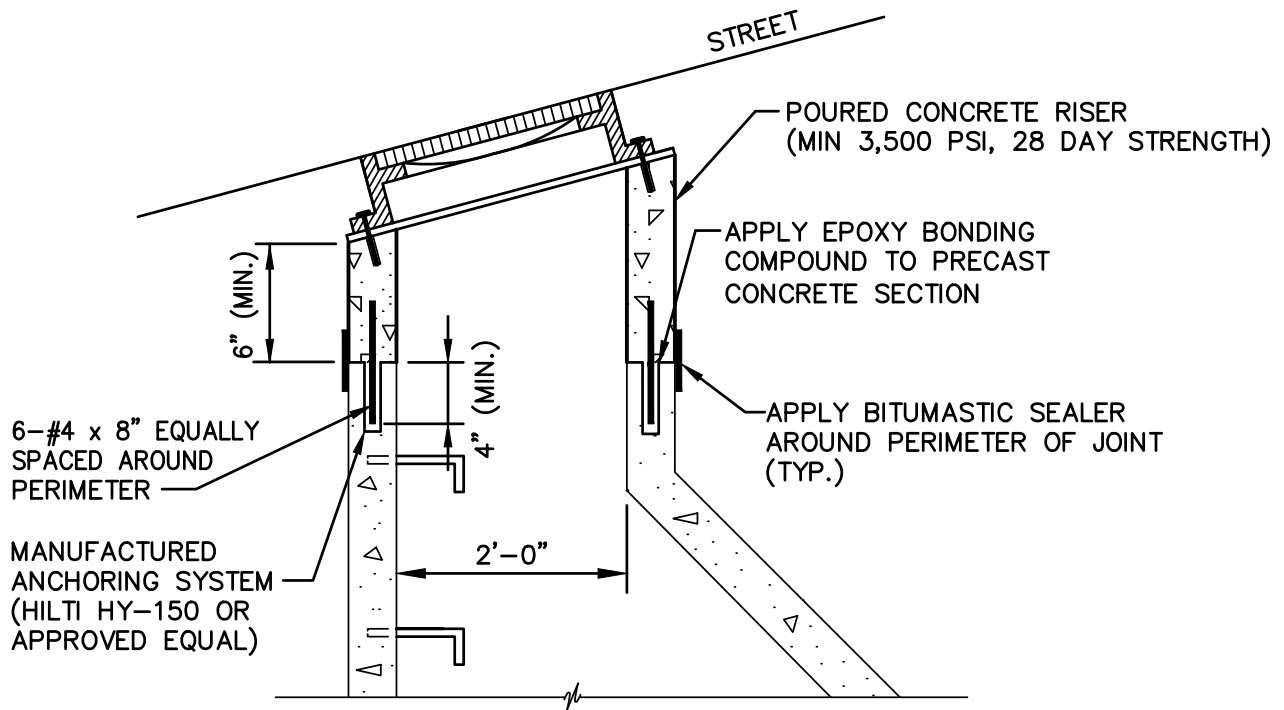
FILE NAME: MH-7-STEPS.dwg

STANDARD DETAILS

MANHOLE STEPS

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DATE	REVISIONS
2/18	DWG. CREATED
SCALE NO SCALE	DWG. NO. MH-7



SECTION

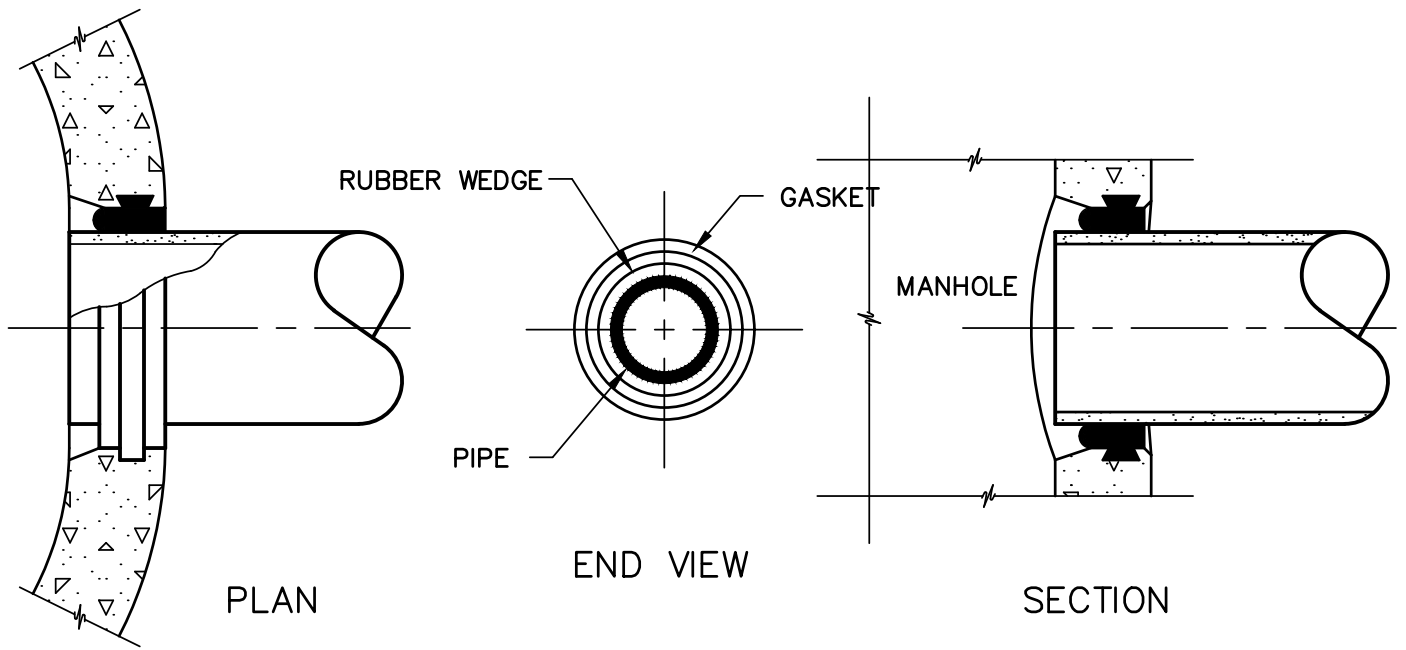
NOTES:

1. TO BE USED ONLY AFTER CONSULTATION WITH AUTHORITY OR IT'S ENGINEER WHERE SLOPES OF STREETS ARE 4% OR GREATER.
2. INSTALL EXTRA STEPS AS NECESSARY. MAX LENGTH TO FIRST STEP TO BE 18"

STANDARD DETAILS

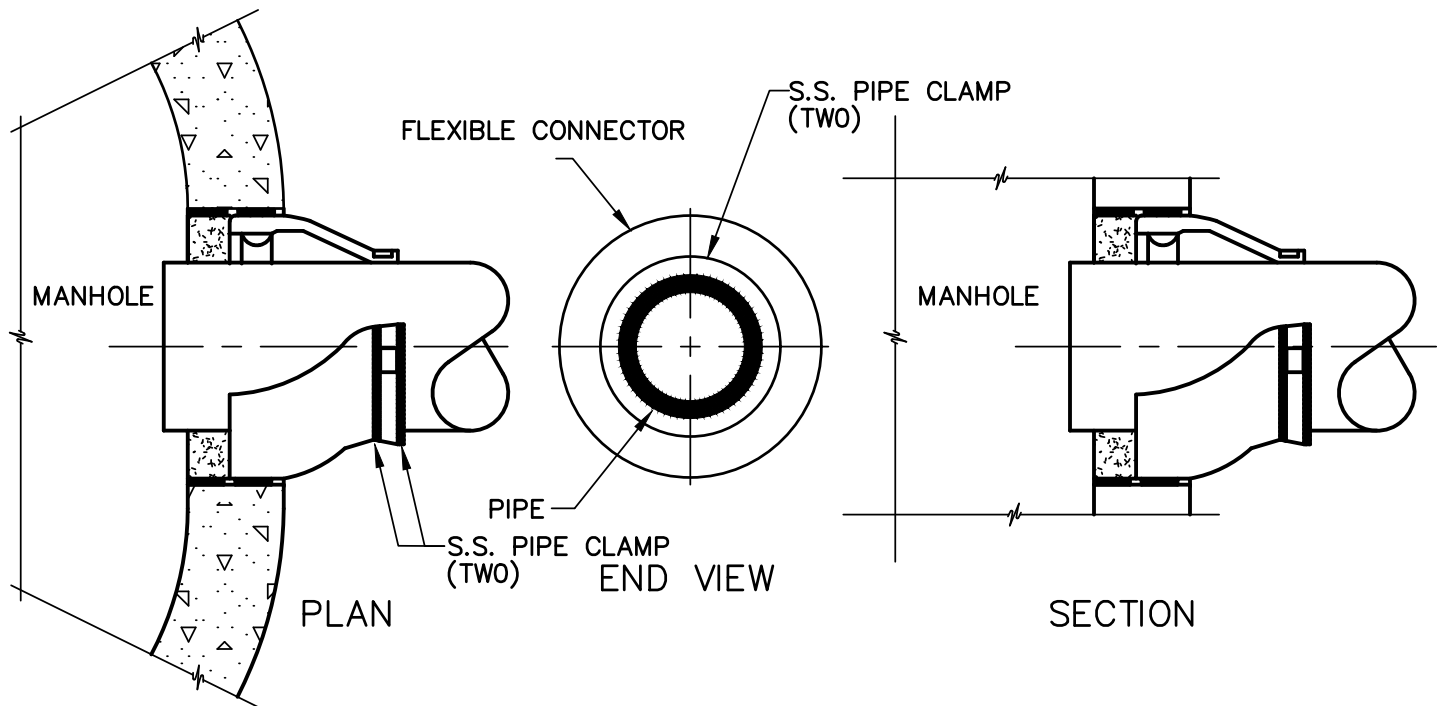
**POURED CONCRETE RISER FOR
STREET GRADES OF 2% OR GREATER**
SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DATE	REVISIONS
2/18	DWG. CREATED
SCALE NO SCALE	DWG. NO. MH-8



TYPE 1

RUBBER GASKET CAST INTO
PRECAST PIPE OPENINGS



TYPE 2

FLEXIBLE CONNECTOR WITH KORBAND
AND TWO STAINLESS STEEL CLAMPS

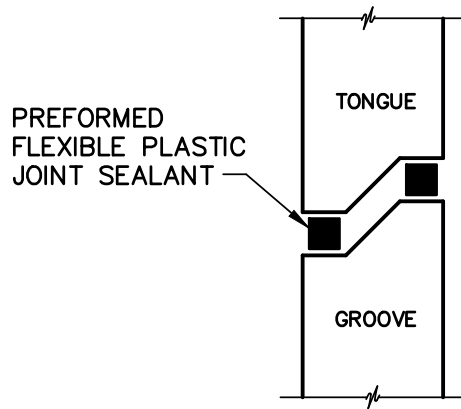
FILE NAME: MH-9-PIPEGASKETS.dwg

STANDARD DETAILS

MANHOLE PIPE GASKETS

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DATE	REVISIONS
2/18	DWG. CREATED
SCALE NO SCALE	DWG. NO. MH-9



SECTION

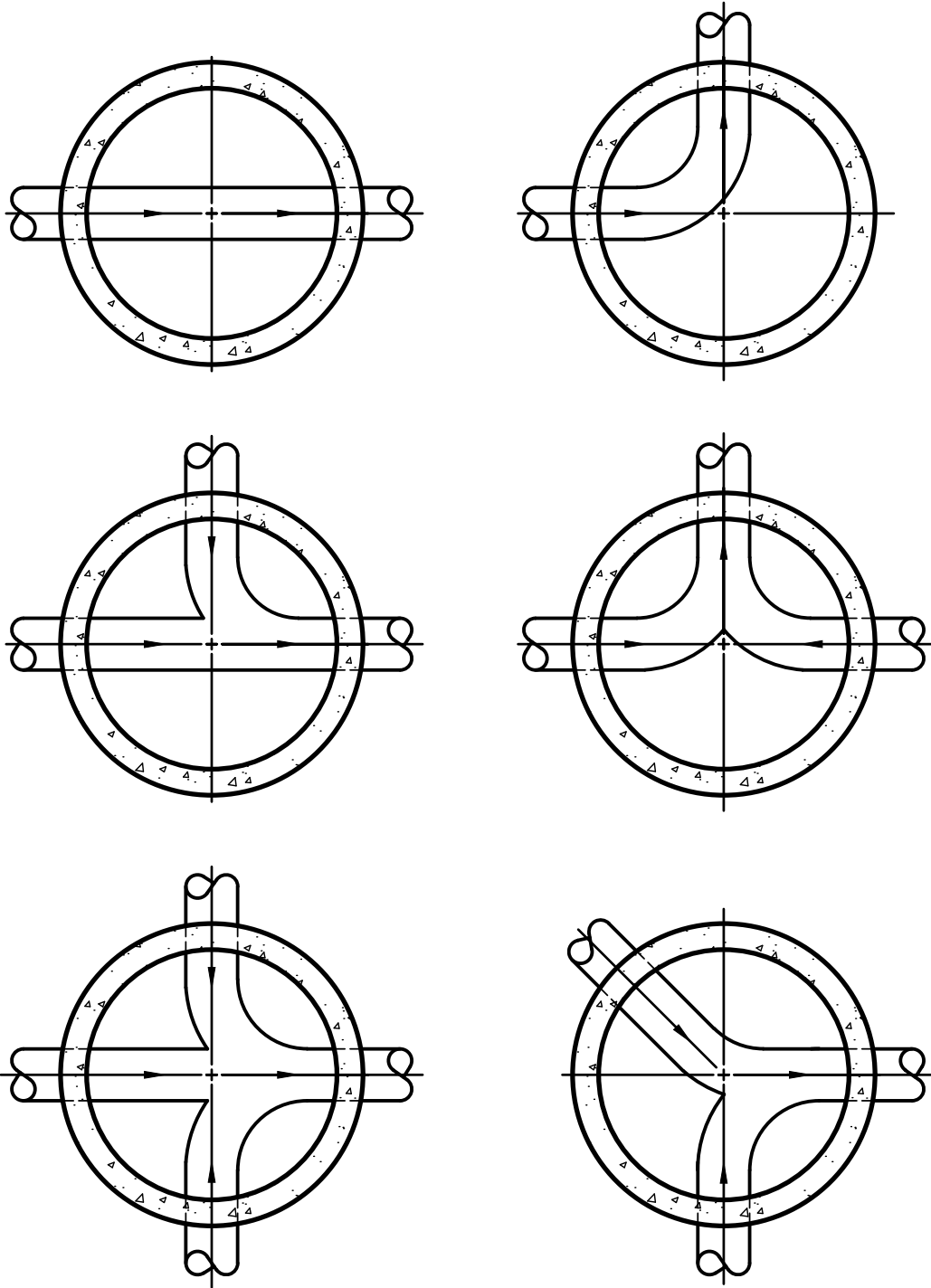
FILE NAME: MH-10-GASKET.dwg

STANDARD DETAILS

MANHOLE SECTION JOINT SEAL

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DATE	REVISIONS
2/18	DWG. CREATED
SCALE NO SCALE	DWG. NO. MH-10



NOTE:

1. IF ANGLES ARE LESS THAN 90 DEGREES
A 5 FOOT OR LARGER DIAMETER MANHOLE
WILL BE USED.

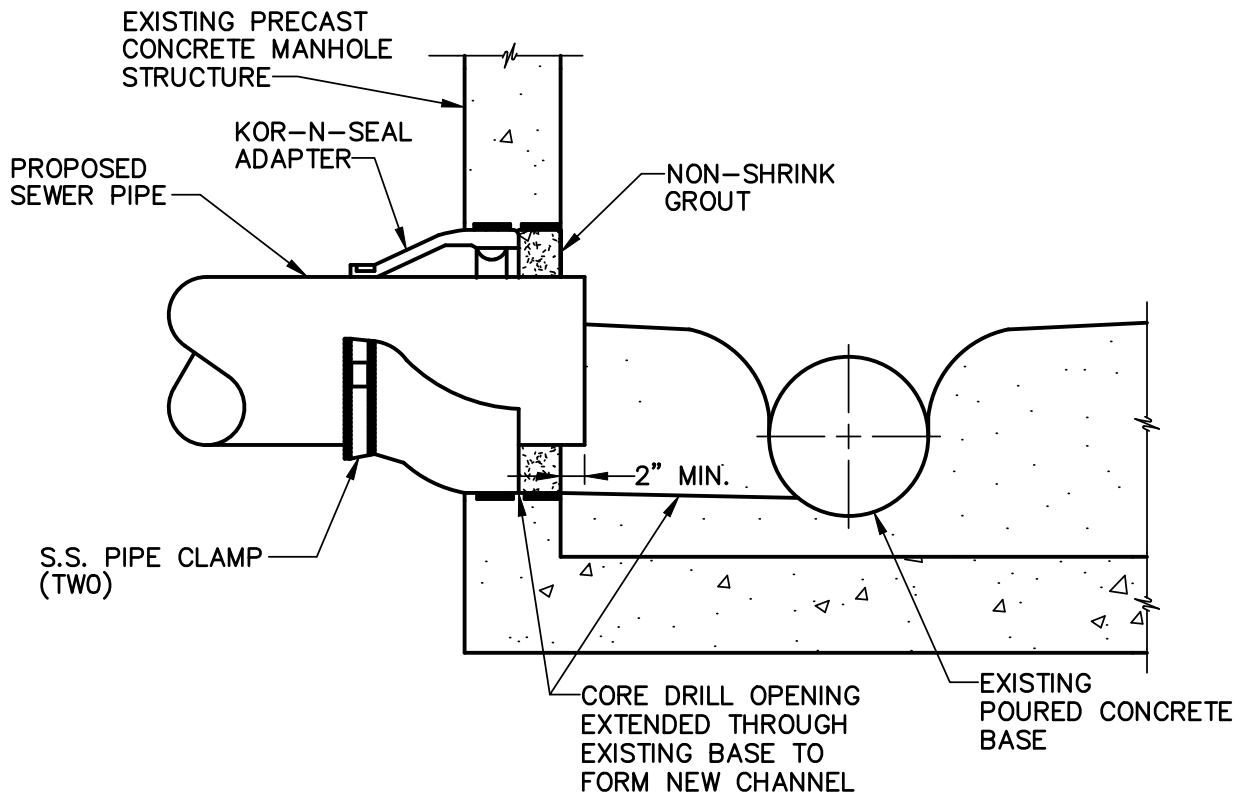
FILE NAME: MH-11-CHANNELS.dwg

STANDARD DETAILS

TYPICAL PLAN OF MANHOLE CHANNELS

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DATE	REVISIONS
2/18	DWG. CREATED
SCALE NO SCALE	DWG. NO. MH-11



KOR-N-SEAL DETAIL

NOTE:

1. NEW PIPE CHANNEL RECONSTRUCTION IN ACCORDANCE WITH AUTHORITY REQUIREMENTS.

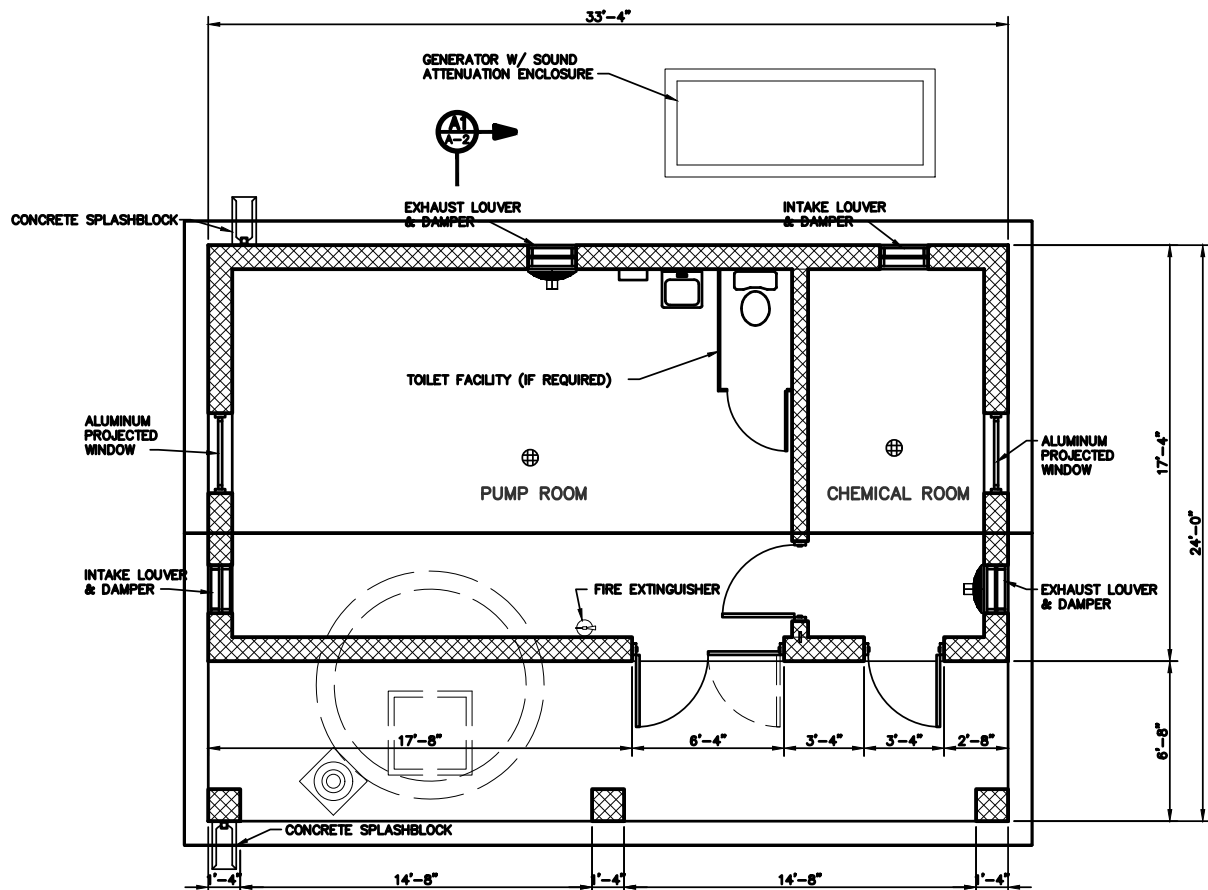
FILE NAME: MH-12-KORNSEAL.dwg

STANDARD DETAILS

MANHOLE PIPE ADAPTERS

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DATE	REVISIONS
2/18	DWG. CREATED
SCALE NO SCALE	DWG. NO. MH-12

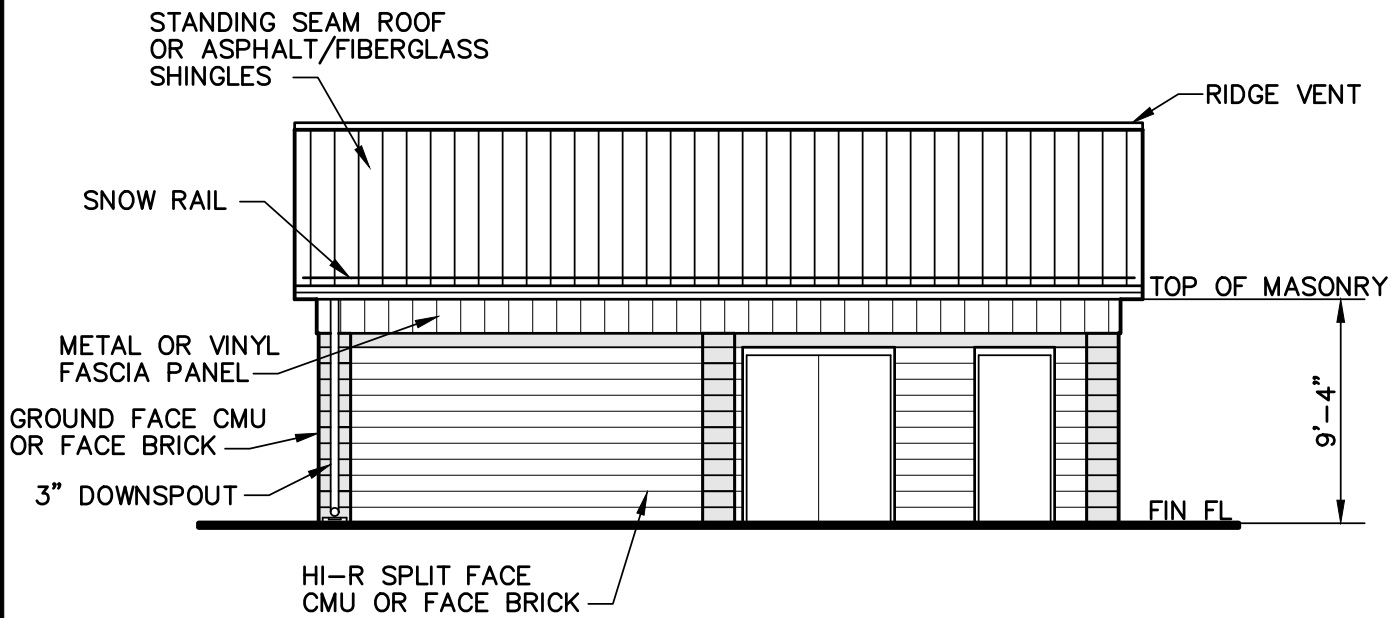


FILE NAME: PS-1-PUMP STATION.dwg

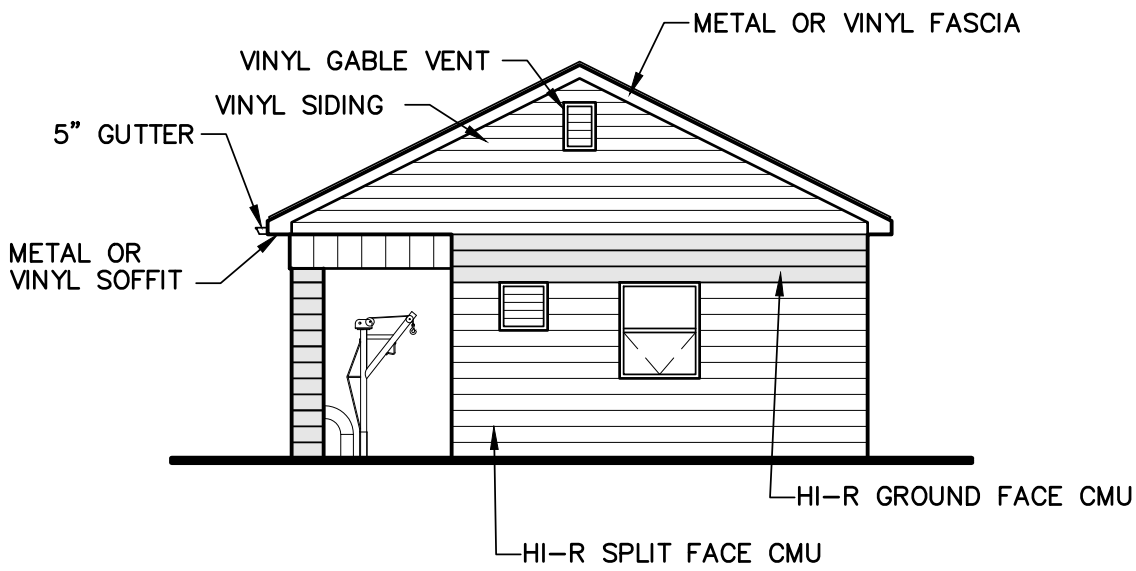
STANDARD DETAILS

TYPICAL PUMP STATION LAYOUT W/
TOILET FACILITIES & CHEMICAL ROOM
SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DATE	REVISIONS
2/18	DWG. CREATED
SCALE NO SCALE	DWG. NO. PS-1



FRONT



SIDE

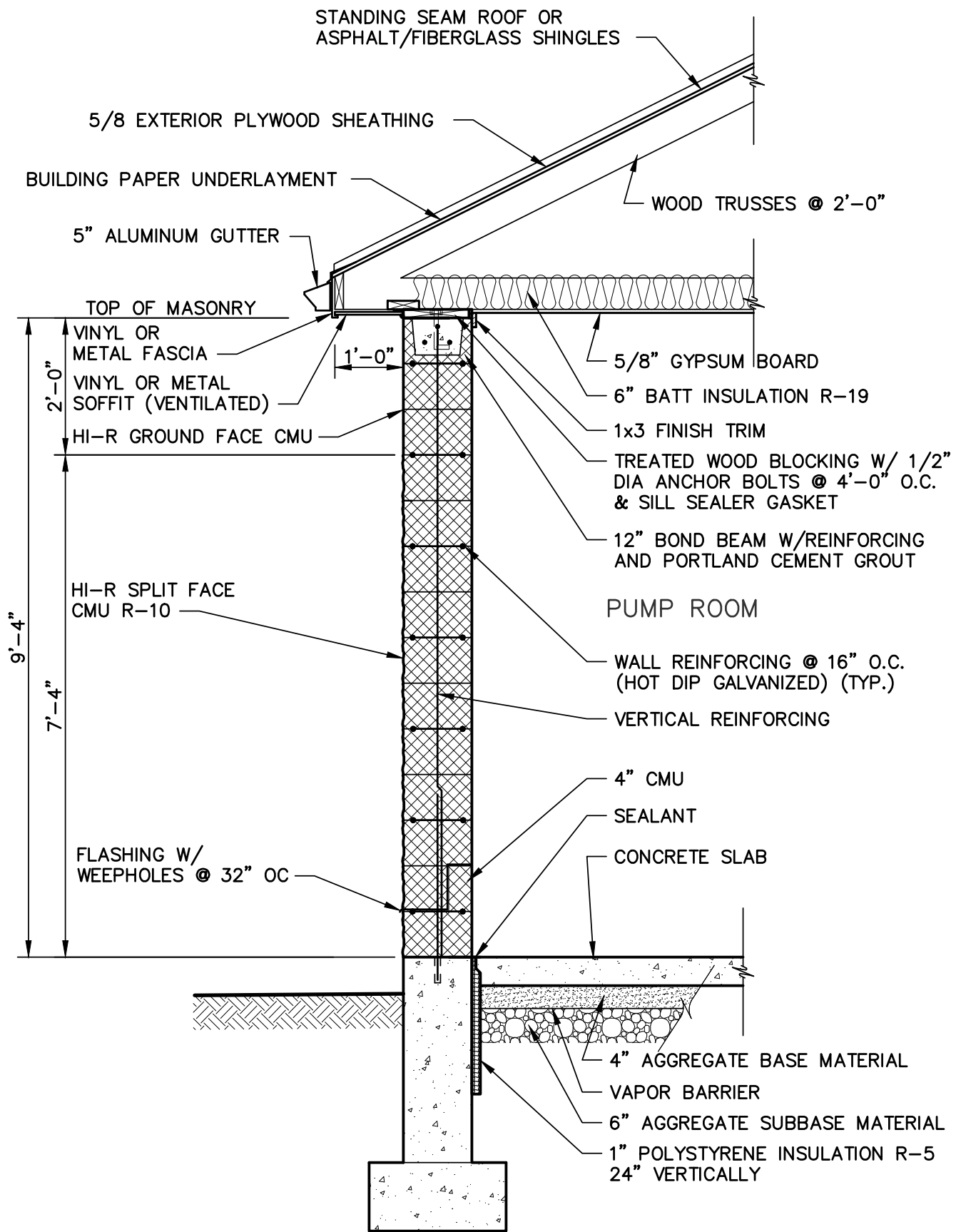
FILE NAME: PS-1-PUMP STATION.dwg

STANDARD DETAILS

TYPICAL PUMP STATION ELEVATIONS

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DATE	REVISIONS
2/18	DWG. CREATED
SCALE NO SCALE	DWG. NO. PS-2



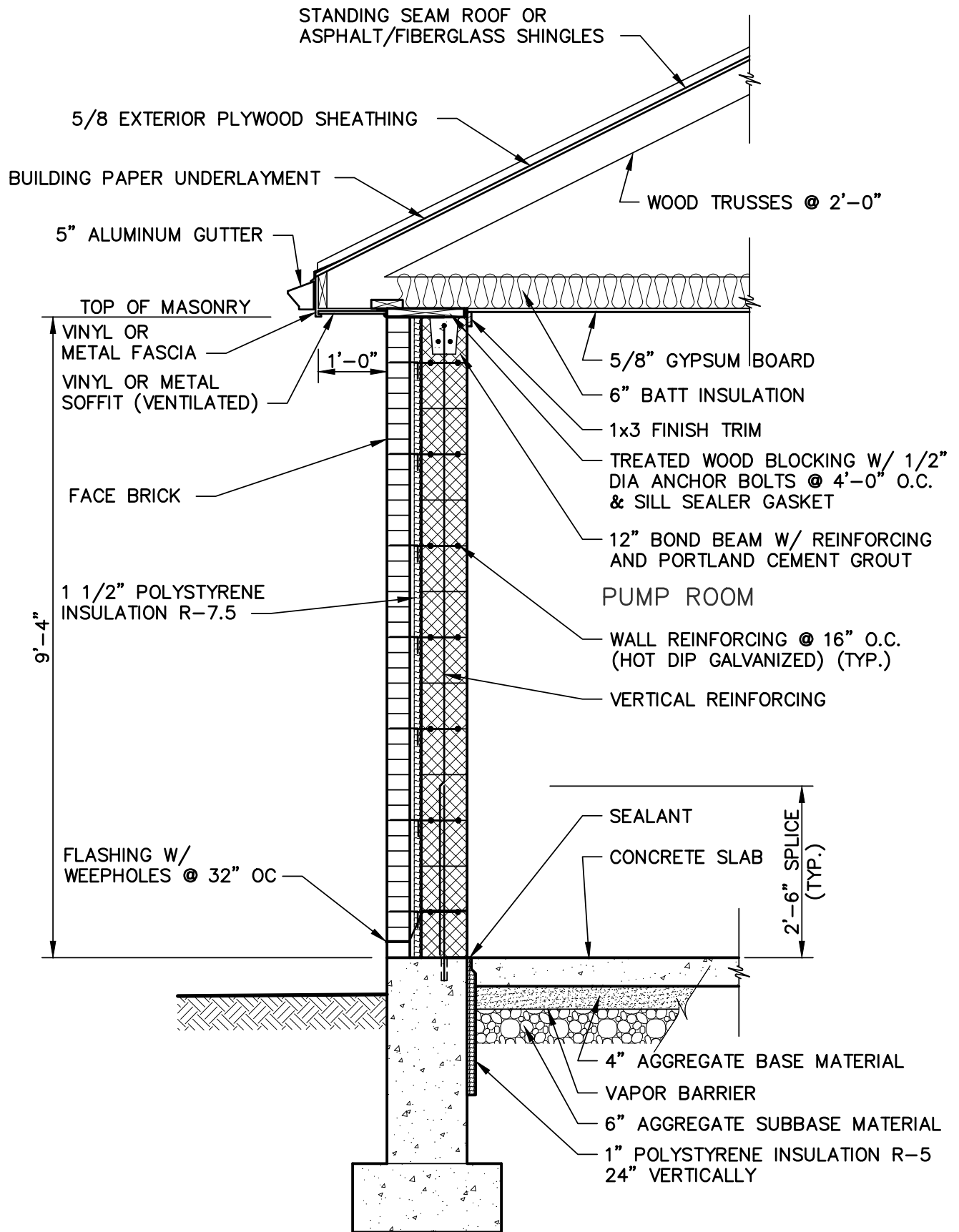
FILE NAME: PS-1-PUMP STATION.dwg

STANDARD DETAILS

PUMP STATION SPLIT FACE CMU SECTION

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DATE	REVISIONS
2/18	DWG. CREATED
SCALE NO SCALE	DWG. NO. PS-3



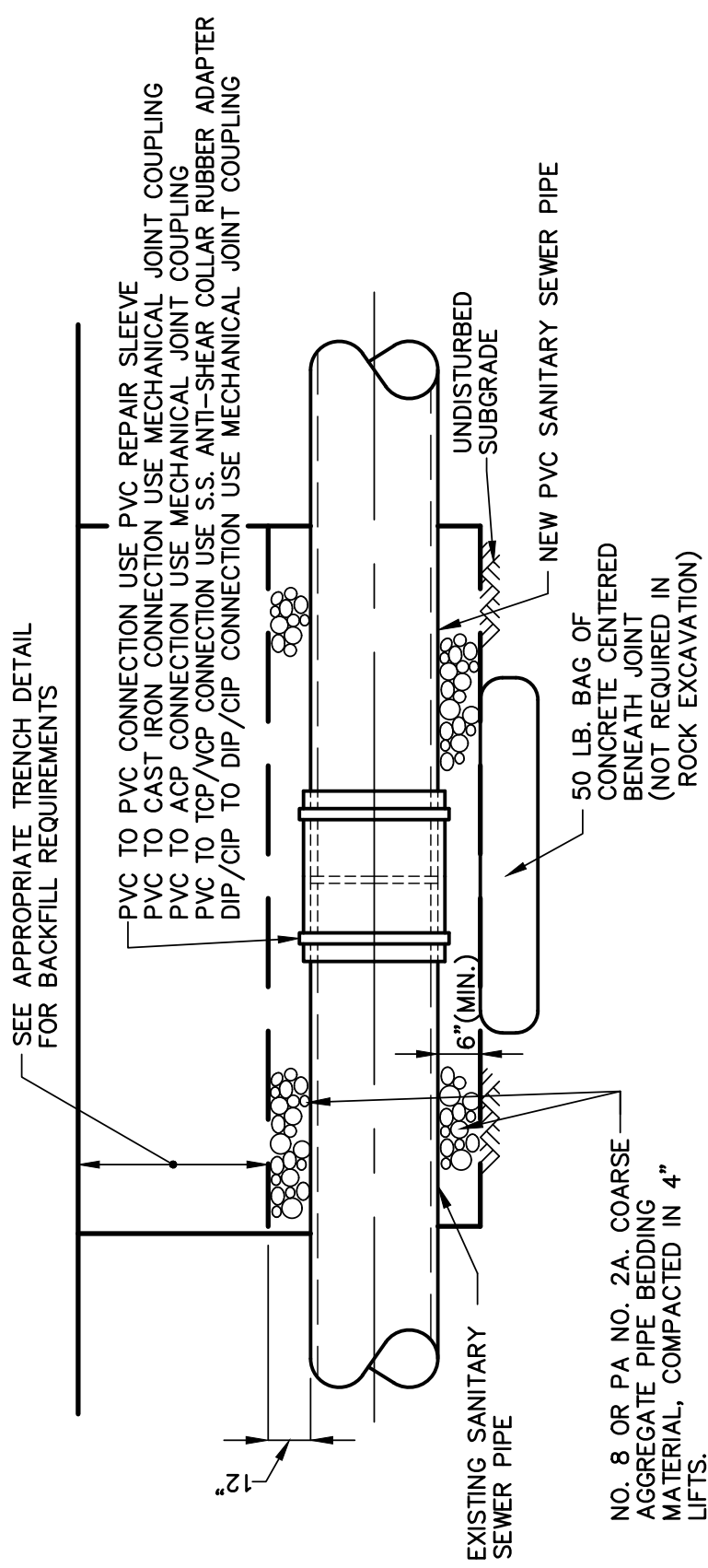
FILE NAME: PS-1-PUMP STATION.dwg

STANDARD DETAILS

PUMP STATION BRICK SECTION

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DATE	REVISIONS
2/18	DWG. CREATED
SCALE NO SCALE	DWG. NO. PS-4



NOTE: RECONNECTIONS TO BE AIR TESTED IN ACCORDANCE WITH SPECIFICATIONS.

MECHANICAL JOINT COUPLINGS TO BE SMITH-BLAIR OR APPROVED EQUAL

FILE NAME: SEW-1-PIPERECONN.dwg

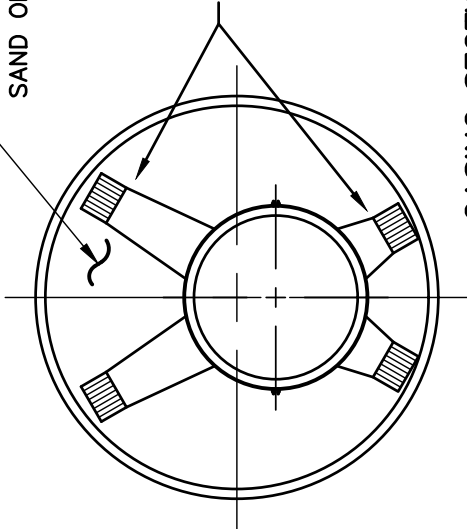
STANDARD DETAILS

PIPE RECONNECTION DETAIL

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DATE	REVISIONS
2/18	DWG. CREATED
SCALE NO SCALE	DWG. NO. SEW-1

CASING TO BE FILLED WITH SAND OR LIME STONE CHIPS



NON-CENTERED/RESTRAINED
PAINTED STEEL SPACERS
WITH GLASS REINFORCED
PLASTIC RUNNERS
OR
PRESSURE TREATED BLOCKING
W/ STAINLESS STEEL STRAPS

CASING SECTION

NO SCALE

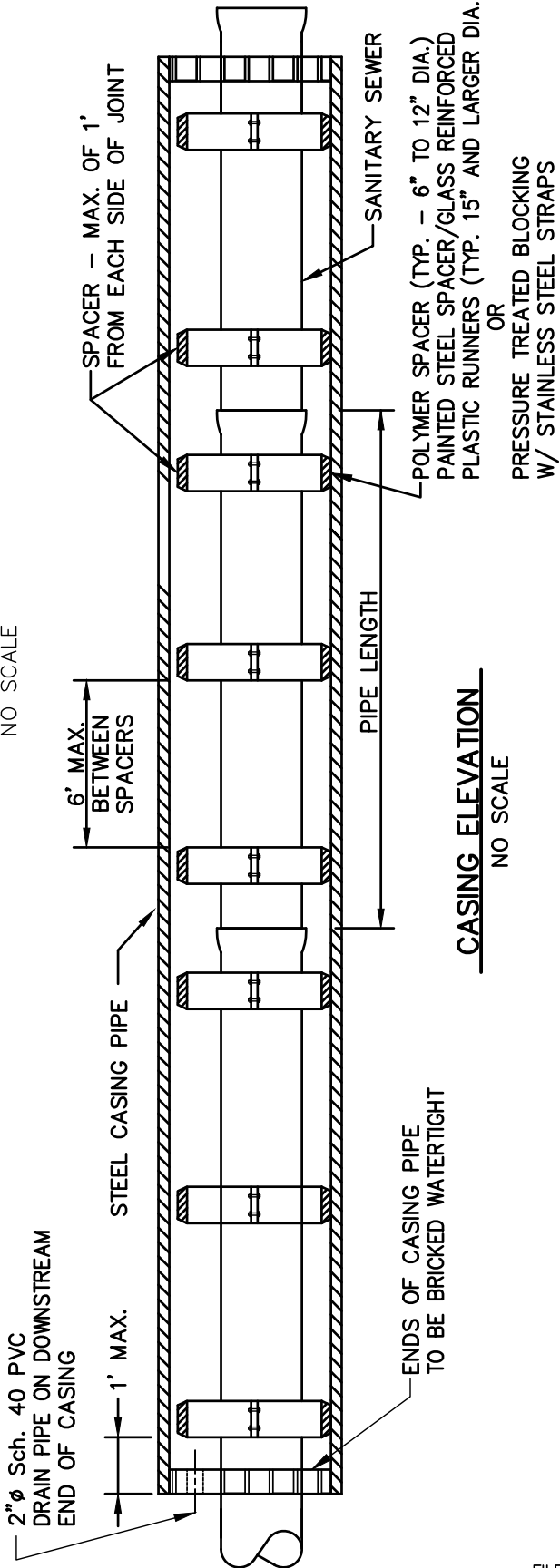
2" ϕ Sch. 40 PVC
DRAIN PIPE ON DOWNSTREAM
END OF CASING

1' MAX.

STEEL CASING PIPE

6' MAX.
BETWEEN
SPACERS

SPACER - MAX. OF 1'
FROM EACH SIDE OF JOINT



PIPE LENGTH

ENDS OF CASING PIPE
TO BE BRICKED WATERTIGHT

POLYMER SPACER (TYP. - 6" TO 12" DIA.)
PAINTED STEEL SPACER/GLASS REINFORCED
PLASTIC RUNNERS (TYP. 15" AND LARGER DIA.)

PRESSURE TREATED BLOCKING
W/ STAINLESS STEEL STRAPS

SANITARY SEWER

CASING ELEVATION

NO SCALE

NOTES:

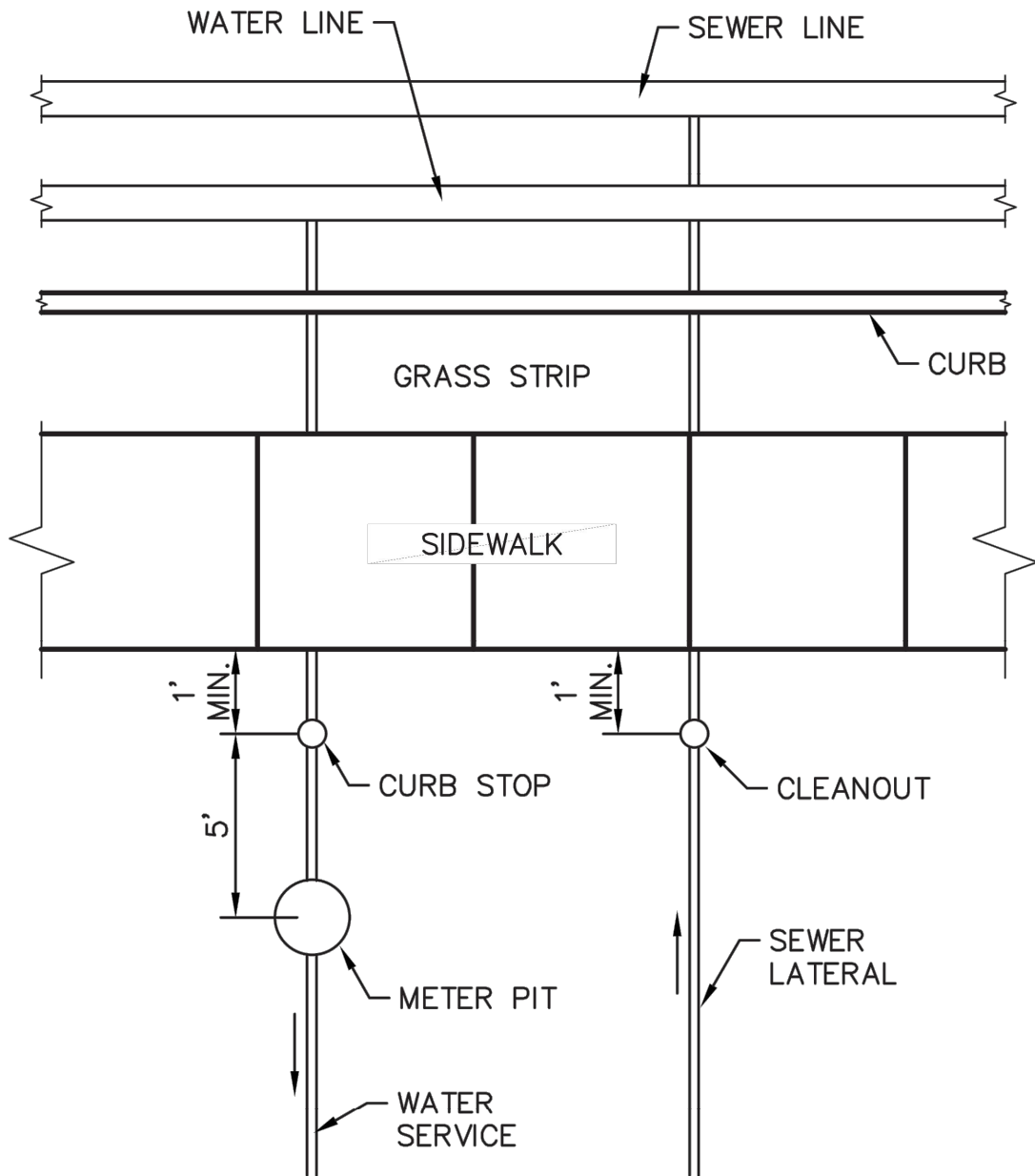
1. MINIMUM CASING SIZE WILL BE 36-INCH DIAMETER
2. CASING PIPE TO BE INSTALLED AT THE SAME SLOPE AS THE SANITARY SEWER

FILE NAME: SEW-2-PIPECASING.dwg

STANDARD DETAILS
**CASING DETAILS FOR PIPE
BORINGS/TUNNELS**

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DATE	REVISIONS
2/18	DWG. CREATED
SCALE NO SCALE	DWG. NO. SEW-2



SERVICE LINE CONNECTION DETAIL

N.T.S.

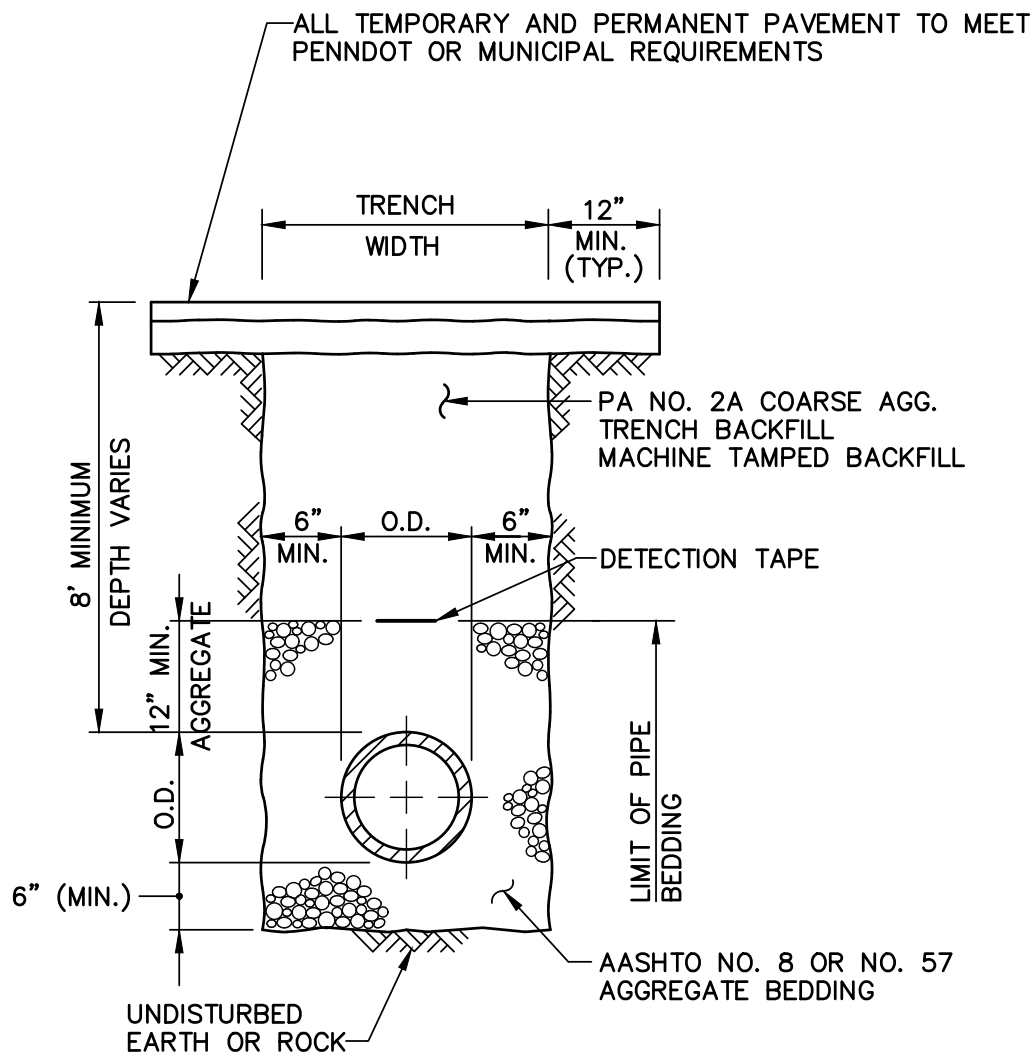
FILE NAME:W-S_CONNECTION.dwg

STANDARD DETAILS

SERVICE LINE CONNECTION DETAIL

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DATE	REVISIONS
5/21	DWG. CREATED
SCALE NO SCALE	DWG. NO. SEW-3



LOCAL ROADS

NOTES:

1. WHEN IN PAVED AREAS SUCH AS DRIVEWAYS OR PARKING LOTS, PAVING RESTORATION SHALL BE IN ACCORDANCE WITH CONTRACT DOCUMENTS.
2. NO BACKFILL MATERIAL LARGER THAN 6-INCHES WILL BE PROVIDED.
3. MINIMUM DEPTH OF COVER FOR FORCE MAIN WILL BE 5 FEET.
4. MINIMUM DEPTH OF COVER FOR GRAVITY SEWER WILL BE 8 FEET.
5. SLAG AND/OR SLAG MIXTURE WILL NOT BE ALLOWED AS BACKFILL.

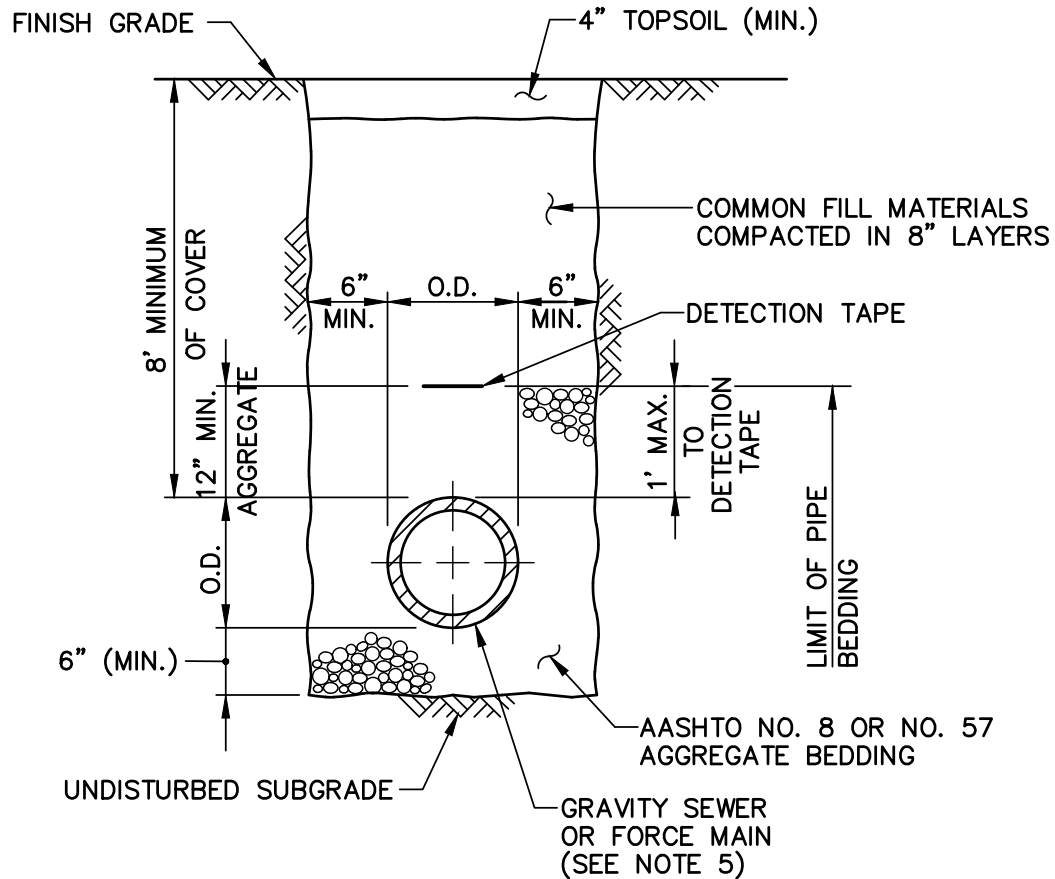
FILE NAME: TRENCH-1-PAVED.dwg

STANDARD DETAILS

TRENCH DETAIL IN PAVED AREAS

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DATE	REVISIONS
2/18	DWG. CREATED
SCALE NO SCALE	DWG. NO. TR-1



NOTES:

1. WHEN IN PAVED AREAS SUCH AS DRIVEWAYS OR PARKING LOTS, PAVING RESTORATION SHALL BE IN ACCORDANCE WITH CONTRACT DOCUMENTS.
2. NO BACKFILL MATERIAL LARGER THAN 6-INCHES WILL BE PROVIDED.
3. MINIMUM DEPTH OF COVER FOR FORCE MAIN WILL BE 5 FEET.
4. MINIMUM DEPTH OF COVER FOR GRAVITY SEWER WILL BE 8 FEET.
5. FOR FORCE MAIN SEE FORCE MAIN LOCATOR ASSEMBLY DETAIL FM-3.

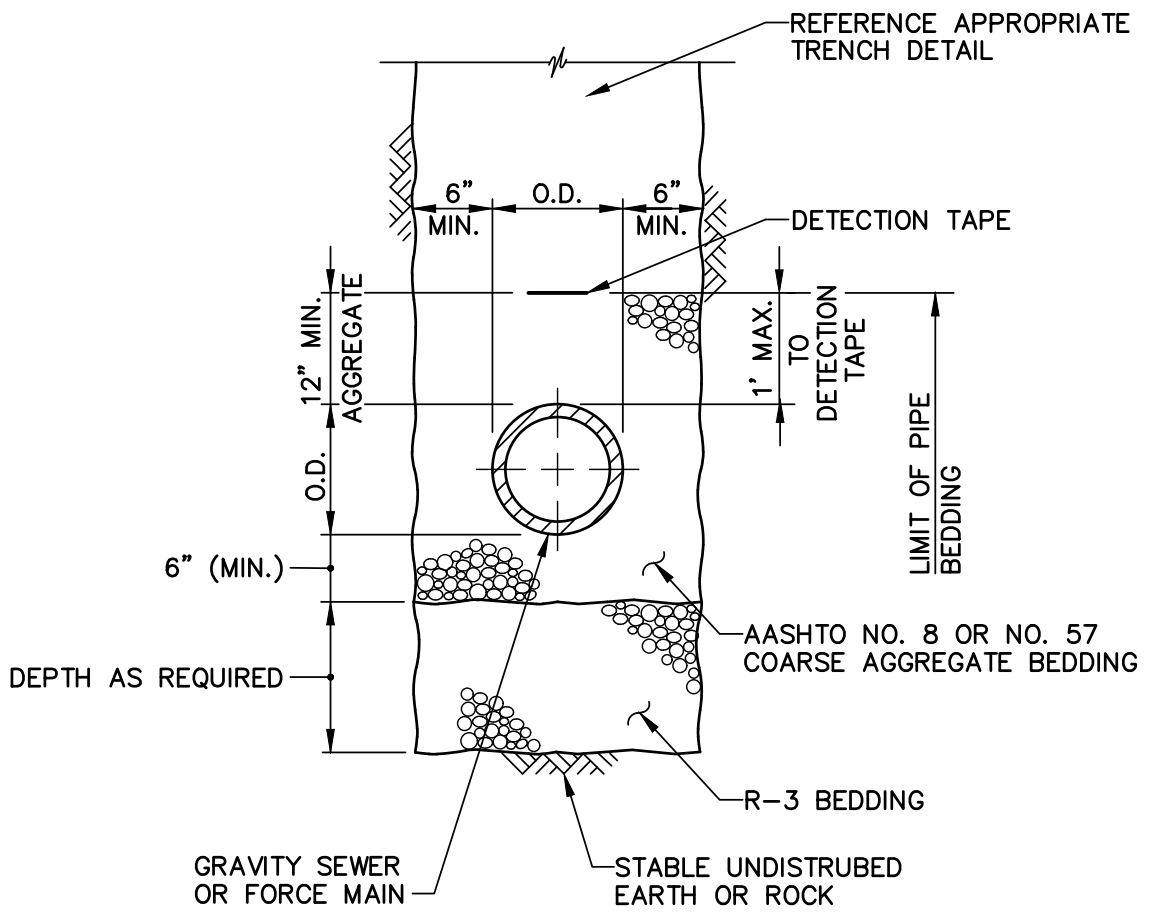
FILE NAME: TRENCH-2-UNPAVED.dwg

STANDARD DETAILS

TRENCH DETAIL IN UNPAVED AREAS

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DATE	REVISIONS
2/18	DWG. CREATED
SCALE NO SCALE	DWG. NO. TR-2



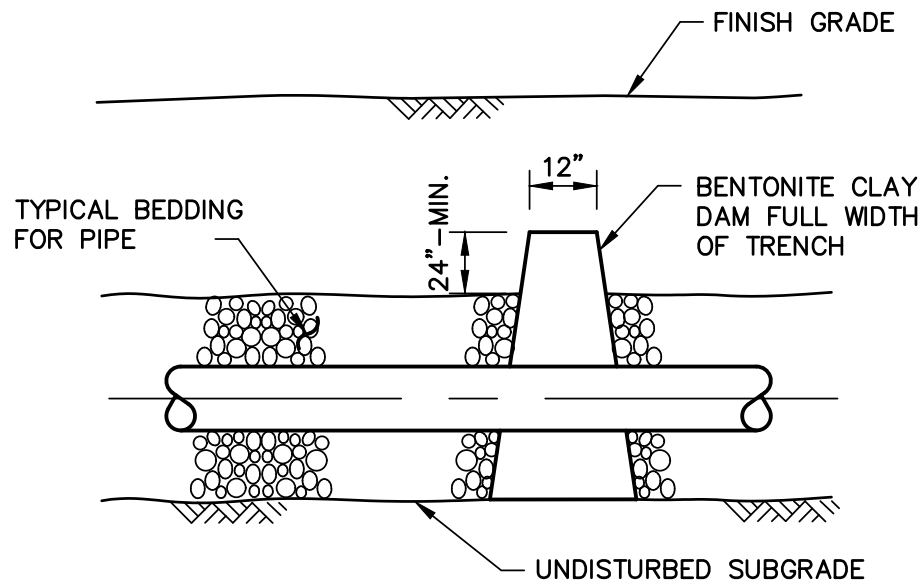
FILE NAME: TRENCH-3-UME.dwg

STANDARD DETAILS

UNSUITABLE MATERIAL EXCAVATION

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DATE	REVISIONS
2/18	DWG. CREATED
SCALE NO SCALE	DWG. NO. TR-3



NOTE:

1. HEIGHT OF CLAY DAM TO BE DETERMINED IN THE FIELD.

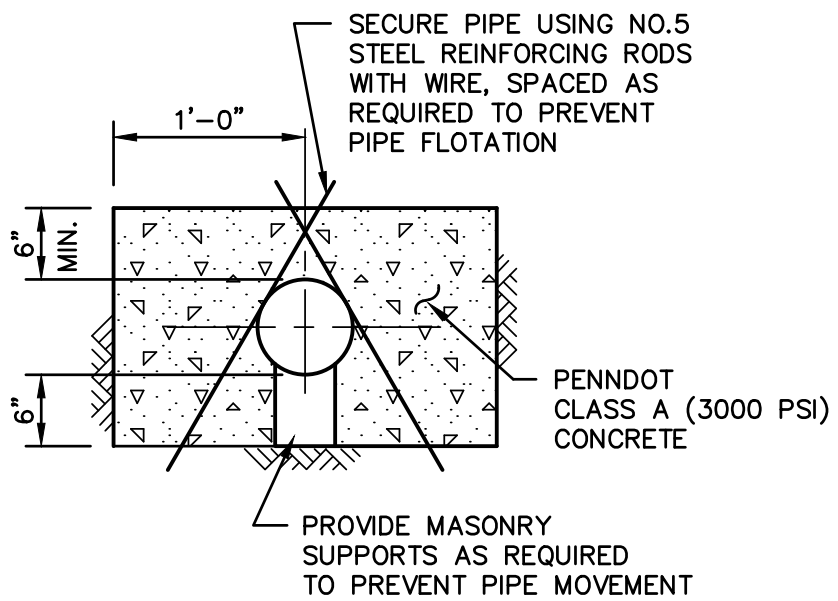
FILE NAME: TRENCH-4-CLAYDAM.dwg

STANDARD DETAILS

BENTONITE CLAY DAM DETAIL

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DATE	REVISIONS
2/18	DWG. CREATED
SCALE NO SCALE	DWG. NO. TR-4



FILE NAME: TRENCH-5-ENCASEMENT.dwg

STANDARD DETAILS

CONCRETE ENCASEMENT DETAIL

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DATE	REVISIONS
2/18	DWG. CREATED
SCALE NO SCALE	DWG. NO. TR-5