CONSTRUCTION AND MATERIAL SPECIFICATIONS

EAST PENNSBORO TOWNSHIP

CUMBERLAND COUNTY, PENNSYLVANIA

ADOPTED
OCTOBER 2023

C.S. DAVIDSON, INC.

ENGINEERING A BETTER COMMUNITY

38 NORTH DUKE STREET, YORK, PA • PHONE (717) 846-4805

50 WEST MIDDLE STREET, GETTYSBURG, PA • PHONE (717) 337-3021

315 W. JAMES STREET, SUITE 102, LANCASTER, PA • PHONE (717) 481-2991

WWW.CSDAVIDSON.COM

ABBREVIATED TABLE OF CONTENTS

SECTION 00100

TERMS AND ABBREVIATIONS

PART 1 GENERAL

1.01 TERMS

Unless indicated otherwise, the meaning of terms used in these specifications shall be as follows:

Building Sewer: That part of the sewer pipe that extends from the end of the building to the upstream end of the service lateral. The building sewer installation shall be subject to the inspection and approval of the Township.

Construction Observation: The observation of the work performed by the Developer to ascertain its conformity with the Township's Construction and Material Specifications.

Contract: This is defined as the written agreement between a developer and contractor or Township and contractor performing the site improvements. The Contract also includes the Drawings as defined hereinafter.

Contractor: This is defined as a company performing the construction of site improvements.

Developer: This is defined as a subdivider or potential buyer, property owner, or equitable owner who has executed an agreement with a contractor performing site improvements.

Developer's Contractor: The person, firm, or corporation constructing the sewers on behalf of the Developer, if other than the Developer.

Drawings/Approved Drawings: These are defined as those land development and subdivision plans or construction documents approved by the Township; and also, such supplementary drawings as may be issued from time to time in order to elucidate or clarify said Drawings, or for showing details which are not shown thereon. Drawings shall meet the requirements of the Plan and Specification Standards contained within the Subdivision and Land Development Ordinance.

Engineer: Is defined as the person or organization duly employed/retained by the Township as a consultant and authorized to inspect the results of the performance of the work under Contract by the Contractor, acting directly or through properly authorized agents, engineers, assistants, inspectors, or other representatives acting severally within the scope of the particular duties entrusted to them. The word "Engineer," shall include the officers, agents, and employees of the Engineer. In cases where the Township does not employ a consultant, the word "Township" is substituted for "Engineer" throughout these Specifications.

Inspection: The examination of the work performed by the Contractor to ascertain its conformity with the Drawings and Specifications.

Lateral: The entire sanitary sewer serivce extending from the sewer main to a building, including both the service lateral and building sewer.

Municipality: This is defined as East Pennsboro Township and its full-time employees, elected officials, and appointed representative(s).

Observation Tee: The double sweeping tee placed at the service connection and extended to the surface and capped to allow inspection of flow from the building sewer.

Property Owner: The owner of the property at the time the lateral is being installed or replaced.

Project: The total construction proposed.

Project Representative: The authorized representative of the Township or Third-Party Engineer assigned to the site or any part thereof for observation of construction.

Service Connection: The point of connection between the service lateral and the building sewer.

Service Lateral: That part of the sewer pipe extending from the sewer main to a point near the end of right-of-way. The East Pennsboro Township (Township) requires this pipe to be six (6) inches in diameter. The service lateral installation shall be subject to the inspection and approval of the Township.

Sewer System: The sanitary sewer system including the collection sewers, interceptors, pumping stations, lift stations, force mains, and any and all other appurtenances thereto, as constructed or dedicated, owned, operated, and maintained by the Township.

Shop Drawings: All drawings, diagrams, illustrations, schedules, and other data which are specifically prepared by or for the Developer to illustrate some portion of the work and all illustrations, brochures, standard schedules, performance charts, instructions, diagrams, and other information prepared by a supplier and submitted by the Developer to illustrate material or equipment for some portion of the work.

Specifications: Collectively, all of the definitions, descriptions, directions, provisions, requirements, terms, and stipulations contained in these Standard Specifications; and all written supplements thereto, made or to be made, pertaining to the Contract, and the materials and workmanship to be furnished under the Contract.

Subcontractor: A person, firm, or corporation having direct contact with the Contractor to perform part of the latter's contract; such as one who installs or furnishes and installs equipment forming a permanent part of the Contract work, or who furnishes labor for work required by the Contract in accordance with the Drawings and their specifications. This term does not include individual workmen furnishing labor only, nor one who merely furnished material not worked to a special design.

Township: This is defined as East Pennsboro Township and its full-time employees, elected officials, and appointed representative(s).

Underground Facilities: All pipelines, conduits, ducts, cables, wires, manholes, vaults, tunnels or other such facilities or attachments, and any encasements containing such facilities which have been installed underground to furnish any of the following services or materials: electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, sewage and drainage removal, traffic or their control systems or water.

Warranty Period: An 18-month time period beginning with the Township's final acceptance and issuance of completion certificate.

1.02 ABBREVIATIONS

The following abbreviations are used in the text of these specifications:

AASHTO	American Association of State Highway Transportation Officials
ACI	American Concrete Institute
AISC	American Institute of Steel Construction
ADA	Americans with Disabilities Act
ADT	Average Daily Traffic
ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
AWWA	American Water Works Association
BCBC	Bituminous Concrete Base Course
DI	Ductile Iron
FS	Federal Specifications
HES	High Early Strength
HDPE	High Density Polyethylene
IEEE	Institute of Electrical & Electronics Engineers
IES	Illuminating Engineering Society
IPCEA	Insulated Power Cable Engineers Association
MH	Manhole
MUTCD	Manual of Uniform Traffic Control Devices
NEC	National Electric Code
NECS	National Electric Safety Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
OSHA	Occupational Safety & Health Administration
PA DEP	Pennsylvania Department of Environmental Protection
PennDOT	Pennsylvania Department of Transportation
Psi	Pounds per square inch
PSIG	Pounds per square inch gauge
PTM	Pennsylvania Test Method
PVC	Polyvinyl Chloride
SDR	Standard Dimension Ratio
SESC	Soil Erosion and Sedimentation Control
SESPC	Soil Erosion and Sediment Pollution Control

UHMW	Ultra High Molecular Weight
UL	Underwriter's Laboratories, Inc.
WWF	Welded Wire Fabric

END OF SECTION

K:\483390200\Design\Constuction & Material Specs\SECTION 00100- TERMS AND ABBREVIATIONS.doc

SECTION 00160

UTILITY CONFLICT STATEMENT

PART 1 GENERAL

1.01 DISCREPANCIES

A. Any discrepancies between the requirements of these specifications and the requirements of any other authorized agency, such as public utilities must be resolved prior to commencement of construction activities in order to avoid delays.

1.02 REQUIREMENTS

A. It is the responsibility of the Contractor to comply with the requirements of the PA One Call System, as required by PA Act 287 as amended, prior to commencement of construction activities in order to avoid delays.

B. The Contractor will insure that all work is within the requirements of the Pennsylvania Underground Utility Protection Law.

C. Test Pits:

1. In locations where, new underground utilities are to be connected to existing underground utilities, the Contractor will not be permitted to proceed with the new construction until he has dug test pits and determined the exact location and elevation of the existing underground utilities. Dig such test pits only at the locations agreed to by the Engineer.

END OF SECTION

SECTION 01010

GENERAL REQUIREMENTS

PART 1 GENERAL

1.01 DRAWING AND SPECIFICATIONS

The Drawings and Specifications are complementary, and the requirements of any one shall be considered as the requirements of all. Changes to these specifications can be made at the discretion of the Township

A. The Specifications in this Township document are written as if they were included in the Contract Documents executed by and between the Developer and the Contractor. Whether they are so used is at the discretion of the Developer; however, the Township will not accept the public improvements provided by the Developer unless and until they conform to the requirements of these Standard Specifications.

B. All Drawings pertaining to the Project shall be submitted by the Developer to the Township for review. After review of these Drawings by the Township, the Developer shall make any corrections required, and submit corrected copies thereof to the Township. The Township's approval of the Drawings shall not relieve the Developer from responsibility for errors or discrepancies in such Drawings. Drawings shall be prepared and submitted in conformance with the requirements set forth herein.

C. Deviations from the Drawings or Specifications required by the demand of construction will be determined by the Engineer only, and authorized in writing.

D. At all times the Contractor shall keep on the Project site, available to the Engineer and his representatives, one (1) copy of the Drawings, and Specifications.

1.02 WORK CONDITIONS

A. No night, Sunday, or legal holiday work, requiring the presence of the Engineer or his representative, will be permitted, except in cases of emergency and then only with the written consent of the Engineer, and to such an extent as he may judge necessary.

B. Roadway paving work shall not be performed on Saturdays without one-week prior arrangements with the Township. The Contractor will be required to pay for a Township Inspector on site and at the paving manufacturing plant, at Township determined premium-time rates.

C. No work shall be done when, in the opinion of the Engineer, the weather is unsuitable for good and careful work to be performed. Should the severity of the weather continue, such that the work cannot be performed successfully, the Contractor, upon order of the Engineer, shall cease all such work until directed to resume the same.

D. The Contractor shall arrange for, and be responsible for, a sufficient amount of illumination at all times subject to the approval of the Engineer, to carry on all phases of the work.

E. Construct the work in stages to provide for public convenience.

   1. Do not close off public use of facilities until completion of one stage of construction will provide alternative usage.

F. Conduct construction operations to ensure the least inconvenience to the general public.

G. Take measures to control traffic when working on or near public roads and streets.

   1. Employ traffic control measures in accordance with the MUTCD and Pennsylvania Department of Transportation Publication No. 213, "Temporary Traffic Control Guidelines," or latest revision.

   2. Employ traffic control measures only after requesting traffic alterations, in writing to the Township.

   3. Notify East Pennsboro Township, Cumberland County Emergency Services (911), Local School District(s), and Postal Service at least 72 hours in advance of any operations requiring changes to existing traffic patterns.

   4. Materials and safety devices (i.e., barricades, flashing warning lights, reflectors and signs) which the Contractor provides for the purpose of protecting the work and the safety of the public and for maintaining and protecting traffic shall conform to the requirements specified in Section 901 of the current edition of the Commonwealth of Pennsylvania Department of Transportation Specifications Publication 408.

   5. Reasonable access must be maintained to adjacent property owner's and commercial properties.

   6. All excavations in access drive, driveways, and State Highway right-of-way shall be backfilled or plated at the end of each work day.

H. Restore existing paving outside the limits of the work that is damaged by the Developer's operations, to its original condition at the expense of the Developer.

I. Continuously keep rights-of-way, storage areas, streets, roads, highways and adjacent properties free from accumulation of waste materials, excess excavation, rubbish and windblown debris resulting from construction operations.

J. Protection of Existing Utilities and Structures:

   1. Take all precautions and utilize all facilities required to protect existing utilities and structures.

   2. In compliance with Act 287, as amended, of the General Assembly of Pennsylvania, advise each Utility Company 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 Company and suggestions for procedures to avoid damage to its lines.

3. 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 Company assistance to expect and procedures to follow to prevent damage.

4. Immediately report to the Utility Company, the Township and the Engineer any break, leak or other damage to the lines or protective coatings made or discovered during the work and immediately alert the occupants of affected premises of any emergency created or discovered.

5. Allow free access of Utility Company personnel at all times for purposes of maintenance, repair and inspection.

6. Protect all storm sewer systems from the introduction of any mud, debris, polluted water or foreign material.

7. Protect all sanitary sewer systems from the introduction of storm water, mud, debris, or foreign material. Introduction of storm water into the sanitary sewer system is prohibited.

1.03 ADVERTISING

A. No advertising will be permitted on any part of structures, scaffolding, fences, materials, obstructions, barricades or on any other areas of the work.

1.04 PERMITS

A. The Developer's attention is directed to Chapter 459, Occupancy of Highways by Utilities under Title 67 Transportation of the Pennsylvania Code. The Developer will pay the cost of the PennDOT highway occupancy permit and the costs of the permit inspection fees, if any. Township will be designated as the permittee. The Developer shall pay all costs in connection with the highway occupancy permit or permits, including but not limited to all costs for special insurance and bonds. The Developer/Contractor is responsible for scheduling final inspection and obtaining final PennDOT approval.

B. The Developer shall secure and pay the cost for the Department of Environmental Protection Water Quality Management Permit.

C. The Developer shall secure and pay for other permits required to comply with Federal, State, and local ordinances and regulations.

1.05 TOWNSHIP HIGHWAY OCCUPANCY PERMIT

A. Developer/Contractor must obtain a highway occupancy permit prior to commencing work, within the right-of-way of an adopted Township road.

1. Employ traffic control measures only after approval from the Township in accordance with 1st Class Township Code. Refer to the 1st Class Township Code Section 2014 for proper procedures.

2. Notify East Pennsboro Township, Cumberland County Emergency Services (911), Local School District(s), and Postal Service at least 72 hours in advance of any operations requiring changes to existing traffic patterns.

1.06 SUBMITTALS AND CERTIFICATIONS

A. All materials and products requiring submission of manufacturer's information must be approved by the Engineer prior to purchasing and installing. 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.

B. The Developer/Contractor shall provide any additional information required by the Engineer to assure compliance with these specifications.

C. Provide the number of paper copies as indicated by the Township (plus 1 electronic submission) of all submittals and certificates to the Engineer.

PART 2 EXECUTION

2.01 PROCEDURE

A. Confer and verify with other Contractors as to locations and extent of their work, to the end that interferences and deletions between trades are prevented and embedded or required items are installed in conjunction with the work under this contract. Interconnections between work of other contracts shall be made by the Developer whose work is erected last unless otherwise specifically stated in the Contract Documents, required by the Engineer or necessitated by the nature or extent of the work.

2.02 DEVELOPER'S USE OF PREMISES

A. Confine construction equipment, the storage of materials and equipment, and operations of workmen to within the permanent and temporary rights-of-way.

B. Pipeline materials may be stored appropriately along the route of the Work provided such stored materials do not unduly restrict public use or infringe on private property that has not given written approval of use.

C. Assume full responsibility for materials stored on site.

D. Provide dumpsters for disposal of waste materials. Do not stock pile waste materials on site.

E. The Developer/Contractor shall provide self-contained toilet units at the site.

F. Field offices or structures in or along the right-of-way of the Township shall be maintained in good order and repair.

2.03 UTILITY MARKING TAPE

A. Tape shall consist of minimum 5-mil (0.005") overall thickness, with no less than a 35 gauge (0.00035") solid aluminum foil core a minimum of 2" width. The foil must be visible from BOTH sides. The layers shall be laminated together with the extrusion lamination process, not adhesives. Further, there shall be NO inks or printing extending to the edges of the tape. The adhesive will NOT contain any dilutants, pigments or contaminants and is specially formulated to resist degradation by all known alkalis, acids, chemical reagents and solvents normally encountered in the soil. All printing shall be encased to avoid ink rub-off.

B. Test Data:

Property	***Method***	***Value***
Thickness	ASTM D2103	5.0 mils
Tensile strength	ASTM D882	25 lbs./inch (5500 psi)
Elongation	ASTM D 882-88	<50% at break
Printability	ASTM D2578	>50% dynes/cm^2
Flexibility	ASTM D 671-81	Pliable hand
Inks	Mfg. Specs.	Heat set Myles
Message repeat	Mfg. Specs.	Every 20"
Foils	Mfg. Specs.	Dead soft/annealed
Top Layer	Mfg. Specs.	Virgin PET
Bottom Layer	Mfg. Specs.	Virgin LDPE
Adhesives	Mfg. Specs.	>30%, solid 1.5#/R
Bond strength	Boiling H^2O @ 100° C	5 hours w/o peel
Colors	APWA code	See below

C. Color Code shall be as follows:

1. Safety Red: Electric power, distribution and transmission and municipal electric systems.

2. High Visibility Safety Yellow: Gas and oil distribution and transmission, dangerous materials, product and stem.

3. Safety Alert Orange: Telephone and telegraph systems, police and fire communications, and cable television.

4. Safety Precaution Blue: Water systems and slurry pipelines.

5. Safety Green: Sanitary and storm sewer systems.

6. Safety Brown: Force mains, reclaimed water lines and effluent reuse lines.

7. Alert Purple: Reclaimed non-potable water lines.

2.04 SOIL EROSION AND SEDIMENTATION CONTROL PLAN

A. The Developer/Contractor is required to provide soil erosion and sedimentation control measures as indicated in the Soil Erosion and Sedimentation Control Plan which will be completed as necessitated by the nature or extent of the work. An approved copy of the Soil Erosion and Sedimentation Control Plan, as approved by the Cumberland County Conservation District, shall be submitted to the Township.

2.05 FIELD OBSERVATION

A. Field observation shall be at the discretion of the Township. The work shall at all times be subject to the observation of the Township's Engineer, Inspector, or authorized representative, who shall have free access to the work, and be furnished by the Developer with every reasonable facility for examination of the work, to the extent of uncovering, testing or removing finished portions thereof. The Developer shall provide all labor and equipment necessary for such observations. The Engineer may require the Developer to uncover for observation, or to remove any work done or placed in violation or disregard of instructions issued to the Developer by the Engineer, Township or their representatives. The Township's Engineer, Inspector, or authorized employees shall have the authority to halt construction if, in their opinion, construction is not being done according to specifications and/or construction drawings. Any construction not being performed in accordance with the Township Specifications shall be reported to the Township and Engineer for direction. Periodic field visits will occur on all construction activities, unless special circumstances warrant additional time. The Developer/Contractor is responsible for payment of Engineer's inspection and administrative fees to the Township.

B. The Engineer and Project Representatives are the representatives of the Township during the construction of the work. When so authorized by the Township, it shall be the duty of the Engineer to provide observation of construction to provide greater assurance that materials and work conform fully to the requirements of these Specifications. The Engineer shall perform such other duties as may be assigned from time to time and shall have such additional authority as may be defined elsewhere in these General Instructions. The Engineer shall in no case act as foreman or perform other duties for the Developer nor interfere with the management of the work by the Developer.

C. All observations and tests shall be performed without unnecessarily delaying the work. All material and workmanship, if not otherwise designated by these Specifications shall be subject to observation and test by the Township and/or Engineer or their duly authorized representatives. The Township and Engineer shall have the right to reject defective material or workmanship or require its correction. Rejected workmanship shall be satisfactorily replaced with proper material and the Developer shall promptly segregate and remove rejected material from the premises. If these Specifications, the Engineer's instructions, laws, ordinances, or any public authority require the work to be specially tested or approved, the Developer shall give the Engineer timely notice of its readiness for inspection.

D. The Engineer shall, within a reasonable time after presentation to it, determine all questions in relation to the construction of the Project, and in all cases decide every question that may arise relative to the performance of the work.

E. The Engineer shall have full authority to decide all questions that may arise relative to the quality and acceptability of materials furnished and the manner, rate of progress, quality and acceptability of work performed, and the interpretation of these Specifications.

2.06 DEFECTIVE WORK

A. When any material not conforming to the requirements of these Specifications and Drawings, has been delivered upon the Site of the Project, or incorporated in the work, or when any work performed is of inferior quality, such material or work shall be considered as defective and shall be immediately removed and renewed or made satisfactory as directed by the Third-Party Engineer or Owner. Failure or neglect on the part of the Third-Party Engineer or Owner to condemn or reject any bad or inferior work or materials, shall not be construed as to imply an acceptance of such work or materials, if such bad or inferior material or work becomes evident at any time prior to the delivery of the Completion Certificate by the Township to the Developer.

B. The Developer shall remove any work or material condemned and shall rebuild and replace the same.

C. The Developer shall promptly move from the premises all materials condemned by the Third-Party Engineer or Owner as failing to conform to these Specifications, whether incorporated into the work or not, and the Developer shall promptly replace its own work.

2.07 GENERAL OUTLINE OF STEPS AND SUBMITTALS FOR DEVELOPER INSTALLED SANITARY SEWER SYSTEMS

A. For all land development plans, regardless of size, the Developer shall be required to submit drawings to the Township for review and comment.

B. Planning Phase:

1. Submit written request to Township, inquiring as to the availability of capacity in the sanitary sewer system.

2. If capacity exists, submit a PADEP Planning Module or Post Card application requesting capacity.

   a. The Engineer will determine availability of capacity and advise the Township.

   b. The Township will either approve or disapprove the Developer's request.

3. For land development plans with existing planning module approval, submit approval letter with remaining capacity.

4. For sewers that are to remain private, submit the Declaration of Covenants and Restrictions, Association Articles of Incorporation, properly chartered trust, and/or maintenance agreement that are required to be submitted with the Planning Module to ensure long term proper operation and maintenance of the proposed private sanitary sewer system.

C. Design Phase:

1. Developer shall provide an ESCROW with the first submission of drawings. ESCROW is established by separate Township Resolution that is revised from time to time. As the design review progresses and the Township incurs costs greater than the initial deposit, the Township may request additional escrow deposits from the Developer.

2. The Developer shall submit eight (8) sets of Developer's Drawings for each submission to the Township for review and comment.

3. Drawing shall be on the Pennsylvania State Plane Coordinate System and NAVD 88.

4. The Developer shall submit documentation to Township indicating permission from neighboring property owners when a right-of-way is required from a property not owned by the Developer, or when Developer intends to use an easement not explicitly stated to be used by Township. These may include gas, electric, or phone easements.

5. Developer shall submit two (2) sets of plats and legal descriptions for any easements to be dedicated to the Township, prior to approval of Developer's Drawings. At completion of work, these shall be used in the dedication process.

6. If a Highway Occupancy Permit is needed for installation of the sewer, the Developer shall prepare the permit in the name of the Township. The Developer shall then deliver the application to the Township for signature and subsequent delivery to PennDOT. Likewise, if a Part II Water Quality Management (WQM) Permit is required, the Developer shall prepare the permit in the name of the Township. The Developer shall then deliver the application to the Township for signature and subsequent delivery to DEP.

7. Upon approval of the Developer's Drawings, the Township will provide a listing of requirements prior to issuance of a Notice to Proceed.

D. Agreement Phase:

1. Upon approval of the Developer's Drawings, a Sewer Extension Agreement (SEA) shall be entered into between the Developer and owner of the property being developed and the Township. SEAs 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 Developer shall submit a construction cost estimate for review by the Township. The construction cost estimate will be used for financial security. The construction cost estimate will be multiplied by 1.10 for a ten percent contingency and this is the amount of required financial security.

        2. The Developer shall then select the desired form of financial security. The most common forms are Performance Bonds, Letters of Credit and Escrow Accounts.

    b. Upon receipt of the above information, the Township will develop three (3) original copies of the SEA and attach the Developer's financial security.

2. The following items shall also be submitted to the Township prior to issuance of a Notice to Proceed:

    a. Developer shall submit one (1) copy of the Developer's Contractor's Insurance Certificate:

        (1) The East Pennsboro Township shall be named as an additional insured.

        (2) The Township's Engineer and Third-Party Engineer(s) shall be named as an additional insured.

    b. Developer shall submit an electronic copy of Shop Drawings to the Engineer(s) for review and comment. Contractor cannot start work until all shop drawings are approved. Any work performed prior to the review/approval of shop drawings is at the sole risk/expense of the Contractor.

    c. Developer shall have executed SEA.

E. Construction Phase:

1. The Developer will be issued a Notice to Proceed once all the above items are addressed.

2. A Pre-Construction Meeting shall be held. Attendees at the Pre-Construction meeting shall include at a minimum the Contractor, Developer, Township, Project Representative, and Third-Party Engineer(s).

3. The Developer shall be responsible for issuing a 72-hour notice to the Township indicating the intent to start construction.

4. Developer shall install the sewers in accordance with Township's Construction and Material Specifications:

    a. The Developer shall be responsible for record keeping of lateral locations, final elevations of manholes and final location of all piping.

    b. The Developer shall be responsible for survey and layout of sewer.

    c. Developer shall provide GPS locations and shapefiles for all manholes, tee connections, observation tee locations and force main locations.

5. The Township's Project Representative shall observe installation and testing of the sewer extension.

6. The Township's Project Representative shall prepare a list of punch list items.

7. The Developer shall complete all punch list items.

F. Post Construction:

1. Developer shall submit Record Drawings as outlined later in Section 01300.

2. Developer shall submit revised plats and legal descriptions, if needed, for dedication of sewer easements- both on and off the Developer's property, as necessary. The requirements of the plats and legal descriptions are as outlined later in Section 01300.

3. Until Record Drawings and plats and legal descriptions required under Items 1 and 2 above are provided, the Developer shall place in escrow an amount sufficient to survey the development and provide record drawings, straight-line diagrams, deed of dedication, bill of sale and all other items required by the Township. In an effort to offset some of the escrow amount, the Developer's land development engineer can submit the most recent version in AUTOCAD electronically, a copy of the land development plans and profiles of the sewer extension so that the field survey of as-built conditions would only need to be verified.

4. Developer shall submit to the Township a Guarantee Phase Financial Security (Maintenance Security):

   a. The security shall be in the amount of 15 percent of the approved construction cost estimate.

   b. The security shall be in effect for 18 months from the date of executed deed of dedication.

   c. Thirty (30) days prior to expiration of the Maintenance Security, the Township may perform an inspection of the sewer extension. Any deficiencies shall be corrected at the Developer's expense. If Developer refuses to correct deficiencies, the Maintenance Security will be used by the Township to correct them.

5. Upon completion of construction and receipt and approval of the above Post Construction Submissions and Financial Security, the Township will then permit issuance of individual connection permits.

2.08 ITEMS REQUIRED PRIOR TO BEGINNING CONSTRUCTION

A. Items Required from Developer:

1. Sewer Extension Agreement (SEA) and related documents (SEA is a condition of plan approval)

2. County Conservation District approved Erosion Control Plan.

3. Blasting permit (if needed).

4. PennDOT Highway Occupancy Permit (if needed).

5. "Approved" Traffic Control Plan from Township (if applicable).

6. 72-hour notice indicating Developer intends to start work.

7. Pre-construction meeting.

8. Evidence that the final subdivision plan has been filed at the county courthouse, Recorder of Deeds office, if applicable.

9. Performance and Payment Bonds or other financial security to assure completion of the sewer construction.

10. Receipt of a letter from the Developer stating the name of the Developer's Contractor who will be installing the facilities, when applicable.

11. A copy of the Water Quality Management (WQM) Permit issued by the DEP, when applicable; or the DEP Planning Module approval letter if a WQM permit is not required.

12. Shop drawings. (Mentioned in spec already)

13. Plats and legal descriptions of easements to be dedicated to the Township. The easements must be recorded at the Court House.

14. A set of "approved" construction drawings.

2.09 PRECONSTRUCTION MEETING

A. Before starting the work, a conference will be held at the Township office to review the project and to establish a working understanding between the parties as they relate to the Project. Present at the conference will be the Developer or his representative, the Township Engineer, the Township's Inspector, the Contractor and the Superintendent. At the preconstruction meeting, the Developer or Contractor shall supply a schedule for construction activities and a list of materials/products to be used on the Project. The list should identify manufacturers, model numbers and sufficient data to assure compliance with these Specifications. The Developer or Contractor shall supply a list of personnel with contact information that the Township may use in the event of an emergency.

2.10 RECORD DRAWINGS

A. The Contractor is required to keep an up-to-date set of Record Drawings (As-Constructed Drawings) for the project. Up-to-date is defined as containing modifications for work performed within the past 30 days.

B. The Contractor shall identify the location of all newly installed, existing to remain, and abandoned pipe and conduit as it is installed or uncovered during the construction period.

C. The Contractor shall provide detailed locations of all sanitary sewer locations, depth, and length. The Contractor shall provide detailed lateral locations of all water service locations, including depth and length. Sewer laterals shall be located using manholes as a reference point and stationary from that point. Water service curb stops shall be located using distance from property lines. The Contractor shall survey with GPS all structures and manholes and provide the information to the Engineer. An East Pennsboro Township As-Built Sanitary Sewer Lateral Locations form is provided in Appendix A for use by the Contractor.

D. No trenching for pipe or conduit shall be backfilled until the piping has been located and recorded by the Contractor.

E. The CONTRACTOR shall verify As-Constructed elevations of sanitary sewer and storm sewer rim and pipe inverts and road profiles.

F. At the end of the project, the Contractor's record drawings shall be turned over to the Engineer in AutoCAD format or as indicated in the Subdivision and Land Development Ordinance, or directed by the Engineer.

G. The Engineer will review the Contractor's record drawings. If the Record Drawings do not meet the requirements stated above, final adoption of the improvements will not be approved.

2.11 FINAL ACCEPTANCE

A. There will be no final acceptance of sewer lines until all other utilities are installed and all testing is completed.

2.12 RESPONSIBILITY FOR MAINTENANCE AND REPAIR

A. Any conduit installed on property for the purpose of conveying sewage to and connecting with a sewer located in a street, highway, alley, right-of-way, etc., shall be maintained in good working order and maintained by the owner of the said property from the point of its origin to its point of connection with the said sewer, except that should said repair or maintenance require a digging up of a street, highway, or alley, then and in that event the responsibility of the owner for said maintenance and repair shall extend from the conduit's point of origin to the curb line, if any, and if none, then to within four feet of the cartway, paved, or unpaved. [Ord. 190-68, 7/15/1968, § 1]

END OF SECTION

SECTION 02100

CLEARING AND GRUBBING

PART 1 GENERAL

1.01 DESCRIPTION

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

1. Clearing
2. Grubbing
3. Stripping and stockpiling topsoil
4. Debris disposal

B. Related Work Specified Elsewhere:

1. Utility Conflict Statement ..... Section 00160
2. Site excavation and placement of fill material ..... Section 02210
3. Trenching, backfilling and compacting ..... Section 02221
4. Roadway excavation, fill, and compaction ..... Section 02230
5. Soil erosion and sedimentation control..... Section 02270
6. Finish grading, seeding, and sodding..... Section 02485

C. Definitions:

1. *Clearing:* is defined as the removal of trees, brush, down timber, rotten wood, rubbish, and any above original ground elevation not designated to be saved. Clearing also includes removal of fences, walls, guard posts, guide rail, signs, and other obstructions interfering with the proposed work.

2. *Grubbing*: is defined as the removal from below the surface of the natural ground of stumps, roots and stubs, brush, organic materials, and debris.

D. Applicable Standard Details: NONE

1.02 QUALITY ASSURANCE - Section Not Used

1.03 SUBMITTALS

A. Permits:

1. For off-site disposal, submit two copies of the agreement with each property owner releasing the Township from responsibility in connection with the disposal of the debris, and permits or approvals from regulatory agencies.

1.04 JOB CONDITIONS

A. Construction Limits

1. The Contractor may clear all obstructions within the construction limits or permanent and construction rights-of-way except those specifically designated on the drawings or specifications to be saved or restored.

B. Coordination With Utilities

1. The Contractor shall ensure all work complies with the requirements of the Pennsylvania Underground Utility Protection Law.

PART 2 PRODUCTS

2.01 MATERIALS

A. Temporary Fencing:

1. Undamaged picket snow fence, 4' high, formed of wooden slats, tightly woven with wire cable.

2. Soil-set fence posts, studded "T" type, 6' high.

3. Undamaged temporary construction fencing, 4' high, formed of plastic, orange colored.

B. Tree Wound Dressing:

1. Antiseptic and waterproof, asphalt base.

PART 3 EXECUTION

3.01 PREPARATION

A. Notify the Township, the PA One Call System, and regulatory agencies at least 3 business days prior to beginning any clearing work.

B. Contractor's work should meet the requirements of the Soil Erosion and Sedimentation Control Plan for the site, as approved by the Cumberland County Conservation District.

C. Protect benchmarks, property corners, utilities, existing trees, shrubs and other landscape features designated for preservation with temporary fencing or barricades satisfactory to the Township. No material shall be stored or construction operation carried on within 4-feet of any tree to be saved or within the tree protection fence

D. When a private enclosure fence encroaches on the work area, notify the property owner at least 5 days in advance of the clearing/grubbing operations to permit the owner to remove it, construct a supplemental fence, or make such other arrangements as may be necessary for security purposes. Upon failure of the property owner to reasonably proceed with the work required to secure his property, carefully remove the fence, in whole or in part and neatly pile the materials onto the owner's property.

3.02 UTILITY RELOCATIONS

A. Inform all companies, individuals and others owning or controlling facilities or structures within the limits of the work which have to be relocated, adjusted or reconstructed in sufficient time for the utility to organize and perform such work in conjunction with or in advance of the Contractor's operations.

B. Comply with the requirements of Pennsylvania Underground Utility Protection Law.

3.03 CLEARING

A. Confine clearing to within the construction limits.

B. Clear in a manner that will avoid damage to property corners, trees, shrubs, structures, and other installations which are to be retained.

C. Comply with the requirements of Pennsylvania Underground Utility Protection Law.

D. Where stumps are not required to be grubbed, flush cut with ground elevation.

3.04 GRUBBING

A. Grub areas within the construction limits to remove roots and other objectionable material to a minimum depth of 24".

B. Remove all stumps within the cleared areas.

3.05 STRIPPING AND STOCKPILING TOPSOIL

A. Strip topsoil to whatever depth it may occur from areas to be excavated, filled, or graded and stockpile.

B. Topsoil shall not be used as backfill.

C. Topsoil should be protected through implementation of a Soil Erosion and Sedimentation Control Plan to prevent discharge to any storm sewer system.

3.06 DEBRIS DISPOSAL

A. Trees, logs, branches, brush, stumps, and other debris resulting from clearing and grubbing operations shall become the property of the Contractor and shall be legally disposed of.

B. Burning of any debris is prohibited.

C. Discarded materials within the right-of-way limits necessary to perform the work shall be removed and properly disposed of at the Contractor's expense.

3.07 RESTORATION

A. Repair all injuries to bark, trunk, limbs, and roots or remaining plants by properly dressing, cutting, and painting, using approved arboricultural practices and materials.

B. Replace trees, shrubs, and plants designated to be saved which are permanently injured or die as a result of construction operations with like species.

C. Remove protective fences, enclosures, and guards upon the completion of the project.

D. Restore guard posts, guide rail, signs, and other interferences to the condition equal to that existing before construction operations.

E. Fences, mailboxes, and signs within the line of work shall be carefully removed, stored, and upon completion of backfill, reset or replaced to their original condition and location, at the Contractor's expense.

END OF SECTION

SECTION 02150

BORING AND JACKING

PART 1 GENERAL

1.01 DESCRIPTION

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

1. Approach trench excavation
2. Installation of casing pipe
3. Installation of carrier pipe

B. Related work specified elsewhere:

1. Utility Conflict Statement ..... Section 00160
2. Trenching, backfilling and compacting ..... Section 02221

C. Definitions: NONE

D. Applicable Standard Details:

1. EPT 02150-1 .....Casing Installation

1.02 QUALITY ASSURANCE

A. Reference Standards:

1. Comply with applicable federal, state and local ordinances, codes, statutes, rules and regulations, and affected jurisdictional bodies.

2. Pennsylvania Department of Transportation Publication 408 Specifications.

3. American Railway Engineering Association, Manual for Railway Engineering.

B. Contractor Qualifications:

1. Construction operations shall be undertaken only by a Contractor well experienced with a minimum of five operations of similar magnitude and condition.

1.03 SUBMITTALS

A. Submit history of previous work completed of equivalent nature and scope. Include qualifications and experience of key personnel.

B. Submit description of proposed construction methods, including methods to establish and maintain vertical and horizontal alignment.

C. Manufacturers' Literature

1. Submit manufacturers' catalog information for each type of pipe, fittings, couplings, adapters, gaskets, casing spacers, and assembly of joints for approval by the Township. Include manufacturers' recommendations for deflection in pipe joints.

D. Certificates:

1. Submit certifications for each type of pipe, fittings, gaskets, lubricants or other joint materials from the manufacturers attesting that each of these meets or exceeds specifications requirements.

1.04 JOB CONDITIONS

A. Conduct operations so as not to interfere with, interrupt, damage, destroy, or endanger the integrity of surface or subsurface structures or utilities, and landscape in the immediate or adjacent areas.

B. When boring or jacking under state highways and railroads, comply with applicable right-of-way occupancy permits, including requirements for maintenance and protection of traffic.

C. If boring is obstructed, relocate or jack or tunnel crossing as approved by the Township.

D. Coordination With Utilities:

1. The Contractor shall insure all work complies with the requirements of the Pennsylvania Underground Utility Protection Law.

PART 2 PRODUCTS

2.01 STEEL CASING PIPE

A. ASTM A53; 35,000 psi minimum yield strength, new materials only.

B. Full circumference welded joints.

C. Diameter and wall thickness as shown on the drawings.

2.02 CASING SPACERS

A. Timber Skids:

1. Pressure treated, cut to a cross-sectional size to allow placement of the carrier pipe in the casing and to support the barrel of the carrier pipe.

a. Provide with notches to accommodate fastening.

B. Bolt On:

1. Stainless steel shell with PVC liner, stainless steel hardware, and UHMW polymer runners. Centered Type. Cascade Waterworks Manufacturing Company, Yorkville, Illinois, or equal.

C. Non-Metallic:

1. HDPE with no metal bolts or attachments. Spacers shall strap onto carrier pipe and slide easily into casing but shall not move during installation.

2. Spacers shall provide constant projections around entire circumference of carrier pipe. Projections must have minimum height to pipe bells, similar to RACI type spacers as manufactured by RACI Spacers of North America, Vernon, British Columbia, or approved equal.

2.03 STEEL STRAPPING: ASTM A36

2.04 SAND (Fine aggregate)

A. Section 703.1, PennDOT Publication 408 Specifications. Type A.

2.05 GROUT

A. One part Portland cement (ASTM C150), and 6 parts mortar sand mixed with water to a consistency applicable for pressure grouting.

2.06 FLOWABLE FILL

A. Type D as specified in PennDOT Publication 408 Section 220.

2.07 BORED LATERAL PIPING

A. Gravity sewer pipe and fitting for 4" or 6" PVC bored laterals shall meet ASTM D3034, minimum SDR-21.

B. Solvent cemented joints shall meet ASTM D2855 specifications.

C. Solvent cement shall meet ASTM D2564 specifications.

D. Solid wall coupling shall be provided to make pipe transition from SDR-21 to SDR-35 or Schedule 40 piping.

E. All laterals shall be air tested with cleanouts in place.

PART 3 EXECUTION

3.01 APPROACH TRENCH

A. Excavate approach trench using methods as site conditions require.

B. Ensure pipe entrance face as near perpendicular to alignment as conditions permit.

C. Establish a vertical entrance face at least 1 foot above top of casing or tunnel lining.

D. Install adequate excavation supports as specified in Section 02221.

3.02 CASING PIPE INSTALLATION METHODS

A. Boring:

1. Install casing pipe with the determined vertical and horizontal alignment prior to installation of the carrier pipe.

2. Push the pipe into the ground with a boring auger rotating within the pipe to remove the spoil. Do not advance the cutting head ahead of the casing pipe except for that distance necessary to permit the cutting teeth to cut clearance for the pipe. The machine bore and cutting head arrangement shall be removable from within the pipe. Arrange the face of the cutting head to provide a barrier to the free flow of soft material.

3. Do not overcut excavation by more than 1" greater than the outside diameter of the casing pipe.

4. If voids should develop greater than the outside diameter of the pipe by approximately one inch, grout to fill voids.

B. Jacking:

1. Construct adequate thrust wall normal to the proposed line of thrust.

2. Impart thrust load to the pipe through a suitable thrust ring that is sufficiently rigid to ensure distribution of the thrust load on the pipe.

C. Drilling and Jacking:

1. Use an oil field type rock roller bit or plate bit made up of individual roller cutter units solidly welded to the pipe which is turned and pushed for its entire length by the drilling machine to give the bit the necessary cutting action.

2. Inject a high-density slurry (oil field drilling mud) to the head as a cutter lubricant. Inject slurry at the rear of the cutter units to prevent jetting action ahead of the pipe.

D. Mining and Jacking:

1. Utilize manual hand mining excavation from within the casing pipe as it is advanced with jacks, allowing minimum ground standup time ahead of the casing pipe.

3.03 CARRIER PIPE INSTALLATION WITHIN CASING PIPE

A. All provisions regarding cleaning, inspection and handling specified under pipe material sections apply to this work.

B. Place the carrier as shown on Standard Detail EPT 02150-1. Exercise care to prevent damage to pipe joints when carrier pipe is placed in casing.

C. Support pipeline within casing so that no external loads are transmitted to carrier pipe. Attach casing spacers to barrel of carrier pipe at 6' on centers, minimum 2 per pipe section.

D. Close ends of casing by sealing with brick masonry bulkheads, water-plug, or other approved hydraulic cement. The downstream bulkhead shall have a 2" diameter weephole (stainless steel).

E. Completely fill annular space between carrier pipe and casing pipe with limestone screenings or sand. If in a State Highway, fill annular space with flowable fill.

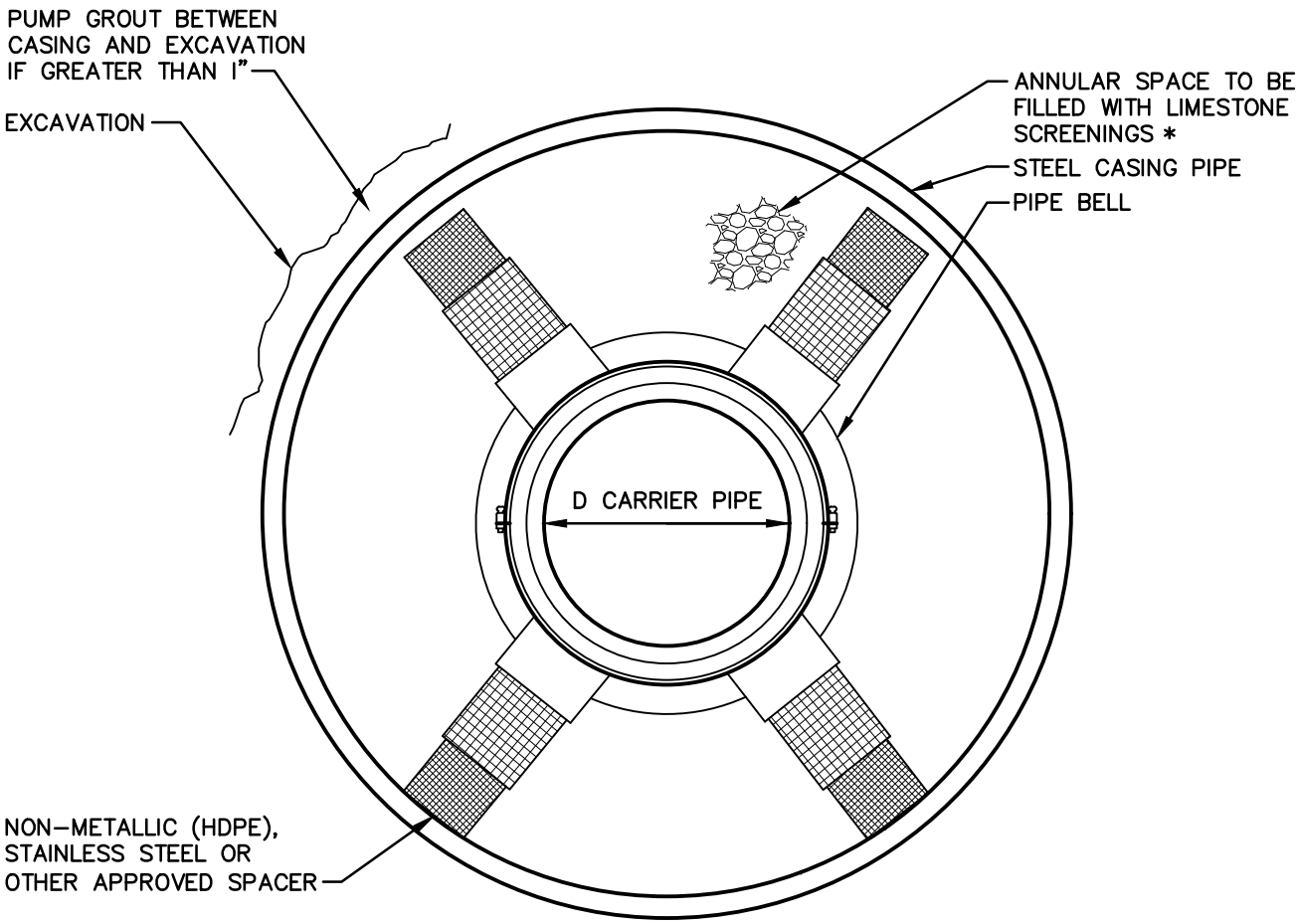
3.04 CARRIER PIPE INSTALLATION WITHOUT CASING PIPE

A. Bore the opening with a boring auger to the determined vertical and horizontal alignment.

B. Do not overcut boring excavation by more than 1" greater than the outside diameter of the lateral pipe.

C. Carefully guide the lateral pipe and joints through the opening, assembling joints prior to inserting into the boring.

END OF SECTION



NOTE:
DO NOT SUPPORT CARRIER PIPE ON BELLS

* IF IN STATE HIGHWAY RIGHT-OF-WAY, USE FLOWABLE FILL, TYPE D.

EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

C.S. DAVIDSON, INC.
ENGINEERING A BETTER COMMUNITY
38 NORTH DUKE STREET, YORK, PA • PHONE (717) 846-4805
50 WEST MIDDLE STREET, GETTYSBURG, PA • PHONE (717) 337-3021
315 W. JAMES STREET, SUITE 102, LANCASTER, PA • PHONE (717) 481-2991
WWW.CSDAVIDSON.COM

CASING INSTALLATION

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	1/1/2023
DWG. NO.	EPT2150-1
FILE NO.	4833.9.02.00

SECTION 02210

SITE EXCAVATION AND PLACEMENT OF FILL MATERIAL

PART 1 GENERAL

1.01 DESCRIPTION

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

1. Excavation
2. Blasting
3. Placement and compaction of fill material

B. Related work specified elsewhere:

1. Utility Conflict Statement ..... Section 00160
2. Clearing and grubbing..... Section 02100
3. Trenching, backfilling and compacting ..... Section 02221
4. Roadway excavation, fill and compaction ..... Section 02230
5 Soil erosion and sedimentation control ..... Section 02270
6. Finish grading, seeding, sodding..... Section 02485

C. Definitions: NONE

D. Applicable Standard Details: NONE

1.02 QUALITY ASSURANCE

A. Reference Standards:

1. Pennsylvania Department of Transportation (PennDOT), latest revision:

Publication 408, Specifications

Publication 213, Temporary Traffic Control Guidelines

Publication 19, Field Test Manual

PTM No. 106 - Moisture-Density Relations of Soils (using 5.5 lb Rammer and 12-inch Drop)

PTM No. 402 - Determine In-Place Density and Moisture Content of Construction Materials by Use of Nuclear Gauges

2. American Society for Testing and Materials (ASTM):

D698 Test Method of Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft.-lbf./ft^3)

D1557 Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft.-lbf./ft^3)

D6938 Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

3. American Association of State Highway and Transportation Officials (AASHTO):

T89 Determining Liquid Limit of Soils

T90 Determining Plastic Limit and Plasticity Index of Soils

4. Pennsylvania Code

Title 67, Transportation, Chapter 459, Occupancy of Highway by Utilities

B. Testing Agency:

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

C. Compaction Testing:

1. Determine compaction by the testing procedure contained in ASTM D698 or ASTM D1557 at the locations and frequencies specified by the Township.

1.03 SUBMITTALS

A. Certificates:

1. Submit certified compaction testing results from the soil testing laboratory.

1.04 JOB CONDITIONS

A. Classification of Excavation:

1. All site excavation work includes excavation and removal of all soil, shale, rock, boulders, fill, and all other materials encountered of whatever nature.

B. Protection of Existing Utilities and Structures:

1. Take all precautions and utilize all facilities required to protect existing utilities and structures in compliance with the Pennsylvania Underground Utility Line Protection Law. Request cooperative steps of the Utility and suggestions for procedures to avoid damage to its lines.

2. Allow free access to Utility personnel at all times for purposes of maintenance, repair, and inspection.

PART 2 PRODUCTS

2.01 ACCEPTABLE MATERIALS

A. For purposes of construction control, the following materials may be deemed acceptable for use in placement of fills:

1. Soil. Soil shall include all inorganic material having a maximum size that can be readily placed and compacted in loose 8-inch layers of which more than 35 percent shall pass the No. 200 sieve. Soil shall have a minimum dry weight density of 98 pounds per cubic foot as determined in accordance with PTM No. 106 and a maximum liquid limit of 65 as determined in accordance with AASHTO Designation T89. The plasticity index, as determined by AASHTO Designation T90 for soils having liquid limits of 41 to 65 inclusive, shall be not less than that determined by the formula: Plasticity Index = Liquid Limit - 30.

2. Granular Material. Granular material shall include all natural or synthetic mineral aggregates having a maximum size that can be readily placed and compacted in loose 8-inch layers of which 35 percent or less shall pass the No. 200 sieve.

3. Shale. Shale shall include all rock-like materials formed by the natural consolidation of mud, clay, silt, and fine sand and usually thinly laminated, comparatively soft, and easily split, having a maximum size that can be readily placed and compacted in loose 8-inch layers.

4. Rock. Rock shall include all igneous, metamorphic, and sedimentary rock having a maximum size that can be readily placed and compacted in loose 8-inch layers and which generally has sufficient fines to normally fill all the voids in each layer.

5. Random Materials. Random material shall include any combination of the above classifications and may include old concrete, brick, etc., from demolition; having a maximum size that can be readily placed and compacted in loose 8-inch layers, and which have been approved by the Township.

6. Flowable Fill. See Section 02221.

PART 3 EXECUTION

3.01 MAINTENANCE AND PROTECTION OF TRAFFIC

A. Coordinate the work to ensure the least inconvenience to traffic and maintain traffic on one or more unobstructed lanes unless closing of the roadway is authorized.

B. Maintain access to all streets and private drives and for emergency vehicles.

C. When streets must be closed, provide and maintain signs, flashing warning lights, barricades, markers, and other protective devices as required to conform to construction operations and to keep traffic flowing with minimum restrictions.

D. Comply with State and local codes, permits and regulations.

3.02 SALVAGE TOPSOIL

A. Within the areas indicated for grading, strip topsoil to the depth of suitable topsoil material and stockpile for subsequent top-soiling operations. See Section 02100.

3.03 PLACEMENT OF FILL MATERIAL

A. After removal of topsoil, areas to receive fill shall be thoroughly rolled, and any soft spots disclosed by rolling shall be excavated and the unsuitable material removed and disposed of in a waste area. The excavated area shall be filled with suitable fill material approved by the Township and re-compacted. Suitable fill material shall be spread in layers of not more than 8-inches (loose) over the full area of the fill, and compacted to the required density by the use of compaction equipment. All fill material shall be compacted to not less than 95% of its maximum dry weight density at its optimum moisture content, plus or minus 2%, as determined by ASTM D698, under roadways, shoulders, driveways, curbs, sidewalks, and all parking areas and not less than 90% in yards and fields. When the material is too coarse to satisfactorily use these methods, compaction will be determined by the Township based on non-movement of the material under the compaction equipment.

B. Fill material placed in areas inaccessible to the compaction equipment shall be placed in uniform loose layers not exceeding 4 inches in depth and compacted by means of approved mechanical tampers to the density requirements herein specified.

C. When a previously constructed fill requires additional material to bring it to required elevation, the top of the fill shall be thoroughly scarified before the required additional material is placed.

D. Material containing moisture in excess of that percentage which will ensure satisfactory compaction shall not be placed in the fill and fill material shall not be placed on material that has become unstable due to excessive moisture.

E. Frozen fill material shall not be placed in fills, and fill material shall not be placed on frozen material. If during construction the top of the fill freezes, all frozen material shall be removed before additional material is placed.

F. Wet or frozen materials which would be suitable when dried or when thawed and dried may be wasted by the Contractor for his convenience only with the written permission of the Township, and subject to replacement in equivalent volume, at the expense of the Contractor. However, in no case shall waste material be disposed of in the flood channel area of any stream. In all cases, the filling must be in compliance with all Federal and State requirements.

G. Shale and random material containing an excessive quantity of large fragments shall be so placed that the coarser material is in areas where no building foundations or utility trenches are to be located. The large pieces shall then be broken down by the use of approved equipment until all voids are filled. Mixtures of shale and rock shall be placed in accordance with the requirements for placing shale.

H. Where fill is to be constructed on a slope, the slope shall be benched to the width and depth shown on the drawings or as approved by the Township.

3.04 EXCAVATION

A. Perform excavation of borrow material in a manner satisfactory to the Township. Strips borrow pits of brush, trees, roots, grass and other vegetation prior to removal of material for use in fill. During the excavation operation, grade the borrow area to ensure free drainage of water from the area. Place and maintain erosion control devices after completion of the excavation, grade the excavated area, including side slopes, to drain and present a uniformly trim appearance merging into the surrounding terrain. After borrow excavation operations are complete, re-grade area, if necessary, to prevent erosion.

3.05 BLASTING

A. No blasting is permitted without a State permit and advance notice to the Township.

B. Blasting is the sole responsibility of the Contractor and no duty is assumed or to be exercised by the Township relative thereto.

C. Blasting work shall be supervised by licensed and experienced personnel and performed in conformance with applicable Federal, State and local codes.

D. Store explosives in a secure and safe manner in strict conformity to State and local regulations with such storage clearly marked "DANGEROUS EXPLOSIVES", and in the care of a competent watchman at all times.

E. Provide Township with a copy of the blasting permit and notify emergency services.

3.06 CONTROL OF EXCAVATED MATERIAL

A. Provide temporary barricades to prevent excavated material from encroaching on private property, walks, gutters, and storm drains.

B. 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.

C. All excavated material shall be controlled in accordance with the Soil Erosion & Sedimentation Control plan, as approved by the Cumberland County Conservation District and in accordance with section 02270, Soil Erosion and Sedimentation Control.

3.07 DEWATERING

A. Keep excavations dry and free of water. Dispose of precipitation and subsurface water clear of the work.

B. 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.

C. Comply with Federal and State requirements for dewatering to any watercourse, prevention of stream degradation, and erosion and sediment control.

D. All work to be outlined in an erosion and sedimentation plan reviewed and approved by the Cumberland County Conservation District and in accordance with section 02270, Soil Erosion and Sedimentation Control.

3.08 TOPSOILING

A. Top soiling shall be as specified in Section 02485.

3.09 DISPOSAL OF EXCAVATED MATERIAL

A. Excavated material remaining after completion of placement of fills shall remain the property of the Contractor, removed from the construction area, and properly disposed of.

3.10 FOREIGN BORROW MATERIAL

A. Foreign borrow consists of excavation, placement, and compaction in fill areas of approved material obtained from sources outside the project limits.

B. The Contractor shall make his own arrangements for obtaining all foreign borrow material and pay all costs involved, including an approved erosion and sedimentation control plan for the borrow excavation site.

END OF SECTION

SECTION 02221

TRENCHING, BACKFILLING, AND COMPACTING

PART 1 GENERAL

1.01 DESCRIPTION

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

1. Cutting paved surfaces
2. Blasting
3. Trench excavation, backfill and compaction
4. Support of excavation
5. Pipe bedding requirements
6. Control of excavated material
7. Rough grading
8. Restoration of unpaved surfaces

B. Related work specified elsewhere:

1. Utility Conflict Statement ..... Section 00160
2. Clearing and grubbing: ..... Section 02100
3. Boring and jacking: ..... Section 02150
4. Soil erosion and sedimentation control: ..... Section 02270
5. Finish grading, seeding and sodding: ..... Section 02485
6. Trench paving & restoration: ..... Section 02575

C. Definitions: NONE

D. Applicable Standard Details:

1. EPT 02221-1 ..... Pipe Bedding Details
2. EPT 02221-2 ..... Flowable Backfill Detail
3. EPT 02221-3 ..... Clay Dike Detail
4. EPT 02221-4 ..... Utility Line Wetland Crossing (Flumed) Detail
5. EPT 02221-5 ..... Utility Line Stream Crossing (Flumed) Detail
6. EPT 02221-6 ..... Utility Line Stream Crossing (Bypass) Detail
7. EPT 02221-7 ..... Trench Detail in Paved Areas
8. EPT 02221-8 ..... Trench Detail in Unpaved Areas
9. EPT 02221-9 ..... Unsuitable Material Excavation Detail

1.02 QUALITY ASSURANCE

A. Reference Standards:

1. Pennsylvania Department of Transportation (PennDOT), latest revisions:

Publication 408, Specifications

Publication 213, Temporary Traffic Control Guidelines

Publication 72M, Standards for Roadway Construction

Publication 19, Field Test Manual

PTM No. 106 – Moisture-Density Relations of Soils (using 5.5 lb. Rammer and 12-inch drop)

PTM No. 402 – Determining-in-Place Density and Moisture Content of Construction Materials by Use of Nuclear Gauges

2. American Society for Testing and Materials (ASTM):

C33	Specifications for Concrete Aggregates
D698	Test Method of Laboratory Compaction Characteristics of Soil Using Standard Effort
D6938	Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

3. Pennsylvania Code Title 67, Transportation, Chapter 459 occupancy of highways by utilities.

B. Testing Agency:

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

C. Inspections/Compaction Testing:

1. Inspection by Township will, at a minimum, be made of bearing material, backfill material, and pipe installation.

1.03 SUBMITTALS

A. Certificates:

1. Submit certification attesting that the composition analysis of pipe bedding, select material stone backfill materials and flowable fill meet specification requirements.

2. Submit certified compaction testing results from the soils testing laboratory, if required.

B. Compaction Equipment List:

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

C. Permits:

1. Township Highway Occupancy Permit.

2. PennDOT Highway Occupancy Permit.

1.04 JOB CONDITIONS

A. Classification of Excavation:

1. Excavation work includes excavation and removal of all soil, shale, rock, boulders, fill, and other materials encountered of whatever nature.

B. Compaction of Backfill:

1. The degree of compaction required at each location is indicated in the Backfill and Surface Restoration Requirements Table in Section 02575.

C. Protection of Existing Utilities and Structures:

1. Take all precautions and utilize all facilities required to protect existing utilities and structures. Comply with the requirements of the Pennsylvania Underground Utility Protection Law. 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 Township 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.

D. Site Inspection:

1. Prior to entering upon any private property, the Contractor shall have arranged for and completed a site inspection of each property with Township, at which time the Township will advise the Contractor as to what area is available for work; as to the trees, planting, and improvements which may be removed or disturbed during the work; and as to any special conditions or requirements which shall govern the work on each property.

PART 2 PRODUCTS

2.01 PIPE BEDDING MATERIAL

A. Type III and Type IV Bedding Material:

1. AASHTO No. 8, Table C, Section 703.2, Publication 408. Do not use slag or cinders.

B. Type V Bedding:

1. AASHTO No. 8 coarse aggregate conforming to Section 703, Publication 408. Do not use slag or cinders.

2.02 BACKFILL MATERIAL

A. Select Material Backfill:

1. Crushed stone or gravel aggregate conforming to Select Granular Material (2RC), Section 703.3, Publication 408 Specifications. Do not use slag or cinders.

B. Flowable Backfill Material:

1. Applicable type for proposed work as indicated in PennDOT Publication 408 Section 220.

C. Suitable Backfill Material (unpaved areas)

1. From top of pipe bedding material to 24” over top of pipe:

a. Material excavated from the trench if free of stones larger than 6” in size and free of wet, frozen or organic materials.

2. From 24" above pipe to subgrade elevation:

a. Material excavated from the trench if free of stones larger than 8" in size and free of wet, frozen, or organic materials.

D. Suitable Backfill Material (Streets, Driveways, and Shoulders)

1. From top of pipe bedding material to subgrade elevation:

a. Select material backfill

b. Flowable backfill material – where directed or approved.

PART 3 EXECUTION

3.01 MAINTENANCE AND PROTECTION OF TRAFFIC

A. Coordinate the work to ensure the least inconvenience to traffic and maintain traffic on one or more unobstructed lanes unless closing of the roadway is authorized.

B. Maintain access to all streets and private drives and for emergency vehicles.

C. When streets must be closed, provide and maintain signs, flashing warning lights, barricades, markers, and other protective devices as required to conform to construction operations and to keep traffic flowing with minimum restrictions.

D. Comply with State and local codes, permits and regulations.

3.02 CUTTING PAVED SURFACES PRIOR TO TRENCHING

A. Where installation of pipelines, miscellaneous structures, and appurtenances necessitate breaking a paved surface, make cuts 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.

C. The requirement for neat line cuts, in other than state highways, may be waived if the final paving restoration indicates overlay beyond the trench width.

3.03 BLASTING

A. No blasting is permitted without a State permit, copy provided to Township, and 72-hour advance notice to the Township and any other emergency services.

B. Blasting is the sole responsibility of the Contractor and no duty is assumed or to be exercised by the Township relative thereto.

C. Blasting work shall be supervised by licensed and experienced personnel and performed in conformance with applicable Federal, State and local codes.

3.04 TRENCH EXCAVATION

A. Depth of Excavation:

1. Gravity Pipelines:

a. Excavate mainline trenches to the required depth and grade for the invert of the pipe plus that excavation necessary for placement of pipe bedding material.

b. Excavation for laterals shall provide a straight uniform grade of 1/4" per foot from the main pipeline to the right-of-way line, plus that excavation necessary for placement of pipe bedding material.

2. Pressure Pipelines:

    a. Excavate trenches to the minimum depth necessary to place required pipe bedding material and to provide a minimum of 42” from the top of the pipe to the finished ground elevation, except where specific depths are otherwise shown on the Drawings.

3. Where unsuitable bearing material is encountered in the trench bottom, continue excavation until the unsuitable material is removed, solid bearing is obtained or can be established, or concrete cradle can be placed. If no concrete cradle is to be installed, refill the trench to required pipeline grade with pipe bedding material.

4. Where the Contractor, by error or intent, excavates beyond the minimum required depth, backfill the trench to the required pipeline grade with pipe bedding material.

B. Width of Excavation:

1. Excavate trenches, including laterals, to a width necessary for placement and jointing of the pipe, and for placing and compacting pipe bedding and trench backfill around the pipe, but not less than 16" or more than 24" plus the pipe outside diameter from the bottom of the trench to a point 12" above the crown of the pipe.

2. Shape trench walls completely vertical from trench bottom to at least 2' above the top of the pipe. Trench walls from 2' above the top of the pipe to grade to be benched and sloped, or shaved, to comply with Federal and State laws and codes.

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.

3.05 SUPPORT OF EXCAVATION

A. Excavation support is the sole responsibility of the Contractor and no duty is assumed or to be exercised by the Township relative thereto.

B. Support excavations with sheeting, shoring, and bracing or a "trench box" as required to comply with Federal and State laws and codes.

C. Install adequate excavation supports to prevent ground movement or settlement of 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 at no expense to the Township.

D. Withdraw sheeting, shoring, and bracing as backfilling proceeds unless otherwise approved by the Township.

3.06 CONTROL OF EXCAVATED MATERIAL

A. Keep the ground surface on both sides of the excavation free of excavated material to comply with Federal and State laws and codes.

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 is dumped into the stream course. Remove cofferdams immediately upon completion of pipeline construction.

E. Comply with the requirements of the Soil Erosion & Sedimentation Control plan, as approved by the Cumberland County Conservation District and as specified in Section 02270, Soil Erosion and Sedimentation Control.

3.07 DEWATERING

A. Keep excavations dry and free of water. Dispose of precipitation and subsurface water clear of the work. Comply with Section 02270, Soil Erosion and Sedimentation Control.

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 requirements for dewatering to any watercourse, prevention of stream degradation, and erosion and sediment control.

3.08 PIPE BEDDING REQUIREMENTS

A. Flowable Backfill Bedding:

1. Depth of pipe bedding aggregate and flowable fill as shown on Standard Detail EPT 02221-2.

B. Type III Bedding:

1. Depth of pipe bedding aggregate as shown on Standard Detail EPT 02221-1.

2. Provide Type III bedding when installing reinforced concrete storm drain pipe.

C. Type IV Bedding:

1. Depth of pipe bedding aggregate as shown on Standard Detail EPT 02221-1.

2. Provide Type IV bedding when installing all other pipe larger than 2" diameter.

D. Type V Bedding:

1. Depth of pipe bedding aggregate as shown on Standard Detail EPT 02221-1.

2. Provide Type V bedding when installing piping 2" diameter and smaller.

E. Shape recesses for the joints or bell of the pipe by hand. Assure that the pipe is supported on the lower quadrant (under haunches) for the entire length of the barrel. Fill all voids below the pipe.

F. Pipe embankment material shall be placed, worked by hand or compacted until a minimum density of 90% in yards and 95% under roadways, shoulders, driveways and sidewalks is achieved (at optimum moisture content, ±2%, standard proctor).

3.09 PIPE LAYING

A. Provide required pipe bedding placed in accordance with the detail EPT 02221-1 or EPT 02221-2.

B. Lay pipe as specified in the appropriate Section of these Specifications for pipeline construction.

3.10 THRUST RESTRAINT

A. Provide pressure pipe with concrete thrust blocking (See Section 03050) or use restrained joint fittings at all bends, tees, valves, and changes in direction.

3.11 BACKFILLING TRENCHES

A. After pipe installation and inspection, backfill trenches to 12" above the crown of the pipe with specified backfill materials, as per pipe bedding detail (EPT-02221-1), placed and carefully compact with approved compaction equipment in layers of suitable thickness to provide specified compaction. Backfill and compact the remainder of the trench with specified backfill material. Refer to Backfill and Surface Restoration Requirements Table in Section 02575 for trench backfill material and compaction requirements at each specific location.

B. Lift Thickness Limitations For Crushed Aggregate:

1. Submit a list of the compaction equipment to be utilized on the project, the recommendations of the equipment manufacturer as to the maximum lift thickness which can be placed, and the method of compaction to be used with this equipment to achieve the required compaction. In no case shall maximum lift thickness placed exceed the maximum limits specified by the manufacturer's recommendations. However, if the equipment manufacturer's lift thickness recommendation is followed and the specified compaction is not obtained, the Contractor shall, at his own expense, remove, replace, and retest as many times as is required to obtain the specified compaction.

2. Lift thickness limitations specified for state highways, shoulders, or embankments shall govern over the compaction equipment manufacturer's recommendations.

C. Jetting:

1. When approved by the Township in writing, jetting methods may be used to consolidate backfill. Quality assurance methods to verify adequate compaction will be a condition of the approval by the Township.

D. Uncompacted Backfill:

1. Where uncompacted backfill is indicated on the drawings, backfill the trench from one foot above the pipe to the top of the trench with material excavated from the trench, crowned over the trench to a sufficient height to allow for settlement to grade after consolidation, providing for surface water drainage.

E. Unsuitable Backfill Material:

1. Where the Township 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 select material backfill.

F. Compaction Testing:

1. Conduct compaction tests as directed by the Township during backfilling operations.

2. Determine compaction in state highways and shoulders by the testing procedure contained in Pennsylvania Test Method, PTM 106 or PTM 402.

3. Determine compaction in areas other than state highways and shoulders by the testing procedure contained in ASTM D698 or ASTM D6938.

3.12 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 legally disposed of.

3.13 ROUGH GRADING

A. Rough subgrade areas disturbed by construction to a uniform finish. Form the bases for terraces, banks, and lawns.

B. Grade areas to be paved to depths required where placing subbase and paving materials.

C. Rough grade areas to be topsoiled and seeded to 6" below indicated finish contours.

3.14 RESTORATION OF UNPAVED SURFACES

A. Restore unpaved surfaces disturbed by construction to equal the surface condition prior to construction.

B. Restore grassed areas in accordance with Section 02485.

3.15 LIMITS OF WORK

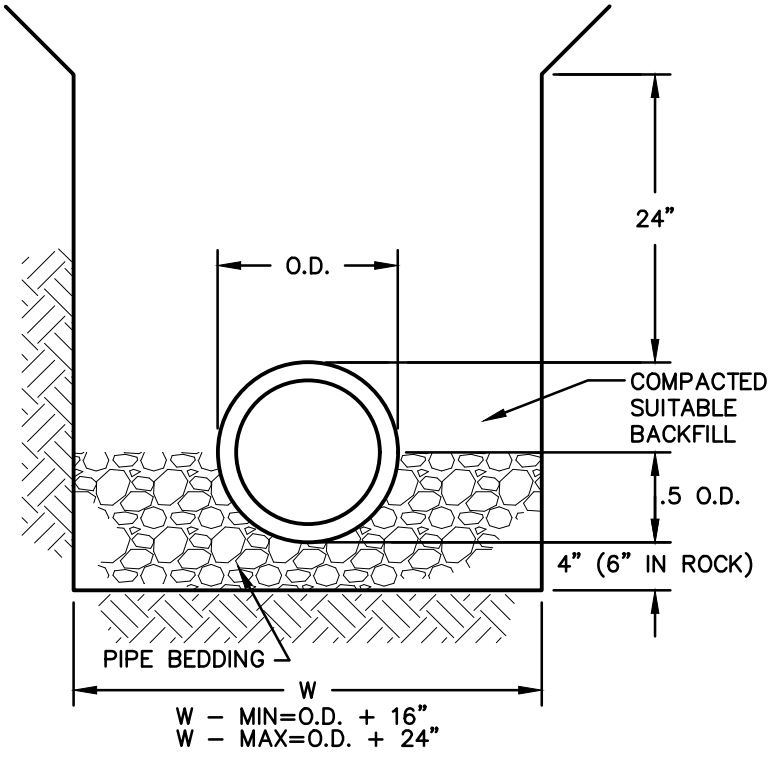
A. All disturbances shall be confined to Developer's property, street rights-of-way, permanent easements, and temporary construction easements shown on the Drawings.

B. The Contractor shall not permit trucks and equipment to enter private driveways.

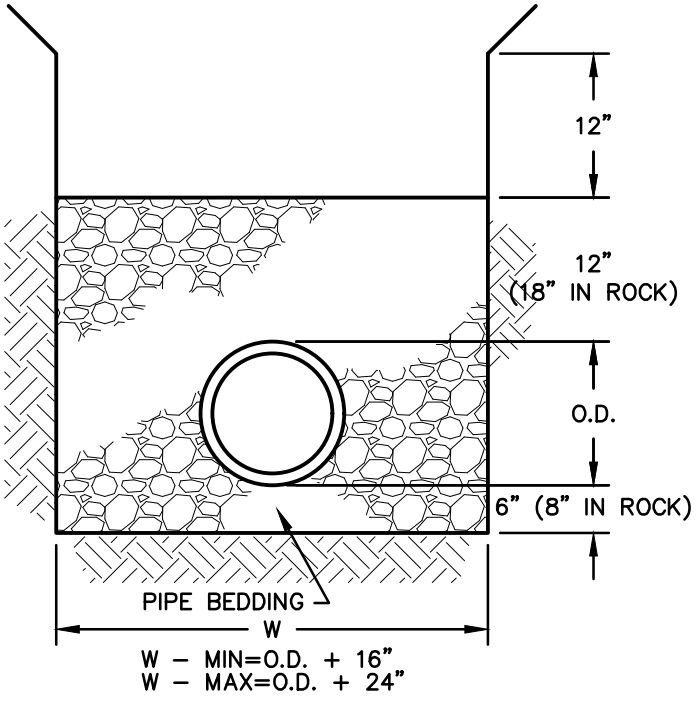
C. All work shall be confined to the Township or state highway rights-of-way and permanent rights-of-way or temporary construction rights-of-way shown on the Drawings.

D. The Contractor shall not permit trucks and equipment to enter private property except where easements are provided or prior written permission from the owner has been obtained by the Contractor.

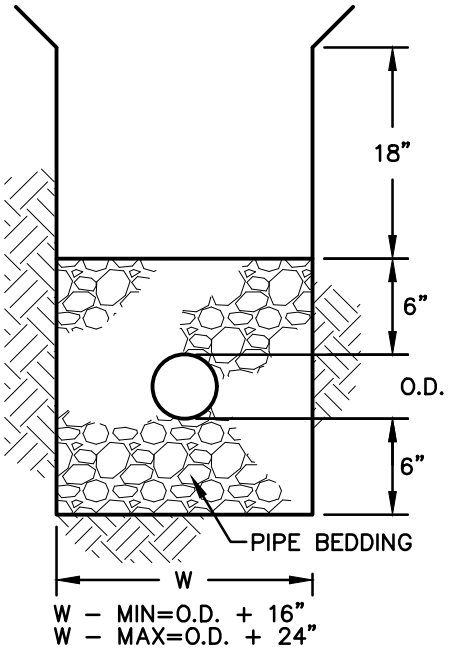
END OF SECTION



TYPE III
(RCP ONLY)



TYPE IV



TYPE V
(2" DIA. AND SMALLER)

NOTE: TYPE I AND II NOT PERMITTED.

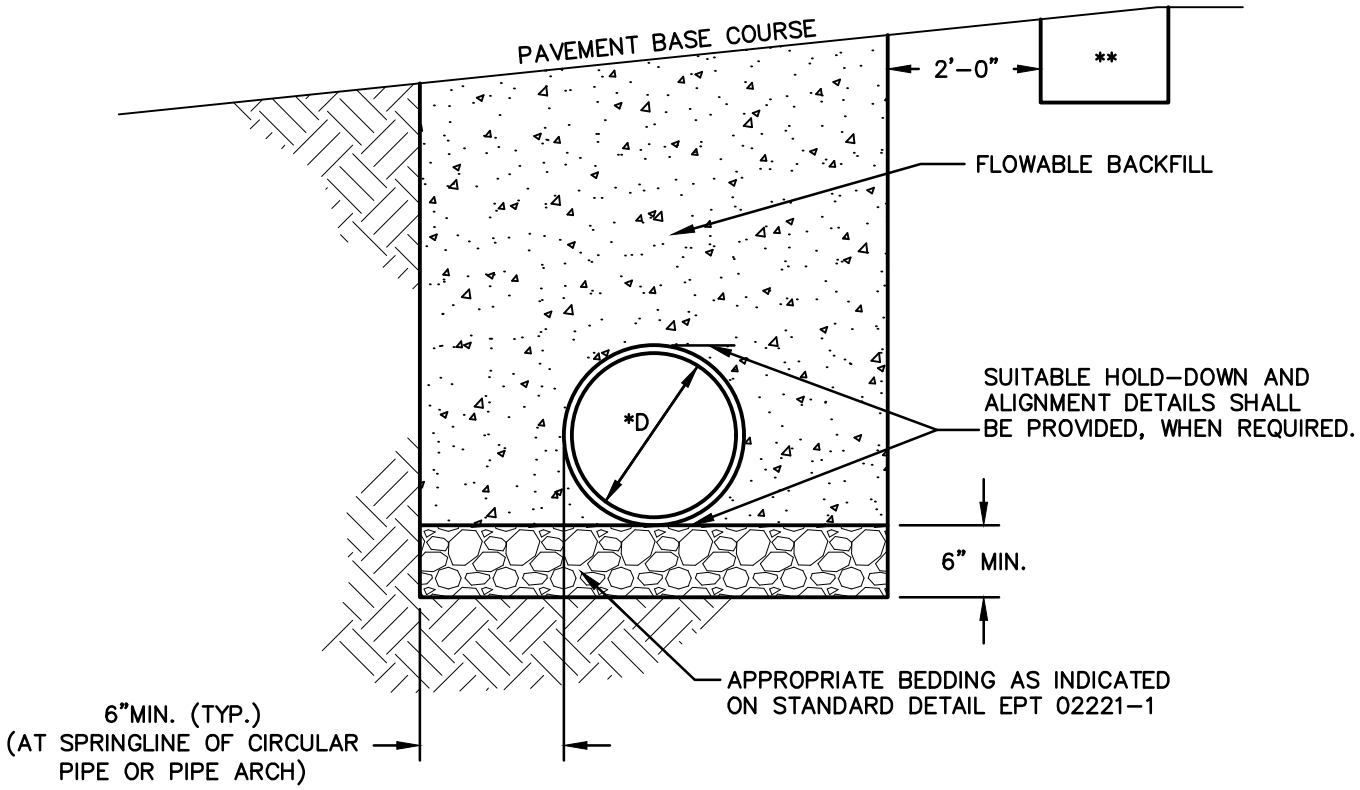
EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

C.S. DAVIDSON, INC.
ENGINEERING A BETTER COMMUNITY
38 NORTH DUKE STREET, YORK, PA • PHONE (717) 846-4805
50 WEST MIDDLE STREET, GETTYSBURG, PA • PHONE (717) 337-3021
315 W. JAMES STREET, SUITE 102, LANCASTER, PA • PHONE (717) 481-2991
WWW.CSDAVIDSON.COM

PIPE BEDDING DETAILS

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	1/1/2023
DWG. NO.	EPT02221-1
FILE NO.	4833.9.02.00



*D = 3'-0" MAXIMUM DIAMETER OR RISE.

** IF DRAINAGE IS REQUIRED TO MAINTAIN POSITIVE FLOW OF WATER AWAY FROM THE TRENCH, IT MUST BE PROVIDED BY USE OF PROPERLY DESIGNED GRANULAR OR SYNTHETIC DRAINS.

NOTES:

1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408, SECTIONS 601 AND 220.

2. FLOWABLE BACKFILL WILL ENVELOP THE LAST SECTION OF PIPE OR END SECTION. CONSTRUCT DIKE OF FLOWABLE BACKFILL MATERIAL AS SPECIFIED IN SPECIAL PROVISION OR PROVIDE FORMWORK TO CONTAIN FLOWABLE BACKFILL.

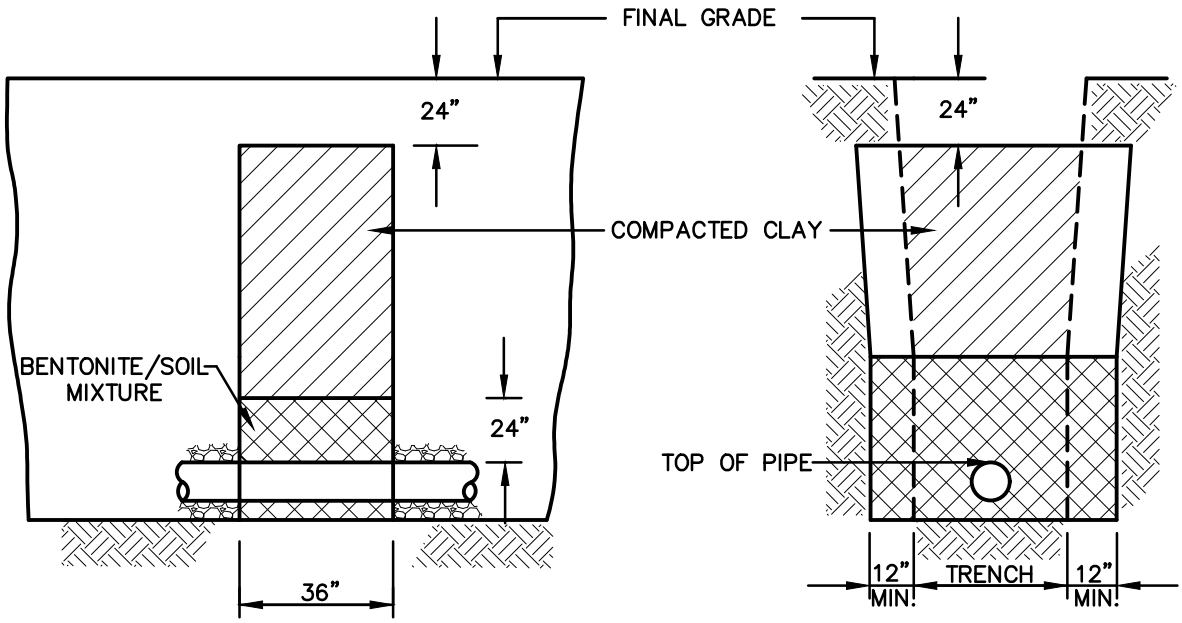
EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

C.S. DAVIDSON, INC.
ENGINEERING A BETTER COMMUNITY
38 NORTH DUKE STREET, YORK, PA • PHONE (717) 846-4805
50 WEST MIDDLE STREET, GETTYSBURG, PA • PHONE (717) 337-3021
315 W. JAMES STREET, SUITE 102, LANCASTER, PA • PHONE (717) 481-2991
WWW.CSDAVIDSON.COM

FLOWABLE BACKFILL DETAIL

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	1/1/2023
DWG. NO.	EPT02221-2
FILE NO.	4833.9.02.00



NOTES:

1. COMPACTED CLAY DIKES SHALL EXTEND VERTICALLY FROM UNDISTURBED GROUND AT BOTTOM OF TRENCH TO WITHIN 24" OF FINAL GRADE, AND FROM UNDISTURBED GROUND ON TRENCH SIDES FOR WIDTH OF TRENCH AND 12" BEYOND EACH SIDE OF TRENCH.

2. CLAY BACKFILL TO A POINT 24" OVER THE PIPE SHALL CONSIST OF A BENTONITE/SOIL MIXTURE AT A 5:1 MIX.

3. REMAINING BACKFILL SHALL CONSIST OF CLAY CONTAINING NO MORE THAN 15% (BY VOLUME) STONE NOT LARGER THAN TWO (2") INCHES IN DIAMETER. CLAY SHALL BE PLACED IN SIX (6") INCH LIFTS AND COMPACTED BY MECHANICAL TAMPER TO NOT LESS THAN 95% OF MAXIMUM DENSITY AT OPTIMUM MOISTURE CONTENT.

EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

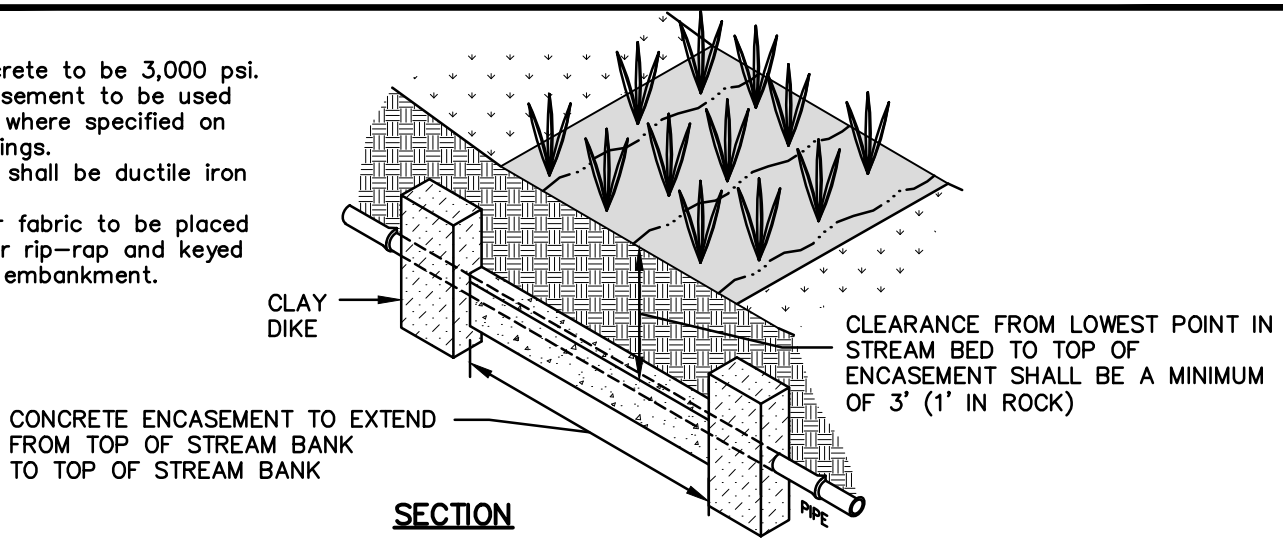
C.S. DAVIDSON, INC.
ENGINEERING A BETTER COMMUNITY
38 NORTH DUKE STREET, YORK, PA • PHONE (717) 846-4805
50 WEST MIDDLE STREET, GETTYSBURG, PA • PHONE (717) 337-3021
315 W. JAMES STREET, SUITE 102, LANCASTER, PA • PHONE (717) 481-2991
WWW.CSDAVIDSON.COM

CLAY DIKE DETAIL

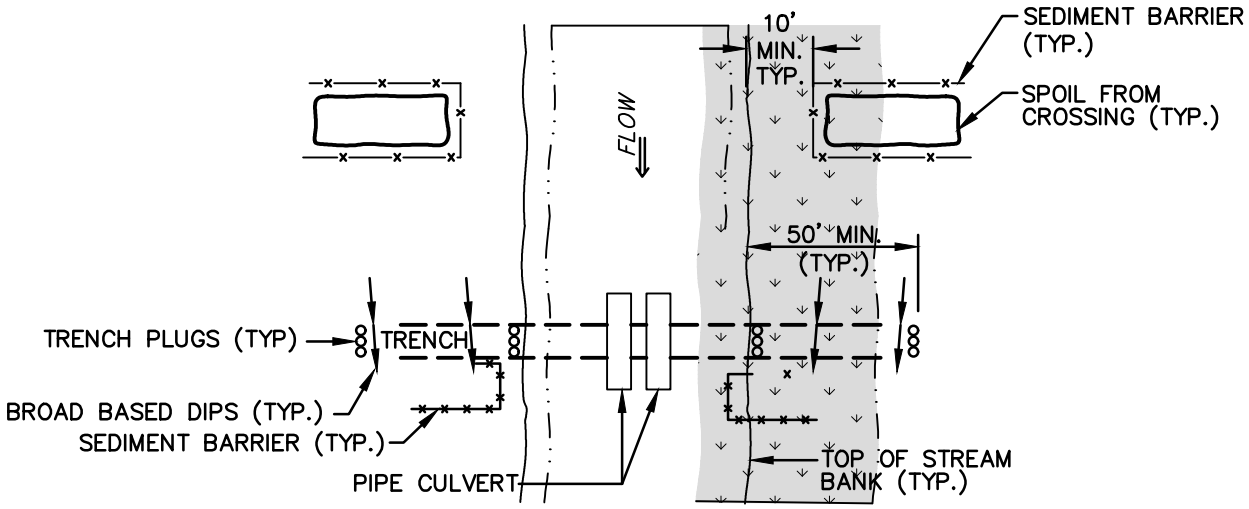
EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	1/1/2023
DWG. NO.	EPT02221-3
FILE NO.	4833.9.02.00

Notes:
1. Concrete to be 3,000 psi.
2. Encasement to be used only where specified on drawings.
3. Pipe shall be ductile iron pipe.
4. Filter fabric to be placed under rip–rap and keyed into embankment.



SECTION



PLAN

NOTES:
1. All work within the wetland area must follow the requirements for all applicable permits obtained for the project. All work within the stream, including the trench backfilling, stabilization of the stream banks must be completed within 72 hours.
2. Install broad based dips at 50' from the top of bank and 10' from the top of bank.
3. Construct sediment barriers and direct runoff from the broad based dips into them.
4. Install temporary pipe culverts in the wetland. Size and number of culverts to be determined on site to adequately convey baseflow. (Mats, pads, or other similar devices shall be installed where crossing of wetland areas by construction equipment cannot be avoided.)
5. Install pipe with trench plugs.
6. Once entire pipe is installed between corresponding manholes install clay dikes and concrete encasement.
7. Remove trench plugs and backfill trench with native wetland material. Original grades through wetland must be restored. Any excess material must be removed from the wetland. Mounding of fill material to allow for settlement in the trench will be permitted in accordinance with best construction methods.
8. Remove temporary pipe.
9. Woodchips from clearing and grubbing of wetland area should be spread over all disturbed areas. Do not reseed the disturbed areas of the wetland.
10. Install sediment barrier at top of wetland banks. Grade out broad base dips and all disturbed areas in accordance with Seeding Restoration Table.
11. Provide pinning to anchor pipe.

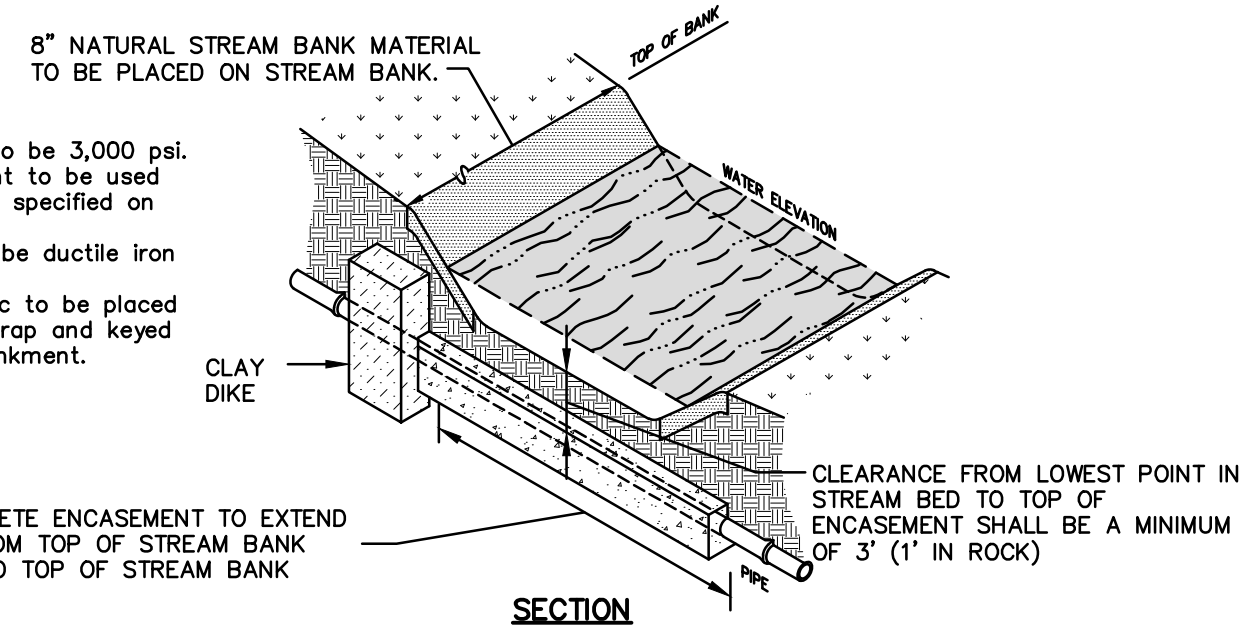
EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

C.S. DAVIDSON, INC.
ENGINEERING A BETTER COMMUNITY
38 NORTH DUKE STREET, YORK, PA • PHONE (717) 846-4805
50 WEST MIDDLE STREET, GETTYSBURG, PA • PHONE (717) 337-3021
315 W. JAMES STREET, SUITE 102, LANCASTER, PA • PHONE (717) 481-2991
WWW.CSDAVIDSON.COM

UTILITY LINE WETLAND CROSSING (FLUMED) DETAIL

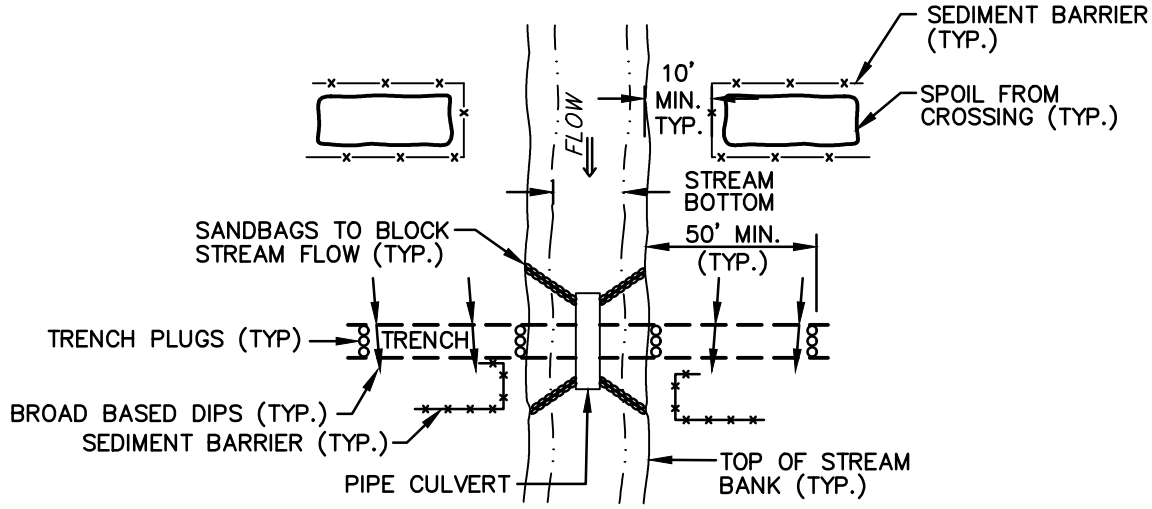
EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	1/1/2023
DWG. NO.	EPT02221-4
FILE NO.	4833.9.02.00



Notes:
1. Concrete to be 3,000 psi.
2. Encasement to be used only where specified on drawings.
3. Pipe shall be ductile iron pipe.
4. Filter fabric to be placed under rip–rap and keyed into embankment.

SECTION



PLAN

NOTES:
1. All work within the stream area must follow the requirements for all applicable permits obtained for this project. All work within the stream, including the trench backfilling, stabilization of the stream banks must be completed within 72 hours.
2. Install broad based dips at 50' from the top of bank and 10' from the top of bank.
3. Construct sediment barriers and direct runoff from the broad based dips into them.
4. Install temporary pipe culvert in the stream. Size and number of culverts to be determined on site or adequately convey baseflow. Minimum culvert diameter to be 12".
5. Install pipe with trench plugs.
6. Once entire pipe is installed between corresponding manholes install clay dikes and concrete encasement.
7. Remove trench plugs and backfill trench. Place minimum 8" of natural stream bed material at existing grades.
8. Remove sandbags and temporary pipe.
9. Install sediment barrier at top of stream banks. Grade out broad base dips and all disturbed area in accordance with seeding restoration table.
10. Provide pinning to anchor pipe.

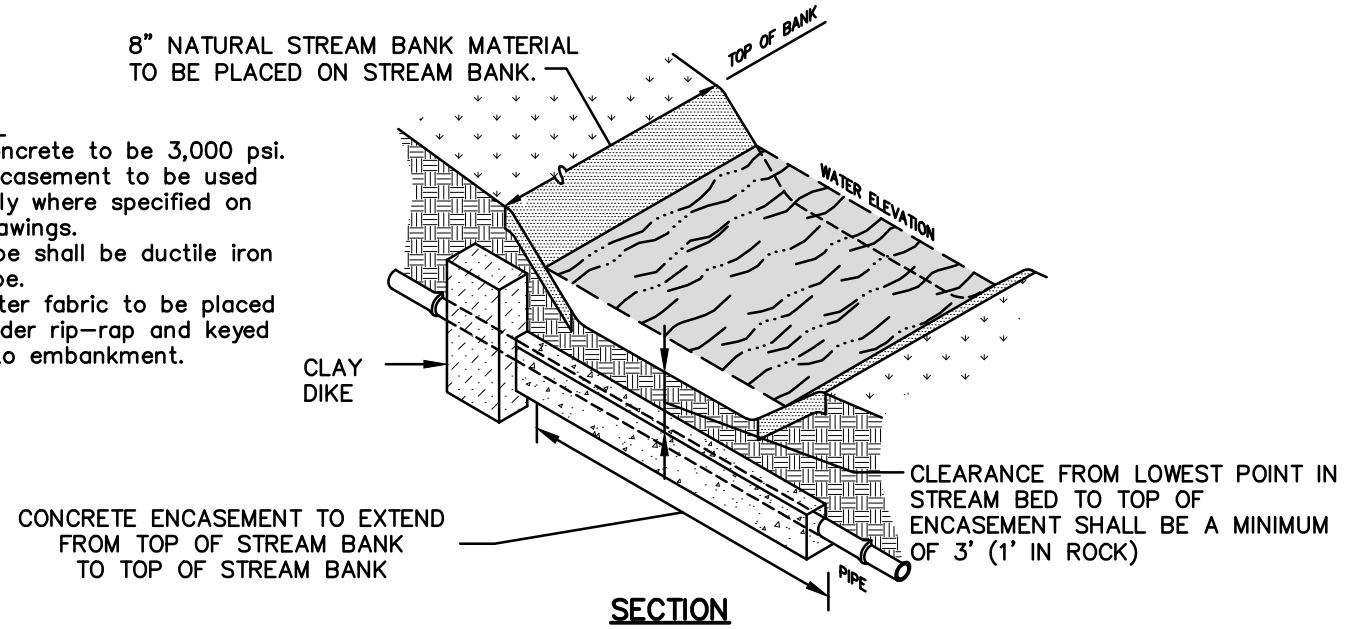
EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

C.S. DAVIDSON, INC.
ENGINEERING A BETTER COMMUNITY
38 NORTH DUKE STREET, YORK, PA • PHONE (717) 846-4805
50 WEST MIDDLE STREET, GETTYSBURG, PA • PHONE (717) 337-3021
315 W. JAMES STREET, SUITE 102, LANCASTER, PA • PHONE (717) 481-2991
WWW.CSDAVIDSON.COM

UTILITY LINE STREAM CROSSING (FLUMED) DETAIL

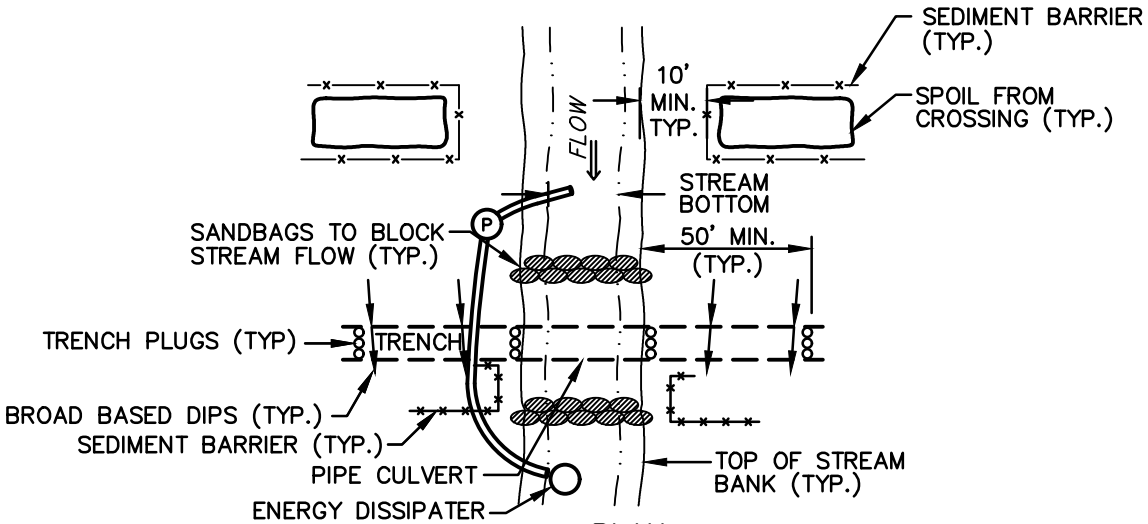
EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	1/1/2023
DWG. NO.	EPT02221-5
FILE NO.	4833.9.02.00



Notes:
1. Concrete to be 3,000 psi.
2. Encasement to be used only where specified on drawings.
3. Pipe shall be ductile iron pipe.
4. Filter fabric to be placed under rip–rap and keyed into embankment.

SECTION



PLAN

NOTES:
1. All work within the stream area must follow the requirements for all applicable permits obtained for this project. All work within the stream, including the trench backfilling, stabilization of the stream banks must be completed within 72 hours.
2. Install broad based dips at 50' from the top of bank and 10' from the top of bank.
3. Construct sediment barriers and direct runoff from the broad based dips into them.
4. Install temporary pipe culvert in the stream. Size and number of culverts to be determined on site or adequately convey baseflow. Minimum culvert diameter to be 12".
5. Install pipe with trench plugs.
6. Once entire pipe is installed between corresponding manholes install clay dikes and concrete encasement.
7. Remove trench plugs and backfill trench. Place minimum 8" of natural stream bed material at existing grades.
8. Remove sandbags and temporary pipe.
9. Install sediment barrier at top of stream banks. Grade out broad base dips and all disturbed area in accordance with seeding restoration table.
10. Provide pinning to anchor pipe.

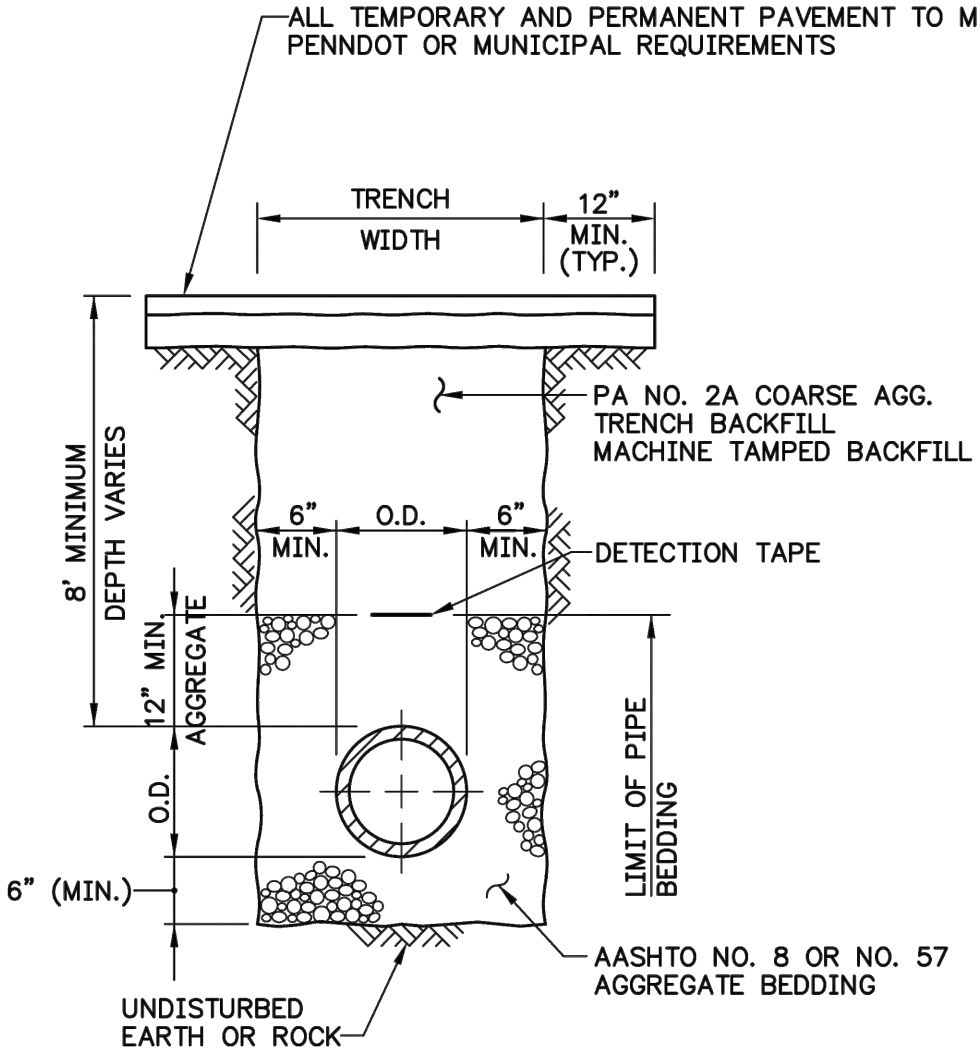
EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

C.S. DAVIDSON, INC.
ENGINEERING A BETTER COMMUNITY
38 NORTH DUKE STREET, YORK, PA • PHONE (717) 846-4805
50 WEST MIDDLE STREET, GETTYSBURG, PA • PHONE (717) 337-3021
315 W. JAMES STREET, SUITE 102, LANCASTER, PA • PHONE (717) 481-2991
WWW.CSDAVIDSON.COM

UTILITY LINE STREAM CROSSING (BYPASS) DETAIL

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	1/1/2023
DWG. NO.	EPT02221-6
FILE NO.	4833.9.02.00



LOCAL ROADS

NOTES:

1. WHEN IN PAVED AREAS SUCH AS DRIVEWAYS OR PARKING LOTS, PAVING RESTORATION SHALL BE IN ACCORDANCE WITH MUNICIPAL REQUIREMENTS.
2. NO BACKFILL MATERIAL LARGER THAN 6–INCHES.
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.

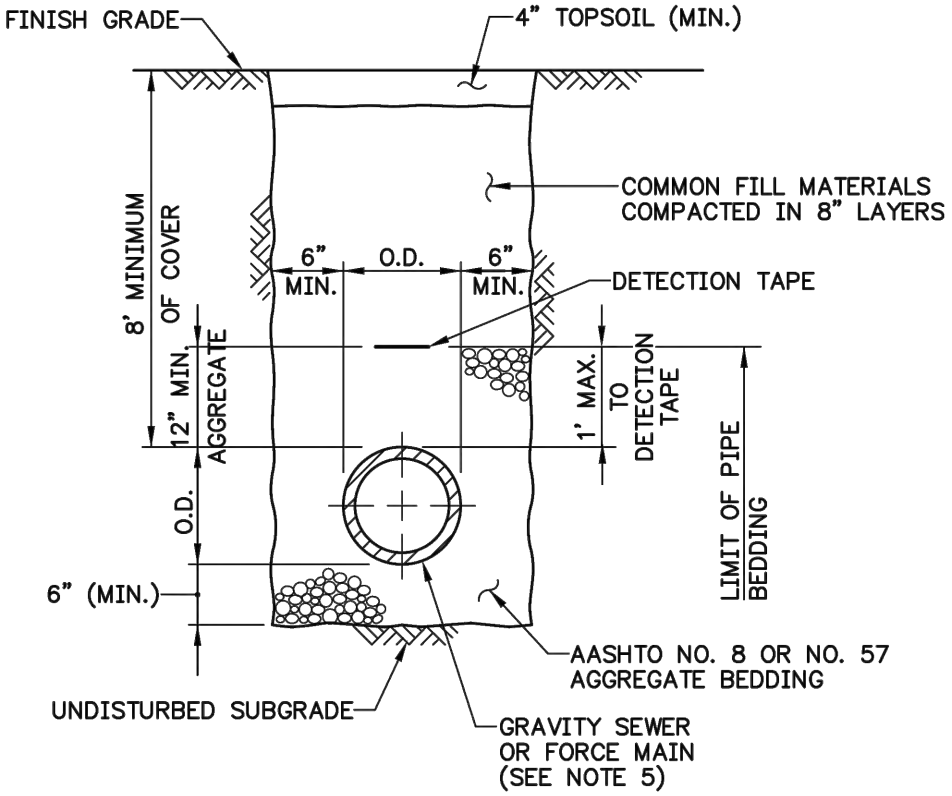
EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

GHD
225 GRANDVIEW AVENUE SUITE 403, CAMP HILL, PA
PHONE (717) 541-0622
WWW.GHD.COM

TRENCH DETAIL IN PAVED AREAS

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	8/1/2023
DWG. NO.	EPT02221-7
FILE NO.	4833.9.02.00



NOTES:

1. WHEN IN PAVED AREAS SUCH AS DRIVEWAYS OR PARKING LOTS, PAVING RESTORATION SHALL BE IN ACCORDANCE WITH MUNICIPAL REQUIREMENTS..
2. NO BACKFILL MATERIAL LARGER THAN 6–INCHES.
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.

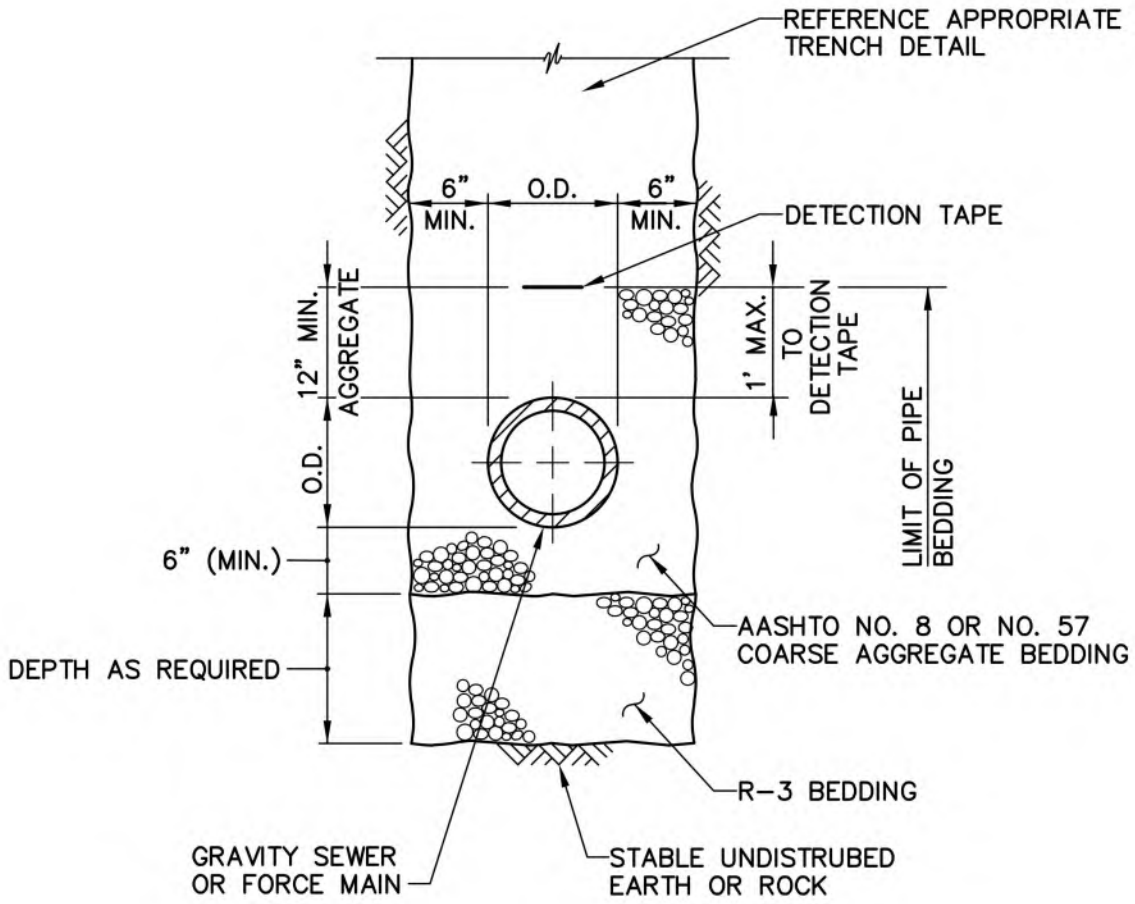
EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

GHD
225 GRANDVIEW AVENUE SUITE 403, CAMP HILL, PA
PHONE (717) 541-0622
WWW.GHD.COM

TRENCH DETAIL
IN UNPAVED AREAS

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	8/1/2023
DWG. NO.	EPT02221-8
FILE NO.	4833.9.02.00



EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

GHD

225 GRANDVIEW AVENUE SUITE 403, CAMP HILL, PA
PHONE (717) 541-0622
WWW.GHD.COM

UNSUITABLE MATERIAL EXCAVATION DETAIL

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	8/1/2023
DWG. NO.	EPT02221-9
FILE NO.	4833.9.02.00

SECTION 02230

ROADWAY EXCAVATION, FILL, AND COMPACTION

PART 1 GENERAL

1.01 DESCRIPTION

A. The work of this Section includes but is not limited to:

1. Excavation
2. Compaction
3. Fill
4. Subgrade Preparation
5. Base Preparation

B. Related Work Specified Elsewhere:

1. Utility Conflict Statement ..... Section 00160
2. Clearing and grubbing..... Section 02100
3. Site excavation and placement of fill material ..... Section 02210
4. Soil erosion and sedimentation control..... Section 02270
5. Finish grading, seeding and sodding..... Section 02485
6. Bituminous paving and surfacing..... Section 02500

C. Definitions:

1. *Roadway*: Area under and within ten feet of the edge of paving.

2. *Roadway Subgrade*: The prepared earth surfaces on or over which additional roadway materials will be placed or work is to be performed.

D. Applicable Standard Details:

1. See Section 02500.

2. The "Backfill and surface Restoration Requirements" Table in Section 02575 lists the specific paving requirements.

1.02 QUALITY ASSURANCE

A. Reference Standards:

1. American Association of State Highway and Transportation Officials (AASHTO):

T99 Moisture-Density Relations of Soils (using a 5.5-lb. Rammer and a 12-inch Drop).

T191 Standard Method of Test for Density of Soil In-Place by the Sand Cone Method.

2. American Society for Testing and Materials (ASTM):

D698	Test Method of Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft.-lbf./ft3)
D1557	Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft.-lbf./ft3)
D2167	Test Method for Density and Unit Weight of of Soil in Place by the Rubber-Ballon Method.
D6938	Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

3. Pennsylvania Department of Transportation Publication 408 Specifications - Section 703.2 Coarse Aggregate.

B. Inspections:

1. Inspection by the Township will, at a minimum, be made of materials upon delivery to the job site; of the subgrade prior to placement of the base course; of the completed base course prior to placement of the binder surface; of the completed binder course prior to placement of the wearing course; and of the completed wearing course.

1.03 SUBMITTALS

A. Certificates:

1. Submit certification from aggregate suppliers attesting that materials conform to specifications herein. Certification shall be provided with each load of crushed aggregate delivered to the job site.

B. One copy of the approved Soil Erosion & Sedimentation Control plan, including approval letter.

1.04 JOB CONDITIONS

A. As specified in Section 02210.

PART 2 PRODUCTS

2.01 ACCEPTABLE MATERIALS

A. *Roadway Fill Areas*: As specified previously under Site Excavation and Placement of Fill Material, Section 02210.

B. *Embankment Fill Areas*: As specified previously under Site Excavation and Placement of Fill Material, Section 02210.

C. *Excavated Areas*: Suitability of material for subgrade purposes shall be determined by non-movement of the material under compaction equipment.

D. *Coarse Aggregate*: Hard, tough, durable, and uncoated inert particles reasonably free from clay, silt, vegetation other deleterious substances coarse aggregate shall be obtained from approved source.

2.02 GEOTEXTILES

A. For all areas of wet subgrade – Class 4 Type C as defined in PennDOT Publication 408, Specifications, Section 735, and as approved by the Township.

B. For pavement base drains – Class 1 as defined by PennDOT Publication 408 Specifications, Section 735, and as approved by the Township.

PART 3 EXECUTION

3.01 SUBGRADE

A. Perform soil erosion control work in accordance with requirements of approved Soil Erosion and Sedimentation Control Plan and Section 02270.

B. *Roadway Excavation*: Excavate or otherwise remove and satisfactorily dispose of materials located within the limits indicated on the drawings for roadways.

1. Excavate to roadway subgrade depths required, and cut drainage channels and waterways as detailed on the drawings. Proof roll subgrade to the satisfaction of the Township.

2. Remove rock encountered in roadway excavation to a depth six inches below finished subgrade elevation.

3. Excavate unsuitable subgrade material. Refill such areas to required elevation with acceptable materials.

4. Place geotextile layer in wet areas prior to placing final base course.

C. *Roadway Grading*: Shape subgrade of roadways, intersections, approaches, entrances and adjoining pedestrian walkways to no more than 0.10 foot above or below the design elevations.

D. *Roadway Fill*: Construction requirements for roadway fill shall be as follows:

1. Form the roadway fill with acceptable materials.

2. Compact material to a minimum final density of not less than 95% of the maximum dry weight density at its optimum moisture content plus or minus 2% per ASTM D698 or D1557. Proof roll roadway fill to the satisfaction of the Township.

E. *Roadway Embankment*: Construction requirements for roadway embankment shall be as follows:

1. Break up shale and other rock-like materials formed by natural consolidation of mud, clay, silt, and fine sand into a maximum size that can be readily placed and compacted in loose eight (8) inch layers.

2. Place rock to form the base of roadway embankments. Place in uniform loose layers not exceeding in depth the approximate average size of the larger rock, but not exceeding eight (8) inches deep.

3. Smooth and level each layer adding soil or granular material conforming to Section 02210, in sufficient quantity to supplement the smaller rock pieces, filling the voids and pockets.

4. Form the top 18 inches of roadway embankments with soil or granular material conforming to Section 02210.

5. Compact embankment material to a minimum final density of not less than 95% of the maximum dry weight density at its optimum moisture content plus or minus 2% per ASTM D698 or D1557. Proof roll embankments to the satisfaction of the Township.

6. During foreign borrow excavation operations, keep the borrow area graded to ensure free water drainage. Following completion of work in the borrow area; grade the area to present a uniformly trim appearance merging into the surrounding terrain and to prevent erosion.

3.02 BASE COURSES

A. Subbase Course

1. Compact subgrade material to a minimum final density of not less than 95% of the maximum dry weight density at its optimum moisture content plus or minus 2% per ASTM D698 or D1557. Perform finish rolling on roadway subgrade just prior to installation of aggregate subbase or base course.

2. When indicated on the drawings or directed by the Township, construct subbase in accordance with PennDOT Publication 408 Specifications, Section 350.

B. Crushed Aggregate Base Course (Type A)

1. On prepared subgrade (or subbase if required), spread AASHTO No. 10 (limestone screenings) to a depth of one inch and compact. Construct stone base of AASHTO No. 1 aggregate to an 8" compacted depth.

2. Compaction shall be achieved by means of approved static or vibratory equipment as specified in PennDOT Publication 408. If static roller is used, base course of more than 8 inches shall be constructed in two lifts. If approved vibratory roller is used, base course up to 10 inches in compacted thickness may be constructed in one course.

3. *Spreading Coarse Material*: The coarse material shall be spread uniformly on the initial layer of fine material by approved mechanical stone spreaders to the full width of the base unless otherwise specified for part-width construction. Spreaders shall be adjusted to spread the loose material to obtain a layer of the required depth after compaction. In areas inaccessible to spreading equipment, the material may be spread directly from trucks provided the distribution is equivalent to that achieved by the spreader. All segregated material shall be removed and replaced with well graded material. The coarse material shall not be spread for a distance of more than an average day's work ahead of choking and compacting.

4. *Compacting Coarse Material*: Immediately after surface corrections have been made to the spread coarse material, it shall be thoroughly compacted. The rolling shall begin at the sides and progress to the center, except on super-elevated curves where the rolling shall begin on the low side and progress to the high side. The rolling shall be parallel with the centerline of the roadway, uniformly lapping each preceding track, covering the entire surface with the rear wheels ahead of the roller wheels. After each layer of material has been spread and compacted, it shall be checked with approved templates and straightedges, and all irregularities shall be satisfactorily corrected. Red flags shall be placed at the limits of satisfactorily compacted coarse material. The flags shall be moved ahead as additional material is compacted, and no filler shall be applied to the coarse material in advance of the flag-marked sections.

5. *Application of Fine Material*: After the coarse material has been set and keyed by compaction, dry limestone screenings (AASHTO No. 10.), in an amount equal to approximately 50% of that required to fill the voids in the coarse material, and shall be spread uniformly over the surface. The vibratory compaction equipment shall then be operated over the surface to cause the screenings to settle into the voids. The remaining screenings shall be spread and vibrated in one or more applications to satisfactorily fill the voids; however, the quantity of screenings used and the operation of filling shall not cause floatation of the coarse aggregate. Areas not completely filled, in the foregoing operations, shall be filled by manual methods and need not be further vibrated.

6. *Compacting and Bonding*: After completing the vibration of the fine material, the surface of single-layer construction, or the surface of each layer of multi-layer construction, shall be sprinkled with water and rolled. All excess screenings forming in piles or cakes upon the surface shall be loosened and scattered by sweeping, exercising care that the fine material is not removed below the top of the coarse aggregate. On the surface of single-layer construction or the top layer of multi-layer construction, the sprinkling and rolling shall be continued and additional screenings applied where necessary until all voids are filled and until a slight wave of grout forms in front of the roller wheels. Brooms attached to the roller, and hand brooms, shall be used to distribute the grout uniformly into the unfilled voids. After the wave of grout has been produced over the entire section of the base course, this portion shall be left to dry. The surface shall be sprinkled and re-rolled as required to bond it thoroughly and to secure a satisfactory surface. The quantity of screenings and water used shall be sufficient to produce a smooth, hard monolithic surface.

7. *Maintenance and Traffic*: The Contractor shall maintain the completed base course until the placement of the surface course. No traffic shall be allowed on the base course other than necessary local traffic and that developing from the operation of essential construction equipment. Any defects which may develop in the construction of the base course or any damage caused by the operation of local or job traffic is the responsibility of the Contractor and shall be immediately repaired or replaced at no expense to the Township.

C. Crushed Aggregate Base Course (Type B)

1. On prepared subgrade (or subbase if required), construct stone base of PennDOT 2A coarse aggregate to the compacted depth specified in the "Backfill and Surface Restoration Requirement" Table in Section 02575. Material substitutions shall be approved by the Township.

2. Compaction shall be achieved by means of approved static or vibratory equipment. If static roller is used, base course of more than 8 inches shall be constructed in two lifts. If approved vibratory roller is used, base course up to 10 inches compacted thickness may be constructed in one course.

3. *Spreading Coarse Material*: The aggregate material shall be spread uniformly by approved mechanical stone spreaders to the full width of the base unless otherwise specified for part-width construction. Spreaders shall be adjusted to spread the loose material to obtain a layer of the required depth after compaction. In areas inaccessible to spreading equipment, the material may be spread directly from trucks provided the distribution is equivalent to that achieved by the spreader. All segregated material shall be removed and replaced with well graded material. The aggregate material shall not be spread for a distance of more than an average day's work ahead of compacting.

4. *Compacting Coarse Material*: Immediately after surface corrections have been made to the spread material, it shall be compacted. The rolling shall begin at the sides and progress to the center, except on super elevated curves where the rolling shall begin on the low side and progress to the high side. The rolling shall be parallel with the centerline of the roadway, uniformly lapping each preceding track, covering the entire surface with the rear wheels and continuing until the material does not creep or wave ahead of the roller wheels. After each layer of material has been spread and compacted, it shall be checked with approved templates and straightedges, and all irregularities shall be satisfactorily corrected. Red flags shall be placed at the limits of satisfactorily compacted material. The flags shall be moved ahead as additional material is compacted.

5. *Maintenance and Traffic*: The Contractor shall maintain the completed base course until the placement of the surface course. No traffic shall be allowed on the base course other than necessary local traffic and that developing from the operation of essential construction equipment. Any defects which may develop in the construction of the base course or any damage caused by the operation of local or job traffic is the responsibility of the Contractor and shall be immediately repaired or replaced at no expense to the Township.

D. Crushed Aggregate Shoulders

1. As specified in Section 02230, Article 3.02.C.

E. Pavement Base Drain – See Section 02618

3.03 FIELD QUALITY CONTROL

A. Surface Tolerance.

1. After the base course has been completed as specified, the surface smoothness shall be checked with approved templates, string lines, or straightedges.

a. *Templates*: The Contractor shall furnish and use approved templates of required length and cut to the required crown of the finished surface of the base course, for checking the crown and contour thereof. The templates shall be equipped with metal or other approved vertical extensions attached to each end, so that the bottom of the template will be at the elevation of the top of the aggregate. At least 3 such templates shall be furnished, and used at intervals of not more than 25 feet.

b. *String Lines*: String lines, for controlling the finished elevation of the proposed base course, shall be furnished with ample supports and offset along each side of the base course, and shall be maintained until all irregularities have been satisfactorily corrected.

c. *Straightedges*: Approved straightedges 10 feet in length shall also be furnished and used for testing longitudinal irregularities in the surface of the base course.

2. Any surface irregularities that exceed ½ inch shall be remedied by loosening the surface and removing or adding material as required, after which the entire area, including the surrounding surface, shall be rolled until satisfactorily compacted.

B. *Tests for Depth of Finished Base Course*: During the progress of the work, the depth of the base course will be measured by the Township and unsatisfactory work shall be repaired, corrected, or replaced. The initial layer of fine material placed as a bed and filler (Type A Bases) will be measured and considered as part of the base course in determining the compacted depth of the finished base course.

1. The depth will be determined by cutting or digging holes to the full depth of the completed base course. One depth measurement shall be made for each 1500 square yards, or less, of completed base course. Any section in which the depth is ½ inch or more deficient in specified depth shall be satisfactorily corrected.

2. All test holes shall be backfilled with similar material and satisfactorily compacted. This operation shall be performed under the observation of Township personnel who will check the depth for record purposes.

C. Field Moisture-Density Tests.

1. Conduct such tests as specified under Site Excavation and Placement of Fill Material: Section 02210.

END OF SECTION

SECTION 02270

SOIL EROSION AND SEDIMENTATION CONTROL

PART 1 GENERAL

1.01 DESCRIPTION

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

1. Installation of soil erosion and sedimentation control (SESC) measures as per approved plan.

2. Maintenance of SESC measures.

3. Restoration of area and removal of any interim SESC measures placed to protect areas from erosion during the stabilization period.

B. Related work specified elsewhere:

1. Clearing and grubbing: ..... Section 02100
2. Site excavation and placement of fill material: ..... Section 02210
3. Finish grading, seeding, sodding: ..... Section 02485
4. Storm drain pipe: ..... Section 02618

C. Applicable Standard Details:

1. EPT 02270-1 ... General Soil Erosion Control For Residential Sites
2. EPT 02270-2 .....Stabilized Rock Construction Entrance
3. EPT 02270-3 ..... Silt Barrier Fence Detail
4. EPT 02270-4 .....Compost Filter Sock Detail
5. EPT 02270-5 ..... Super Filter Fabric Fence
6. EPT 02270-6 .....Rock Filter Outlet
7. EPT 02270-7 .....Straw Bale Barrier
8. EPT 02270-8 ..... Pumped Water Filter Bag

1.02 QUALITY ASSURANCE

A. Reference Standards:

1. Pennsylvania Department of Transportation (PennDOT), latest revision:

Publication 408, Specifications

Publication 72M, Roadway Construction Standards (RC 0-99)

2. Pennsylvania Department of Environmental Protection (PA DEP):

   Erosion and Sediment Pollution Control Program Manual Document No. 363-2134-008, Effective March 31, 2012 or latest revisions thereof as released in accordance with PA Code 25 Chapter 102.

3. Asphalt Institute Specifications

1.03 SUBMITTALS

A. One copy of an approved Soil Erosion and Sedimentation Control plan, including approval letter from the Cumberland County Conservation District. This plan may not be adjusted by the Contractor without prior approval of the County Conservation District and other regulatory agencies as applicable.

1.04 JOB CONDITIONS: Section Not Utilized.

PART 2 MATERIALS

2.01 STONE FOR RIP-RAP

A. Stone used shall be the type and size of rip-rap shown on the Drawings and shall meet the requirement of Publication 408, Section 850.

2.02 MATTING FOR EROSION CONTROL

A. The Contractor shall furnish a certification from the manufacturer that the matting conforms to the requirements as shown on the County approved Soil Erosion and Sedimentation Control Plan or in instances, where a County approval is not required, the Township approved plan. Matting shall meet the following requirements. Contractors schedule shall be reviewed to determine adequate type of matting used.

B. Temporary Rolled Erosion Control Products (Temporary RECPs):

1. Ultra-short Term (3-month Functional Longevity) Type 1.A, Type 1.B, Type 1.C. and Type 1.D

   a. As specified in Publication 408, Section 806.2(a) Table A.

2. Short Term (12-month Functional Longevity) Type 2.A, Type 2.B, Type 2.C. and Type 2.D

   a. As specified in Publication 408, Section 806.2(a) Table B

3. Extended-Term (24-month Functional Longevity) Type 3.A and Type 3.B.

   a. As specified in Publication 408, Section 806.2(a) Table C

4. Long-Term (36-month Functional Longevity) Type 4.A. and Type 4.B

    a. As specified in Publication 408, Section 806.2(a) Table D

C. Permanent Rolled Erosion Control Products (Permanent RECPs):

1. Type 5.A, 5.B, 5.C, 5.D, 5.E, And 5.F as specified in Publication 408, Section 806.2(b) Table E.

2.03 EROSION CONTROL DEVICES

A. Silt Barrier Fence:

1. Geotextiles, Class 3: As specified in Publication 408, Section 735.1 (a) (b) (c) (d) and Section 865.2 (a).

2. Mesh Support: As specified in Publication 408, Section 865.2(b).

3. Post:

    a. Wood or steel or acceptable plastic with equivalent section and sufficient length for height of fence required.

    b. As specified in Publication 408, Section 865.2 (c).

4. Fasteners: As specified in Publication 408, Section 865.2(d).

5. Ground Anchors, Guy Wires: As specified in Publication 408, Section 865.2 (e) (f).

B. Compost Filter Sock:

1. Sock: High-density polyethylene (HDPE) expandable, tubular, biodegradable or photodegradable, 3 mil to 5 mil, 3/8 inch knitted meshes netting. Size as specified on the Drawings, as specified in Publication 408, Section 867.2.b

C. Compost: Well-decomposed, stable, weed-free, organic compost meeting AASHTO MP-9 as specified in Publication 408 Section 867.2.a.

D. Stakes 2-inch x 2-inch wood or equivalent steel stakes, length provided to ensure a minimum embedded depth of 18 inches and 3-4 inches extended above the top of the sock.

2.04 TEMPORARY COVER

A. Seed: As specified in Section 02485.

B. Seed Mixtures: As specified in Section 02485.

C. Inoculant: As specified in Section 02485.

2.05 SOIL SUPPLEMENT MATERIALS

A. Fertilizer: As specified in Section 02485.

B. Agricultural Lime: As specified in Section 02485.

2.06 MULCHING MATERIALS

A. Straw: As specified in Section 02485.

B. Wood Cellulose Fiber: As specified in Section 02485.

C. Mulching Binder:

1. Emulsified Asphalt: SS-1, CSS-1, CMS-1, MS-2, RS-1, RS-2, CRS-1, or CRS-2. Designations from Asphalt Institute Specifications.

D. Wood Chips: Wood chips, recovered from clearing and grubbing operation will be acceptable as mulch for seeding and shall be used at a rate of 35 cubic yards per acre.

2.07 STORM DRAIN PIPE

A. As specified in Section 02618.

2.08 PUMPED WATER FILTER BAG

A. As specified in Standard Detail EPT 02270-8.

PART 3 EXECUTION

3.01 CONSTRUCTION SEQUENCE

A. All earth disturbance activities shall proceed in accordance with the following general sequence and in accordance with the approved Soil Erosion and Sedimentation Control plan (where applicable). Each stage shall be completed and immediately stabilized before any following stage is initiated.

1. Clearing

2. Grubbing

3. Topsoil stripping shall be limited only to those areas described in each stage.

B. At least seven (7) days before starting any earth disturbance activities, the Developer and/or Operator/Contractor shall invite all contractors involved in those activities, (the landowner, all appropriate municipal officials, the erosion and sediment control plan preparer), and a representative of the County Conservation District to an on-site pre-construction meeting.

C. At least three (3) days before starting any earth disturbance activities, all contractors involved in those activities shall notify the Pennsylvania One Call System Incorporated at 1-800-242-1776 (811) for the location of existing underground utilities.

D. The Contractor shall clear and grub areas only required to be cleared by the proposed construction. The detailed construction sequence listed on the allowed plan shall be strictly followed.

E. Immediately upon discovering unforeseen circumstances posing the potential for accelerated erosion and/or sediment pollution, the Contractor/operator shall implement appropriate best management practices to eliminate the potential for accelerated erosion and/or sediment pollution.

F. The Developer/Contractor shall field mark the limits of disturbance for all work and all waters of the Commonwealth boundaries (ex. stream buffers, wetland boundaries, spring seeps, and floodway) prior to the start of construction.

G. Upon completion of all earth disturbance activities and permanent stabilization of all disturbed areas, the Developer and/or Contractor shall contact the County Conservation District for an inspection prior to the removal of the Best Management Practice (BMP's) facilities.

H. Upon completion of all earth disturbance activities, removal of all temporary BMP's and permanent stabilization of all disturbed areas, the Developer and/or Contractor shall contact the County Conservation District for a final inspection.

3.02 SOIL EROSION AND SEDIMENTATION CONTROL

A. Topsoil stockpile heights shall not exceed 35 feet. Stockpile side slopes must be 2:1 or flatter.

B. A copy of the approved erosion and sedimentation control plan must be available at the project site at all times.

C. All pumping of sediment laden water shall be through a sediment control BMP, such as a pumped water filter bag or equivalent sediment removal facility, over undisturbed vegetated areas.

D. All building materials and wastes must be removed from the site and recycled or disposed of in accordance with the PA DEP's solid waste management regulations at (PA Code 2501 et esq. 271.1 and 287,1 et seq). No building materials, water or unused building material shall be buried, dumped or discharged at the site.

E. The Contractor shall be responsible for the removal of any excess material and shall ensure that the site(s) receiving the excess has an approved erosion and sedimentation control plan that meets the conditions of PA Code 25, Chapter 102 and/or other State or Federal regulations.

F. Clean Fill is defined as: uncontaminated, non-water soluble, non-decomposable, inert, solid material. The term includes: soil, rock, stone, dredged material, used asphalt, brick, block or concrete from construction and demolition activities that is separate from other waste and is recognizable as such. The term does not include materials placed in or on the waters of the Commonwealth unless otherwise authorized. (The term "used asphalt" does not include milled asphalt or asphalt that has been processed for re-use).

G. Any placement of clean fill that has been affected by a spill or release of a regulated substance must use Form FP-001 to certify the origin of the fill materials and the results of the analytical testing to qualify the material as clean fill. Form FP-001 must be retained by the Developer of the property receiving the fill.

H. Environmental due diligence must be performed to determine if the fill materials associated with the project qualify as clean fill. Environmental due diligence is defined as: investigative techniques, including but not limited to, visual property inspections, electronic database searches, review of property ownership, review of property use history, Sanborn maps, environmental questionnaires, transaction screens, analytical testing, environmental assessments, or audits. Analytical testing is not a required part of due diligence unless visual inspection and/or review of the past land use of the property indicates that the fill may have been subject to a spill or release of a regulated substance. If the fill may have been affected by a spill or release of a regulated substance, it must be tested to determine if it qualifies as clean fill. Testing should be performed in accordance with Appendix A of the PA DEP's policy Management of Clean Fill.

3.03 STABILIZATION SPECIFICATIONS

A. Permanent stabilization is defined as a minimum uniform 70% perennial vegetative cover or other permanent non-vegetative cover with a density sufficient to resist accelerated surface erosions and subsurface characteristics sufficient to resist sliding and other movements.

B. Immediately after disturbance activities cease, the operator shall stabilize the disturbed areas. During non-geminating periods, mulch must be applied at the specified rates. Disturbed areas which are not at finished grade and which will be re-disturbed within 1-year must be stabilized in accordance with the temporary vegetative stabilization specifications. Disturbed areas which are at final grade or which will not be re-disturbed within 1-year must be stabilized in accordance with the permanent vegetative stabilization specifications.

C. An erosion control blanket will be installed on all disturbed slopes steeper than 3:1, all areas of concentrated flows, and disturbed areas within 50' of waters of the Commonwealth.

D. Straw and hay mulch should be anchored immediately after application to prevent being windblown. A tractor-drawn implement may be used to "crimp" the straw or hay into the soil. This method is limited to slopes no steeper than 3:1. The machinery should be operated on the contour. (Note: Crimping of hay or straw by running over it with tracked machinery is not recommended.)

E. Asphalt, either emulsified or cut-back, containing no solvents or other diluting agents toxic to plant or animal life, uniformly applied at the rate of 31 gallons per 1000 sq. yd. may be used to tack mulch.

F. Synthetic Binders (chemical binders) may be used as recommended by the manufacture to anchor mulch provided sufficient documentation is provided to show they are non-toxic to native plant and animal species.

G. Lightweight plastic, fiber, or paper nets may be stabled over the mulch according to manufacturer's recommendations.

H. Tracking slopes is required by running tracked machinery up and down the slope, leaving tread marks parallel to the contour. (Note: If a bulldozer is used, the blade shall be up.) Care should be exercised on soils having a high clay content to avoid over-compaction.

3.04 MAINTENANCE PROGRAM

A. Until the site is stabilized, all erosion and sediment control BMP's must be maintained properly. Maintenance must include inspections of all erosion and sediment control BMP's after each runoff event and on a weekly basis. All preventative and remedial maintenance work, including cleanest, repair replacement, re-grading, reseeding, re-mulching and re-netting must be performed immediately. If erosion and sediment control BMP's fail to perform as expected, replacement BMP's or modifications of those installed will be required.

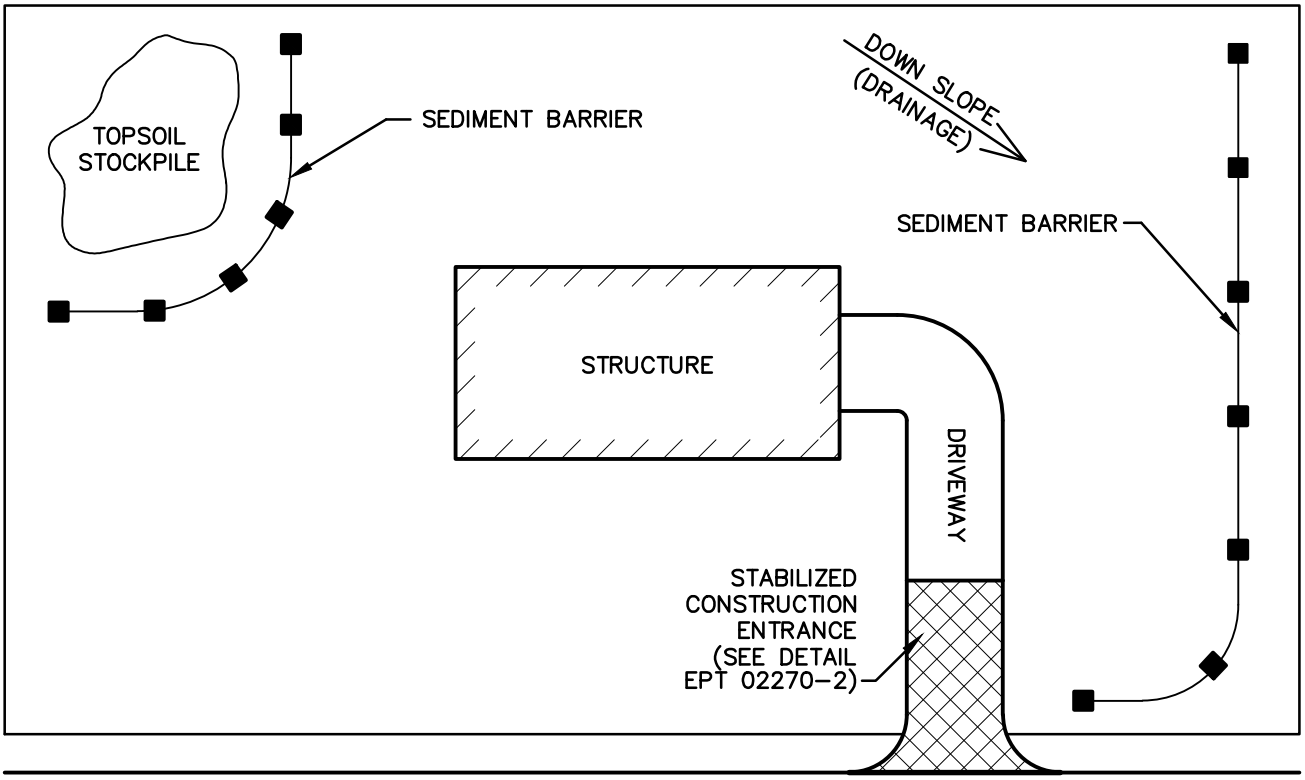
B. The permittee and co-permittee must ensure that visual site inspections are conducted weekly, and after each measurable precipitation event by qualified personnel, trained and experienced in erosion and sedimentation control, to ascertain that Erosion and Sedimentation Control (E&S) BMP's are operational and effective in preventing pollution to the waters of the Commonwealth. A written report of each inspection shall be kept, and include:

1. A summary of the site conditions, E&S BMP's, and compliance; and

2. The date, time, and the name of the person conducting the inspection.

C. Any sediment removed from BMP's during construction will be returned to upland areas on site and incorporated into site grading.

END OF SECTION



TYPICAL CONSTRUCTION SEQUENCE

1. INSTALL STABILIZED CONSTRUCTION ENTRANCE.
2. INSTALL ACCEPTABLE SEDIMENT BARRIERS ALONG THE DOWNSLOPE EDGE OF THE PROPERTY.
3. STRIP TOPSOIL AND STOCKPILE ON UPSLOPE PORTIONS OF THE AREA.
4. ROUGH GRADE THE AREA.
5. SEED AND MULCH ALL DISTURBED AREAS. TEMPORARY COVER SHALL BE ANNUAL RYE GRASS APPLIED AT A SEEDING RATE OF 10 POUNDS PER 1000 SQUARE YARDS.
6. INSPECT AND MAINTAIN EROSION AND SEDIMENTATION CONTROLS ON A REGULAR BASIS. EROSION AND SEDIMENTATION CONTROLS SHALL NOT BE REMOVED UNTIL THE DISTURBED AREAS ARE STABILIZED.
7. ENSURE ALL VEHICLES LEAVING THE SITE HAVE MUD REMOVED FROM TIRES AND UNDERCARRIAGES.

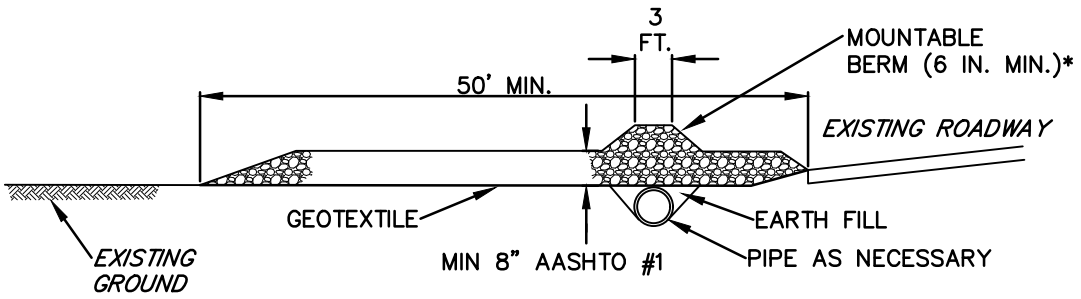
EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

C.S. DAVIDSON, INC.
ENGINEERING A BETTER COMMUNITY
38 NORTH DUKE STREET, YORK, PA • PHONE (717) 846-4805
50 WEST MIDDLE STREET, GETTYSBURG, PA • PHONE (717) 337-3021
315 W. JAMES STREET, SUITE 102, LANCASTER, PA • PHONE (717) 481-2991
WWW.CSDAVIDSON.COM

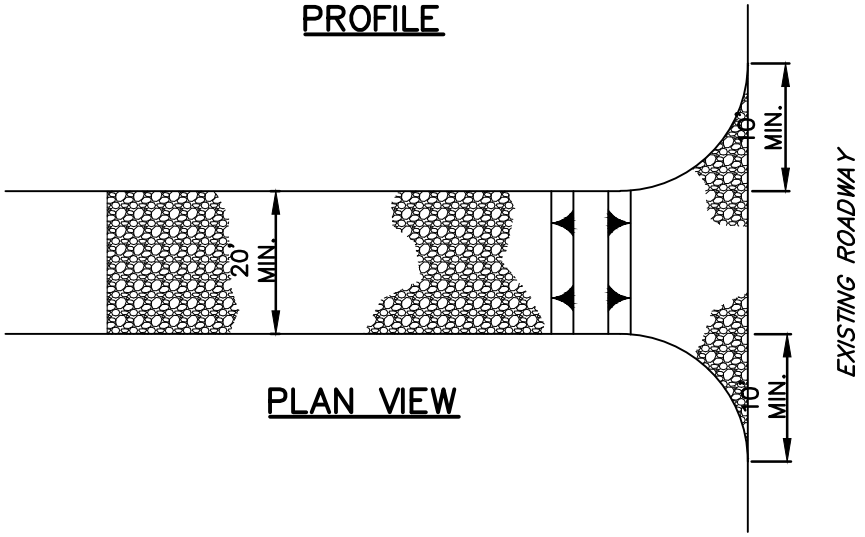
GENERAL SOIL EROSION CONTROL FOR RESIDENTIAL SITES

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	1/1/2023
DWG. NO.	EPT02270-1
FILE NO.	4833.9.02.00



PROFILE



PLAN VIEW

* MOUNTABLE BERM USED TO PROVIDE PROPER COVER FOR PIPE

NOTES:

REMOVE TOPSOIL PRIOR TO INSTALLATION OF ROCK CONSTRUCTION ENTRANCE. EXTEND ROCK OVER FULL WIDTH OF ENTRANCE.

RUNOFF SHALL BE DIVERTED FROM ROADWAY TO A SUITABLE SEDIMENT REMOVAL BMP PRIOR TO ENTERING ROCK CONSTRUCTION ENTRANCE.

MOUNTABLE BERM SHALL BE INSTALLED WHEREVER OPTIONAL CULVERT PIPE IS USED AND PROPER PIPE COVER AS SPECIFIED BY MANUFACTURER IS NOT OTHERWISE PROVIDED. PIPE SHALL BE SIZED APPROPRIATELY FOR SIZE OF DITCH BEING CROSSED.

MAINTENANCE: ROCK CONSTRUCTION ENTRANCE THICKNESS SHALL BE CONSTANTLY MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ROCK. A STOCKPILE SHALL BE MAINTAINED ON SITE FOR THIS PURPOSE. ALL SEDIMENT DEPOSITED ON PAVED ROADWAYS SHALL BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE IMMEDIATELY. IF EXCESSIVE AMOUNTS OF SEDIMENT ARE BEING DEPOSITED ON ROADWAY, EXTEND LENGTH OF ROCK CONSTRUCTION ENTRANCE BY 50 FOOT INCREMENTS UNTIL CONDITION IS ALLEVIATED OR INSTALL WASH RACK. WASHING THE ROADWAY OR SWEEPING THE DEPOSITS INTO ROADWAY DITCHES, SEWERS, CULVERTS, OR OTHER DRAINAGE COURSES IS NOT ACCEPTABLE.

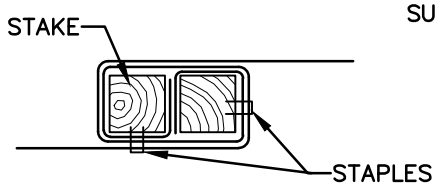
EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

C.S. DAVIDSON, INC.
ENGINEERING A BETTER COMMUNITY
38 NORTH DUKE STREET, YORK, PA • PHONE (717) 846-4805
50 WEST MIDDLE STREET, GETTYSBURG, PA • PHONE (717) 337-3021
315 W. JAMES STREET, SUITE 102, LANCASTER, PA • PHONE (717) 481-2991
WWW.CSDAVIDSON.COM

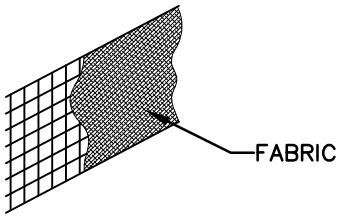
STABILIZED ROCK CONSTRUCTION ENTRANCE DETAIL

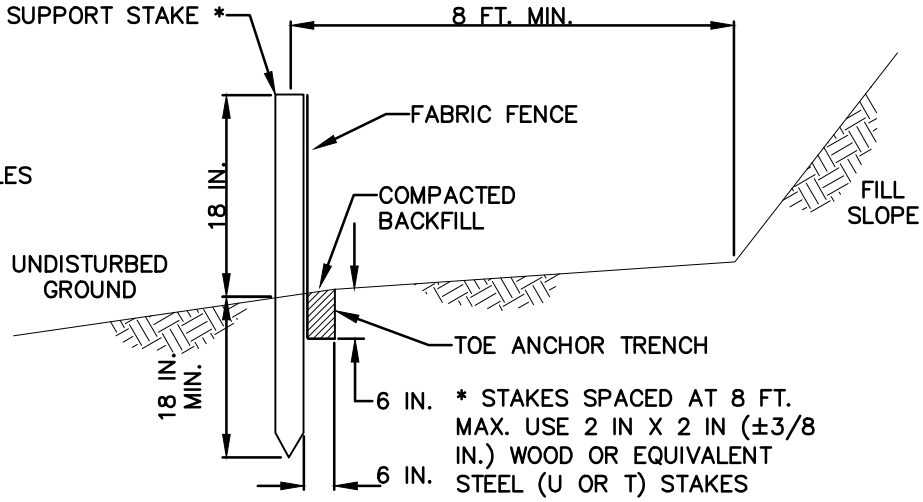
EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	1/1/2023
DWG. NO.	EPT02270-2
FILE NO.	4833.9.02.00



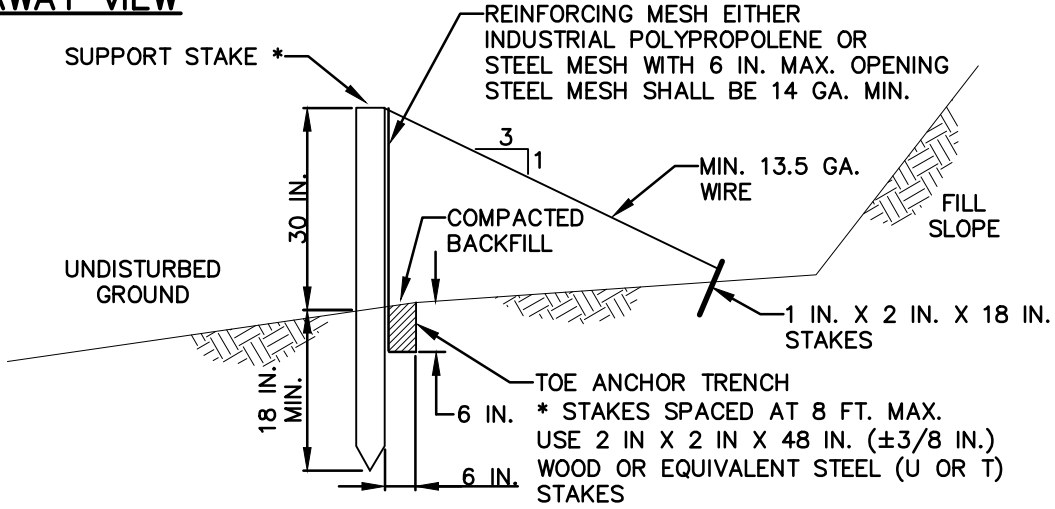
JOINING FENCE SECTIONS





18" SILT FENCE DETAIL

CUTAWAY VIEW



30" SILT FENCE DETAIL

NOTES:

FABRIC SHALL HAVE THE MINIMUM PROPERTIES AS SHOWN IN TABLE 4.3 OF THE PA DEP EROSION CONTROL MANUAL.

FABRIC WIDTH SHALL BE 30 IN. MINIMUM FOR 18 IN. HIGH FENCE AND 42 IN. FOR 30 IN. HIGH FENCE. STAKES SHALL BE HARDWOOD OR EQUIVALENT STEEL (U OR T) STAKES. FOR 30 IN. HIGH FENCE,AN 18 IN. SUPPORT STAKE SHALL BE DRIVEN 12 IN. MINIMUM INTO UNDISTURBED GROUND.

SILT FENCE SHALL BE PLACED AT LEVEL EXISTING GRADE. BOTH ENDS OF THE FENCE SHALL BE EXTENDED AT LEAST 8 FEET UP SLOPE AT 45 DEGREES TO THE MAIN FENCE ALIGNMENT.

SEDIMENT SHALL BE REMOVED WHEN ACCUMULATIONS REACH HALF THE ABOVE GROUND HEIGHT OF THE FENCE.

ANY SECTION OF SILT FENCE WHICH HAS BEEN UNDERMINED OR TOPPED SHALL BE IMMEDIATELY REPLACED WITH A ROCK FILTER OUTLET (DETAIL EPT2270–6).

FENCE SHALL BE REMOVED AND PROPERLY DISPOSED OF WHEN TRIBUTARY AREA IS PERMANENTLY STABILIZED.

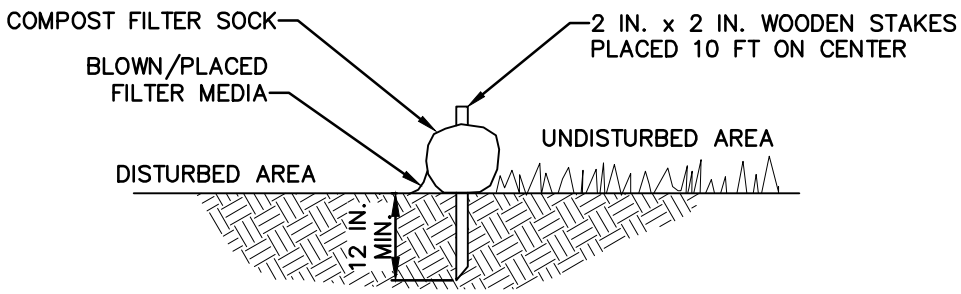
EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

C.S. DAVIDSON, INC.
ENGINEERING A BETTER COMMUNITY
38 NORTH DUKE STREET, YORK, PA • PHONE (717) 846-4805
50 WEST MIDDLE STREET, GETTYSBURG, PA • PHONE (717) 337-3021
315 W. JAMES STREET, SUITE 102, LANCASTER, PA • PHONE (717) 481-2991
WWW.CSDAVIDSON.COM

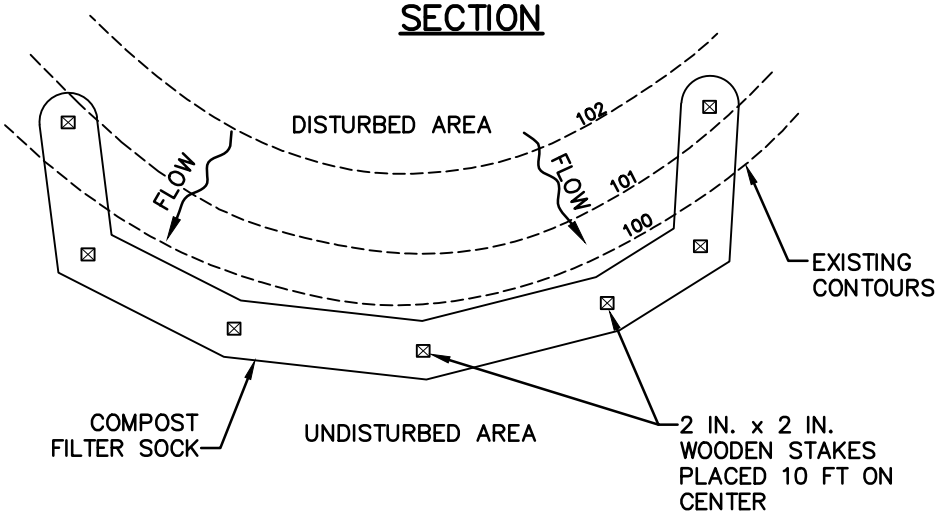
SILT BARRIER FENCE DETAIL

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	1/1/2023
DWG. NO.	EPT02270-3
FILE NO.	4833.9.02.00



SECTION



PLAN VIEW

NOTES:

SOCK FABRIC SHALL MEET STANDARDS OF TABLE 4.1 OF THE PA DEP EROSION CONTROL MANUAL. COMPOST SHALL MEET THE STANDARDS OF TABLE 4.2 OF THE PA DEP EROSION CONTROL MANUAL.

COMPOST FILTER SOCK SHALL BE PLACED AT EXISTING LEVEL GRADE. BOTH ENDS OF THE BARRIER SHALL BE EXTENDED AT LEAST 8 FEET UP SLOPE AT 45 DEGREES TO THE MAIN BARRIER ALIGNMENT. MAXIMUM SLOPE LENGTH ABOVE ANY BARRIER SHALL NOT EXCEED THAT SPECIFIED FOR THE SIZE OF THE SOCK AND THE SLOPE OF ITS TRIBUTARY AREA.

TRAFFIC SHALL NOT BE PERMITTED TO CROSS COMPOST FILTER SOCKS.

ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES 1/2 THE ABOVE GROUND HEIGHT OF THE BARRIER AND DISPOSED IN THE MANNER DESCRIBED ELSEWHERE IN THE PLAN.

COMPOST FILTER SOCKS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT. DAMAGED SOCKS SHALL BE REPAIRED ACCORDING TO MANUFACTURER'S SPECIFICATIONS OR REPLACED WITHIN 24 HOURS OF INSPECTION.

BIODEGRADABLE COMPOST FILTER SOCKS SHALL BE REPLACED AFTER 6 MONTHS; PHOTODEGRADABLE SOCKS AFTER 1 YEAR. POLYPROPYLENE SOCKS SHALL BE REPLACED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.

UPON STABILIZATION OF THE AREA TRIBUTARY TO THE SOCK, STAKES SHALL BE REMOVED. THE SOCK MAY BE LEFT IN PLACE AND VEGETATED OR REMOVED. IN THE LATTER CASE, THE MESH SHALL BE CUT OPEN AND THE MULCH SPREAD AS A SOIL SUPPLEMENT.

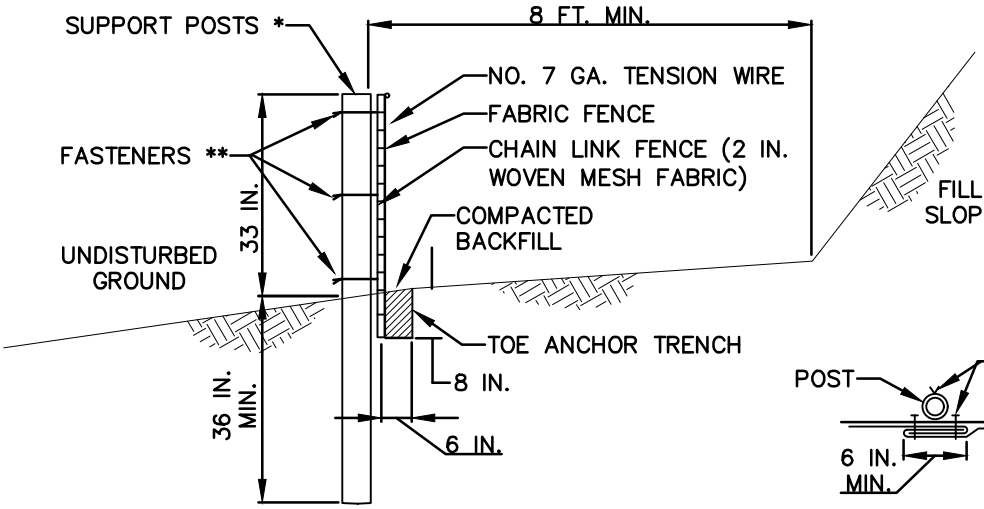
EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

C.S. DAVIDSON, INC.
ENGINEERING A BETTER COMMUNITY
38 NORTH DUKE STREET, YORK, PA • PHONE (717) 846-4805
50 WEST MIDDLE STREET, GETTYSBURG, PA • PHONE (717) 337-3021
315 W. JAMES STREET, SUITE 102, LANCASTER, PA • PHONE (717) 481-2991
WWW.CSDAVIDSON.COM

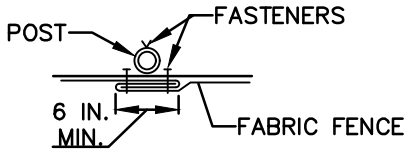
COMPOST FILTER SOCK DETAIL

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	1/1/2023
DWG. NO.	EPT02270-4
FILE NO.	4833.9.02.00



SECTION VIEW



JOINING FENCE SECTIONS

* POSTS SPACED AT 10 FT. MAX. USE 2–1/2 IN. DIA HEAVY DUTY GALVANIZED OR ALUMINUM POSTS.

** CHAIN LINK TO POST FASTENERS SPACED AT 14 IN. MAX. USE NO. 9 GA. ALUMINUM WIRE OR NO. 9 GALVANIZED STEEL WIRE. FABRIC TO SHAIN FASTENERS SPACED AT 24 IN. MAX. ON CENTER.

NOTES:

FABRIC SHALL HAVE THE MINIMUM PROPERTIES AS SHOWN IN TABLE 4.3 OF THE PA DEP EROSION CONTROL MANUAL.

FABRIC WIDTH SHALL BE 42 IN. MINIMUM.

POSTS SHALL BE INSTALLED USING A POSTHOLE DRILL.

CHAIN LINK SHALL BE GALVANIZED NO. 11.5 GA. STEEL WIRE WITH 2–1/4 IN. OPENING, NO. 11 GA. ALUMINUM COATED STEEL WIRE IN ACCORDANCE WITH ASTM–A–491, OR GALVANIZED NO. 9 GA. STEEL WIRE TOP AND BOTTOM WITH GALVANIZED NO. 11 GA. STEEL INTERMEDIATE WIRES. NO. 7 GAGE TENSION WIRE TO BE INSTALLED HORIZONTALLY THROUGH HOLES AT TOP AND BOTTOM OF CHAIN–LINK FENCE OR ATTACHED WITH HOG RINGS AT 5 FT MAX. CENTERS.

SILT FENCE SHALL BE PLACED AT LEVEL EXISTING GRADE. BOTH ENDS OF THE FENCE SHALL BE EXTENDED AT LEAST 8 FEET UP SLOPE AT 45 DEGREES TO THE MAIN FENCE ALIGNMENT.

SEDIMENT SHALL BE REMOVED WHEN ACCUMULATIONS REACH HALF THE ABOVE GROUND HEIGHT OF THE FENCE.

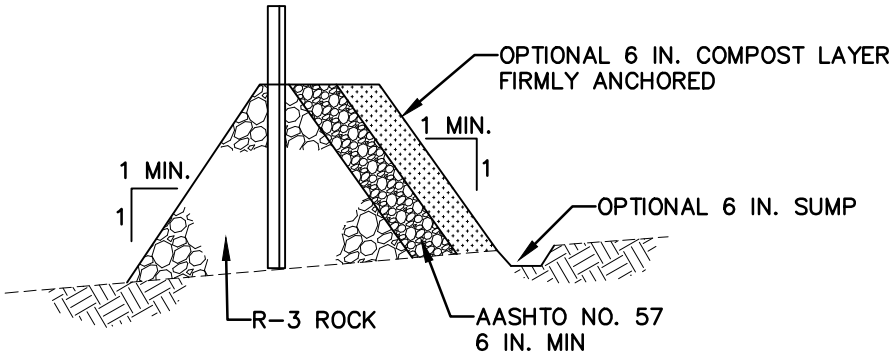
FENCE SHALL BE REMOVED AND PROPERLY DISPOSED OF WHEN TRIBUTARY AREA IS PERMANENTLY STABILIZED.

C.S. DAVIDSON, INC.
ENGINEERING A BETTER COMMUNITY
38 NORTH DUKE STREET, YORK, PA • PHONE (717) 846-4805
50 WEST MIDDLE STREET, GETTYSBURG, PA • PHONE (717) 337-3021
315 W. JAMES STREET, SUITE 102, LANCASTER, PA • PHONE (717) 481-2991
WWW.CSDAVIDSON.COM

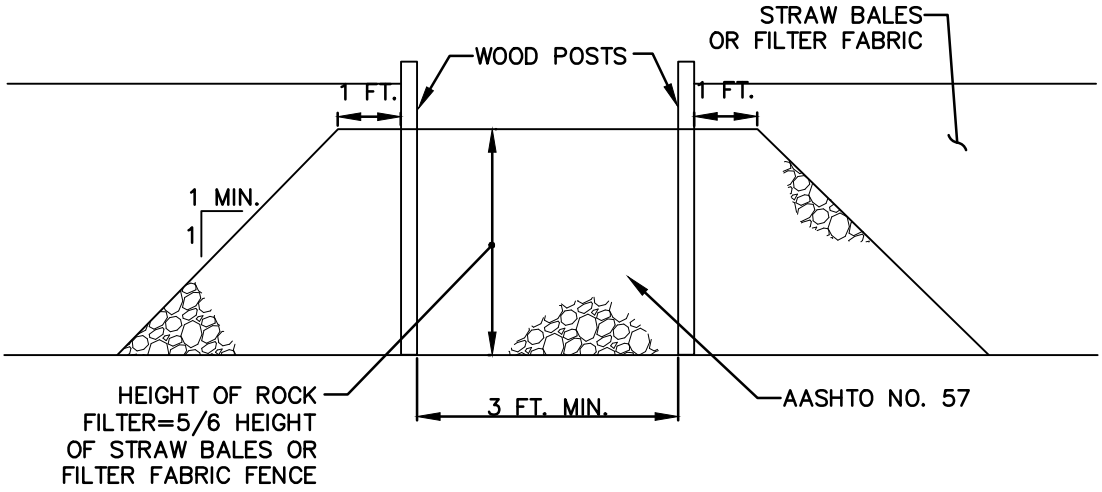
SUPER SILT FENCE
DETAIL

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	1/1/2023
DWG. NO.	EPT02270-5
FILE NO.	4833.9.02.00



OUTLET CROSS-SECTION



UP-SLOPE FACE

NOTES:

A ROCK FILTER OUTLET SHALL BE INSTALLED WHERE FAILURE OF A SILT FENCE OR STRAW BALE BARRIER HAS OCCURRED DUE TO CONCENTRATED FLOW. ANCHORED COMPOST LAYER SHALL BE USED ON UPSLOPE FACE IN HQ AND EV WATERSHEDS.

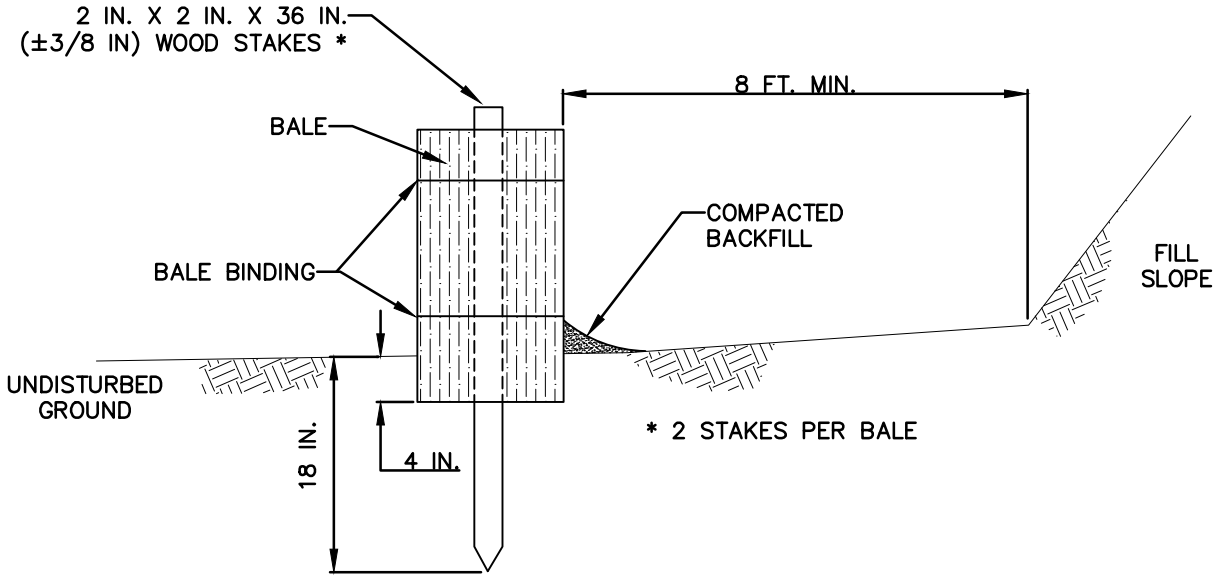
SEDIMENT SHALL BE REMOVED WHEN ACCUMULATIONS REACH 1/3 THE HEIGHT OF THE OUTLET.

C.S. DAVIDSON, INC.
ENGINEERING A BETTER COMMUNITY
38 NORTH DUKE STREET, YORK, PA • PHONE (717) 846-4805
50 WEST MIDDLE STREET, GETTYSBURG, PA • PHONE (717) 337-3021
315 W. JAMES STREET, SUITE 102, LANCASTER, PA • PHONE (717) 481-2991
WWW.CSDAVIDSON.COM

ROCK FILTER OUTLET
DETAIL

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	1/1/2023
DWG. NO.	EPT02270-6
FILE NO.	4833.9.02.00



SECTION VIEW

NOTES:

STRAW BALE BARRIERS SHALL NOT BE USED FOR PROJECTS EXTENDING MORE THAN 3 MONTHS.

STRAW BALE BARRIERS SHALL BE PLACED AT EXISTING LEVEL GRADE WITH ENDS TIGHTLY ABUTTING THE ADJACENT BALES. FIRST STAKE OF EACH BALE SHALL BE ANGLED TOWARD ADJACENT BALE TO DRAW BALES TOGETHER. STAKES SHALL BE DRIVEN FLUSH WITH THE TOP OF THE BALE. BOTH ENDS OF THE BARRIER SHALL BE EXTENDED AT LEAST 8 FEET UP SLOPE AT 45 DEGREES TO THE MAIN BARRIER ALIGNMENT.

COMPACTED BACKFILL SHALL EXTEND APPROXIMATELY 4 IN. ABOVE GROUND LEVEL.

SEDIMENT SHALL BE REMOVED WHEN ACCUMULATIONS REACH 1/3 THE ABOVE GROUND HEIGHT OF THE BARRIER. DAMAGED OR DETERIORATED BALES SHALL BE REPLACED IMMEDIATELY UPON INSPECTION.

ANY SECTION OF STRAW BALE BARRIER WHICH HAS BEEN UNDERMINED OR TOPPED SHALL BE IMMEDIATELY REPLACED WITH A ROCK FILTER OUTLET (EPT02270–6).

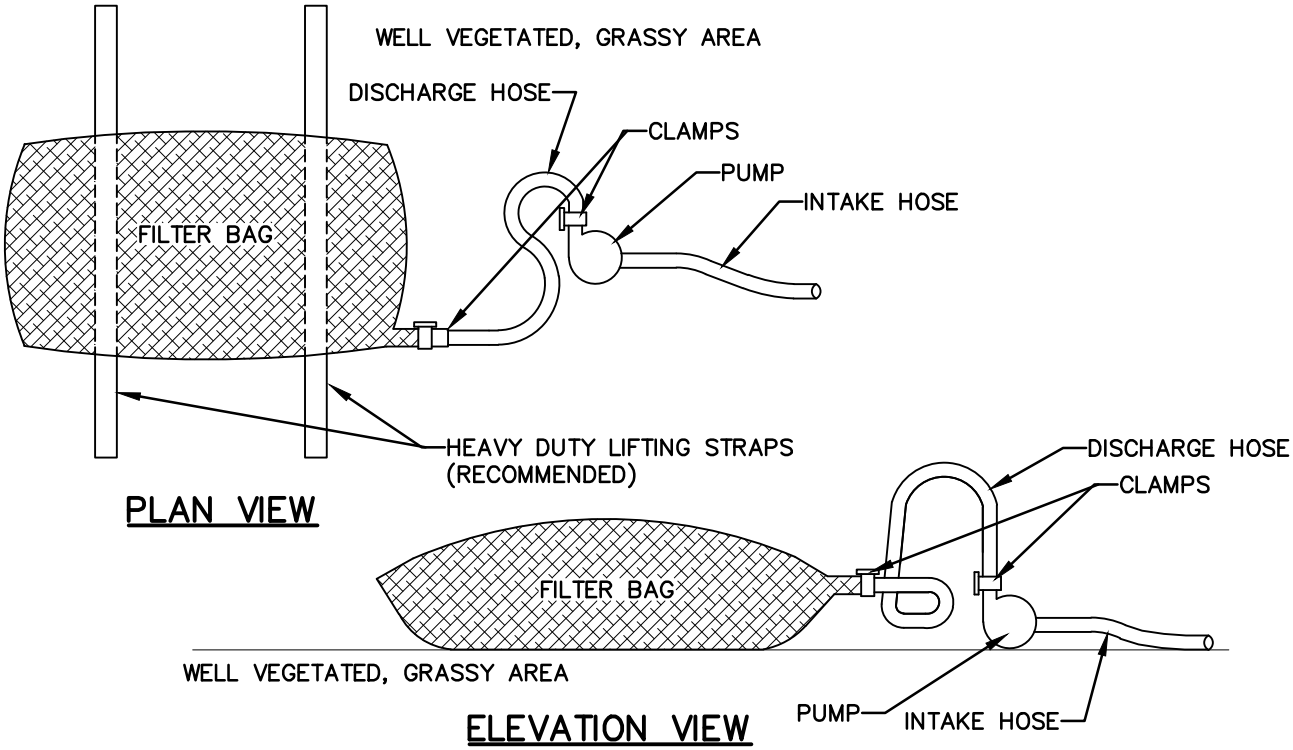
BALES SHALL BE REMOVED WHEN THE TRIBUTARY AREA HAS BEEN PERMANENTLY STABILIZED.

C.S. DAVIDSON, INC.
ENGINEERING A BETTER COMMUNITY
38 NORTH DUKE STREET, YORK, PA • PHONE (717) 846-4805
50 WEST MIDDLE STREET, GETTYSBURG, PA • PHONE (717) 337-3021
315 W. JAMES STREET, SUITE 102, LANCASTER, PA • PHONE (717) 481-2991
WWW.CSDAVIDSON.COM

STRAY BALE BARRIER
DETAIL

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	1/1/2023
DWG. NO.	EPT02270-7
FILE NO.	4833.9.02.00



NOTES:

LOW VOLUME FILTER BAGS SHALL BE MADE FROM NON-WOVEN GEOTEXTILE MATERIAL SEWN WITH HIGH STRENGTH, DOUBLE STITCHED "J" TYPE SEAMS. THEY SHALL BE CAPABLE OF TRAPPING PARTICLES LARGER THAN 150 MICRONS. HIGH VOLUME FILTER BAGS SHALL BE MADE FROM WOVEN GEOTEXTILES THAT MEET THE FOLLOWING STANDARDS:

PROPERTY	TEST METHOD	MINIMUM STANDARD
AVG. WIDE WIDTH STRENGTH	ASTM D-4884	60 LB/IN
GRAB TENSILE	ASTM D-4632	205 LB
PUNCTURE	ASTM D-4833	110 LB
MULLEN BURST	ASTM D-3786	350 PSI
UV RESISTANCE	ASTM D-4355	70%
AOS % RETAINED	ASTM D-4751	80 SIEVE

A SUITABLE MEANS OF ACCESSING THE BAG WITH MACHINERY REQUIRED FOR DISPOSAL PURPOSES SHALL BE PROVIDED. FILTER BAGS SHALL BE REPLACED WHEN THEY BECOME 1/2 FULL OF SEDIMENT. SPARE BAGS SHALL BE KEPT AVAILABLE FOR REPLACEMENT OF THOSE THAT HAVE FAILED OR ARE FILLED. BAGS SHALL BE PLACED ON STRAPS TO FACILITATE REMOVAL UNLESS BAGS COME WITH LIFTING STRAPS ALREADY ATTACHED.

BAGS SHALL BE LOCATED IN WELL-VEGETATED (GRASSY) AREA, AND DISCHARGE ONTO STABLE, EROSION RESISTANT AREAS. WHERE THIS IS NOT POSSIBLE, A GEOTEXTILE UNDERLAYMENT AND FLOW PATH SHALL BE PROVIDED. BAGS MAY BE PLACED ON FILTER STONE TO INCREASE DISCHARGE CAPACITY. BAGS SHALL NOT BE PLACED ON SLOPES GREATER THAN 5%. FOR SLOPES EXCEEDING 5%, CLEAN ROCK OR OTHER NON-ERODIBLE AND NON-POLLUTING MATERIAL MAY BE PLACED UNDER THE BAG TO REDUCE SLOPE STEEPNESS.

NO DOWNSLOPE SEDIMENT BARRIER IS REQUIRED FOR MOST INSTALLATIONS. COMPOST BERM OR COMPOST FILTER SOCK SHALL BE INSTALLED BELOW BAGS LOCATED IN HQ OR EV WATERSHEDS, WITHIN 50 FEET OF ANY RECEIVING SURFACE WATER OR WHERE GRASSY AREA IS NOT AVAILABLE.

THE PUMP DISCHARGE HOSE SHALL BE INSERTED INTO THE BAGS IN THE MANNER SPECIFIED BY THE MANUFACTURER AND SECURELY CLAMPED. A PIECE OF PVC PIPE IS RECOMMENDED FOR THIS PURPOSE.

THE PUMPING RATE SHALL BE NO GREATER THAN 750 GPM OR 1/2 THE MAXIMUM SPECIFIED BY THE MANUFACTURER, WHICHEVER IS LESS. PUMP INTAKES SHALL BE FLOATING AND SCREENED.

FILTER BAGS SHALL BE INSPECTED DAILY. IF ANY PROBLEM IS DETECTED, PUMPING SHALL CEASE IMMEDIATELY AND NOT RESUME UNTIL THE PROBLEM IS CORRECTED.

EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

C.S. DAVIDSON, INC.
ENGINEERING A BETTER COMMUNITY
38 NORTH DUKE STREET, YORK, PA • PHONE (717) 846-4805
50 WEST MIDDLE STREET, GETTYSBURG, PA • PHONE (717) 337-3021
315 W. JAMES STREET, SUITE 102, LANCASTER, PA • PHONE (717) 481-2991
WWW.CSDAVIDSON.COM

PUMPED WATER
FILTER BAG DETAIL

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	1/1/2023
DWG. NO.	EPT02270-8
FILE NO.	4833.9.02.00

SECTION 02485

FINISH GRADING, SEEDING, AND SODDING

PART 1 GENERAL

1.01 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. Sodding
6. Mulching
7. Maintenance

B. Related work specified elsewhere:

1. Clearing and grubbing:..... Section 02100
2. Trenching, backfilling and compacting: ..... Section 02221

C. Definitions: NONE

D. Applicable Standard Details: NONE

1.02 QUALITY ASSURANCE

A. Reference Standards:

1. Pennsylvania Department of Transportation (PennDOT), latest revision:

   Publication 408, Specifications

2. American Association of State Highway Transportation Officials (AASHTO):

   T194 Determination of Organic Matter in Soils by Wet Combustion

3. Pennsylvania Department of Agriculture

4. Others:

   Agricultural Liming Materials Act of 1978, P.L.15

   Pennsylvania Seed Act of 1965, Act 187, as amended

   Pennsylvania Soil Conditioner and Plant Growth Substance Law, Act of December 1, 1977, P.L. 258 No. 86 (3P.S. 68.2) as amended

   Rules for Testing Seeds of the Association of Official Seed Analysts

   Federal and State pesticide acts and registration requirements

B. Sod Producer - Company specializing in sod production and harvesting with a minimum of 5 years experience.

C. Sod Installer - Company specializing in performing this work with a minimum of 5 years experience.

1.03 SUBMITTALS

A. Samples:

1. Unless otherwise directed, furnish three strips of sod, 4-1/2 feet long by 12" wide, laid on 3" of topsoil and tamped in place. The samples shall be representative of the sod and workmanship to be provided. Include sod source location.

B. Certificates:

1. Unless directed otherwise, prior to use or placement of material, submit certifications of material composition of the following for approval:

   a. Topsoil analysis

   b. Fertilizer

   c. Lime

   d. Seed mixtures

   e. Inoculant

   f. Sod

1.04 JOB CONDITIONS - Section not utilized

PART 2 PRODUCTS

2.01 TOPSOIL

A. Having a pH of between 6.0 and 7.0; containing not less than 2% nor more than 10% organic matter as determined by AASHTO T194.

B. Fertile friable loam, sand loam, or clay loam which will hold a ball when squeezed with the hand, but which will crumble shortly after being released.

C. Free of clods, grass, roots, or other debris harmful to plant growth.

D. Free of pests, pest larvae, and matter toxic to plants.

2.02 FERTILIZER

A. Basic Dry Formulation Fertilizer:

1. Analysis 10-20-20 and as defined by the Pennsylvania Soil Conditioner and Plant Growth Substance Law.

B. Starter Fertilizer:

1. Analysis 38-0-0 or 31-0-0 and as defined by the Pennsylvania Soil Conditioner and Plant Growth Substance Law.

2.03 LIME

A. Raw ground limestone conforming to PennDOT Publication 408, Section 804.2(b).

2.04 SEED

A. 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.

B. Fresh, clean, dated material from the last available crop and within the date period specified, with a date of test not more than 9 months prior to the date of sowing. Percentage of pure seed present shall represent freedom from inert matter and from other seeds distinguishable by their appearance. All seeds will be subject to analysis and testing.

TABLE 1 - GRASS AND AGRICULTURAL SEEDS

Species	***Minimum Guaranteed Purity (Percent)***	***Maximum Weed Seed (Percent)***	***Minimum Guaranteed Germination (Percent)***
Kentucky Bluegrass *(Poapratensis)*	98	0.20	80
Perennial Ryegrass *(Lolium perenne*, var. Pennfine)	98	0.15	90
Tall Fescue (*Festuca arundinacea*), var. Kentucky 31)	98	0.15	85
Crownvetch (*Coronilla varia*)	99	0.10	65
Creeping Red Fescue (*Festuca rubra*, var. Pennlawn)	98	0.15	85
Annual Rye Grass (*Lolium multiflorum*)	98	0.15	90
Timothy (*Phleum pratense*)	98	0.25	85
Birdsfoot Trefoil mixture *(Lotus corniculatus)*	98	0.10	80*
Redtop *(Agrostis alba)*	92	0.15	80
** Minimum 20% hardseed and 60% normal sprouts*			

2.05 SEED MIXTURES

A. See "Seeding Restoration Table" at end of this Section or appropriate tables located on the Approved Soil Erosion and Sedimentation Control plan (where applicable).

2.06 INOCULANT

A. Inoculate leguminous seed before seeding with nitrogen fixing bacteria culture prepared specifically for the species.

B. Do not use inoculant later than the date indicated by the manufacturer.

C. Protect inoculated seed from prolonged exposure to sunlight prior to sowing.

D. Reinoculate seed not sown within 24 hours following initial inoculation.

2.07 MULCHING MATERIALS

A. Mulches for seeded areas shall be one, or a combination of, the following:

1. Straw:

a. Cured to less than 20% moisture content by weight.

b. Contain no stems of tobacco, soybeans, or other coarse or woody material.

c. Wheat or oat straw.

2. Wood Cellulose:

a. No growth or germination inhibiting substances.

b. Green, air dried. Packages not exceeding 100 pounds.

c. Requirements:

Moisture Content: ..... 12%±3%

Organic Matter: .....98.6%±0.2% on the oven dried basis.

Ash Content: ..... 1.4%±0.2%

Minimum Water-Holding Capacity:..... 1,000%

3. Mushroom Manure:

a. Organic origin, free of foreign material larger than 2" and substances toxic to plant growth.

b. Organic Matter: 20% minimum

c. Water-Holding Capacity: 120% minimum

d. pH: 6.0

B. Sewage sludge compost is not permitted.

2.08 SOD

A. Well-rooted Kentucky Bluegrass (Poa pratensis) sod containing a growth of not more than 10% of other grasses and clovers.

B. Free from noxious weeds such as Bermuda grass, wild mustard, crab grass, and kindred grasses.

C. Mow sod in the field to a height of not more than 2-1/2" within 5 days prior to lifting.

D. Cut sod to a depth equal to the growth of the fibrous roots, but in no case less than 1-1/2", exclusive of grass and thatch. Do not cut sod when the ground temperature is below 32°F.

E. Deliver sod to the project site within 24 hours after being cut and place sod within 36 hours after being cut. Do not deliver small, irregular, or broken pieces of sod. Do not deliver more sod than can be laid within 24 hours.

F. During wet weather, allow sod to dry sufficiently to prevent tearing during handling and placing. During dry weather, moisten sod to ensure its vitality and to prevent dropping of the soil during handling. Sod which dries out will be rejected.

PART 3 EXECUTION

3.01 TIME OF OPERATIONS

A. Spring Seeding:

1. Preliminary operations for seed bed preparation may commence as soon after February 15 as ground conditions permit.

B. Fall Seeding:

1. Preliminary operations for seed bed preparation may commence after July 15.

3.02 FINISH GRADING

A. Preparation of Subgrade:

1. "Hard pan" or heavy shale:

a. Plow to a minimum depth of 6".

b. Loosen and grade by harrowing, discing, or dragging.

c. Hand rake subgrade. Remove rocks over 2" in diameter and other debris.

2. Loose loam, sandy loam, or light clay:

a. Loosen and grade by harrowing, discing, or dragging.

b. Hand rake subgrade. Remove rocks over 2" in diameter and other debris.

B. Placing Topsoil:

1. Place topsoil and spread over the prepared subgrade to obtain the required depth and grade elevation. Compact with a roller having not more than 65 pounds per roller foot width to a final compacted thickness of not less than 6".

2. Hand rake topsoil and remove all materials unsuitable or harmful to plant growth.

3. Do not place topsoil when the subgrade is frozen, excessively wet, or extremely dry.

4. Do not handle topsoil when frozen or muddy.

C. Tillage:

1. After seed bed areas have been brought to proper compacted elevation, thoroughly loosen to a minimum depth of 6" by disking, harrowing, or other approved methods. Do not work top-soiled areas when frozen or excessively wet.

2. Liming:

a. Distribute lime uniformly at the specified rates.

b. Thoroughly incorporate into the topsoil to a depth of 6".

c. Incorporate as a part of the tillage operation.

3. Basic Fertilizer:

a. Distribute basic fertilizer uniformly at the specified rate.

b. Thoroughly incorporate into the topsoil to a depth of 6".

c. Incorporate as a part of tillage operation.

D. Finish Grading:

1. Remove unsuitable material larger than ½" in any dimension.

2. Uniformly grade surface to the required contours without the formation of water pockets.

3. Rework areas which puddle by the addition of topsoil and starter fertilizer and rerake.

3.03 SEEDING

A. Distribute starter fertilizer at the specified rates.

B. Incorporate starter fertilizer into the upper 1" of soil.

C. Uniformly sow specified seed mix by use of approved hydraulic seeder, power-drawn drill, power-operated seeder, or hand-operated seeder. Do not seed when winds are over 15 mph.

D. Upon completion of sowing, cover seed to an average depth of 1/4" by hand re-raking or approved mechanical methods.

E. Mulch immediately after seeding, using one of the following methods:

1. Place straw mulch in a continuous blanket at a minimum rate of 1,200 pounds per 1,000 square yards.

a. Anchor straw mulch by use of twine, stakes, wire staples, paper, or plastic nets.

b. Emulsified asphalt may be used for anchorage provided it is applied uniformly at a rate not less than 31 gallons per 1,000 square yards.

c. Chemical mulch binders may be used for anchorage if they are applied uniformly at the manufacturer's recommended rate.

d. Chemical mulch binders or a light covering of topsoil may be used for anchorage when the size of the area precludes the use of mechanical equipment.

2. Apply wood cellulose fiber hydraulically at a rate of 320 pounds per 1,000 square yards. Incorporate as an integral part of the slurry after seed and soil supplements have been thoroughly mixed.

3. Spread mushroom manure uniformly to a minimum depth of ½" or to the depth indicated on the drawings.

F. When mulch is applied to grass areas by blowing equipment, the use of cutters in the equipment will be permitted to the extent that a minimum of 95% the mulch is 6" or more in length. For cut mulches applied by the blowing method, achieve a loose depth in place of not less than 2".

G. When mulching by the asphalt mix method, apply the mulch by blowing. Spray the asphalt binder material into the mulch as it leaves the blower. Apply the binder to the mulch in the proportion of 1.5 to 2.0 gallons per 45 pounds of mulch.

1. Protect structures, pavements, curbs, and walls to prevent asphalt staining.

2. Erect warning signs and barricades at intervals of 50 feet or less along the perimeter of the mulched area.

3. Do not spray asphalt and chemical mulch binders onto any area within 100 feet of a stream or other body of water.

3.04 SODDING

A. Prior to sod placement, complete finish grading and moisten prepared surface to received sod.

B. Do not place sod when the temperature is lower than 32°F.

C. Place sod by hand with tight joints and no overlap. Transverse joints shall be broken or staggered.

D. Place sod so that the top of the sod is flush with the surrounding grade.

E. Use of tools which damage the sod or dumping of sod from vehicles will not be permitted.

F. Water sod to the saturation point immediately after placement.

G. After watering, tamp with an approved tamper to close all joints and insure close contact between sod and sod bed. After tamping, the sod shall present a smooth, even surface free from bumps and depressions. If so directed, use a light roller, weighing not more than 65 pounds per foot of roller width to complete firming and smoothing the sod.

H. When placing sod in ditches, place the strip with the long dimension at right angles to the flow of water. At any point where water will start flowing over a sodded area, the upper edge of the sod strips shall be turned into the soil below the adjacent area and a layer of compacted earth placed over this juncture to conduct the water over the edge of the sod.

I. In ditches and on slope areas, stake each strip of sod securely with at least 1 wood stake for each 2 square feet of sod. Stakes shall be ½" by 1" with a length of 8" to 12". Drive stakes flush with the top of the sod, with the long face parallel to the slope contour.

3.05 MAINTENANCE

A. Maintenance includes watering, weeding, cleanup, edging and repair of depressions, washouts, or gullies.

B. Those areas which do not show a prompt catch of grass within 14 days of seeding or sodding shall be reseeded or re-sodded until complete grass catch occurs.

C. Maintain sodded areas for 3 months from the date of substantial completion, mow to maintain maximum height of 2-1/2" or as specified on drawings.

SEEDING RESTORATION TABLE

RESTORATION CONDITION	TOPSOIL	LIME*	BASIC FERTILIZER	STARTER FERTILIZER	SEED MIX & SOWING RATE (% BY WEIGHT)
Temporary Cover (PennDOT E)	N/A	1 Ton/Acre	5-5-5 @ 1000# /Acre	N/A	100% Annual Ryegrass Sow 10# per 1,000 Sq. Yds. March 15 thru October 15
Roadside; Non-mowed (PennDOT D)	Yes	800# per 1000 Sq. Yds.	10-20-20 @ 140# per 1000 Sq. Yds.	38-0-0 @ 50# per 1000 Sq. Yds. Or 31-0-0 @ 61# per 1000 Sq. Yds.	70% Tall Fescue 30% Creeping Red Fescue Sow 21# per 1000 Sq. Yds. Mar. 15 thru May/Aug. thru Oct. 15
Roadside; mowed (PennDOT B)	Yes	800# per 1000 Sq. Yds.	10-20-20 @ 140# per 1000 Sq. Yds.	38-0-0 @ 50# per 1000 Sq. Yds. Or 31-0-0 @ 61# per 1000 Sq. Yds.	50% Kentucky Bluegrass 30% Creeping Red Fescue 20% Perennial Ryegrass Sow 21# per 1000 Sq. Yds. Mar. 15 thru May/Aug. thru Oct. 15
Bank Areas (PennDOT C)	Yes	800# per 1000 Sq. Yds.	No	38-0-0 @ 50# per 1000 Sq. Yds Or 31-0-0 @ 61# per 1000 Sq. Yds.	45% Crownvetch 55% Annual Ryegrass Sow 9# per 1000 Sq. Yds. Anytime except Sept. and Oct.
Bank Areas (PennDOT W)	Yes		No	38-0-0 @ 50# per 1000 Sq. Yds. Or 31-0-0 @ 61# per 1000 Sq. Yds.	70% Tall Fescue 20% Birdsfoot Trefoil Mixture 10% Redtop Sow 10.5# per 1000 Sq. Yds.
Lawns (PennDOT B)	Yes	800# per 1000 Sq. Yds.	10-20-20 @ 140# per 1000 Sq. Yds.	38-0-0 @ 50# per 1000 Sq. Yds. Or 31-0-0 @ 61# per 1000 Sq. Yds.	50% Kentucky Bluegrass 30% Pennlawn Red Fescue 20% Perennial Ryegrass Sow 21# per 1000 Sq. Yds. Mar. 15 thru May/Aug. thru Oct. 15
Open Fields; Non-Cultivated, Pasture	No	No	No	38-0-0 @ 50# per 1000 Sq. Yds. Or 31-0-0 @ 61# per 1000 Sq. Yds.	100% Timothy Sow 10# per 1000 Sq. Yds. Mar. thru May/Aug. thru Sept.
Open Fields; Cultivated	No	No	No	38-0-0 @ 50# per 1000 Sq. Yds. Or 31-0-0 @ 61# per 1000 Sq. Yds.	100% Annual Ryegrass Sow 10# per 1,000 Sq. Yds. March 15 thru Oct. 15
Woods; Sparse	No	No	10-20-20 @ 140# per 1000 Sq. Yds.	38-0-0 @ 50# per 1000 Sq. Yds. Or 31-0-0 @ 61# per 1000 Sq. Yds.	100% Red Fescue Sow 36# per 1000 Sq. Yds. Mar. 15 thru May/Aug. thru Oct. 15
Sodding	Yes	800# per 1000 Sq. Yds.	10-20-20 @ 140# per 1000 Sq. Yds.	N/A	N/A
Basin/Channels	Yes	No	10-20-20 @ 140# Per 1000 Sq. Yds.	38-0-0 @ 50# per 1000 Sq. Yds Or 31-0-0 @ 61# per 1000 Sq. Yds.	50% Tall Fescue, 25% Rough Bluegrass, 15% Reed Canary Grass, 10% Redtop

*Unless lesser rate indicated by soils test

END OF SECTION

SECTION 02500

BITUMINOUS PAVING AND SURFACING

PART 1 GENERAL

1.01 DESCRIPTION

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

1. Superpave base course construction.
2. Placement and compaction of bituminous binder and wearing surface.
3. Placement of bituminous seal coat and surface treatment.
4. Surface preparation.

B. Related work specified elsewhere:

1. Clearing and grubbing:..... Section 02100
2. Site excavation and placement of fill material: ..... Section 02210
3. Roadway excavation, fill, and compaction: ..... Section 02230
4. Pavement markings ..... Section 02760

C. Definitions: NONE

D. Applicable Standard Details:

1. EPT 02500-1 .....Typical Road Cross Section Detail
2. EPT 02500-2 ..... Typical Road with Curb Cross Section Detail
3. EPT 02500-3 ..... Typical Alley Cross Section Detail
4. EPT 02500-4 ..... Street Widening Detail
5. EPT 02500-5 ..... Paved Trail Surface Detail
6. EPT 02500-6 ..... Gravel Trail Surface Detail

1.02 QUALITY ASSURANCE

A. Reference Standards:

1. Pennsylvania Department of Transportation (PennDOT), latest revision:

Publication 408, Specifications

Publication 213, Work Zone Traffic Control Guidelines

Publication 27, Specification for Bituminous Mixtures (Bulletin 27)

Publication 37, Bituminous Concrete Mixtures, Design Procedures, and Specifications for Special Bituminous Mixtures (Bulletin 25)

2. American Society for Testing and Materials (ASTM):

   D2950 Test Method for Density of Bituminous Concrete in Place by Nuclear Methods

3. Pennsylvania Code

   Title 67 Transportation Chapter 459, Occupancy of Highway by Utilities.

4. MUTCD (most current adopted Edition)

B. Inspections:

1. Inspection by the Township will, at a minimum, be made of the subgrade prior to placement of the base course, and of the base course prior to placement of the binder surface.

1.03 SUBMITTALS

A. Certification:

1. Submit certification from bituminous and aggregate suppliers attesting that materials conform to Publication 408, Specifications.

2. Provide PennDOT Certification of Compliance (CS-4171) with the first load delivered to the job site each day. Certification must be signed by the plant technician and cross referenced with the job mix formula number which must appear on the delivery ticket.

3. Delivery Tickets/Weight Slips - Must be provided with each load delivered to the job site. Weight slips must include, at a minimum, the following:

   a. Job Mix Formula Number

   b. Date and Time

   c. Material Type

   d. Design ESALS

   e. For Wearing Course - Provide SRL Designation

4. Provide compaction testing results, if determined by the Township.

1.04 JOB CONDITIONS

A. Control Traffic:

1. Take measures to control traffic during paving operations. Do not allow traffic on newly paved areas until adequate stability and adhesion have been attained and the material has cooled to 140° F or less.

B. Protection of Adjacent Areas:

1. Restore existing surface outside the limits of the work that has been damaged by the Contractor's operations, to its original condition.

2. Reasonable access must be maintained for adjacent property owners and commercial properties.

PART 2 PRODUCTS

2.01 BITUMINOUS MATERIALS AND AGGREGATES

A. All bituminous materials and aggregates used in base course construction, paving, and resurfacing are designated in these specifications by, and shall conform to, the applicable portions of the Publication 408 Specifications. The coarse aggregate used in bituminous wearing surfaces shall have the following aggregate Skid Resistance Level (SRL) letter designation based on the current Average Daily Traffic (ADT) for resurfacing or anticipated initial daily traffic on new facilities:

ADT	SRL	ALTERNATIVES
20,000 and Above	E	None
5,000 to 20,000	H	E, H, Blend of E and M, Blend of E and G
3,000 to 5,000	G	E, H, G, Blend of H and M, Blend of E and L
1,000 to 3,000	M	E, H, G, M, Blend of H and L, Blend of G and L, Blend of E and L
1,000 and Below	L	Any
Note: *All blends are 50% by mass and shall be accomplished by an approved method.*		

B. All Superpave mixtures shall conform to applicable sections of Publication 408 Specifications. Aggregate shall be provided by approved sources and have the SRL designation as specified above. All mixtures shall be petroleum grade PG 64S-22 and ESALs as specified on the drawings. Submit mixture design for base, binder, and wearing to the Township for approval prior to placement.

2.02 SEALANTS

A. PG 64S-22 or rubberized joint sealing material (ASTM D3405 or modified AASHTO M173) for all transverse, longitudinal or other joints at utilities and curbs.

2.03 STREET SIGNS, POSTS, AND BRACKETS

A. Street Identification Signs

1. Extruded aluminum, 0.80" thick, 9" high, minimum 24" long, high density.

a. Letters shall be composed of a combination of lower-case letters with initial upper-case letters. At a minimum, 6" high upper-case letters and 4.5” lower-case letters shall be used.

b. Street name signs shall have a blue background with a white legend.

B. Posts (For all post mounted signs):

1. Breakaway 2" square steel, in compliance with PennDOT Publication 408 Specifications, Section 931.

2. Ten feet long, extending seven (7) feet above the surface grade in area of no pedestrian traffic.

3. In areas of pedestrian traffic, signs shall provide seven (7) feet of clearance from the bottom of signs to the finished surface grade.

C. Brackets

1. Aluminum alloy, in compliance with Publication 408 Specifications.

2.04 TRAIL MIX

A. Aggregate Trail Mix shall meet the gradation specification shown on the standard detail EPT 02500-6.

B. Paved Trail surface shall meet the requirements shown on standard detail EPT 02500-5.

PART 3 EXECUTION

3.01 BASE COURSES

A. *Superpave Asphalt Base Course* - Where indicated on the drawings, construct base course to compacted depth in accordance with Publication 408, Section 313. Proof roll base course to the satisfaction of the Township. The Township shall approve crushed aggregate base course prior to placement of base course.

B. *Bituminous Concrete* - Where indicated on the Drawings and/or shown in the "Backfill and Surface Restoration Requirements Table", construct bituminous concrete base course to compacted depth in accordance with Publication 408 Specifications. Proof roll base course to the satisfaction of the Township. The Township shall approve the crushed aggregate base course prior to the placement of bituminous concrete base course.

C. If final compacted depth of Base Course is to be 4" or greater then a tracked paver shall be utilized.

3.02 PREPARATION OF EXISTING PAVEMENT SURFACE

A. Clean street surface of all dust, debris, loose stone, earth, or other deleterious material by means of hand brooms or approved power brooms.

B. Scarify areas shown on the drawings. Where the existing base is judged inadequate by the Township, construct new base of the required type shown on the applicable standard detail.

C. Seal all cracks in accordance with Publication 408 Specification, Section 469. With Township approval, cracks may be filled with PG 64S-22.

D. Patch holes and depressions less than three inches with Superpave (9.5mm) wearing material, compacted in layers not exceeding two inches after compaction.

E. Holes greater than three inches in depth shall be sawed back to sound pavement, and patched with a minimum of eight inches of crushed aggregate base course and a depth of Superpave (19mm) binder material that matches the depth of existing pavement. The minimum depth of binder material shall be three inches.

F. Apply tack coat prior to overlaying existing pavement in accordance with Publication 408 Specifications, Section 460.

G. Milling of existing bituminous pavement shall be performed in accordance with Publication 408, Section 491 to the depth and limits specified in the drawings.

1. Saw cut all edges at intersections with streets and driveways and at the limits of work.

2. All milled surfaces shall be swept completely. Millings must be disposed of properly.

3. Supply all water as needed.

4. Contractor shall provide transitions from milled surfaces to non-milled surfaces to allow vehicular traffic during non-working hours.

3.03 SURFACE COURSES

A. Superpave Asphalt

1. Superpave Binder Course - Construct Superpave binder course to the compacted depth shown on the drawings and PennDOT Publication 408 Specifications, Section 413.

2. Superpave Wearing Course - Construct Superpave wearing course to the compacted depth shown on the drawings and PennDOT Publication 408 Specifications, Section 413.

3. Tack coat shall be applied and conform to PennDOT Publication 408 Specifications, Section 460, to ensure bonding between the courses.

4. Do not allow vehicular traffic on newly compacted bituminous material until the temperature cools below 140˚ F.

B. Bituminous Surface Course (ID-2)

1. Marshall Mixes may be utilized, where approved by Township. They shall be constructed in accordance with the applicable requirements of Publication 408 Specifications, to the compacted depths specified on the drawings.

2. Do not allow vehicular traffic on newly compacted bituminous material until the temperature cools below 140˚ F.

C. Compaction

1. Compact by rolling with steel-wheel, vibration or pneumatic tire rollers (minimum GVW = 5 tons) or a combination of these to obtain specified layer thickness and until non-movement of material under compaction equipment is achieved, unless other density requirements are required by the Township.

2. The roller pattern and speed shall be monitored by the Contractor and Township to avoid roller marks, pattern segregation and displacement of hot mixtures.

D. Asphalt Seal Coat (single application)

1. Construct asphalt seal coat in accordance with Publication 408 Specifications, Section 470.

E. Asphalt Surface Treatment (double application)

1. Construct asphalt surface treatment in accordance with Publication 408 Specifications, Section 480.

3.04 JOINTS

A. *Notch* - The edge of an overlay shall be saw cut to a depth of 1-1/2" for the entire length of the joint and the detached material removed to a minimum notch width of 12". Notch shall be skewed a minimum 6:1 unless otherwise noted. A cold planer may be used. The vertical face must be painted with PG 64S-22 or the same asphalt material used in mix design (Publication 408, Section 413.3(k)).

B. *Sealing* - All joints shall be sealed rubberized joint sealing material. When wearing course is placed adjacent to curb to form bituminous gutter, seal with hot bituminous material of the class and type designated for wearing course and extend to 6 inches from the curb, applied evenly.

3.05 SIGNS

A. Install signs as specified by Township.

B. Posts shall be installed in undisturbed earth with anchor top 4" above ground on lower slope side.

C. Where posts are located in concrete, drill the existing concrete to place anchor. If in new concrete, place PVC sleeve in concrete prior to placing post.

3.06 BANK SLOPES

A. The maximum slopes of banks located outside of the street right-of-way, measured perpendicular to the right-of-way of the street, shall not exceed three to one (3:1) for fills and two to one (2:1) for cuts. Wherever possible a four to one (4:1) slope should be utilized. Where guiderail is to be utilized it shall be in accordance with Section 02852.

3.07 TRAIL MIX PLACEMENT

A. Place trail mix to a compacted (100% of dry density) 4" thickness. Placement will be made through the use of a self-propelled paving machine.

B. Compact material using a 3-10 ton roller until non-movement of material under compaction is achieved.

3.08 FIELD QUALITY CONTROL

A. Proof of product.

At the time of material delivery to the site, the Contractor shall furnish the delivery ticket indicating vehicle, material source, date, time, project identification, material quantity, and material specifications, which should identify the Petroleum Grade, Equivalent Single Axle Loads (ESALs), aggregate size, and SRL designation (only for wearing course).

B. Surface Tolerance of Base Course.

1. After the base course has been completed as specified, the surface smoothness shall be checked with approved templates, string lines, or straightedges.

a. *Templates*. The Contractor shall furnish and use approved templates of required length and cut to the required crown of the finished surface of the base course, for checking the crown and contour thereof. The templates shall be equipped with metal or other approved vertical extensions attached to each end so that the bottom of the template will be at the elevation of the top of the aggregate. At least 3 such templates shall be furnished, and used at intervals of not more than 25 feet.

b. *String Lines*. String lines, for controlling the finished elevation of the base course, shall be furnished with ample supports and offset along each side of the base course, and shall be maintained until all irregularities have been satisfactorily corrected.

c. *Straightedges*. Approved straightedges 10 feet in length shall also be furnished and used for testing longitudinal irregularities in the surface of the base course.

2. Any surface irregularities that exceed 1/2 inch shall be remedied by removing or adding bituminous material as required, after which the entire area, including the surrounding surface, shall be rolled until satisfactorily compacted.

C. Tests for Depth of Finished Base Course.

1. During the progress of the work, the depth of the base course will be measured by the Township, and unsatisfactory work shall be repaired, corrected, or replaced. The Township will not be liable for payment for any excess depth of base course.

2. The depth will be determined by cutting or coring holes to the full depth of the completed base course. One depth measurement may be required for each 1500 square yards, or less, of completed base course. Any section in which the depth is ½ inch or more deficient in specified depth, shall be satisfactorily corrected at no expense to the Township.

3. All test holes shall be backfilled with similar material and satisfactorily compacted by and at the expense of the Contractor. This operation shall be performed under the observation of the Township who will check the depth for record purposes.

D. Surface Tolerance of Wearing Course.

1. After the wearing course has been completed as specified, the surface smoothness shall be checked with straightedges.

   a. *Straightedges*. Approved straightedges 10 feet in length shall be furnished and used for testing longitudinal irregularities in the surface of the wearing course.

2. Any surface irregularities that exceed 3/16 inch shall be remedied by removing or adding wearing material as required, after which the entire area, including the surrounding surface, shall be rolled until satisfactorily compacted.

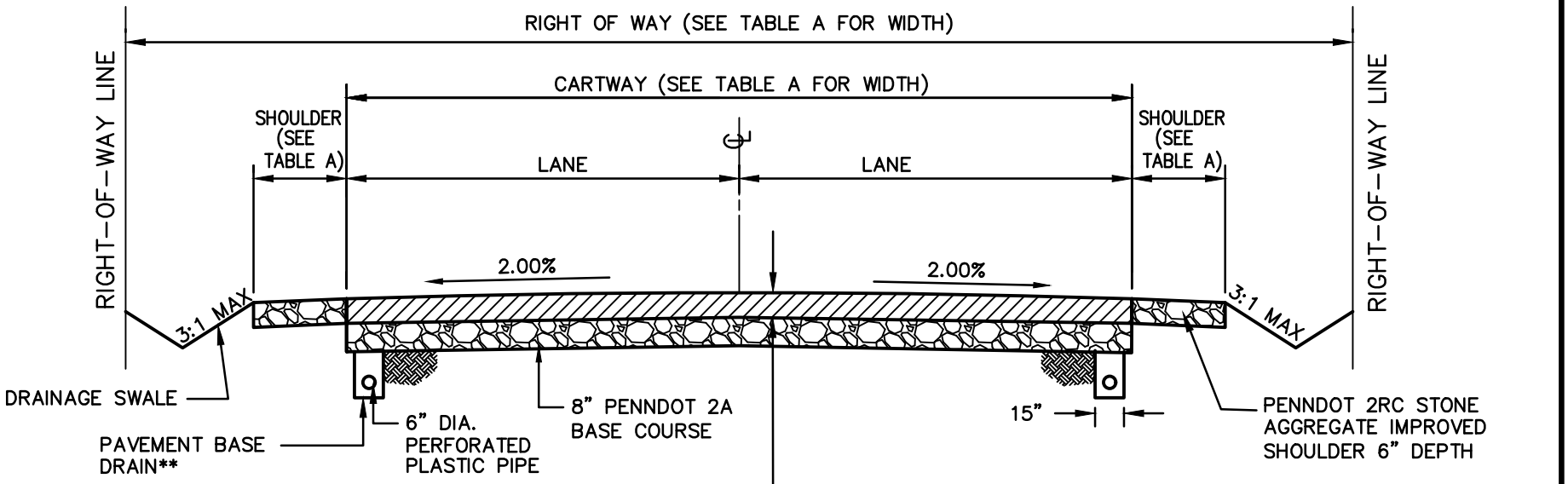
E. Tests for Depth of Finished Wearing Course.

1. During the progress of the work, the depth of the wearing course may be measured by the Township, and unsatisfactory work shall be repaired, corrected, or replaced. The Township will not be liable for payment for any excess depth of wearing course.

2. The depth will be determined by cutting or coring holes to the full depth of the completed wearing course. Test holes to be excavated by the Contractor at no expense to the Township. One depth measurement may be required for each 1,500 square yards of completed wearing course. Any section in which the depth is 1/4 inch or more deficient in specified depth, shall be satisfactorily corrected at no expense to the Township.

3. All test holes shall be backfilled with similar material and satisfactorily compacted by and at the expense of the Contractor. This operation shall be performed under the observation of the Township who will check the depth for record purposes.

END OF SECTION



* THE 19mm BINDER COURSE MUST BE PLACED WITHIN ONE WEEK OF THE PLACEMENT OF THE 25mm BASE.

** PROVIDE PAVEMENT BASE DRAIN FOR 50 FEET ON EITHER SIDE OF VERTICAL SAG CURVES. WHERE STORM SEWER IS REQUIRED AND INTERFERES WITH PLACEMENT OF PAVEMENT BASE DRAIN, ELIMINATE PAVEMENT BASE DRAIN AND USE COMBINATION STORM SEWER AND UNDERDRAIN. SEE PENNDOT RC-30M.

NOTES:

1. MINIMUM ESAL = 0.0 TO 0.3 MILLION
2. MINIMUM SRL = L
3. MINIMUM CBR = 6.0
4. ALL PETROLEUM GRADE TO BE 64S-22
5. EQUIVALENT MARSHALL MIXES MAY BE SUBSTITUTED, WHEN APPROVED BY THE TOWNSHIP

TABLE A

STREET TYPE	RIGHT-OF WAY (FEET)	CARTWAY (FEET)	SHOULDER (FEET)
MINOR ARTERIAL	60	24	8
LOCAL ROAD (COLLECTOR, LOCAL)	50	24	5
MARGINAL ACCESS	40	20	4

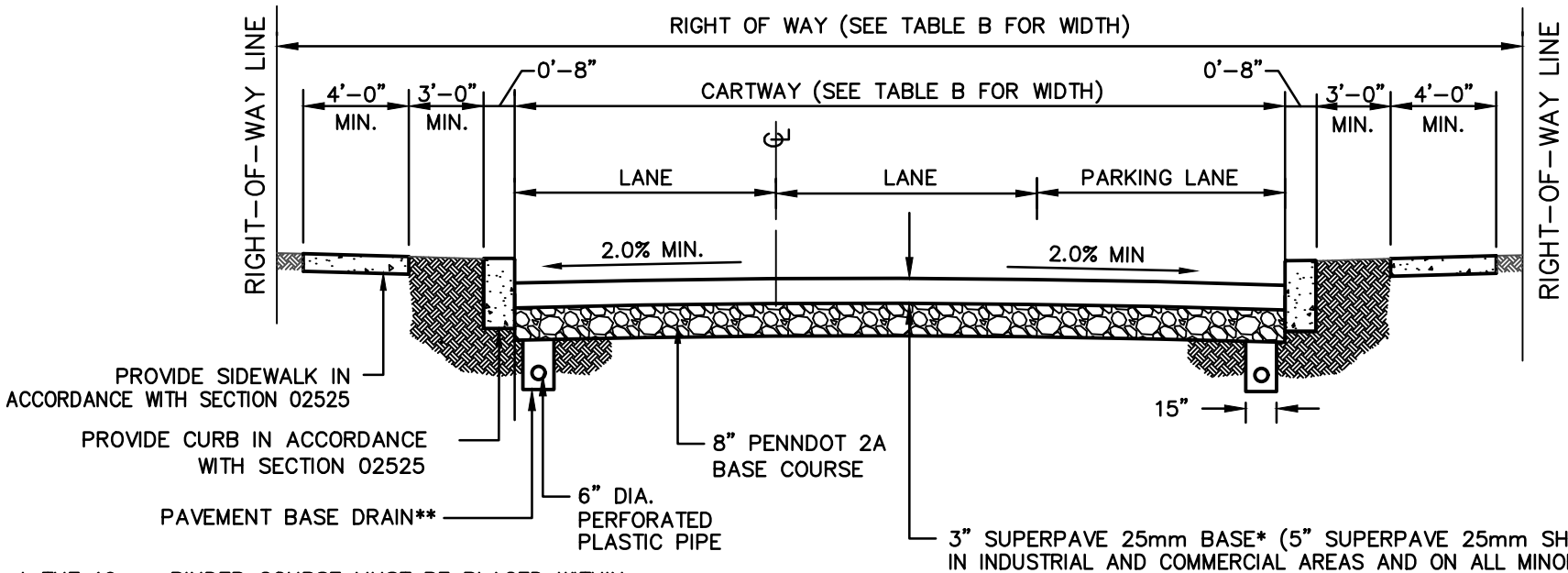
DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	1/1/2023
DWG. NO.	EPT02500-1
FILE NO.	4833.9.02.00
SHEET	1 OF 1

C.S. DAVIDSON, INC.
ENGINEERING A BETTER COMMUNITY
38 NORTH DUKE STREET, YORK, PA • PHONE (717) 846-4805
50 WEST MIDDLE STREET, GETTYSBURG, PA • PHONE (717) 337-3021
315 W. JAMES STREET, SUITE 102, LANCASTER, PA • PHONE (717) 481-2991
WWW.CSDAVIDSON.COM

EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

TYPICAL ROAD CROSS SECTION DETAIL

EAST PENNSBORO TOWNSHIP — CUMBERLAND COUNTY , PENNSYLVANIA



* THE 19mm BINDER COURSE MUST BE PLACED WITHIN ONE WEEK OF THE PLACEMENT OF THE 25mm BASE.

** PROVIDE PAVEMENT BASE DRAIN FOR 50 FEET ON EITHER SIDE OF VERTICAL SAG CURVES. WHERE STORM SEWER IS REQUIRED AND INTERFERES WITH PLACEMENT OF PAVEMENT BASE DRAIN, ELIMINATE PAVEMENT BASE DRAIN AND USE COMBINATION STORM SEWER AND UNDERDRAIN. SEE PENNDOT RC-30M.

NOTES:

1. MINIMUM ESAL = 0.0 TO 0.3 MILLION
2. MINIMUM SRL = L
3. MINIMUM CBR = 6.0
4. ALL PETROLEUM GRADE TO BE 64S-22
5. EQUIVALENT MARSHALL MIXES MAY BE SUBSTITUTED, WHEN APPROVED BY THE TOWNSHIP
6. 4'-0" WIDE SIDEWALKS REQUIRE A 5'X5' PASSING SPACE EVERY 200 LINEAL FEET PER ADA REGULATIONS. 5'-0" WIDE SIDEWALKS MAY BE PROVIDED THROUGHOUT IN LIEU OF PROVIDING THE REQUIRED PASSING SPACE.

TABLE B

STREET TYPE	RIGHT-OF WAY (FEET)	CARTWAY (FEET)
MINOR ARTERIAL	60	36
LOCAL ROAD (COLLECTOR, LOCAL)	50	34
MARGINAL ACCESS	40	26

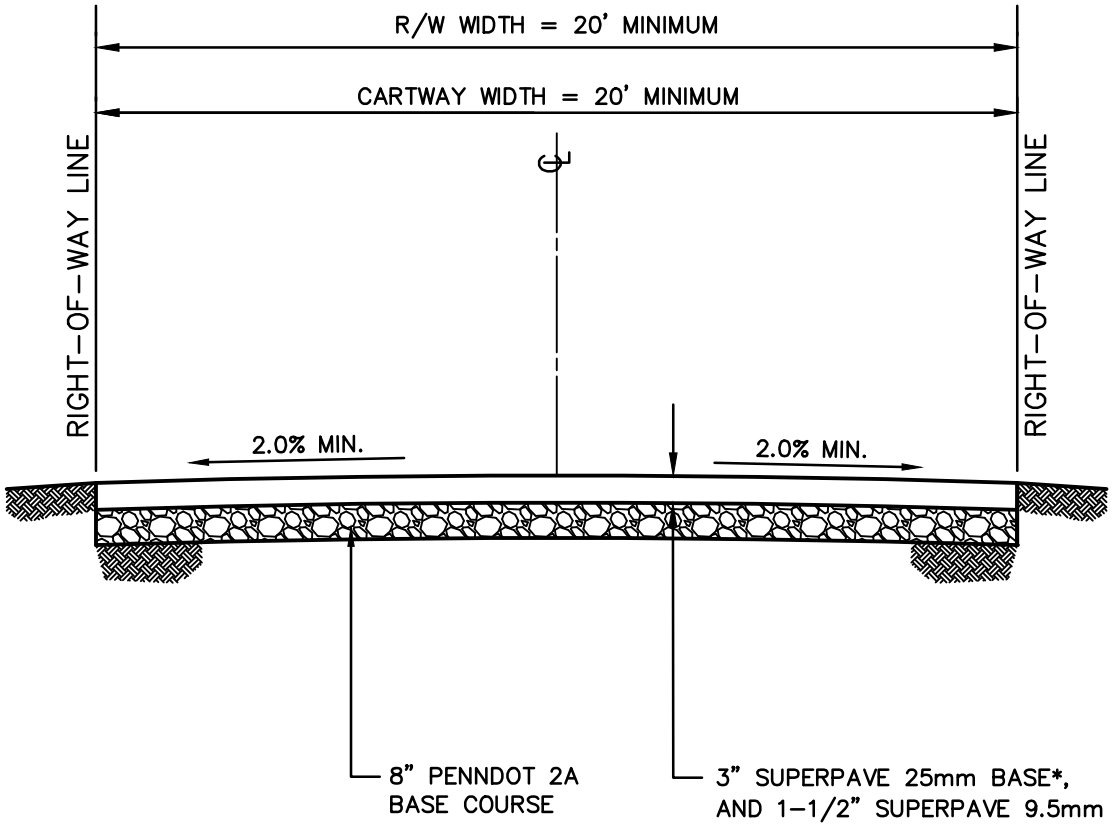
DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	1/1/2023
DWG. NO.	EPT02500-2
FILE NO.	4833.9.02.00
SHEET	1 OF 1

C.S. DAVIDSON, INC.
ENGINEERING A BETTER COMMUNITY
38 NORTH DUKE STREET, YORK, PA • PHONE (717) 846-4805
50 WEST MIDDLE STREET, GETTYSBURG, PA • PHONE (717) 337-3021
315 W. JAMES STREET, SUITE 102, LANCASTER, PA • PHONE (717) 481-2991
WWW.CSDAVIDSON.COM

EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

TYPICAL ROAD WITH CURB AND PARKING LANE CROSS SECTION DETAIL

EAST PENNSBORO TOWNSHIP — CUMBERLAND COUNTY , PENNSYLVANIA



NOTES:

1. MINIMUM ESAL = 0.0 TO 0.3 MILLION
2. MINIMUM SRL = L
3. MINIMUM CBR = 6.0
4. ALL PETROLEUM GRADE TO BE 64S-22
5. EQUIVALENT MARSHALL MIXES MAY BE SUBSTITUTED, WHEN APPROVED BY THE TOWNSHIP

* THE 9.5mm WEARING COURSE MUST BE PLACED WITHIN ONE WEEK OF THE PLACEMENT OF THE 25mm BASE.

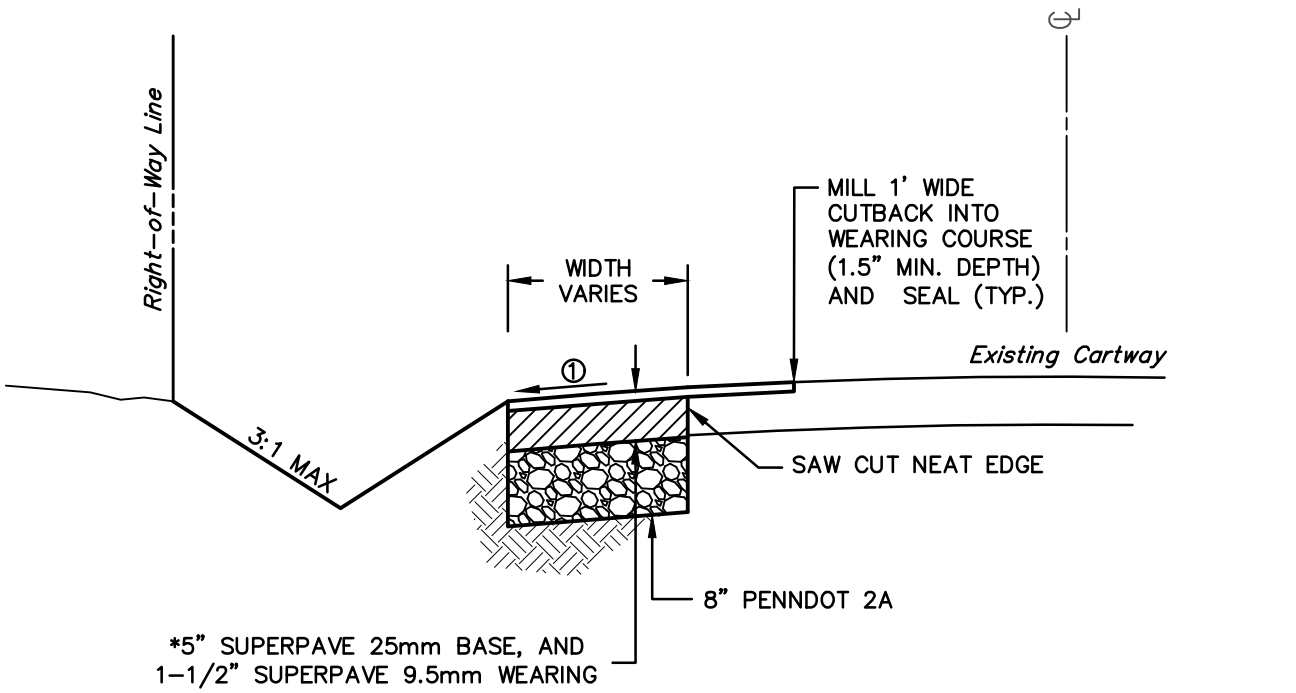
DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	1/1/2023
DWG. NO.	EPT02500-3
FILE NO.	4833.9.02.00
SHEET	1 OF 1

C.S. DAVIDSON, INC.
ENGINEERING A BETTER COMMUNITY
38 NORTH DUKE STREET, YORK, PA • PHONE (717) 846-4805
50 WEST MIDDLE STREET, GETTYSBURG, PA • PHONE (717) 337-3021
315 W. JAMES STREET, SUITE 102, LANCASTER, PA • PHONE (717) 481-2991
WWW.CSDAVIDSON.COM

EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

TYPICAL ALLEY/SERVICE DRIVE CROSS SECTION DETAIL

EAST PENNSBORO TOWNSHIP — CUMBERLAND COUNTY , PENNSYLVANIA



① 2% MINIMUM CROSS-SLOPE, MATCH EXISTING CROSS-SLOPE IF GREATER THAN 2%

* WHERE EXISTING PAVEMENT DEPTH EXCEEDS DEPTH INDICATED, MATCH EXISTING PAVEMENT DEPTH

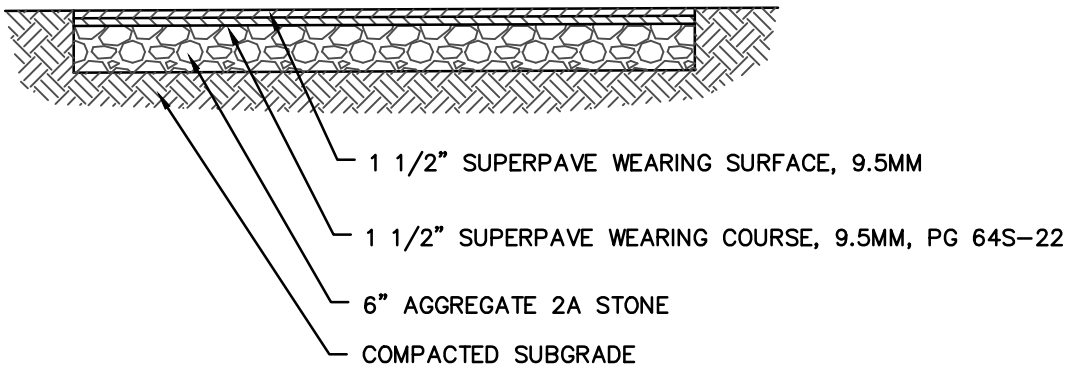
EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

C.S. DAVIDSON, INC.
ENGINEERING A BETTER COMMUNITY
38 NORTH DUKE STREET, YORK, PA • PHONE (717) 846-4805
50 WEST MIDDLE STREET, GETTYSBURG, PA • PHONE (717) 337-3021
315 W. JAMES STREET, SUITE 102, LANCASTER, PA • PHONE (717) 481-2991
WWW.CSDAVIDSON.COM

STREET WIDENING DETAIL

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	1/1/2023
DWG. NO.	EPT02500-4
FILE NO.	4833.9.02.00



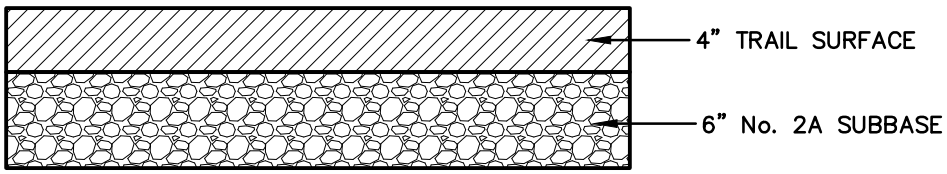
EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

C.S. DAVIDSON, INC.
ENGINEERING A BETTER COMMUNITY
38 NORTH DUKE STREET, YORK, PA • PHONE (717) 846-4805
50 WEST MIDDLE STREET, GETTYSBURG, PA • PHONE (717) 337-3021
315 W. JAMES STREET, SUITE 102, LANCASTER, PA • PHONE (717) 481-2991
WWW.CSDAVIDSON.COM

PAVED TRAIL SURFACE DETAIL

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	1/1/2023
DWG. NO.	EPT2500-5
FILE NO.	4833.9.02.00



TRAIL SURFACE SIEVE RESULTS (SPECIFICATIONS)							
	3/4"	3/8"	#4	#8	#6	#40	#200
Specified Requirements	100	90–100	80–95	70–85	50–70	20–30	10–15

The Plasticity Index (PI) is required to be within range og 6–25.

EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

C.S. DAVIDSON, INC.
ENGINEERING A BETTER COMMUNITY
38 NORTH DUKE STREET, YORK, PA • PHONE (717) 846-4805
50 WEST MIDDLE STREET, GETTYSBURG, PA • PHONE (717) 337-3021
315 W. JAMES STREET, SUITE 102, LANCASTER, PA • PHONE (717) 481-2991
WWW.CSDAVIDSON.COM

GRAVEL TRAIL SURFACE DETAIL

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	1/1/2023
DWG. NO.	EPT02500-6
FILE NO.	4833.9.02.00

SECTION 02525

CEMENT CONCRETE CURB & SIDEWALK

PART 1 GENERAL

1.01 DESCRIPTION

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

1. Subgrade preparation
2. Construction of cement concrete curb and sidewalk
3. Construction of handicap ramps
4. Construction of stamped (patterned) and colored concrete sidewalk

B. Related work specified elsewhere:

1. Trenching, backfilling and compaction ..... Section 02221
2. Finish grading, seeding and sodding ..... Section 02485
3. Bituminous paving and surfacing ..... Section 02500
4. Trench paving and restoration ..... Section 02575
5. Plain and reinforced cement concrete ..... Section 03000

C. Definitions: NONE

D. Applicable Standard Details:

1 EPT 02525-1 ..... Vertical Concrete Curb Details

2 EPT 02525-2 ..... Concrete Sidewalk With Grass Strip Detail

3 EPT 02525-3 .. Concrete Sidewalk With Grass Strip Driveway Apron Detail

4 EPT 02525-4 ..... Roof Leader Under Sidewalk Detail

1.02 QUALITY ASSURANCE

A. Reference Standards:

1. Pennsylvania Department of Transportation:

Publication 408, Specifications

Publication 213, Temporary Traffic Control Guidelines

Department of Justice, Code for Regulations, ADA Standards for Accessible Design

2. American Society for Testing and Materials (ASTM)

   A185 Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete

   A615 Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement

   C94 Specification for Ready-Mixed Concrete

   C143 Test Method for Slump of Hydraulic Cement Concrete

   C231 Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method

   C309 Specification for Liquid Membrane-Forming Compounds for Curing Concrete

   D994 Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type)

   E329 Specification for Agencies Engaged in Construction Inspection, Testing or Special Inspection

B. Inspections:

   1. Inspection by the Township will at a minimum be made of the subgrade, formwork, and any steel prior to placement of the concrete.

   2. Township will observe all on-site testing of concrete, unless noted otherwise.

C. Testing:

   1. All on-site testing as well as laboratory testing shall be performed by the same independent testing agency.

1.03 SUBMITTALS

A. Submit concrete mix designs, including strength test records, for review and approval.

B. Submit certified results of compressive strength cylinder tests (from laboratory/testing agency).

C. Submit copies of concrete batch slips.

1.04 JOB CONDITIONS

A. Control of traffic:

   1. Take measures to control traffic during concreting operations. Do not allow traffic on newly placed concrete until adequate strength has been attained.

B. Protection of adjacent areas:

   1. Restore existing surfaces outside the limits of the work that have been damaged by the Contractor's operations to their original condition.

C. Coordination with utilities:

1. Coordinate all necessary adjustments of existing utilities to accommodate this work.

2. Provide access to the site for utility work.

3. The Contractor shall ensure all work complies with the requirements of the Pennsylvania Underground Utility Protection Law.

PART 2 PRODUCTS

2.01 CONCRETE

A. As specified in Section 03000, Articles 2.01 and 3.01, except as follows:

1. Portland Cement Concrete shall be air-tested and have a minimum 28-day compressive strength of 3,500 psi unless specified higher by the Township.

B. Cement concrete criteria for curbs and sidewalks:

1. Slump: 1" minimum, 5" maximum
2. Air Content: 4.5% minimum, 7.5% maximum
3. Temperature: 50°F minimum, 90°F maximum
4. Water/cement ratio: 0.51 minimum

C. For slip-formed curb, same as above except with a minimum slump of 1-1/2".

2.02 FORMS

A. General requirements:

1. Forms shall be coated with a form release agent just prior to placement of concrete.

B. Straight curbing (or radius greater than 40 feet):

1. Approved metal forms.
2. Wood forms, not less than 2 inch nominal thickness, planed on finish side.

C. Radius curbing:

1. Approved metal forms.
2. Fabricated plywood or hardboard forms.

D. Curbing repairs (less than 10 feet)

1. Approved metal forms.
2. Adjust to match existing conditions.

E. Machine placed curbing:

1. Straight or radius curbing may be placed with a self-propelled machine approved by the Township.

2.03 REINFORCEMENT

A. Welded Wire Fabric – ASTM A185. Size and spacing as shown on Standard Details.

B. Reinforcing bars – ASTM A615, Grade 60 billet steel, size and spacing as shown on Standard Details.

2.04 JOINT MATERIAL

A. Joint Filler – Pre-molded expansion joint material shall be fiber joint filler conforming to ASTM D994.

2.05 FORM COATING MATERIALS

A. Form release agents shall be non-staining, liquid chemical coatings free of kerosene and oil which effectively prevent absorption of moisture into the forms and bonding of the concrete to the forms.

2.06 CONCRETE CURING COMPOUNDS

A. Curing compounds shall be clear, non-staining liquid coatings containing no oil or wax and conforming to ASTM C309, such as Safe-Cure, Sealight 1100, Klear Seal R-75 or Enviocure Clear 500, or Similar material.

PART 3 EXECUTION

3.01 CURB CONSTRUCTION

A. Excavate to required depth, remove and dispose of material, and compact the subgrade material to a firm, even surface.

B. Saw cut existing pavement a minimum of 12 inches from face of new curb. Exposed edges of existing work shall be smooth and square.

C. Forms shall be placed as appropriate to the type of curbing on 2 sides (front and back).

D. Forms shall be securely braced to limit deflection during placement of concrete.

E. Provide openings through curb for drainage pipes, if required. Install one, 2'-0" long, #4 reinforcing bar in the middle of curb centered above the pipe as per standard detail.

F. Concrete shall be placed in accordance with Section 03000, Paragraph 3.05.

G. Variation of more than 1/8" from the established line and grade shall be cause for rejection of that portion of the work.

H. Form or saw contraction joints 3/16" wide and 2" deep at 10-foot maximum intervals on 2 sides (front and top). Saw as soon as possible after the concrete has set sufficiently to preclude raveling during the sawing and before any shrinkage cracking occurs in the concrete but in no case later than 24 hours following completion of the curb placement.

I. Provide ½" expansion joints at 60-foot intervals, at the end of each pour, and at the beginning and end of all radii. ½" expansion joint material shall also separate curb from adjacent sidewalks, poles, hydrants, walls, and other permanent structures, except that 3/4" thick expansion joint material shall be provided at storm inlets.

J. Unless otherwise indicated on the drawings, the last three feet of curb shall be tapered to a 1 1/2" reveal with expansion joint at the beginning of taper.

K. Finish top surface with wood floats. Provide depressions for drainage, driveways, and ramps for the handicapped per the Drawings.

L. Tool all exposed edges to the specified radius.

M. Do not remove forms until concrete has set.

N. Begin proper curing in accordance with Section 03000, immediately after placement.

O. Correct minor irregularities with a carborundum stone or mortar comprised of two-part fine aggregate to one-part cement.

P. For slip-formed curb, uniformly feed the concrete to the machine so the concrete maintains the shape of the section, without slumping after extrusion. Voids or honeycomb on the surface of the finished curb will not be allowed. Immediately after extrusion, perform any additional surface finishing required.

3.02 SIDEWALK CONSTRUCTION

A. Excavate to required depth, remove and dispose of material, and compact the subgrade material to a firm, even surface.

B. Exposed edges of existing work shall be smooth and square.

C. Construct ramps for the handicapped, as required by ADA Regulations, and where directed by the Township. Ramps shall be 6" thick concrete with WWF 6 x 6 – W2.9 x W2.9 (6 ga.) wire mesh, placed 2" from top surface. All handicap ramps shall have detectable warning domes in accordance with ADA regulations.

D. Sidewalks at driveway entrances shall be 6" thick with WWF 6 x 6 – W2.9 x W2.9 (6 ga.) wire mesh placed 2" from top of surface.

E. Sidewalks across sanitary sewer or storm sewer easements shall be 8" thick.

F. Spread AASHTO #57 aggregate and compact to the thickness shown on the Standard Details.

G. Score contraction joints at 5-foot intervals to sufficient depth to insure cracking at the joint. Do not saw cut the contraction joints without prior approval from the Township. Also score sidewalks over each drainage pipe placed underneath.

H. Provide 1/4" expansion joint at 30-foot intervals and at the end of each pour. ½" expansion joint material shall also separate adjacent curb, poles, hydrants, walls, and other permanent structures.

I. Apply light broom finish immediately after float finish as specified in Section 03000.

J. Provide depressions for driveways, downspouts, and drainage as directed by the Township or shown on the drawings. Wherever possible, roof leaders shall be placed under the sidewalks in lieu of depressions.

K. Begin proper curing in accordance with Section 03000, Sub-Section 3.08, immediately following form removal.

3.03 HANDICAP RAMPS

A. The construction of handicap ramps shall be in accordance with all ADA requirements. Detectable Warning Surfaces shall provide significantly contrasting texture and light reflective color. The color of Detectable Warning Surfaces shall be approved by the Township.

3.04 BACKFILLING AND RESTORATION

A. Temporary backfill at curbs shall consist of select granular material per Section 02221, front and back, to within 8" of top of curb.

B. Restore adjacent areas as indicated in Section 02575.

3.05 TESTING

A. *General* - Concrete materials and operations will be tested and inspected as the work progresses. Failure to detect any defective work or material shall not in any way prevent later rejection when such defects are discovered nor shall it obligate the Township for final acceptance.

B. *Testing Services* - The following testing services shall be performed by the offices of the Township's Engineering Representative at the Contractor's expense:

1. Conduct strength tests of the concrete during construction of projects contracted directly by the Township in accordance with the following procedures:

a. Secure composite samples in accordance with ASTM C172. Each sample shall be obtained from a different batch of concrete on a random basis, avoiding any selection of the test batch other than by a number selected at random before commencement of concrete placement.

b. Mold and cure four (4) specimens from each sample in accordance with ASTM C31. Any deviations from the requirements of this Standard shall be recorded in the test report.

c. Test specimens in accordance with ASTM C39. Two (2) specimens shall be tested at 28 days for acceptance and two (2) shall be tested at 7 days for information. The acceptance test results shall be the average of the strengths of the specimens tested at 28 days. If one specimen in a test manifests evidence of improper sampling, molding, or testing, it shall be discarded and the strength of the remaining cylinder shall be considered the test result. Should both specimens in a test show any of the above defects, the entire test shall be discarded.

d. Make at least one strength test for each 50 cu. yd., or fraction thereof, of each mixture design of concrete placed in any 1 day. When the total quantity of concrete with a given mixture design is less than 20 cu. yd., the strength tests may be waived by the Engineer if, in his judgment, adequate evidence of satisfactory strength is provided, such as strength test results for the same kind of concrete supplied on the same day and under comparable conditions to other work or other projects.

2. Determine slump of the concrete sample for each strength test and whenever consistency of concrete appears to vary, using ASTM C143. Make at least one slump test for the first 25 L.F. of sidewalk for each mixture design of concrete placed in any one day. All subsequent testing in one day shall be completed for every 50 cu. yds.

3. Determine air content of the concrete sample for each strength test in accordance with either ASTM C231, ASTM C173, or ASTM C138. Make at least one air content test for the first 25 L.F. of sidewalk for each mixture design of concrete placed in any one day. All subsequent testing in one day shall be completed for every 50 cu. yds.

4. Determine temperature of the concrete sample for each strength test. Make at least one temperature test for the first 25 L.F. of sidewalk for each mixture design of concrete placed in any one day. All subsequent testing in one day shall be completed for every 50 cu. yds.

C. *Additional Services When Required* - The following services shall be performed by the offices of the Township's Engineering Representative when required by the Township at the Contractor's expense:

1. Inspect concrete batching, mixing, and delivery operations to the extent deemed necessary by the Township.

2. Sample concrete at point of placement and perform required tests.

3. Review the manufacturer's report for each shipment of cement and reinforcing steel and conduct laboratory tests or spot checks of the materials as received for compliance with specifications.

4. Mold four (4) additional specimens from each sample in accordance with ASTM C31 and field cure in or on the structure providing the same method of cure for the specimens as that which the structure receives.

D. *Other Services As Needed* - The following services shall be performed by the Township's Engineering Representative at the Contractor's expense:

1. Additional testing of materials or concrete occasioned by their failure by test or inspection to meet specification requirements.

2. Additional testing and inspection required because of changes in materials or proportions requested by the Contractor.

E. Duties and Authorities of Designated Testing Agency:

1. Representatives of the agency shall inspect, sample, and test the materials and the production of concrete. When it appears that any material furnished or work performed by the Contractor fails to fulfill specification requirements, the testing agency shall report such deficiency to the Township and the Contractor.

2. The agency shall report all test and inspection results to the Township and Contractor immediately after they are performed. All test reports shall include the exact location in the work at which the batch represented by a test was deposited. Reports of strength tests shall include detailed information on storage and curing of specimens prior to testing.

3. The testing agency and its representatives are not authorized to revoke, alter, relax, enlarge or release any requirement of the Documents, nor to approve or accept any portion of the work.

F. Responsibilities and Duties of Contractor:

1. The Contractor shall provide the necessary testing services for the following:

   a. Qualification of proposed materials and the establishment of mixture designs.

   b. Other testing services needed or required by the Contractor.

2. The use of testing services shall in no way relieve the Contractor of the responsibility to furnish materials and construction in full compliance with these specifications.

3. The Contractor shall submit to the Township the concrete materials and the concrete mix designs proposed for use with a written request for acceptance. This submittal shall include the results of all testing performed to qualify the materials and to establish the mix designs. No concrete shall be placed in the work until the Contractor has received such acceptance in writing.

G. To facilitate testing and inspection, the Contractor shall:

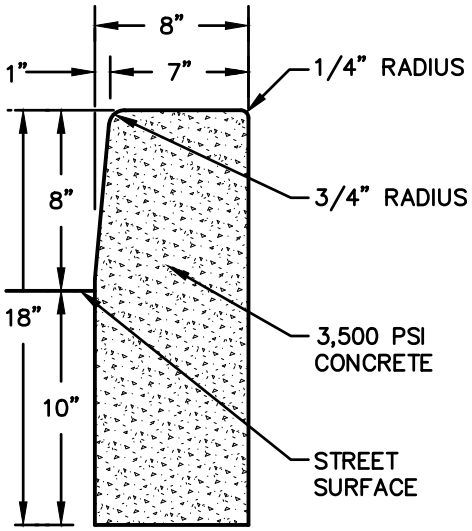
1 Furnish any necessary labor to assist the testing agency in obtaining and handling samples at the project or other sources of materials.

2 Advise the testing agency sufficiently in advance of operations to allow for completion of quality tests and for the assignment of personnel.

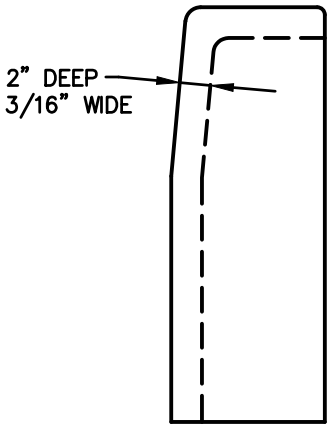
3 Provide and maintain for the sole use of the testing agency adequate facilities for safe storage and proper curing of concrete test specimens on the project site for the first 24 hrs. as required by ASTM C31.

END OF SECTION

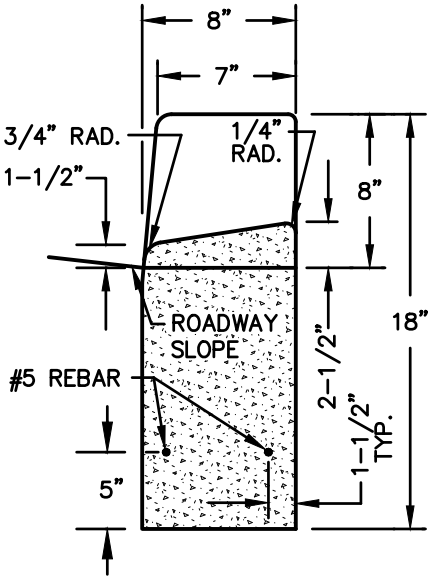
K:\483390200\Design\Constuction & Material Specs\SECTION 02525- CEMENT CONCRETE CURB & SIDEWALK.doc



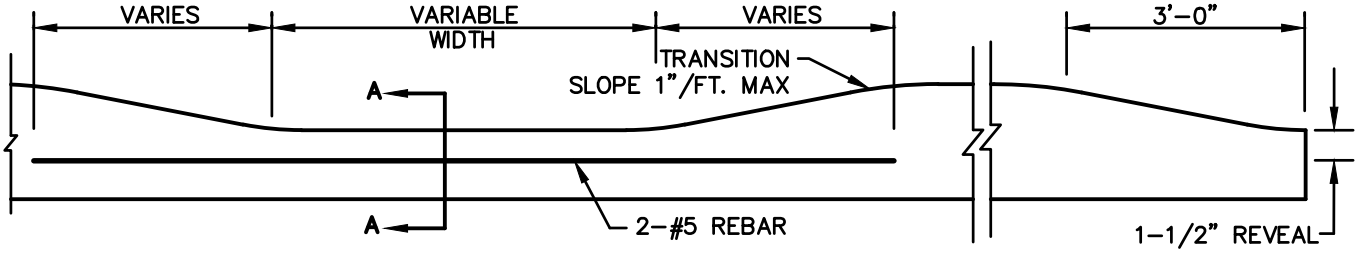
TYPICAL CROSS SECTION



CONTRACTION JOINT



SECTION A–A



DEPRESSED CURBS FOR DRIVES

TERMINAL SECTION

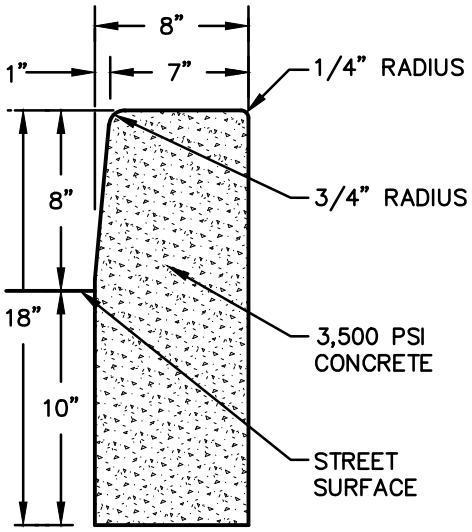
EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

C.S. DAVIDSON, INC.
ENGINEERING A BETTER COMMUNITY
38 NORTH DUKE STREET, YORK, PA • PHONE (717) 846-4805
50 WEST MIDDLE STREET, GETTYSBURG, PA • PHONE (717) 337-3021
315 W. JAMES STREET, SUITE 102, LANCASTER, PA • PHONE (717) 481-2991
WWW.CSDAVIDSON.COM

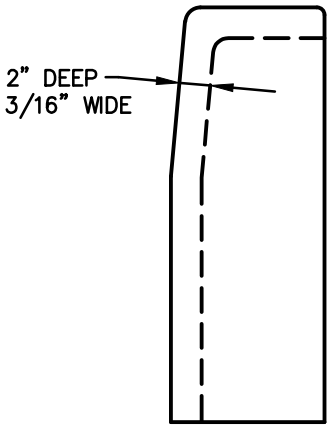
VERTICAL CONCRETE CURB DETAILS

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

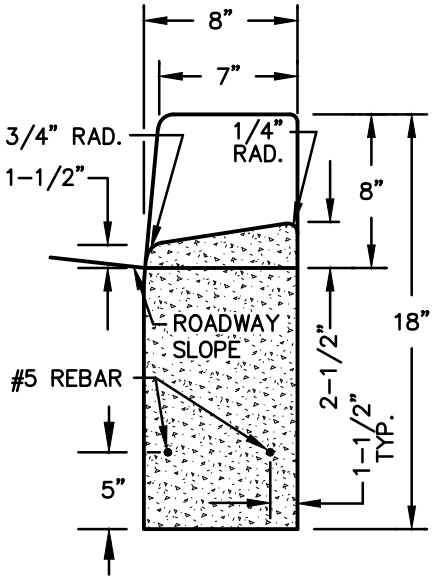
DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	10/11/2022
DWG. NO.	EPT02525-1
FILE NO.	3566.9.02.00



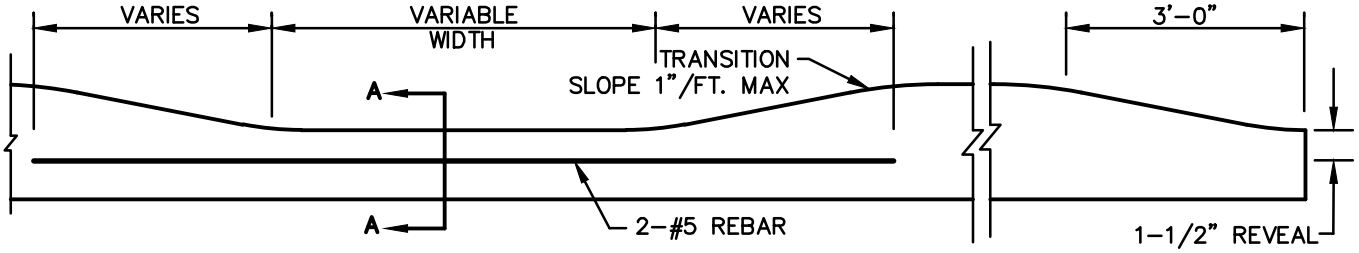
TYPICAL CROSS SECTION



CONTRACTION JOINT



SECTION A–A



DEPRESSED CURBS FOR DRIVES

TERMINAL SECTION

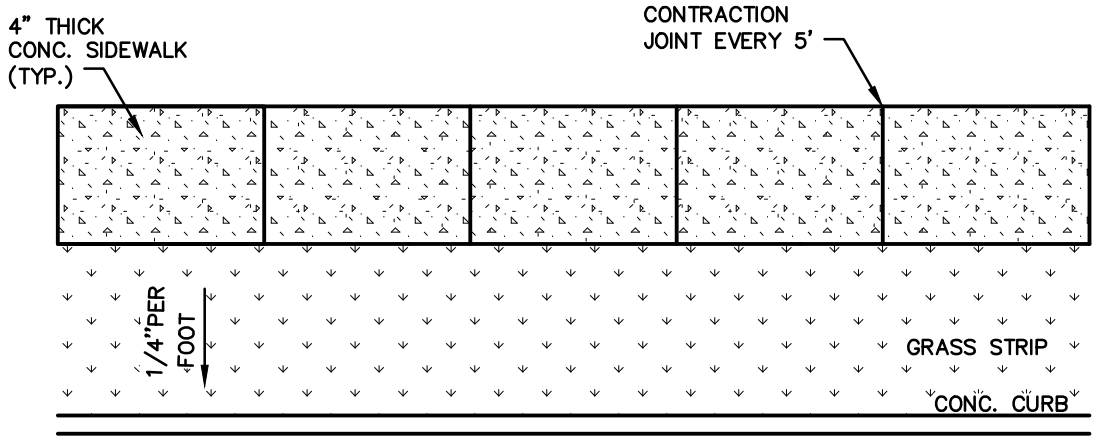
EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

C.S. DAVIDSON, INC.
ENGINEERING A BETTER COMMUNITY
38 NORTH DUKE STREET, YORK, PA • PHONE (717) 846-4805
50 WEST MIDDLE STREET, GETTYSBURG, PA • PHONE (717) 337-3021
315 W. JAMES STREET, SUITE 102, LANCASTER, PA • PHONE (717) 481-2991
WWW.CSDAVIDSON.COM

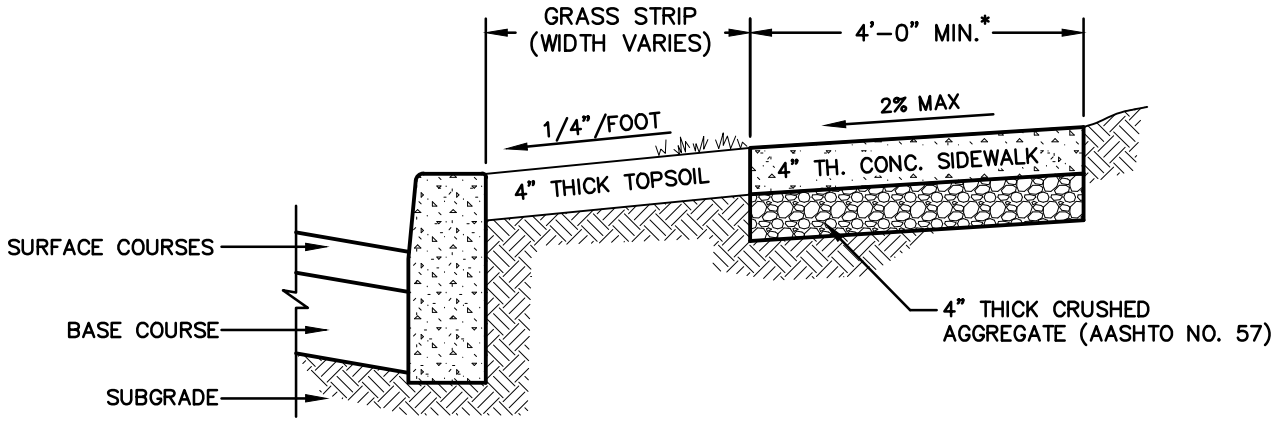
VERTICAL CONCRETE CURB DETAILS

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	1/1/2023
DWG. NO.	EPT02525-1
FILE NO.	4833.9.02.00



PLAN



TYPICAL SECTION

* WHERE 4' WIDE SIDEWALKS ARE TO BE UTILIZED, APPROPRIATE PASSING SPACES SHALL BE PROVIDED IN ACCORDANCE WITH ADA REGULATIONS.

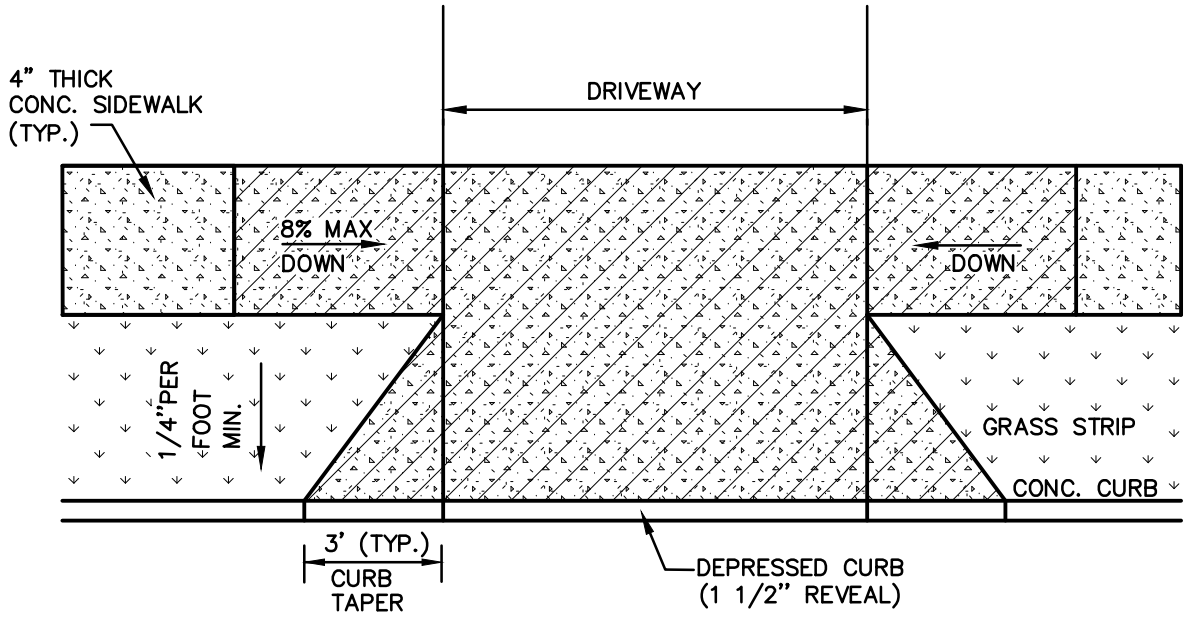
EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

C.S. DAVIDSON, INC.
ENGINEERING A BETTER COMMUNITY
38 NORTH DUKE STREET, YORK, PA • PHONE (717) 846-4805
50 WEST MIDDLE STREET, GETTYSBURG, PA • PHONE (717) 337-3021
315 W. JAMES STREET, SUITE 102, LANCASTER, PA • PHONE (717) 481-2991
WWW.CSDAVIDSON.COM

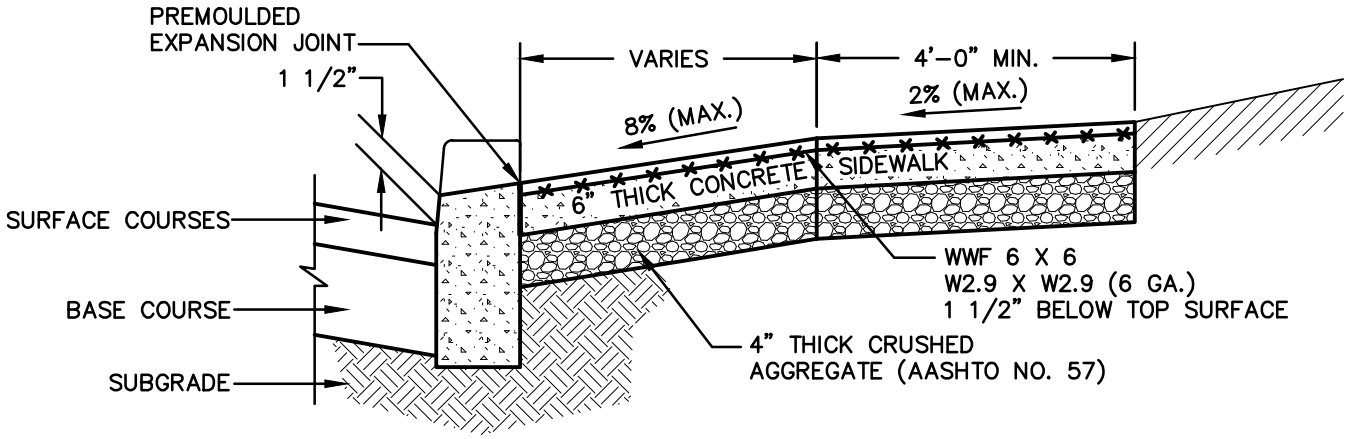
CONCRETE SIDEWALK
WITH GRASS STRIP DETAIL

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	1/1/2023
DWG. NO.	EPT02525-2
FILE NO.	4833.9.02.00



PLAN



TYPICAL SECTION

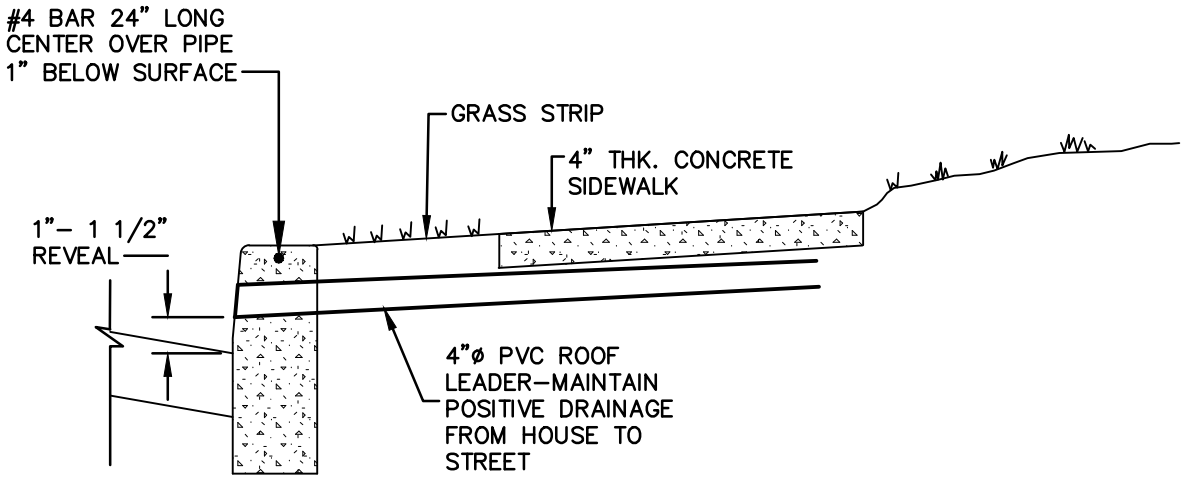
EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

C.S. DAVIDSON, INC.
ENGINEERING A BETTER COMMUNITY
38 NORTH DUKE STREET, YORK, PA • PHONE (717) 846-4805
50 WEST MIDDLE STREET, GETTYSBURG, PA • PHONE (717) 337-3021
315 W. JAMES STREET, SUITE 102, LANCASTER, PA • PHONE (717) 481-2991
WWW.CSDAVIDSON.COM

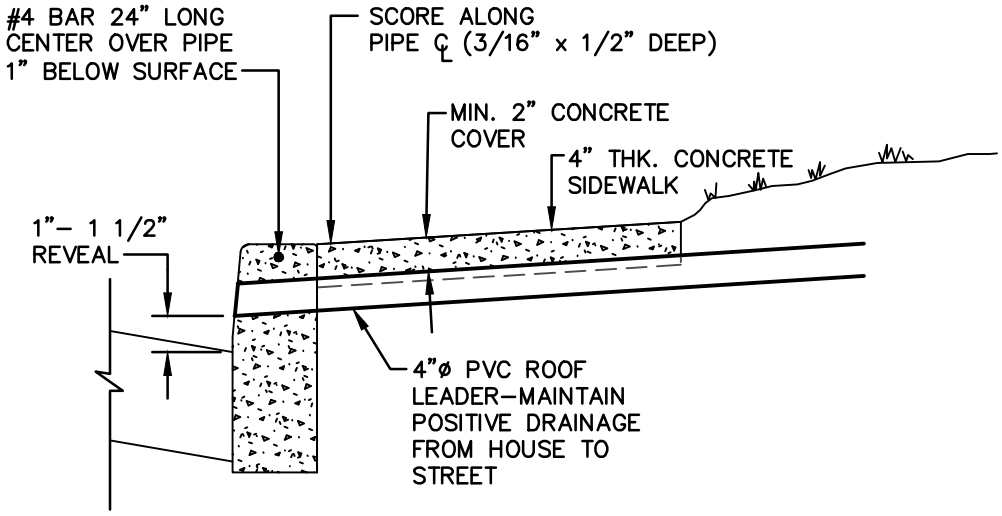
CONCRETE SIDEWALK WITH
GRASS STRIP
DRIVEWAY APRON DETAIL

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	1/1/2023
DWG. NO.	EPT02525-3
FILE NO.	4833.9.02.00



CONCRETE SIDEWALK WITH GRASS STRIP DETAIL



CONCRETE SIDEWALK

EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

C.S. DAVIDSON, INC.
ENGINEERING A BETTER COMMUNITY
38 NORTH DUKE STREET, YORK, PA • PHONE (717) 846-4805
50 WEST MIDDLE STREET, GETTYSBURG, PA • PHONE (717) 337-3021
315 W. JAMES STREET, SUITE 102, LANCASTER, PA • PHONE (717) 481-2991
WWW.CSDAVIDSON.COM

ROOF LEADER
UNDER SIDEWALK
DETAIL

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	1/1/2023
DWG. NO.	EPT02525-4
FILE NO.	4833.9.02.00

SECTION 02575

TRENCH PAVING AND RESTORATION

PART 1 GENERAL

1.01 DESCRIPTION

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

1. Temporary trench paving
2. Permanent trench paving
3. Shoulder restoration
4. Driveway restoration

B. Related work specified elsewhere:

1. Trenching, backfilling, and compacting: ..... Section 02221
2. Roadway excavation, fill and compaction: ..... Section 02230
3. Finish grading, seeding and sodding: ..... Section 02485
4. Bituminous paving and surfacing: ..... Section 02500
5. Plain and reinforced cement concrete: ..... Section 03000

C. Definitions: NONE

D. Applicable Standard Details:

1 EPT 02575-1 .....Temporary Trench Paving
2 EPT 02575-2 ..... Permanent Trench Paving
3 EPT 02575-3 ..Utility Trench Restoration Outside Roadway Detail

1.02 QUALITY ASSURANCE

A. Reference Standards:

1. Pennsylvania Department of Transportation (PennDOT), latest revision:

Publication 408, Specifications
Publication 213, Temporary Traffic Control Guidelines
Publication 27, Specification for Bituminous Mixtures (Bulletin 27)
Publication 37, Specification for Bituminous Materials (Bulletin 25)

2. American Society for Testing and Materials (ASTM):

   D2950 Test Method for Density of Bituminous Concrete in Place by Nuclear Method.

3. Pennsylvania Code, Title 67 Transportation Chapter 459, Occupancy of Highway by Utilities.

B. Inspections:

1. Inspection by the Township will, at a minimum, be made of the materials upon delivery to the job site; of the subgrade prior to placement of the base course; of the completed base course prior to placement of the binder surface; of the completed binder course prior to placement of the wearing course; and of the completed wearing course.

1.03 SUBMITTALS

A. Certificates:

1. Submit certification from bituminous and aggregate suppliers attesting that materials conform to Publication 408 Specifications.

2. Submit bituminous concrete mix design for approval.

3. Provide PennDOT certifications (CS-4171) with each load delivered to the job site, as required by Township.

B. Permits:

1. A Township Highway occupancy permit must be obtained from the Township prior to commencement of construction activities on Township adopted streets.

2. A Highway Occupancy Permit must be obtained from PennDOT prior to commencement of construction activities on State roads.

1.04 JOB CONDITIONS

A. Control of Traffic:

1. Take measures to control traffic during paving operations. Do not allow traffic on newly paved areas until adequate stability and adhesion have been attained and the material has cooled to 140° F or less.

B. Protection of Adjacent Areas:

1. Restore existing surface outside the limits of the work that has been damaged by the Contractor's operations, to its original condition.

C. Concrete Testing: Section 03000.

D. Coordination With Utilities

1. The Contractor shall insure all work complies with the requirements of the Pennsylvania Underground Utility Protection Law.

PART 2 PRODUCTS

2.01 CONCRETE

A. As specified in Section 03000, Articles 2.01 and 3.01.

2.02 BITUMINOUS MATERIALS AND AGGREGATES

A. All bituminous materials and aggregates used in base course construction, paving, and resurfacing are designated in these specifications by, and shall conform to, the applicable portions of the PennDOT Publication 408 Specifications. See descriptions in Sections 02230 and 02500.

PART 3 EXECUTION

3.01 TEMPORARY TRENCH PAVING

A. Place temporary paving immediately upon completion of trench backfilling. Unpaved trenches shall not remain unpaved longer than five working days after backfilling, nor over weekends and holidays; unless construction activities are restricted by PennDOT to restore after backfill.

B. Shape and compact subgrade material proof roll, then place and compact base course to the required thickness.

C. Place temporary paving material. Compact to required minimum thickness with trench roller; having a minimum 300 pounds pressure per inch-width of compaction.

D. Continuously maintain temporary paving.

3.02 PERMANENT TRENCH PAVING

A. For all Bituminous Surface Course (trench), sawcut existing paving in accordance with 67 PA Code, Chapter 459. Remove temporary paving material.

B. Construct permanent base and surface courses to the required compacted thicknesses shown in the backfill and surface restorations requirements table, and in accordance with Publication 408 Specifications. In State Highways, construct paving in accordance with PennDOT Highway Occupancy permit requirements.

C. Maintain permanent paving throughout the contract maintenance period.

3.03 BITUMINOUS OVERLAY

A. See Section 02500.

B. Restore in accordance with the "Backfill and Surface Restoration Requirements Table".

3.04 SHOULDER RESTORATION

A. Restore shoulders in accordance with the "Backfill and Surface Restoration Requirements Table."

3.05 DRIVEWAYS

A. Trim concrete and bituminous driveway surfaces to remove damaged areas. Saw or cut straight joint lines parallel to the centerline of the trench. Cut offsets at right angles to the trench centerline. Trench roller shall have a minimum 300 pounds of pressure per inch.

B. Restore existing concrete driveways with a 6" layer of concrete reinforced with WWF 6 x 6-W2.9 x W2.9 (6 ga.) wire mesh, placed 2" from top surface. See Section 03000.

C. Restore existing bituminous driveways in kind; minimum 2" layer wearing course over 6" layer of select granular material (2A).

D. Restore earth driveways with a 6" layer of select granular material (2RC).

E. Restore stone or gravel driveways in kind; minimum 6" layer of select granular materials (2A).

F. Restore brick driveway with like bricks placed on 4" thick wet sand bed. Place bricks in like patterns and spacing.

3.06 UNPAVED SURFACES

A. Restore surfaces to a condition equal to that prior to construction.

B. Restore non-paved areas in accordance with Section 02485.

BACKFILL AND SURFACE RESTORATION REQUIREMENTS TABLE

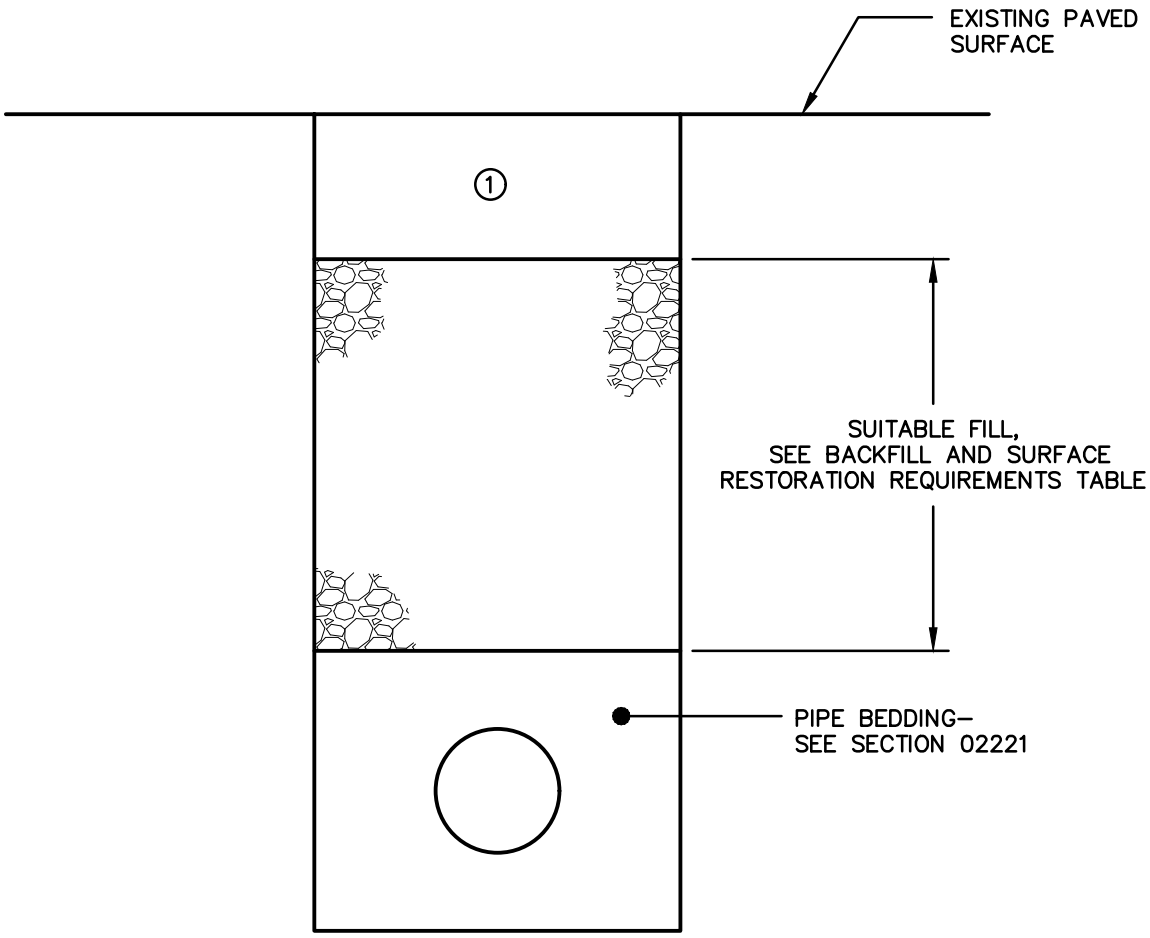
Surface Class	*Type Backfill*	*Percent (1) Compaction*	*Temp. (3) Base*	*Temp. (3) Surface*	*Final Base*	*Final Surface*
Vegetative	S.02221	90%	- - - -	(2)	- - - -	(2)
Stone	S.02221	95%	- - - -	- - - -	- - - -	6" Thick PennDOT 2A S.02230
Bituminous Surface Course (Trench) Minor Arterial/ Local/Collector/ /Marginal Access	S.02221	Subbase 100% Final surface 90-97%	Full Depth(3) 2A Stone	2" thick Superpave or cold patch	8" thick PennDOT 2A	5" thick, 25mm Superpave Base Course, 1½" thick Superpave Wearing Surface (9.5mm)(6)
Bituminous Surface Course (Trench) Alley/Service Drive	S.02221	Subbase 100% Final surface 90-97%	Full Depth(3) 2A Stone	2" thick Superpave or cold patch	8" thick PennDOT 2A	3" thick, 25mm Superpave Base Course, 1½" thick Superpave Wearing Surface (9.5mm)(6)
Concrete	S.02230	Subbase 100%	Full Depth(3) 2A Stone	2" thick Superpave or cold patch	8" thick PennDOT 2A	Min. 6" thick Class AA concrete(5)

NOTE: Materials and construction requirements shall be in accordance with PennDOT Publication 408 Specifications.

1 Minimum, as % of maximum dry weight density at optimum moisture content plus or minus 2%.
2 See Seeding Restoration Table, Section 02485.
3 To remain as final base.
4 All thicknesses shown are minimum compacted thicknesses.
5 PennDOT Pub. 408, Section 704.
6 Where existing pavement depth exceeds depth proposed, match existing pavement depth. If the thickness of 25mm Base Course exceeds 6", place in 2 lifts.

END OF SECTION

K:\483390200\Design\Constuction & Material Specs\SECTION 02575- TRENCH PAVING AND RESTORATION.doc



STREET CLASSIFICATION	①
MINOR ARTERIAL	2" SUPERPAVE
LOCAL/COLLECTOR /MARGINAL ACCESS	2" SUPERPAVE
ALLEY	2" SUPERPAVE
STATE ROADS	SEE PERMIT

MAINTAIN TEMPORARY PAVING UNTIL PERMANENT PAVING IS PLACED. (MIN. 90 DAYS)

EQUIVALENT MARSHALL MIXES ARE ACCEPTABLE

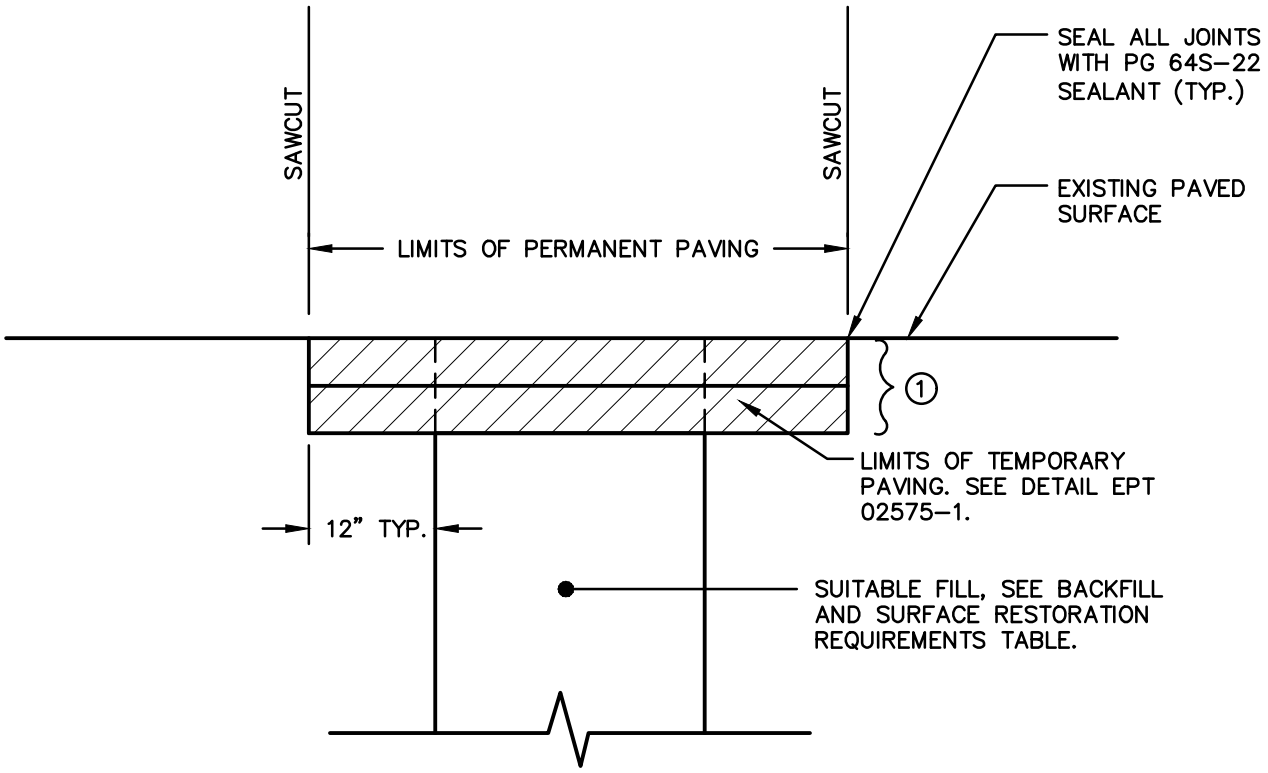
EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

C.S. DAVIDSON, INC.
ENGINEERING A BETTER COMMUNITY
38 NORTH DUKE STREET, YORK, PA • PHONE (717) 846-4805
50 WEST MIDDLE STREET, GETTYSBURG, PA • PHONE (717) 337-3021
315 W. JAMES STREET, SUITE 102, LANCASTER, PA • PHONE (717) 481-2991
WWW.CSDAVIDSON.COM

TEMPORARY
TRENCH PAVING DETAIL

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	1/1/2023
DWG. NO.	EPT02575-1
FILE NO.	4833.9.02.00



STREET CLASSIFICATION	①
MINOR ARTERIAL/ LOCAL/COLLECTOR/ /MARGINAL ACCESS	5" BASE* 1–1/2" WEARING
ALLEYS/SERVICE DRIVE	3" BASE, 1–1/2" WEARING
STATE ROADS	SEE PERMIT

BASE = SUPERPAVE BASE COURSE, 25MM

WEARING = SUPERPAVE WEARING COURSE, 9.5MM

SUPERPAVE MIXES TO BE AS SPECIFIED ON DRAWINGS.

*WHERE EXISTING PAVEMENT DEPTH EXCEEDS DEPTH PROPOSED, MATCH EXISTING PAVEMENT DEPTH. IF THICKNESS OF 25MM BASE COURSE EXCEEDS 6", PLACE IN 2 LIFTS.

NOTE: EQUIVALENT MARSHALL MIXES MAY BE SUBSTITUTED, WHEN APPROVED BY THE TOWNSHIP.

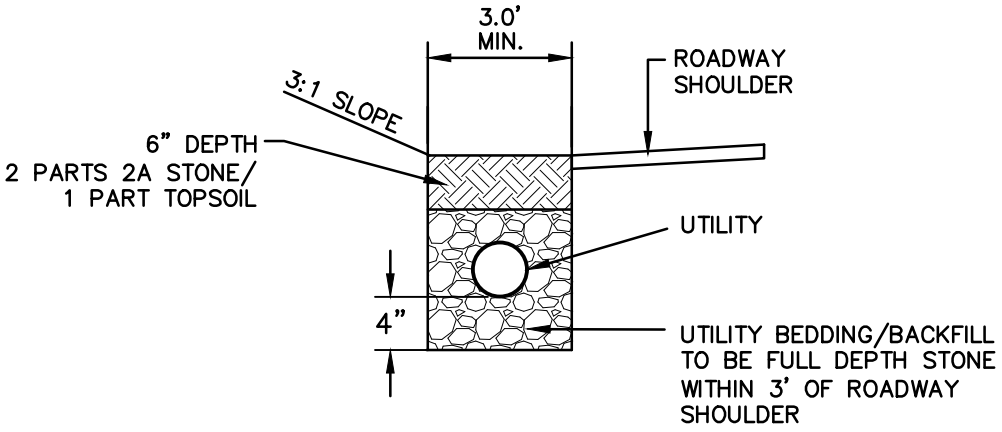
EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

C.S. DAVIDSON, INC.
ENGINEERING A BETTER COMMUNITY
38 NORTH DUKE STREET, YORK, PA • PHONE (717) 846-4805
50 WEST MIDDLE STREET, GETTYSBURG, PA • PHONE (717) 337-3021
315 W. JAMES STREET, SUITE 102, LANCASTER, PA • PHONE (717) 481-2991
WWW.CSDAVIDSON.COM

PERMANENT
TRENCH PAVING DETAIL

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	1/1/2023
DWG. NO.	EPT02575-2
FILE NO.	4833.9.02.00



EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

C.S. DAVIDSON, INC.
ENGINEERING A BETTER COMMUNITY
38 NORTH DUKE STREET, YORK, PA • PHONE (717) 846-4805
50 WEST MIDDLE STREET, GETTYSBURG, PA • PHONE (717) 337-3021
315 W. JAMES STREET, SUITE 102, LANCASTER, PA • PHONE (717) 481-2991
WWW.CSDAVIDSON.COM

UTILITY
TRENCH RESTORATION
OUTSIDE ROADWAY DETAIL

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	1/1/2023
DWG. NO.	EPT02575-3
FILE NO.	4833.9.02.00

SECTION 02602

STORM INLETS, CATCH BASINS, ENDWALLS

PART 1 GENERAL

1.01 DESCRIPTION

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

1. Storm drainage inlets
2. Storm drainage catch basins
3. Storm drainage pipe endwalls
4. Pipe culvert end sections

B. Related work specified elsewhere:

1. Trenching, backfilling and compacting: ..... Section 02221
2. Soil erosion and sedimentation control:..... Section 02270
3. Finish grading, seeding and sodding:..... Section 02485
4. Bituminous paving and surfacing:..... Section 02500
5. Storm drain pipe: ..... Section 02618
6. Plain and reinforced cement concrete: ..... Section 03000
7. Cement concrete for utility construction: ..... Section 03050

C. Definitions: NONE

D. Applicable Standard Details:

1 EPT - 02602-1 ..... Inlet/ Storm Pipe Installation Detail

1.02 QUALITY ASSURANCE

A. Reference Standards:

1. Pennsylvania Department of Transportation (PennDOT), latest revision:

Publication 408, Specifications

Publication 72M, Standards for Roadway Construction

2. American Society for Testing and Materials (ASTM):

A36 Specification for Carbon Structural Steel

A47 Specification for Ferritic Malleable Iron Castings

A48 Specification for Gray Iron Castings

A185 Specification for Steel Welded Wire Fabric for Concrete Reinforcement

A536 Specification for Ductile Iron Castings

A615 Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement

C32 Specification for Sewer and Manhole Brick (made from clay or shale)

C270 Specification for Mortar for Unit Masonry

3. Pennsylvania Code

   Title 67, Transportation, Chapter 459, Occupancy of Highway by Utilities.

1.03 SUBMITTALS

A. Certificates:

1. Submit certification from material suppliers attesting that materials provided meet or exceed specification requirements.

B. Shop Drawings:

1. Submit detailed Shop Drawings, including reinforcing steel details.

C. Submit concrete mix designs, certified results of compressive strength tests, certified field tests, and copies of batch slips for all cast-in-place inlets, catch basins, or endwalls.

1.04 JOB CONDITIONS: Section not utilized.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Precast Concrete Units:

1. After fabrication and curing, transport the units to the job site. Protect until required for installation.

2. Handle to avoid damage to surfaces, edges and corners and to avoid creation of stresses within the units.

B. Inspections

1. Inspection by the Township will, at a minimum, be made of materials upon delivery to the job site; of the subgrade, prior to construction or placement; and of the completed structure, prior to backfill.

2. Precast cement concrete products shall be subject to rejection for failure to conform with these specifications or if any one of the following conditions is noted:

   a. Fractures or cracks passing through the wall, except for a single end crack that does not exceed the depth of the joint.

   b. Defects that indicate incorrect proportioning, mixing, and molding.

   c. Surface defects larger than ½" diameter indicating honey-combed or open texture.

   d. Damaged or cracked ends, where such damage would prevent making a satisfactory joint.

3. Concrete Testing (For Cast-In-Place Work): Section 03000, Paragraph 3.09.

PART 2 PRODUCTS

2.01 MATERIALS

A. Crushed Stone Subbase:

1. AASHTO No. 57 or No. 8, Type C, Crushed Stone or Gravel aggregate, Section 703.2, Publication 408 Specifications. Do not use slag or cinders.

B. Brick:

1. ASTM C32 Grade SS, solid.

C. Masonry Mortar:

1. ASTM C270, Type S.

D. Malleable Iron Castings:

1. ASTM A47, Grade 35018, Domestic.

E. Ductile Iron Castings:

1. ASTM A536, Grade 60-40-18, Domestic.

F. Structural Grade Carbon Steel:

1. ASTM A36.

G. Cast-in-Place Cement Concrete:

1. Section 03050

H. Cast Gray Iron Castings:

1. ASTM A48.

2.02 FABRICATIONS

A. Precast Cement Concrete Units:

1. Comply with the requirements of Section 714, Publication 408 Specifications. Concrete shall be Class AA, unless otherwise specified.

2. All reinforcing shall comply with the requirements of Publication 72M.

3. 6' inlets shall be similar in all respects to standard inlets except that the longitudinal dimension shall be increased by 24".

4. Modified boxes (PennDOT Type 1, 2 or 3, Modified Type I or Modified Type II) shall have reinforced cover adjustment slabs in accordance with Details in Publication 72M.

B. Pipe Culvert End Sections:

1. Concrete or Metal - Comply with the requirements of, Publication 72M, RC-33.

2. Polyethylene end sections shall have smooth interior and be anchored at the flared end.

C. Inlet Grates:

1. Comply with the requirements of Publication 72M, RC-34 PennDOT approved diagonal or bicycle safe grates only.

2. 6' inlet grates shall be similar in all respects to standard inlet grates except that the longitudinal dimension shall be increased by 24".

3. Inlet grates in traffic areas shall be capable of handling HS-25 loading.

4. Welded structural steel grates and frames shall be coated with bituminous paint. All iron castings shall be furnished unpainted.

D. Adjustments:

1. Precast Cement Concrete Grade Adjustment Risers: Shall be cast from 4000 psi concrete (28-day compressive strength), shall be a minimum of 2" thick, and shall be reinforced in accordance with ASTM A478.

2. Brick adjustments are not permitted.

3. Infra-Riser adjustment rubber rings manufactured by East Jordan Iron Works, East Jordan Michigan or approved equal, may be substituted for concrete rings if approved by the Township.

E. Outlet Structures

1. Precast concrete or cast-in-place concrete in accordance with Article 2.02.A.

2. Construct outlet structures to dimensions shown on the drawings. Comply with the requirements of, Publication 72M, RC-31.

PART 3 EXECUTION

3.01 EXCAVATION

A. Excavate as specified in Section 02221.

B. Excavate at location marked in the field.

C. Excavate to the required depth and grade for the bottom of the unit plus that excavation necessary for placement of base material.

3.02 CONSTRUCTION

A. Construct inlets and catch basins of either precast cement concrete sections or of cast-in-place cement concrete, and of the type indicated on the drawings.

1. Place precast units on a minimum 4" compacted crushed stone base.

2. Construct cast-in-place units on a minimum 4” compacted crushed stone base.

3. Pour channels in inlet boxes to channel the flow of water to the outlet pipe and to prevent water from standing in the box.

4. Unless units are cast-in-place, use precast cement concrete grade adjustment risers or Infra Risers to adjust grade. Mortar concrete risers in place.

5. Place bicycle-safe grates in all paved (present or future) areas.

B. Construct endwalls to the dimensions and design indicated on Standard Drawing RC-31M, Publication 72M, and of the type shown on the drawings. Construct endwalls of monolithically cast reinforced concrete.

C. Do not permit pipes to project more than 3" into inlets. Do not expose end of pipe through faces of endwalls.

D. Where indicated on the drawings, provide pipe culvert end sections of the design and dimensions of Standard Drawing RC-33M, Publication 72M.

E. Install polyethylene end sections in accordance with manufacturer’s instructions, bedded and anchored as required.

F. Construct basin outlet structures with inverts, grates and openings at the required elevations shown on the drawings. Connect to new or existing outlet pipes, relaying or adding pipe as needed to meet the structure.

3.03 BACKFILLING

A. Backfill structures only after inspection by the Township.

B. Perform backfilling and compaction as specified in Section 02221, Paragraph 3.11.

3.04 DISPOSAL OF EXCAVATED MATERIAL: Section 02221, Paragraph 3.12

3.05 RESTORATION OF SURFACE AREAS

A. Restore paved areas in accordance with Section 02575.

B. Restore unpaved surfaces as specified in Section 02221, Paragraph 3.14.

END OF SECTION

K:\483390200\Design\Constuction & Material Specs\SECTION 02602- STORMINLETS CATCH BASINS & ENDWALLS.doc

SECTION 02605

MANHOLES

PART 1 GENERAL

1.01. DESCRIPTION

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

1. Installation of Manholes, etc.

B. Related Work Specified Elsewhere

1. Trenching, backfilling and compacting: .....Section 02221
2. Soil erosion and sedimentation control:.....Section 02270
3. Finish grading, seeding and sodding:.....Section 02485
4. Bituminous paving and surfacing:.....Section 02500
5. Piped Utilities – Sanitary Sewers: .....Section 02700
6. Storm drain pipe: .....Section 02618

C. Definitions: None

D. Applicable Standard Details:

1. EPT 02605-1….. ....Standard Heavy Duty Self Sealing Manhole Frame & Cover
2. EPT 02605-2 .....Standard Heavy Duty Water Tight Manhole Frame & Cover
3. EPT 02605-3 .....Precast Concrete Manhole with Precast Concrete Base
4. EPT 02605-4 .....Precast Concrete Manhole with Precast Concrete Base
5. EPT 02605-5 .....Inside Drop Manhole
6. EPT 02605-6 .... Standard Heavy Duty Water Tight Manhole Frame and Cover
7. EPT 02605-7 ..... Manhole Steps
8. EPT 02605-8 .....Poured Concrete Rise for Street Grades of 2% or greater
9. EPT 02605-9 .....Manhole Pipe Gaskets
10. EPT 02605-10 .....Manhole Gasket Joint Seal
11. EPT 02605-11 ..... Typical Plan of Manhole Channels
12. EPT 02605-12 ..... Manhole Pipe Adapters (Manhole Coring)

1.02. 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 (10) inches of mercury and close the valves. Allow vacuum to stabilize for 30 seconds.

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.

(4) Repair or replace defective manholes and retest.

1.03. 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 materials will usually be as follows:

1. Precast Concrete Manholes.
2. Manhole Grade Rings.
3. Manhole Steps.
4. Manhole Castings.

5. Gaskets, Adapters, and Other Appurtenances.

6. Inside Drop Bowl.

B. Six-inch anti-flotation collars shall be installed on all manholes located in sewer easements. Manholes located within streets shall have anti-flotation collars for the following conditions; 4' diameter manholes greater than 11 feet deep and 5' diameter manholes greater than 10 feet deep. Anti-flotation design shall be the ultimate responsibility of the manufacture.

C. Submit manufacturer's Certification of Compliance in accordance with Section 01010.

D. Make submittals prior to start of construction. Make submittals to Township Engineer and Third Party Engineer.

E. Manholes installed within PennDOT rights-of-way and within Township streets shall be PennDOT certified or manufactured by a PennDOT certified manuacturer.

1.04. 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

2.01. 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:

(1) Manholes shall be 48-inches in diameter unless noted otherwise.

(2) Manholes that require inside drop connection must be a minimum of 60-inches in diameter.

b. Precast concrete bases shall be manufactured in accordance with the requirements of ASTM C478:

(1) Cast-in-place concrete bases are not permitted.

c. All manholes shall be eccentric cone top sections unless noted otherwise.

d. 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.

e. All precast concrete manholes shall be designed in accordance with ASTM C890 to accommodate AASHTO highway load class HS20-44.

f. 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.

g. The bases shall be monolithically cast and shall consist of a manhole bottom and a wall which shall extend a minimum of 10 inches above the top of the highest influent sewer. The top of the base section shall be carefully formed to receive the tongue of the barrel section. There shall be a minimum distance of 3 inches between the invert of the lowest effluent sewer and floor of the precast base to provide for the construction of a formed invert and bench wall within the manhole.

h. 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.

2. Portland Cement: Composition and compressive strength conforming to ASTM C478 as follows:

a. ASTM C150, Type I or Type III cement with a crystalline capillary waterproofing admixture for sulphate resistance, as follow:

(1) Xypex Concentrate Admix C-2000.

(2) Rheomac 300D by BASF.

(3) Pennetron.

(4) Ipanex.

b. ASTM C 150 Type II cement.

c. Type I cement with granulated ground blast-furnace slag or fly ash not exceeding 25% by weight.

3. Cast-in-place concrete used for channels inside precast manhole bases shall be of a 4,000 psi Mix Design with a 3/8" diameter maximum allowable aggregate size and a 0.45 maximum water/cementitious ratio:

    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 and matching the criteria above for manhole fabrication.

    c. On-site mixing of concrete for channel construction is not permitted.

4. Precast Reinforced Concrete Manhole Riser and Top Sections:

    a. As previously specified.

5. 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 4 of ASTM C478 and to the detailing and fabrication requirements of Section 6 of ASTM C478.

6. 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 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, alkalies 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 cleaned, sealing compound applied, and joint made in strict conformance with the written specifications of the sealing compound manufacturer.

7. Pipe Openings and Seals:

   a. Openings shall be performed 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. Manhole adapters shall be provided for all PVC pipe in cut-in pipe openings and shall be recommended by the pipe manufacturer.

8. Frame Hold Down Bolts:

   a. Bolts, nuts and washers shall be stainless steel in accordance with ASTM A307 and ASTM A276.

   b. Anti-seize compound shall be used on all threaded surfaces of bolts and frames.

9. Manhole Steps:

   a. Reinforced Plastic Step: Composed of a 1/2-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 PS4.

      (2) Or approved equal.

   b. Field installation of manhole steps shall not be permitted. Steps shall be aligned vertically and spaced so as to be on equal centers in the assembled manhole, a maximum distance of 12 inches apart. 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.

10. 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 A48 Class 30 for gray iron. Designed for AASHTO highway loading class HS-20.

    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 ±1/16 inch.

    f. Covers shall be 26-inches in diameter.

    g. Manhole Casting Schedule.

        (1) Finish: Cover bearing surfaces machined to prevent rocking and rattling under traffic.

        (2) Identification: Cast the word “SEWER” integrally on cover in 2-inch size raised letters.

        (3) Cover Gasket: One piece O-ring gasket or T-Seal gasket factory installed in a machined rectangular or dovetail groove in the cover bearing surface. No flat gaskets shall be permitted:

            (a) Gasket material of neoprene composition having good abrasion resistance, low compression set, 40 durometer hardness and suited for use in sanitary sewer manholes.

            (b) Gluing of gasket in cover is required.

        (4) Tensile Test Bar: Size B, cast separately, but poured from same iron as castings they represent.

    h. Watertight Manhole Frame and Cover: Gray iron castings conforming to previously specified requirements for manhole frame and cover with the addition of cover hold-down bolts:

        (1) Cover Hold-Down Bolts: Type 316 stainless steel, ASTM A 276, bolts and washers.

        (2) Threaded Sleeves: Manhole frame factory fitted with stainless steel threaded sleeve to accept cover bolts. Anti-seize compound shall be used on all threaded surfaces of bolts and frames.

    i. Manhole frames and covers shall be as shown on the Detail Drawings.

j. Manufacturers:

(1) East Jordan Iron Works, Inc.

(2) Neenah Foundry Company.

11. 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 1½ inches in thickness. Split grade rings are unacceptable. Broken or cracked concrete grade rings will not be acceptable.

c. Rubber Grade Rings.

(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 - Molded surface - Interior surface	 75A±10 points 73A±10 points	ASTM D 2240
Tensile Strength	1.6 MPa (232 psi) (not less than 1 MPa)	ASTM D 412 - 87
Compression Deformation - Initial deformation - Final deformation	under 1 MPa (145 psi) 6±4% 6±4%	ASTM D 575
Compression Set	0.4% (no more than 4%) under 1 MPa (145 psi)	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) - Hardness retained - Compressive strength retained - Tensile strength retained - Elongation retained	 100%±5% 100%±5% 100%±5% 100%±5%	ASTM D 573 – 88

(2) Rubber grade rings shall only be used in paved areas.

(3) Tapered rubber grade rings shall be used to accommodate sloped paved surfaces.

12. 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.

13. 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) Parsons

(2) Epoxytech

(3) Or approved equal

14. Epoxy Bonding Compound.

a. Provide a high-modulus, low viscosity, moisture insensitive epoxy adhesive having the following characteristics:

(1) Mix Ratio: 100 percent solids, two component; 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) 452 Epoxy System; Euclid Chemical Company.

(c) Or approved equal.

15. Manhole Lining System (force main and grinder discharges).

a. General Design/Installation Characteristics.

(1) A minimum of three (3) manholes downstream and one (1) upstream of any force main discharges will be lined and two (2) downstream and one (1) upstream for grinder pump discharge shall be lined.

(2) Manholes designated for lining will be lined against H2S corrosion.

(3) Lining system will be from invert to manhole frame including all risers and manhole base. Separate material for chimney seal will be required.

(4) The liner shall be completely watertight, free of any joints or openings other than influent and effluent pipes and cover frame opening.

b. Acceptable Manufacturers:

(1) EpoxyTec.

(2) Madewell Products Mainstay DS-5.

(3) Quadex Structure Guard.

(4) Sherwin Williams Dura Plate 6100.

(5) Sprayroq. Sprayroq will be required if Owner or Engineer determines that the existing manhole has structural damage.

16. Inside Drop Connections

a. Inside drops are the only drop style connections permitted; no outside drops are 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 PVC drop bowl and bowl cover 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. Drop pipe will be a minimum of 8-inch diamter and be SDR-35 pipe. 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.

d. Acceptable manufacturer: Reliner, Inc.

17. Intermetdiate Platforms

a. In manholes 20’ or deeper, intermediate platforms made of stainless steel or precast concrete shall be installed.

b. The platform shall be as indicated on the Detail Drawings and ultimately be approved by ENGINEER.

c. Manholes with intermediate platforms shall be 5’ in diameter.

PART 3 EXECUTION

3.01. 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.

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. Manhole frame and covers to be set to match the final grade, longitudinal slope and cross slope, considering any scratch course and overlay without the use of paving rings. In areas where final wearing is not placed due to winter months, frame and cover shall be winterized to assure snow plows do not damage the frame and cover and traffic makes a smooth transition when traveling.

6. Manholes installed within streets should be 7’ away from curbs and located outside of wheel paths.

7. 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 or two (2) feet above final grade, unless otherwise directed by Owner or Engineer.

8. Cast-in-place concrete bases are not permitted.

9. Connections to existing manholes shall include vacuum testing of manhole prior to and after connection to assure water-tightness of new connection.

10. Where new manholes are constructed on existing sewers, a pre-cast base shall be installed. Cast-in-place bases or doghouse manholes are unacceptable. Installation of new base shall include cutting and removal of mainline, installation of new pre-cast base, sewer pipe and connectors to existing pipe. Vacuum acceptance testing of new manhole is required. Testing of reconnection of existing pipe is required.

11. Any manhole components damaged shall be replaced. Grouting to repair damage is unacceptable.

12. Contrator is responsible for maintaining sewage flow during construction and acceptance testing.

13. Preformed plastic gasket material shall be artificially warmed in cold weather.

14. Minimum drop of 0.10 feet in manhole between invert in and invert out for 8 inch pipe to be verified by Contractor prior to installation. Drop shall be increased to accommodate steep pipe slopes.

15. New pipe connections to existing manholes must be core bored. Core boring is not permitted to be done under steps of manhole or at joints in existing manholes.

16. All manholes and frames and covers shall be installed so that the manhole covers are outside the tire path and flush with final paving.

17. Manholes shall be installed meeting the following conditions:

    a. The sides or "barrel" of the manhole shall be plumb and straight.

    b. The manhole channel shall have a minimum of 0.10 feet of fall across the channel.

    c. The pipe invert shall match the invert of the channel.

18. Center of manhole covers must be shot and GPS locations provided to the Township.

B. Manhole Bases (Precast concrete)

1. All manhole bases shall be installed on a 6-inch layer of coarse aggregate as indicated per Owner's Construction Details.

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. Manholes having less than 24 inches of fall shall have smooth flow trasitions (channel) from influent to effluent pipes to eliminate splash conditions.

4. 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.

5. Precast channels are allowed. However, they must be formed to above specifications and are subject to rejection if they do not meet specifications or are deemed to be unsatisfactory.

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. A double application of 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 trowelled 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. Through wall lift holes are not acceptable.

5. Adjoining riser and conical top sections shall be fitted together to assure true vertical alignment of manhole steps.

6. Repair of manhole sections using grout is not permitted. If any damage occurs, the entire manhole section shall be replaced.

7. Flat top manhole slabs shall only be used for shallow manholes when approved by Owner. All other manholes (4, 5 and 6-foot diameter) shall be installed with top cone sections.

8. Reducing barrels and reducing slabs will not be accepted for five and six foot diameter manholes. Manhole shall be the same diameter from the bottom of the cone to the base.

E. Manhole Steps.

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

2. Steps shall be precast into the manhole and any loose steps shall constitute replacement of entire manhole section.

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 ½-inch thick and trowelled 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, or other approved sealant.

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 through grade rings or poured concrete adjustment risers so bolts are securely fastened to top manhole section. Secure covers to frame as shown on the Detail Drawings.

3.02. MANHOLE REHABILITATION (IF NECESSARY AT TIE IN LOCATIONS)

A. Contractor to remove all brick and existing concrete and steel riser rings and replace with new poured concrete adjustment risers. If total depth of riser exceeds six-inches the cone section is to be removed and a larger cone section and/or intermediate barrel section(s) shall be installed. Grade adjustments shall be performed in accordance with the specifications.

B. If the condition of the existing frame and cover does not meet existing specifications, a new frame and cover shall be installed.

C. Contractor to verify shiplap for manhole prior to ordering any new manhole sections.

D. All manhole frame and covers are to be set to existing ground/street elevation. If the street section is to be paved, the manholes shall be set to finish elevation of new paving.

E. All existing manholes to remain, that the new sanitary sewer is tying into, shall be vacuum tested prior to any grade adjustments and/or coring. Testing shall be performed from above frame to bottom of manhole. If existing manhole does not pass a vacuum test, it shall be replaced or rehabilitated unless the failure is located between the top of the cone and above the frame and can be repaired. If manhole remains, it must also pass a post rehabilitation test.

F. The inside of the manholes shall be cleaned out of any debris (stones, concrete, grout, etc.) that may accumulate during grade adjustments.

G. Contractor to provide pictures of newly insalled manholes to Owner along with a competed manhole inspection form (See included form).

END OF SECTION

MANHOLE INSPECTION RECORD

PROJECT: _____

DATE: _____

INSPECTOR: _____

MANHOLE # _____

1. Is Manhole Frame/Cover in need of replacement?

_____

2. Has Manhole been previously raised?

_____

3. Height of previous adjustment?

_____

4. What material was used to raise Manhole (i.e. bricks, concrete rings, etc.)?

_____

5. What is the condition of the material used to raise Manhole?

_____

6. What is measurement from top step to top of Frame/Lid?

_____

7. What is inside diameter of cover opening?

_____

8. What is thickness of lid?

_____

9. Additional Comments: _____

_____

_____

_____

CLIENT: _____ JOB #: _____ DATE: _____

STREET/LOCATION: _____ PREPARER: _____ TIME: _____

WEATHER CONDITIONS: _____

DRAINAGE SUB-AREA: _____

MANHOLE NUMBER: _____ ___

LEAKAGE OBSERVED? YES ___ NO ___

EST. LEAKAGE RATE (GPD) _____

INSERT INSTALLED? YES ___ NO ___

INSERT REQUIRED? YES ___ NO ___

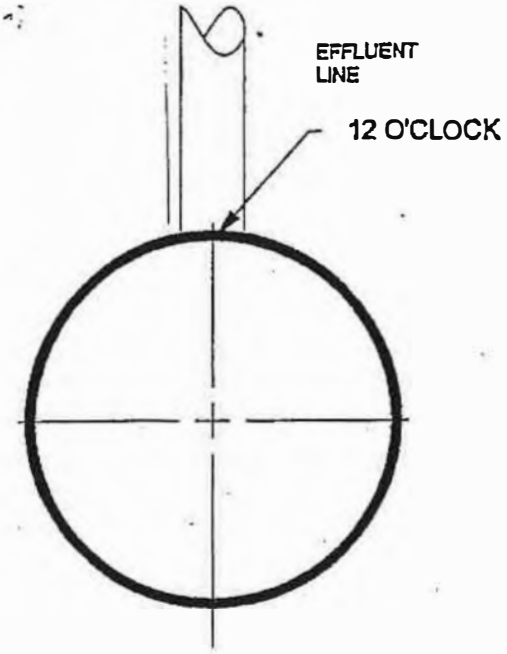
MARK POINTS OF LEAKAGE, AND LOCATION OF INFLUENT LINES, INCLUDING IDENTIFIED SERVICE CONNECTIONS.

ADDITIONAL COMMENTS:

_____

_____

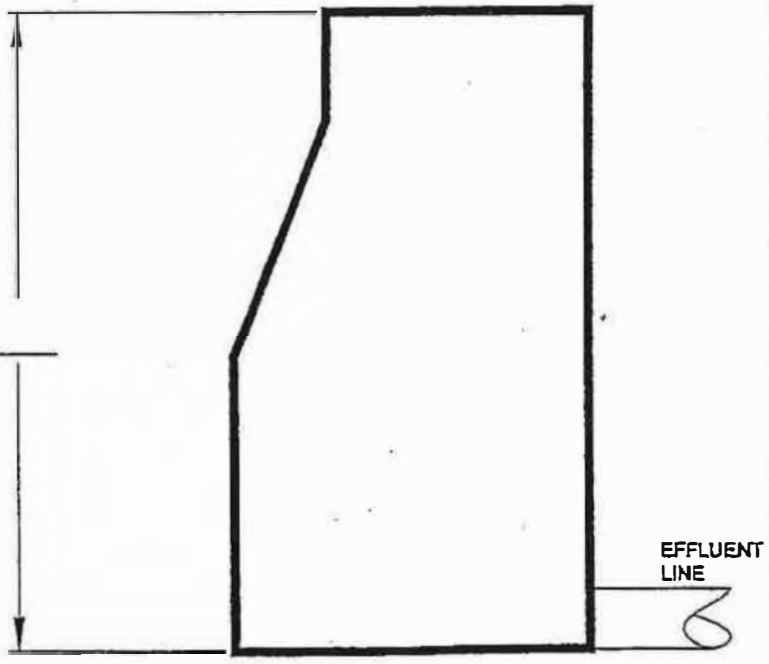
_____



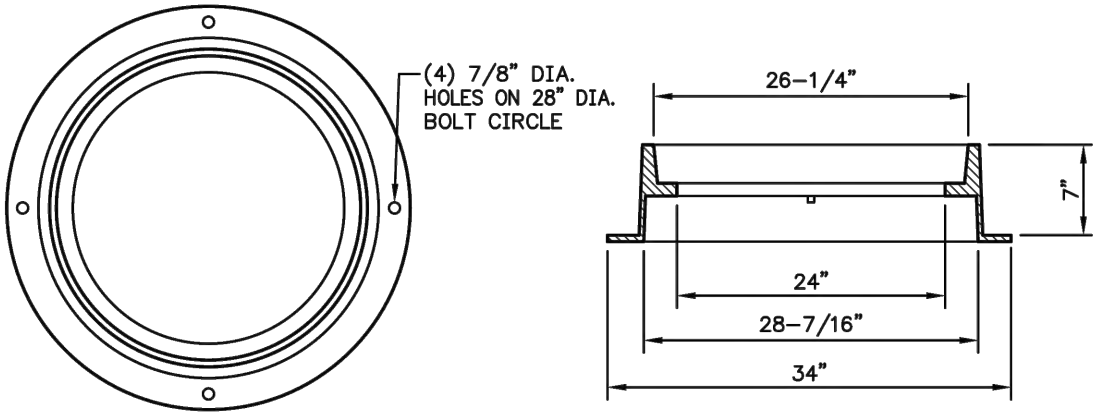
MARK AS:

GENERAL AREA OF LEAKAGE

POINT OF LEAKAGE

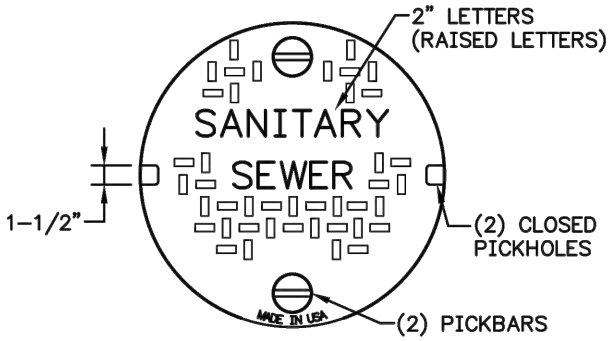


MANHOLE GENERAL INSPECTION FORM

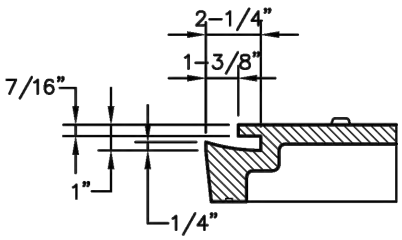


PLAN SECTION

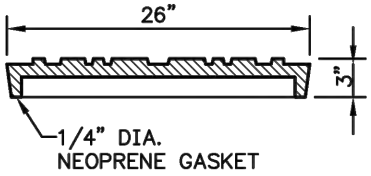
MANHOLE FRAME DETAIL



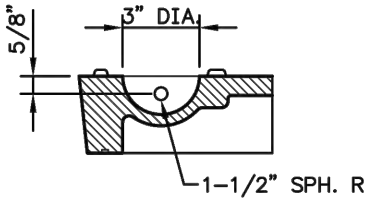
PLAN



PICKHOLE DETAIL



SECTION



PICKBAR DETAIL

MANUFACTURER: EAST JORDON IRON WORKS – OR APPROVED EQUAL

EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

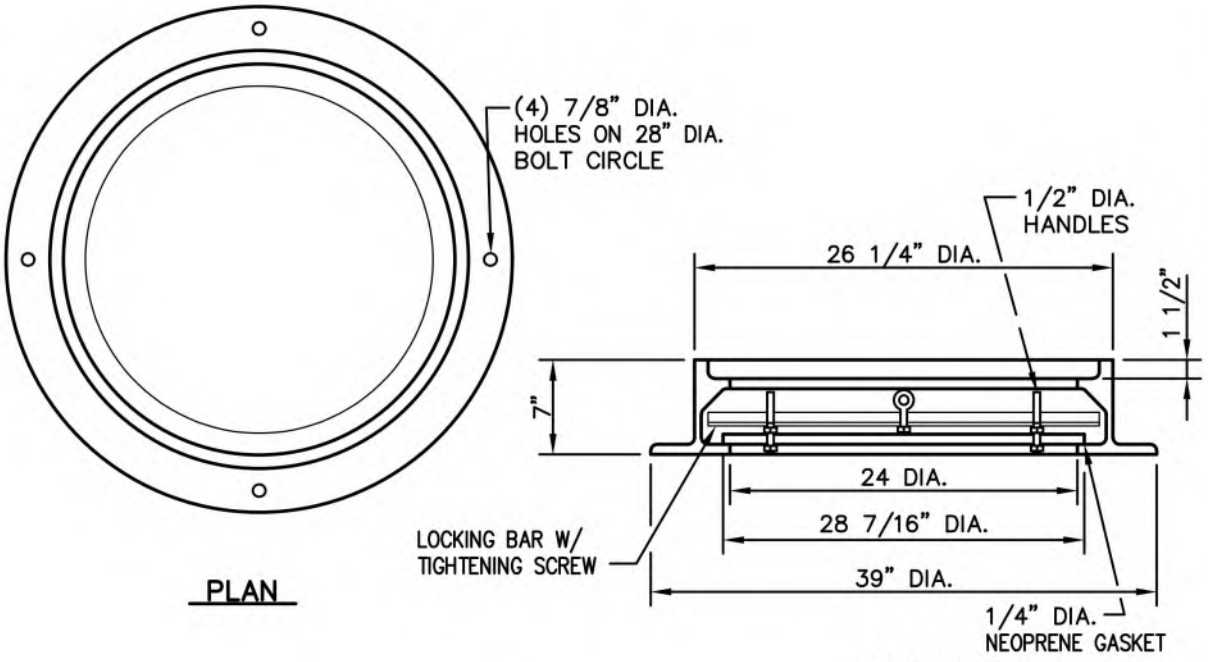
GHD

225 GRANDVIEW AVENUE SUITE 403, CAMP HILL, PA
PHONE (717) 541-0622
WWW.GHD.COM

STANDARD HEAVY DUTY SELF SEALING MANHOLE FRAME AND COVER

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

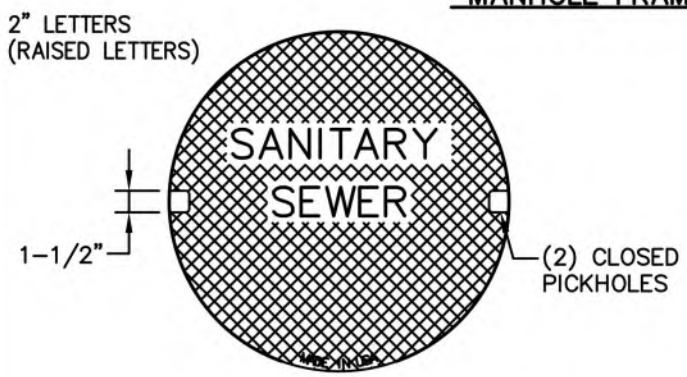
DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	8/1/2023
DWG. NO.	EPT02605-1
FILE NO.	4833.9.02.00



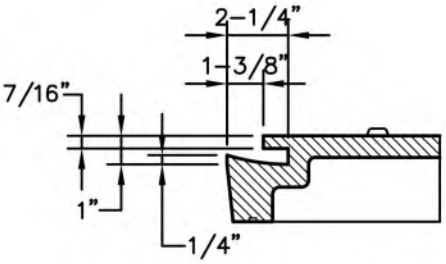
PLAN

SECTION

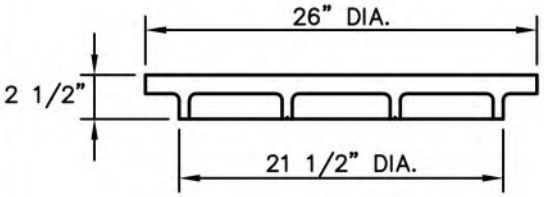
MANHOLE FRAME DETAIL



PLAN



PICKHOLE DETAIL



SECTION

MANUFACTURER: EAST JORDAN IRON WORKS MODEL #1040 OR APPROVED EQUAL

EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

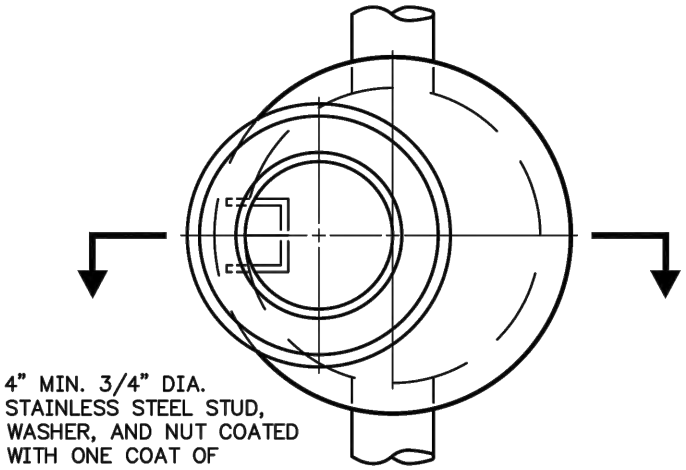
GHD

225 GRANDVIEW AVENUE SUITE 403, CAMP HILL, PA
PHONE (717) 541-0622
WWW.GHD.COM

STANDARD HEAVY DUTY WATER TIGHT MANHOLE FRAME AND COVER

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	8/1/2023
DWG. NO.	EPT02605-2
FILE NO.	4833.9.02.00

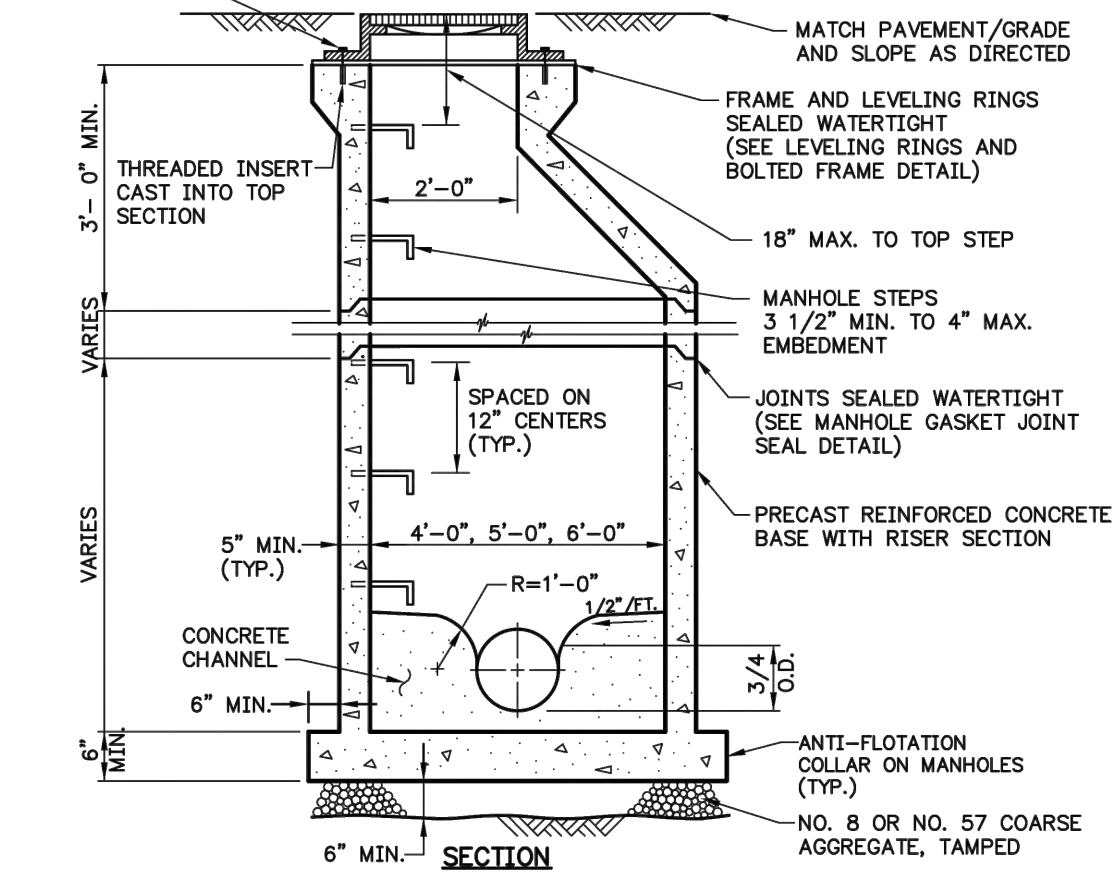


4" MIN. 3/4" DIA. STAINLESS STEEL STUD, WASHER, AND NUT COATED WITH ONE COAT OF STANDARD ASPHALT INSTALLATION

PLAN

NOTES:

1. ALL STONE GRADATIONS ARE AASHTO CLASSIFICATION.
2. PIPES SHALL PROTRUDE 2" INSIDE MANHOLE WALL.
3. MANHOLE FRAMES SHALL BE SET WITH PREFORMED PLASTIC GASKET (RUB-R-NEK) PRIOR TO RESTORATION TO PREVENT INFILTRATION.
4. MINIMUM DEPTH TO TOP OF PIPE WILL BE 8 FEET.



EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

GHD

225 GRANDVIEW AVENUE SUITE 403, CAMP HILL, PA
PHONE (717) 541-0622
WWW.GHD.COM

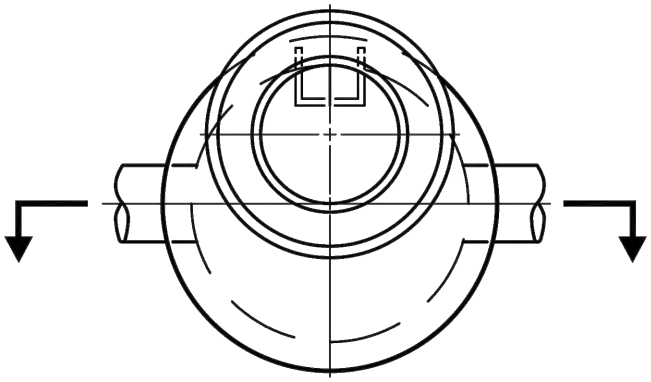
PRECAST CONCRETE MANHOLE WITH PRECAST CONCRETE BASE

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

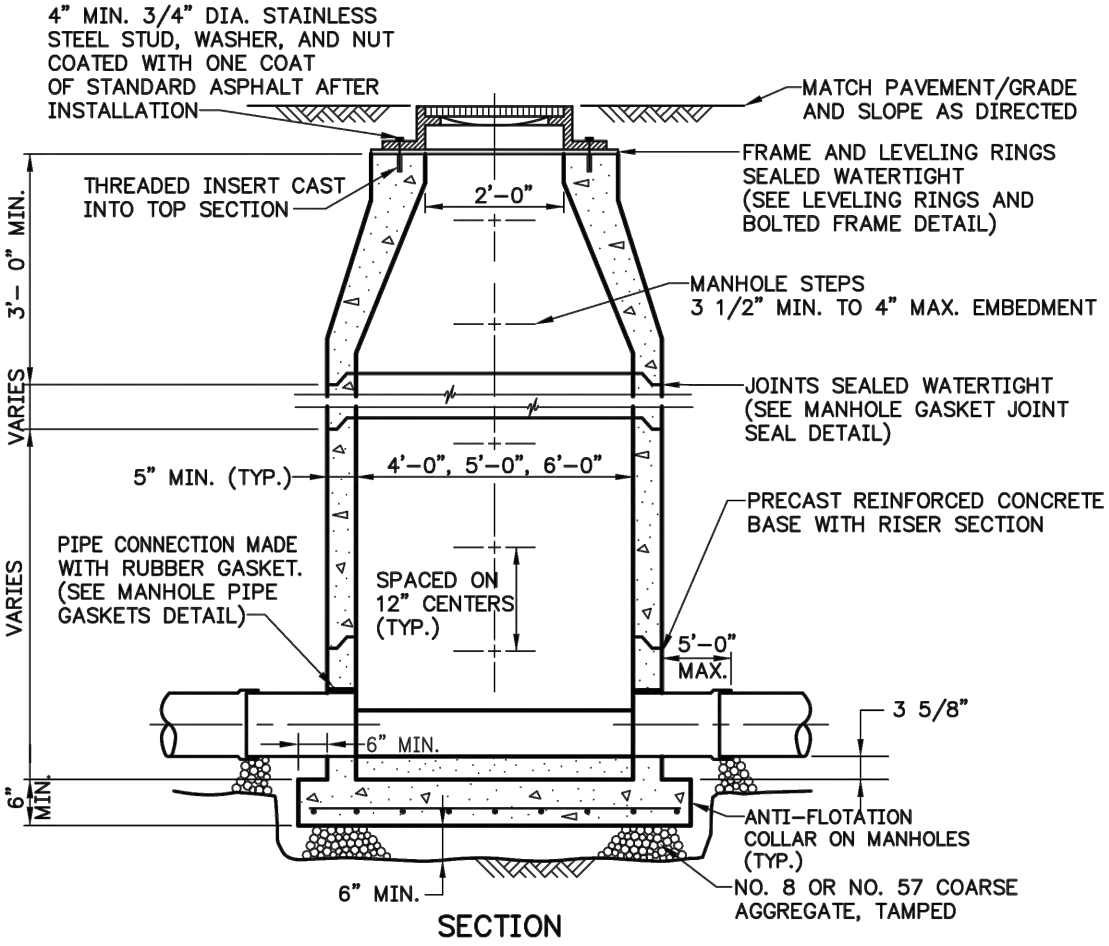
DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	8/1/2023
DWG. NO.	EPT02605-3
FILE NO.	4833.9.02.00

NOTES:

1. ALL STONE GRADATIONS ARE AASHTO CLASSIFICATION.
2. PIPES SHALL PROTRUDE 2" INSIDE MANHOLE WALL.
3. MANHOLE FRAMES SHALL BE SET WITH PREFORMED PLASTIC GASKET (RUB-R-NEK) PRIOR TO RESTORATION TO PREVENT INFILTRATION.
4. MINIMUM DEPTH TO TOP OF PIPE WILL BE 8 FEET.



PLAN



SECTION

EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

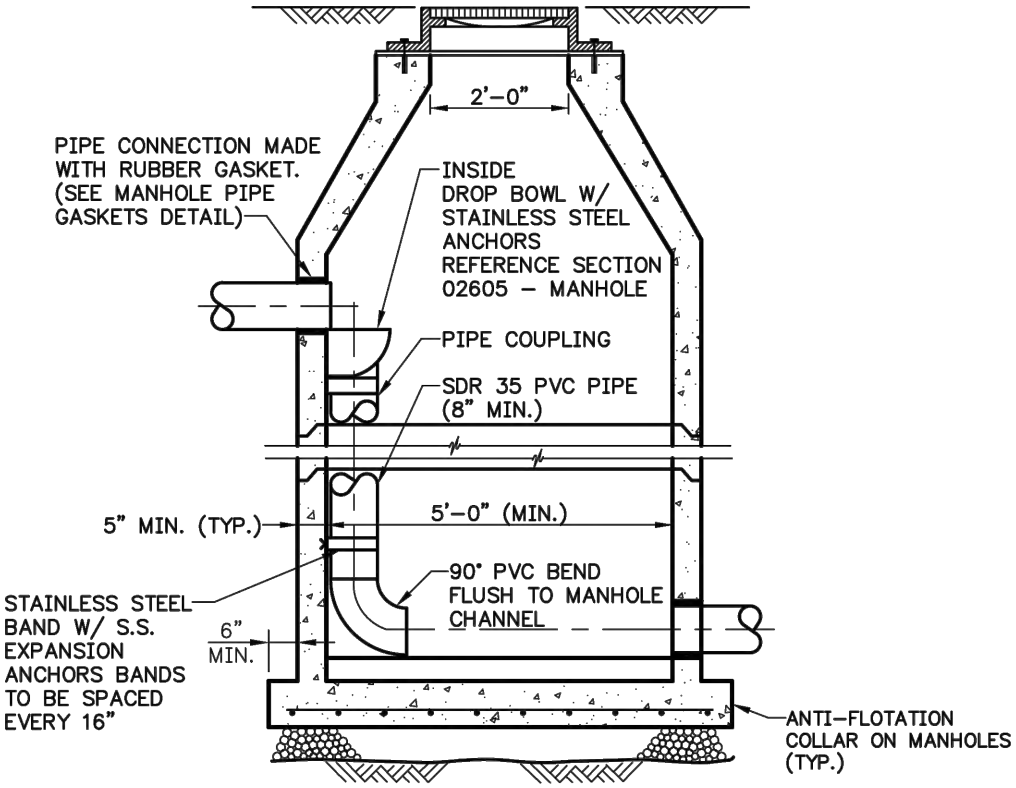
GHD

225 GRANDVIEW AVENUE SUITE 403, CAMP HILL, PA
PHONE (717) 541-0622
WWW.GHD.COM

PRECAST CONCRETE MANHOLE WITH PRECAST CONCRETE BASE

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	8/1/2023
DWG. NO.	EPT02605-4
FILE NO.	4833.9.02.00



SECTION

NOTES:

1. MANHOLE SHALL BE CONSTRUCTED IN ACCORDANCE WITH PRECAST CONCRETE MANHOLE AND PRECAST CONCRETE BASE DETAILS EXCEPT AS SHOWN.

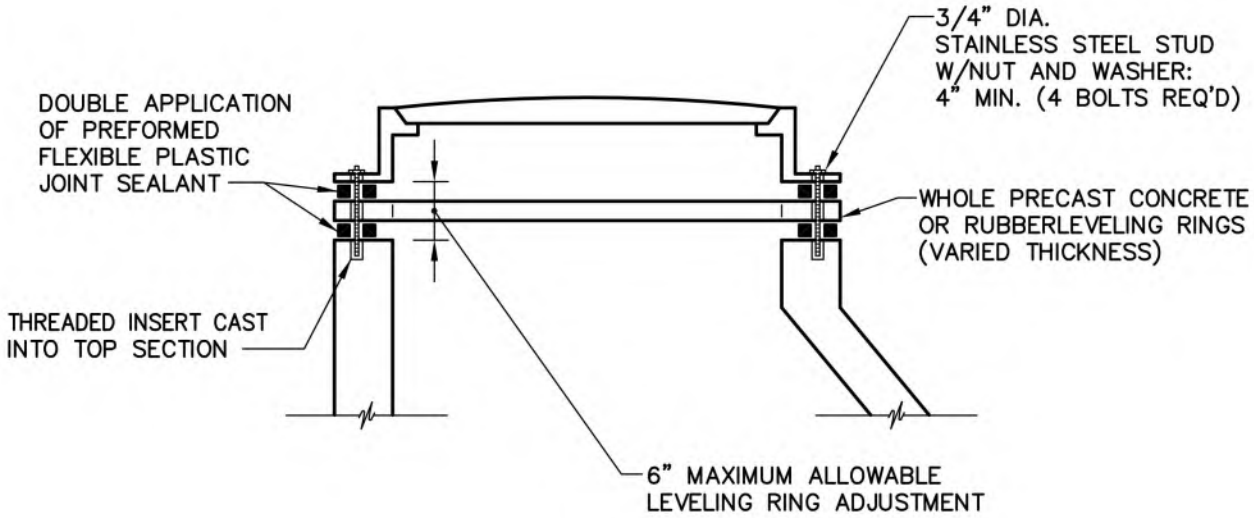
EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

GHD
225 GRANDVIEW AVENUE SUITE 403, CAMP HILL, PA
PHONE (717) 541-0622
WWW.GHD.COM

INSIDE DROP MANHOLE

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	8/1/2023
DWG. NO.	EPT02605-5
FILE NO.	4833.9.02.00



SECTION

EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

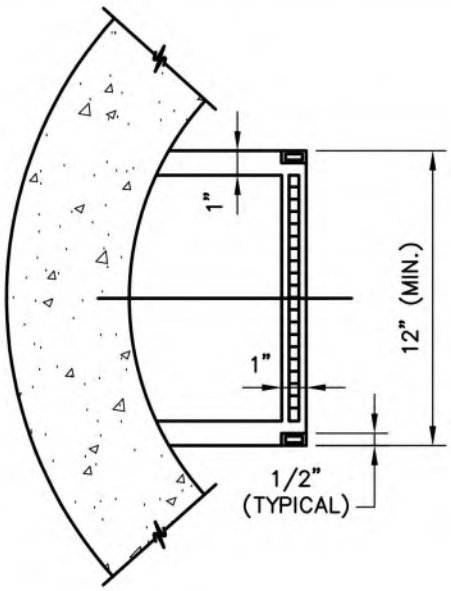
GHD

225 GRANDVIEW AVENUE SUITE 403, CAMP HILL, PA
PHONE (717) 541-0622
WWW.GHD.COM

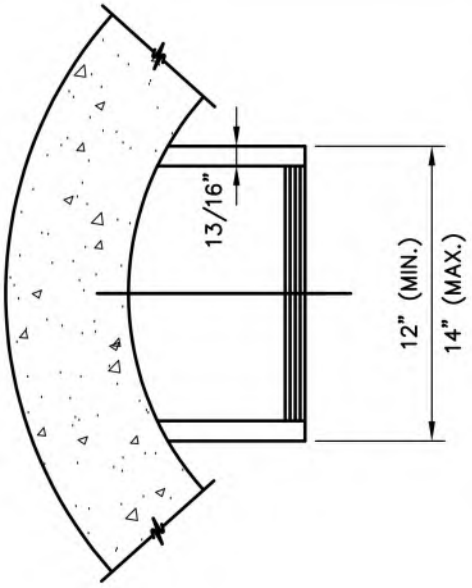
STANDARD HEAVY DUTY WATER TIGHT MANHOLE FRAME AND COVER

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

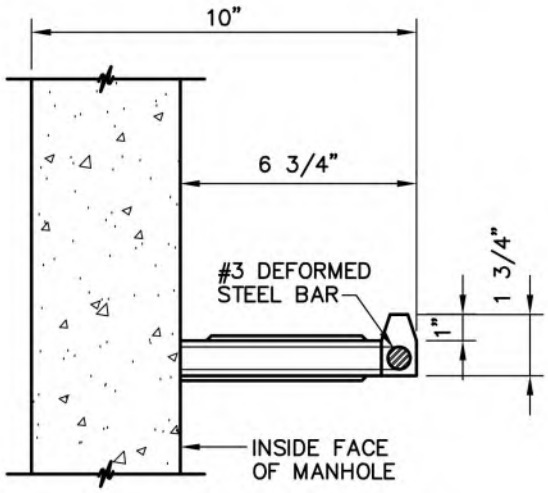
DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	8/1/2023
DWG. NO.	EPT02605-6
FILE NO.	4833.9.02.00



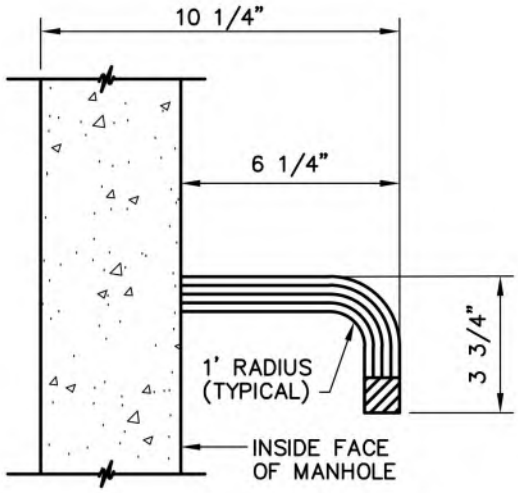
PLAN



PLAN



SECTIONAL ELEVATION
REINFORCED PLASTIC



SECTIONAL ELEVATION
ALUMINUM

EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

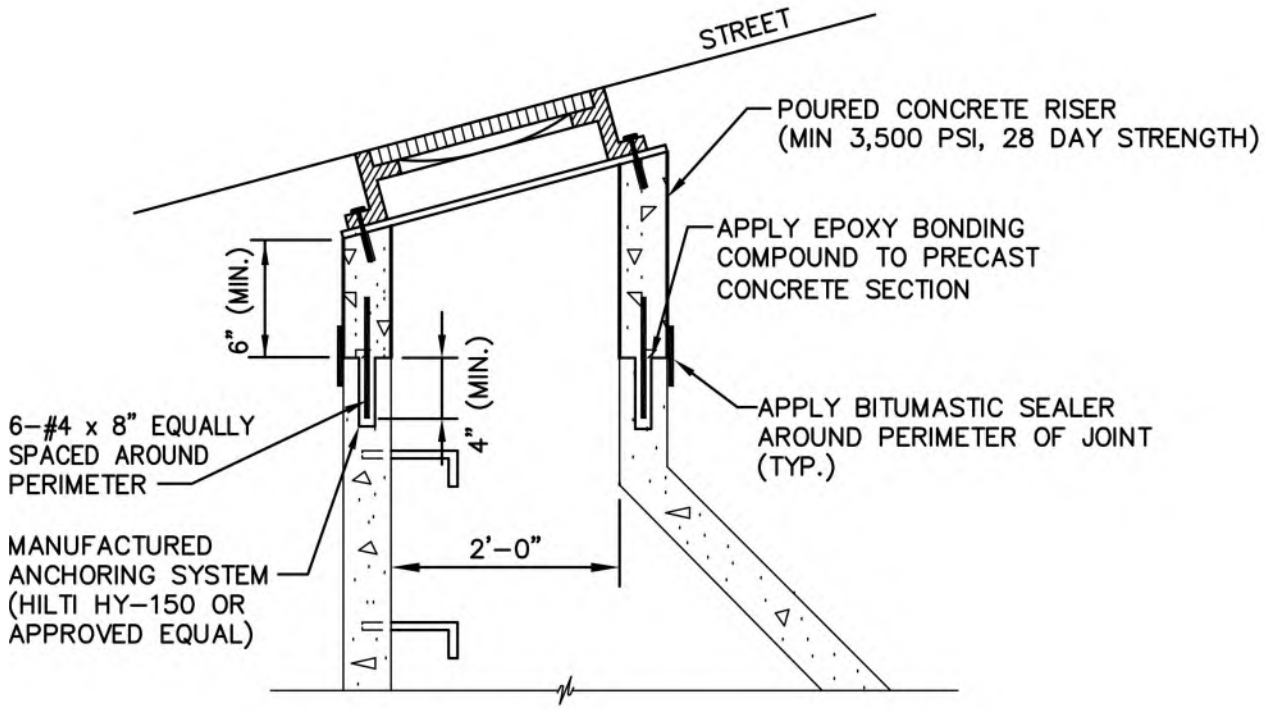
GHD

225 GRANDVIEW AVENUE SUITE 403, CAMP HILL, PA
PHONE (717) 541-0622
WWW.GHD.COM

MANHOLE STEPS

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	8/1/2023
DWG. NO.	EPT02605-7
FILE NO.	4833.9.02.00



SECTION

NOTE:

1. TO BE USED ONLY AFTER CONSULTATION WITH TOWNSHIP 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"

EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

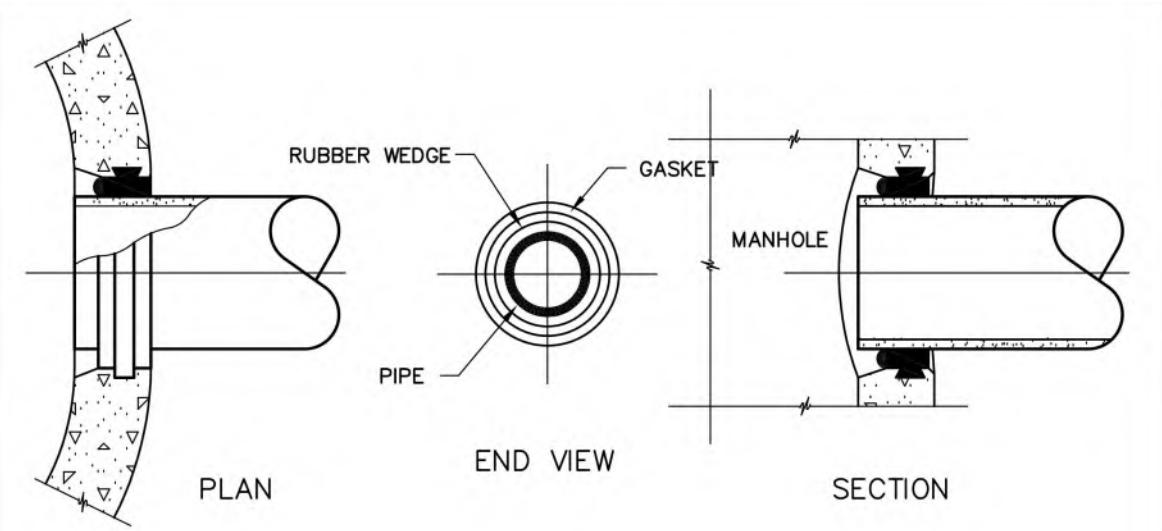
GHD

225 GRANDVIEW AVENUE SUITE 403, CAMP HILL, PA
PHONE (717) 541-0622
WWW.GHD.COM

POURED CONCRETE RISE FOR
STREET GRADES OF 2% OR GREATER

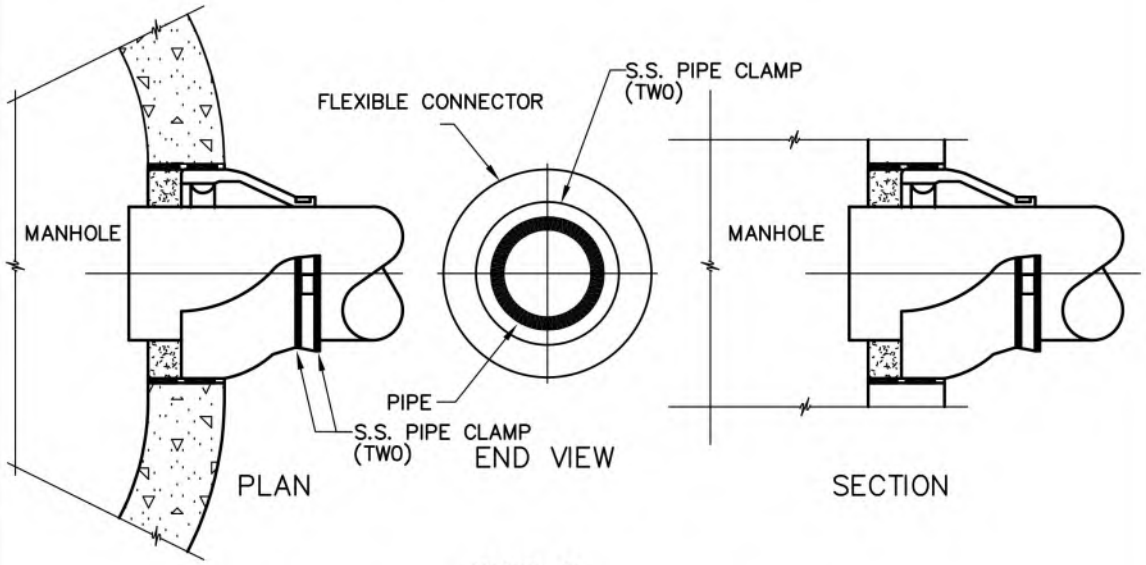
EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	8/1/2023
DWG. NO.	EPT02605-8
FILE NO.	4833.9.02.00



TYPE 1

RUBBER GASKET CAST INTO
PRECAST PIPE OPENINGS



TYPE 2

FLEXIBLE CONNECTOR WITH KORBAND
AND TWO STAINLESS STEEL CLAMPS

EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

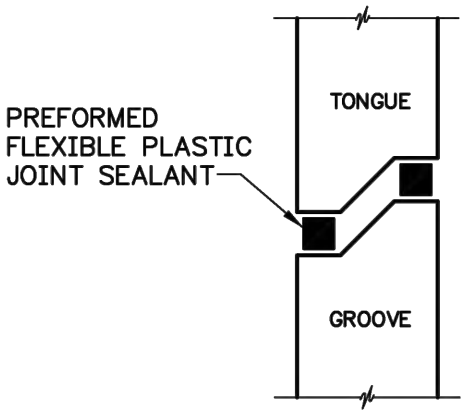
GHD

225 GRANDVIEW AVENUE SUITE 403, CAMP HILL, PA
PHONE (717) 541-0622
WWW.GHD.COM

MANHOLE PIPE GASKETS

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	8/1/2023
DWG. NO.	EPT02605-9
FILE NO.	4833.9.02.00



SECTION

EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

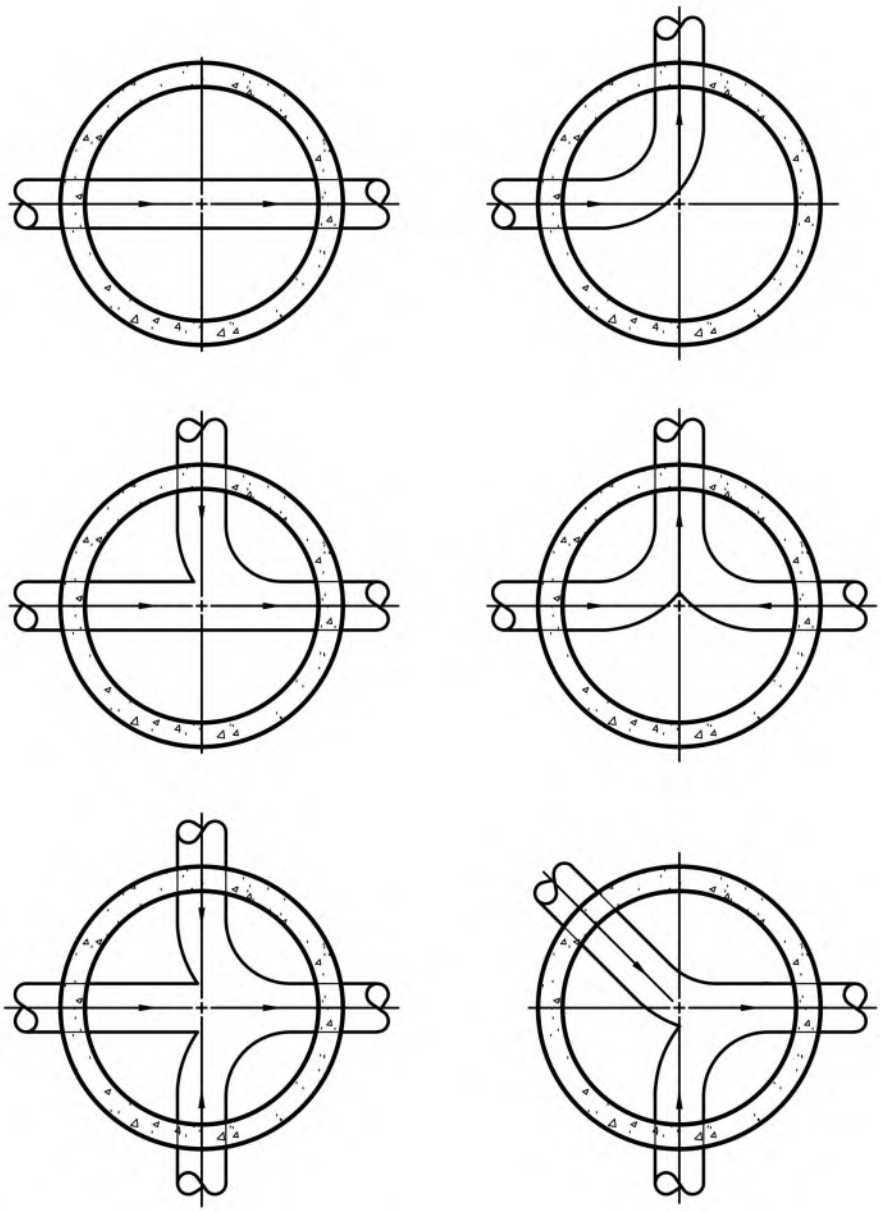
GHD

225 GRANDVIEW AVENUE SUITE 403, CAMP HILL, PA
PHONE (717) 541-0622
WWW.GHD.COM

MANHOLE GASKET JOINT SEAL

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	8/1/2023
DWG. NO.	EPT02605-10
FILE NO.	4833.9.02.00



NOTE:

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

EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

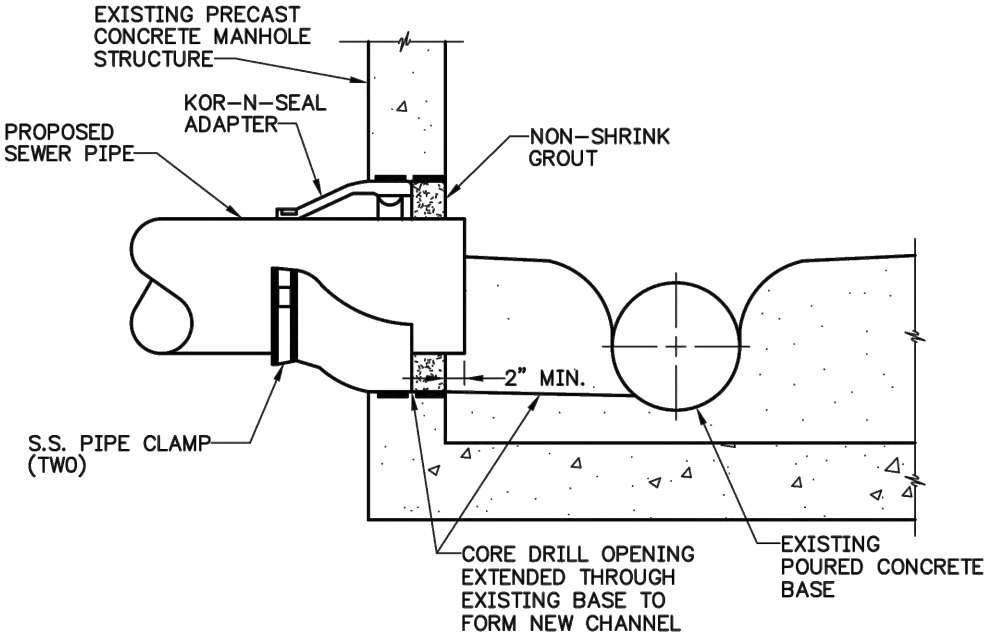
GHD

225 GRANDVIEW AVENUE SUITE 403, CAMP HILL, PA
PHONE (717) 541-0622
WWW.GHD.COM

TYPICAL PLAN OF
MANHOLE CHANNELS

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	8/1/2023
DWG. NO.	EPT02605-11
FILE NO.	4833.9.02.00



KOR-N-SEAL DETAIL

NOTE:

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

EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

GHD

225 GRANDVIEW AVENUE SUITE 403, CAMP HILL, PA
PHONE (717) 541-0622
WWW.GHD.COM

MANHOLE PIPE ADAPTERS
(MANHOLE CORING)

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	8/1/2023
DWG. NO.	EPT02605-12
FILE NO.	4833.9.02.00

SECTION 02618

STORM DRAIN PIPE

PART 1 GENERAL

1.01 DESCRIPTION

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

1. Storm sewer pipelines
2. Pavement base drains and subdrains

B. Related work specified elsewhere:

1. Utility conflict statement ..... Section 00160
2. Boring and jacking..... Section 02150
3. Trenching, backfilling and compaction: ..... Section 02221
4. Finish grading, seeding and sodding: ..... Section 02485
5. Trench paving and restoration: ..... Section 02575
6. Manholes: ..... Section 02601
7. Inlets, catch basins and endwalls:..... Section 02602
8. Cement concrete for utility construction: ..... Section 03050

C. Definitions:

1. Polyethylene pipe Type C - full circular cross-section with corrugated surface both inside and outside.
2. Polyethylene pipe Type S - full circular cross-section with outer corrugated pipe wall and smooth inner wall.

D. Applicable Standard Details: NONE

1.02 QUALITY ASSURANCE

A. Reference Standards:

1. Pennsylvania Department of Transportation:

Publication 408, Specifications

Publication 72M, Standards for Roadway Construction

2. American Society for Testing and Materials (ASTM):

C76 Specification for Reinforced Concrete Culvert Storm Drain, and Sewer Pipe

C507 Specification for Reinforced Concrete Elliptical Culvert, Storm Drain, and Sewer Pipe

D2241 Specification for Poly Vinyl Chloride (PVC) Plastic Pipe (SDR-PR)

D2321 Practice for Underground Installation of Thermoplastic Pipe for Sewers and other Gravity Flow Applications

D2412 Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading

D3034 Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings

D3212 Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals

D3350 Specification for Polyethylene Plastics Pipe and Fittings Materials

F477 Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe

F667 Specification for 3 through 24 inch Corrugated Polyethylene Tubing and Fittings

F758 Specification for Smooth-Wall Poly(Vinyl Chloride) (PVC) Plastic Underdrain Systems for Highway, Airport, and Similar Drainage

F949 Specification for Poly(Vinyl Chloride) (PVC) Corrugated Sewer Pipe With a Smooth Interior and Fittings

F2306 Specification for (12 in. to 60 in.) Annular Corrugated Profile-Wall Polyethylene (PE) Pipe and Fittings for Non-Pressure Gravity-Flow Storm Sewer and Subsurface Drainage Applications

F2648 Specification for (2 in. to 60 in.) Annular Corrugated Profile Wall Polyethylene (PE) Pipe and Fittings for Land Drainage Applications

3. American Association of State Highway Transportation Officials (AASHTO):

M36 Metallic (zinc or aluminum) coated corrugated steel culverts and underdrains

M246 Precoated galvanized steel sheet for culverts and underdrains

M252 Corrugated Polyethylene Drainage Pipe 3” to 10”

M278 Class PS46 Polyvinyl Chloride (PVC) Pipe

M294 Corrugated Polyethylene Pipe, 12" to 60" Diameter

M304 Specification for Poly(Vinyl Chloride) (PVC) Profile Wall Drain Pipe and Fittings Based on Controlled Inside Diameter

1.03 SUBMITTALS

A. Certificates:

1. Submit two copies of manufacturer's certification attesting that the pipe, fittings, and joints meet or exceed specification requirements.

B. Manufacturer's Literature:

1. Submit two copies of the manufacturer's recommendations on installation, handling and storage of materials.

C. One (1) copy of the approved Soil Erosion & Sedimentation Control Plan, including approval letter.

1.04 JOB CONDITIONS: Section not utilized.

1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. During loading, transporting and unloading, exercise care to prevent damage to materials.

B. Do not drop pipe or fittings. Avoid shock or damage at all times.

C. Do not place materials on private property without written permission from the property owner.

PART 2 PRODUCTS

2.01 CORRUGATED POLYETHYLENE PIPE

A. Tubing and Fittings – 3" to 10"

1. AASHTO M252

2. ASTM F667

B. Pipe and Fittings – 12" to 60"

1. Integrally formed smooth interior

2. AASHTO M294

3. ASTM F2306

C. Pavement base drains (6" dia.)

1. AASHTO M252

2.02 REINFORCED CONCRETE PIPE

A. Pipe and Fittings:

1. ASTM C76, Minimum Class II

B. Joints:

1. Tongue and groove or bell and spigot.

2.03 ELLIPTICAL REINFORCED CONCRETE PIPE

A. Pipe:

1. ASTM C507, minimum class HE-A or VE-II

2.04 CORRUGATED GALVANIZED STEEL PIPE AND PIPE ARCH

A. Pipe and Coupling Bends

1. Section 601.2, Publication 408 Specifications.

2. AASHTO M36, Type 1 or AASHTO M218, Type 1 or AASHTO M274, Type II.

3. Minimum 14 gauge: 2 2/3" x ½" corrugations unless otherwise approved by Township.

2.05 POLY VINYL CHLORIDE PIPE

A. Pipe and Fittings

1. AASHTO M278

2. ASTM D3034

PART 3 EXECUTION

3.01 PREPARATION

A. Perform trench excavation and associated work as specified in Section 02221.

B. Provide pipe bedding (Type III or IV) as specified in Section 02221. Place aggregate and compact so that the pipe can be laid to the required tolerances.

C. Work shall comply within the approved Soil Erosion & Sedimentation Control Plan.

3.02 LAYING PIPE IN TRENCHES

A. Give ample notice to the Township in advance of pipe laying operations, minimum 24 hours.

B. Lower pipe into trench using handling equipment designed for the purpose to assure safety of personnel and to avoid damage to pipe. Do not drop pipe.

C. Lay pipe proceeding upgrade with the bell or groove pointing upstream.

D. Lay pipe to a true uniform grade with the barrel of the pipe resting solidly in bedding material throughout its length. Excavate recesses in bedding material to accommodate joints, fittings and appurtenances. Do not subject pipe to a blow or shock to achieve solid bearing or grade.

E. Lay each section of pipe in such a manner as to form a close concentric joint with the adjoining section and to avoid offsets in the flow line.

F. Clean and inspect each pipe and fitting before joining. Align pipe with previously laid sections. Assemble to provide tight, flexible joints that permit movement caused by expansion, contraction, and ground movement. Assemble joints in accordance with the pipe manufacturer's instructions.

G. Check each pipe installed as to line and grade in place. Correct deviation from line and grade immediately. A deviation from the designed line or grade as shown on the drawings will be cause for rejection.

H. Place and compact sufficient backfill to hold each section of pipe firmly in place as the pipe is laid.

3.03 BACKFILLING TRENCHES

A. Backfill pipeline trenches only after examination of pipe by the Township.

B. Backfill and compact trenches as specified in Section 02221.

C. Backfill and compact trenches in cartway of proposed Township roadway with PA No. 2RC from top of pipe to subgrade elevation.

3.04 PAVEMENT BASE DRAINS AND PIPE UNDER DRAINS

A. Construct drains of the size and type indicated on the drawings in accordance with the requirements set forth in Section 610, Publication 408 Specifications and as shown on Standard drawings RC-30, Publication 72M.

3.05 SURFACE RESTORATION

A. Restore unpaved areas in accordance with Section 02221.

B. Restore other areas in accordance with Section 02575.

END OF SECTION

SECTION 02700

PIPED UTILITIES-SANITARY SEWERS

PART 1 GENERAL

1.01. WORK INCLUDED

A. Installation of Sanitary Sewers.

B. Related Work Specified Elsewhere:

1. Clearing and grubbing..... Section 02100
2. Soil erosion and sedimentation control..... Section 02270
3. Finish grading, seeding and sodding..... Section 02485
4. Bituminous paving and surfacing..... Section 02500

C. Applicable Standard Details:

1. EPT 02700-1 .....Pipe Reconnection Detail
2. EPT 02700-2 .....Casing Details for Pipe Borings/Tunnels
3. EPT 02700-3 ..... Steep Slope (Greater than 15%) Sanitary sewer detail

1.02. 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 (10) years, have supplied such materials for at least five (5) years of the ten-year period, and have at least five (5) installations in successful operation for at least five (5) 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 sewer runs shall be televised.

d. All sewers, including manholes, shall be inspected prior to air testing/vacuum testing, and all visible or detectable leaks shall be repaired, or at the Owner's direction replaced, before testing begins. The line acceptance tests shall be made after backfilling has been completed.

e. The Contractor shall repair all visible or detectable leaks or defects of any nature.

f. Any damage caused to properties due to sewage handling and/or sewage backup while air testing shall be the responsibility of the Developer/Contractor.

g. No acceptance testing will be performed until sewer main has been flushed.

h. No acceptance testing will be permitted if there is any remaining sewer pipe installation necessary for manhole sections upstream of desired pipe to be tested.

i. All sewers, including manholes, shall be tested prior to final trench restoration

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 gages 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 gage of known accuracy shall also be provided so that the gages of the test equipment can be frequently checked. All gages 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 has been backfilled for a minimum of thirty (30) days.

3. Cleaning/Televising.

a. No debris, silt or other material shall enter existing sewers. It shall be the responsibility of the Developer/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 downstream of the construction area. All debris shall be removed and properly disposed of in accordance with local, state and federal requirements.

c. The Township requires that all sewers be televised after they have been cleaned. All televising shall conform to the NASSCO standards.

d. Provide electronic copies of log sheets, for each run, with all sanitary sewer facilities. Submittal shall have lengths of runs, lateral locations, etc.

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 psig 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. Maximum test pressure is 10 psig when testing PVC pipe.

    d. The pipe shall hold the required test pressure for the duration prescribed in the air test table (Table 1) below.

    e. Repair and retest sections of sewer not meeting test requirements.

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 × Length, ft.)*			*Specification Time for Length (l) Shown (min:sec)*							
						100 ft.	**150 ft.**	**200 ft.**	**250 ft.**	**300 ft.**	**350 ft.**	**400 ft.**	**450 ft.**
4	1:53	597	0.19	×	Length	1:53	1:53	1:53	1:53	1:53	1:53	1:53	1:53
6	2:50	398	0.427	×	Length	2:50	2:50	2:50	2:50	2:50	2:50	2:51	3:12
8	3:47	298	0.76	×	Length	3:47	3:47	3:47	3:47	3:48	4:26	5:04	5:42
10	4:43	239	1.187	×	Length	4:43	4:43	4:43	4:57	5:56	6:55	7:54	8:54
12	5:40	199	1.709	×	Length	5:40	5:40	5:42	7:08	8:33	9:58	11:24	12:50
15	7:05	159	1.671	×	Length	7:05	7:05	8:54	11:08	13:21	15:35	17:48	20:02
18	8:30	133	3.846	×	Length	8:30	9:37	12:49	16:01	19:14	22:26	25:38	28:51
21	9:55	114	5.235	×	Length	9:55	13:05	17:27	21:49	26:11	30:32	34:54	39:16
24	11:20	99	6.837	×	Length	11:24	17:57	22:48	28:30	34:11	39:53	45:35	51:17
27	12:45	88	8.653	×	Length	14:25	21:38	28:51	36:04	43:16	50:30	57:42	46:54

5. Deflection Testing Procedure.

    a. Use Go-No-Go device in accordance with pipe manufacturer's requirements. Testing shall be performed a minimum of thirty (30) days after the manhole run has been completed, including the installation of all lateral piping.

    b. Unless specified otherwise by Engineer, long term pipe deflection (reduction in vertical inside diameter) shall not exceed 5 percent as specified in DEP Sewage Manual, Section 25.85 Deflection Test and as shown below for PVC SDR 35 pipe. Use pipe manufacturer's requirements if pipe type is other than PVC SDR 35.

    c. Repair and retest sections of sewer not meeting test requirements. (Repair: Removal and replace section that does not meet test requirements.)

    d. Deflection testing will be done at least 30 days after pipe installation, unless otherwise waived by Engineer.

D. Minimum Testing Requirements

1. 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. 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 gages, 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. Before 18 months following the Township's final inspection and approval of sewer extension/replacement, a re-inspection may 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.

1.03. SUBMITTALS

A. Submit shop drawings or catalog 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, Air Release Valve, Gate Valves and Valve Boxes.

2. Stone Certifications.

3. Gaskets, Adapters, Cleanout Covers and Accessories and Other Appurtenances.

4. Detection Tape, Cable, etc.

B. Submit manufacturer's Certification of Compliance in accordance with Section 01300.

C. Make submittals prior to start of construction. Make submittals to Engineer(s).

1.04. 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. Pipe 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

2.01. MATERIALS

A. Ductile Iron Pipe

1. Pipe.

a. Ductile iron pipe shall be centrifugally cast, annealed ductile iron manufactured in accordance with ANSI A21.50 and 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, 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 or ANSI 21.53, 350 psi rating.

    b. Joints shall be push-on or mechanical joint in accordance with ANSI A21.11. Furnish joints with required accessories.

3. Ceramic Epoxy Lining.

    a. The interior of all ductile iron pipe is to be lined with Protecto 401 Ceramic Epoxy Lining, as manufactured by Induron. Coating shall be applied in accordance with the coating manufacturer's specifications.

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:

1. 6-Inch – 18-inch 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 SDR 26.

    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-inch – 48-inch 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 F 794 specification for Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter or ASTM F1803specification for Poly (Vinyl Chloride)(PVC) Closed Profile Gravity 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.

C. Polypropylene Pipe (21-inch and Larger)

    1. Pipe and Fittings.

        a. Polypropylene pipe shall be manufactured in accordance with ASTM F2736 and ASTM D4101. Polypropylene compound shall meet the material requirements of ASTM 2736, Section 4.

        b. Pipe joints shall be push-on with an integral bell and spigot meeting the requirements of ASTM F2736. Spigot shall have two (2) gaskets meeting the requirements of ASTM F477. Joint seal shall meet the watertight requirements of ASTM D3212

        c. Pipe stiffness at 5% deflection shall be 46 PSI for all pipe diameters when tested in accordance with ASTM D 2412.

D. Pipe Couplings and Adapters

    1. All couplings and adapters shall be 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. Dresser, Bradford, PA

    c. Or approved equal.

E. Flexible Pipe Coupling with Anti-Shear Stainless Steel Collar (For Gravity Sewer 6 and 8 inch only and only to be used when directed by the Township)

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

    b. Or equal.

F. Mechanical Pipe Coupling (For pipes 10-inches in diameter and greater):

1. All couplings and adapters for pipes 10-inches in diameter (other than PVC) and greater shall be solid sleeve/mechanical couplers, no flexible couplers will be allowed.

2. Constructed of materials which will pass the strength and chemical requirements of ASTM C954.

3. Couplings must be lined with a fusion bond coating that meets AWWA C213 standards.

4. All nuts and bolts must be stainless steel.

5. Approved manufacturers:

    a. Romac, Bothel, WA.

    b. Mission, Corona, CA.

    c. Krausz, Ocala, FL.

    d. Dresser, Bradford, PA.

    e. Or equal

G. Transition Gaskets:

1. For DIP to SDR 35 PVC pipe transition use a ROMAC Industries transition coupling style XR501 or approved equal. Coupling must be lined with a fusion bond coating that meets AWWA C213 standards.

H. Wye Connections (Sanitary Tee)

1. PVC material to be ASTM D 3034, SDR-35.

2. All wyes shall bear the manufacturer's identifying mark and size.

I. Detection Tape and Detection Cable

1. Detection tape shall be in accordance with the Utility Tape requirements fo Section 01010.

2. The detection tape shall be installed on top of the pipe bedding or a maximum of 12 inches above the pipe (see Trench Detail).

PART 3 EXECUTION

3.01. LAYING PIPE

A. General

1. Maximum sewer run length is 400 ft.

2. Minimum cover over sewer pipe is five (5) feet except when crossing streams, in which case the amount of cover shall be in accordance with the DEP Design Manual.

3. Maximum depth for sewers is to be twenty (20) feet unless prior approval is obtained from the Township. Sewers at depths greater than 18 feet (above top of pipe) shall be Class 52 D.I.P., SDR 26, or C900 pipe.

4. Slopes shall not exceed 20% without prior authorization by Engineer.

5. 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.

6. Each section of pipe shall rest upon 6 inches 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 ±¼- inch.

7. 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.

8. Any pipe that has its grade or joint disturbed after laying shall be taken up and re-laid. Any section of pipe already laid and found to be defective shall be taken up and replaced with new pipe.

9. 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.

10. Maintain pipelines free and clear of debris during the progress of the work.

11. At times when pipe laying is not in progress, the open ends of the pipe shall be closed by watertight plug.

12. 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 bypass pumping, fluming or any other means acceptable to Engineer.

        (1) If bypass pumping is required, provide stand-by pump equivalent to the largest bypass 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.

13. 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.

14. Install wyes/tees a minimum of 5 feet from outside walls of manholes.

B. PVC Pipe

1. Inspect pipe and fittings for defects or damage prior to lowering into the trench.

2. Install pipe and fittings in accordance with manufacturer's written instructions.

3. Do not kick or throw 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.

3.02. 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.

3.03. PRIOR TO ACCEPTANCE

A. The Township reserves the right to retest at the Developer's expense, any piping throughout the duration of the Construction Period.

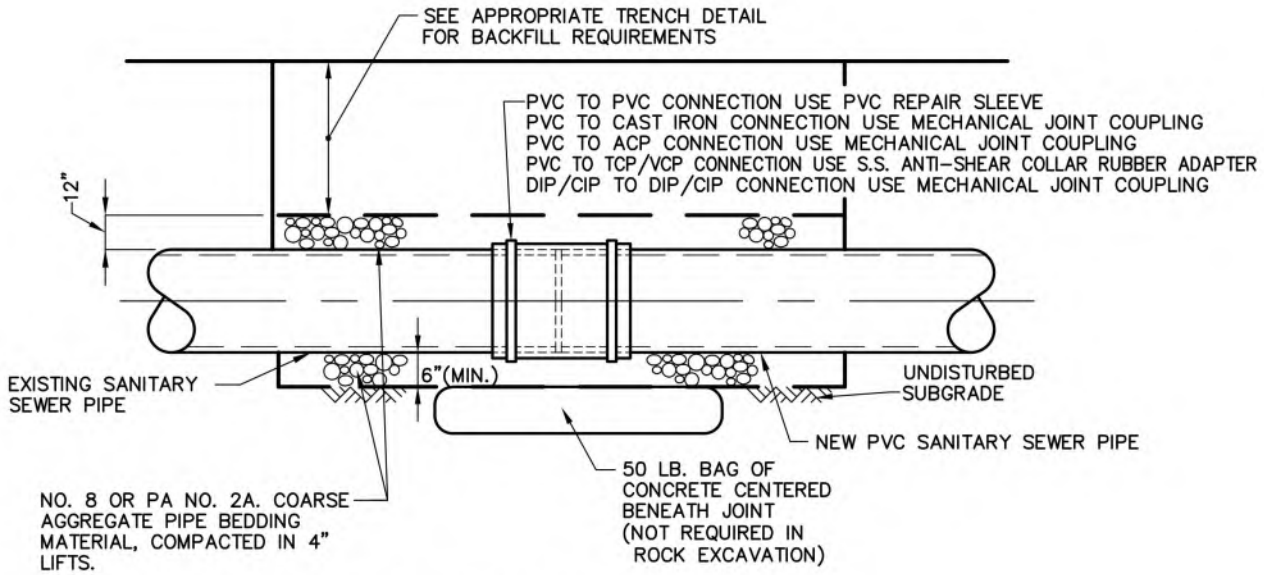
B. Make repairs to piping found defective by such Township conducted tests.

C. The Township 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 manholes 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 Township.

D. The warranty period will begin with all conditions being satisfactory to the Township in its final inspection and Dedication.

E. Eighteen (18) months from the Township's final inspection and approval of the Developer installed sewer extension, a reinspection 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



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

MECHANICAL JOINT COUPLINGS TO BE SMITH-BLAIR OR APPROVED EQUAL

EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

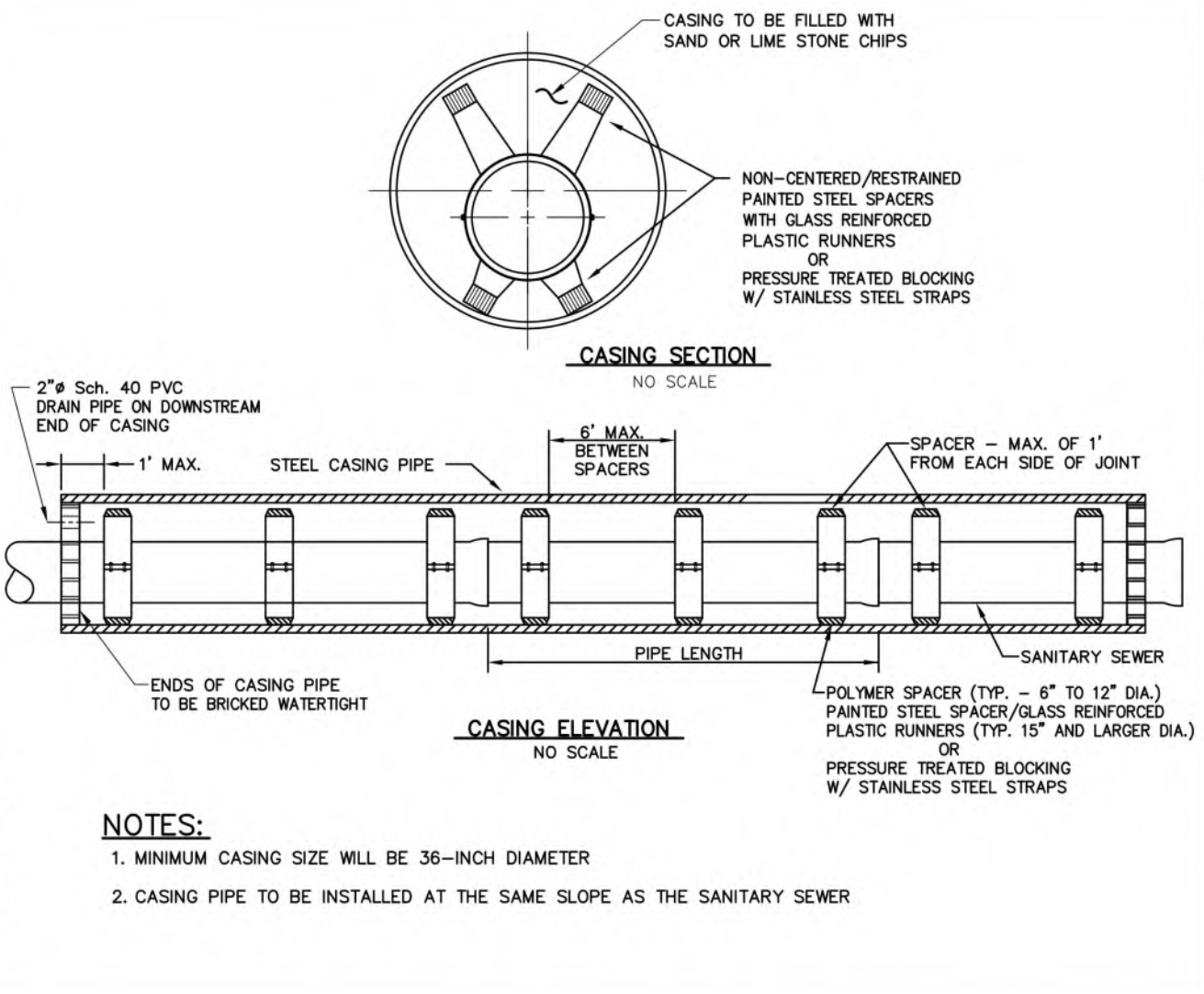
GHD

225 GRANDVIEW AVENUE SUITE 403, CAMP HILL, PA
PHONE (717) 541-0622
WWW.GHD.COM

PIPE RECONNECTION DETAIL

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	8/1/2023
DWG. NO.	EPT02700-1
FILE NO.	4833.9.02.00



NOTES:

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

EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

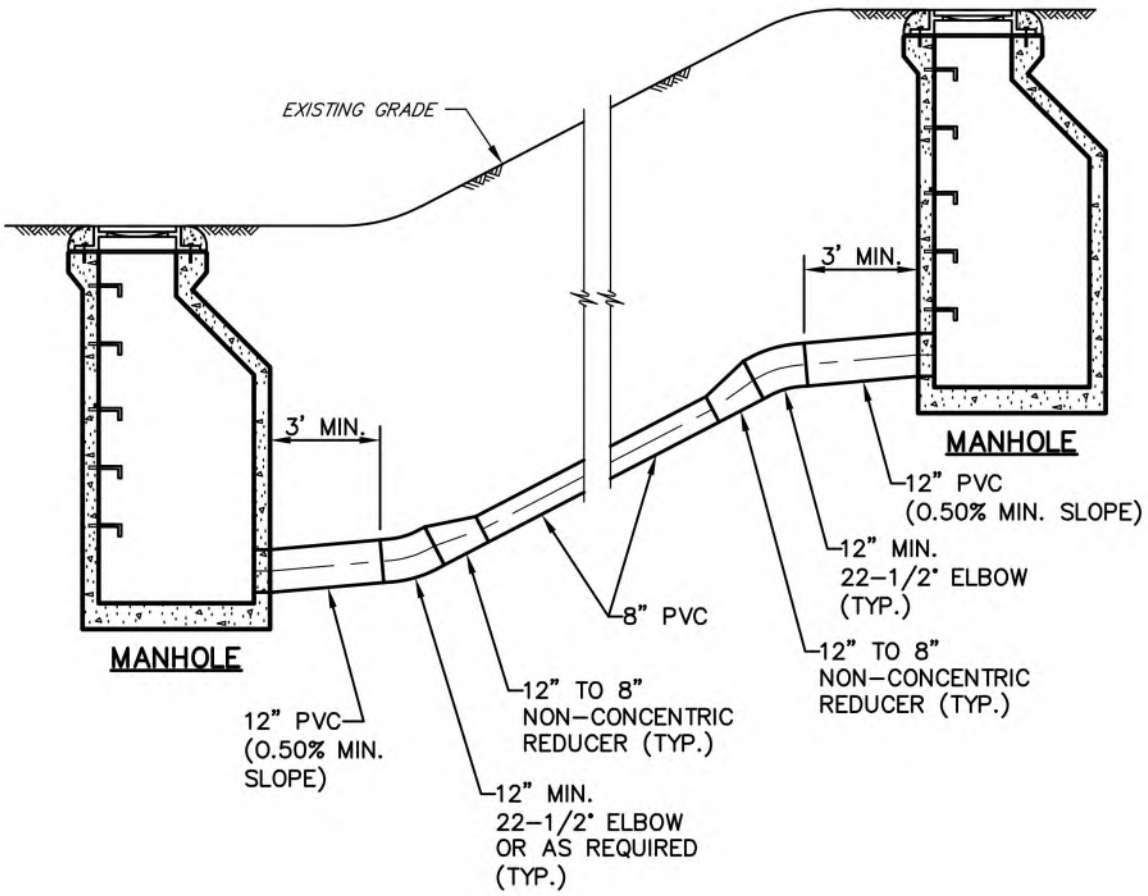
GHD

225 GRANDVIEW AVENUE SUITE 403, CAMP HILL, PA
PHONE (717) 541-0622
WWW.GHD.COM

CASING DETAILS FOR PIPE BORINGS/TUNNELS

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	8/1/2023
DWG. NO.	EPT02700-2
FILE NO.	4833.9.02.00



EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

GHD

225 GRANDVIEW AVENUE SUITE 403, CAMP HILL, PA
PHONE (717) 541-0622
WWW.GHD.COM

STEEP SLOPE (GREATER THAN 15%) SANITARY SEWER DETAIL

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	8/1/2023
DWG. NO.	EPT02700-3
FILE NO.	4833.9.02.00

SECTION 02720

SERVICE LATERAL AND BUILDING SEWER INSTALLATION

PART 1 GENERAL

1.01. WORK INCLUDED

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

B. Related Work Specified Elsewhere:

1. Trenching, Backfilling, and Compacting..... Section 02221
2. Trench Paving and Restoration..... Section 02575

C. Applicable Standard Details:

1. EPT 02720-1 ..... Service lateral - Shallow Sewer Detail
2. EPT 02720-2 ..... Service lateral - Deep Sewer Detail
3. EPT 02720-3 .....Building Sewer Detail
4. EPT 02720-4 ..... Service Lateral Connection to Existing Sewer Main
5. EPT 02720-5 .....Cleanout/Test Tee Cap Protection Casting
6. EPT 02720-6 ..... Service Lateral Disconnection from Existing Sewer Main
7. EPT 02720-7 .....Cleanout Location Plan

1.02. PIPE OWNERSHIP

A. *Building Sewer*: The property owner is the ultimate owner of the pipeline. East Pennsboro Township does not own the Building Sewer.

B. *Service Lateral*: Per Chapter 18 18-114 of Ordinance 190-68, The property owner is the ultimate owner of the pipeline from the termination of the Building Sewer to the point of connection with the sewer main, except for portions of pipeline located within a street, highway or alley. In that event the responsibility of the property owner shall terminate at the curb line or the cartway. East Pennsboro Township will maintain the portion of the pipe located within a street, highway, or alley.

1.03. 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 (10) years, have supplied such materials for at least five (5) years of the 10-year period, and have at least five (5) installations in successful operation for at least five (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 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 of Township.

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 Township.

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 backfill and compaction completed. Each pipe section shall be tested with low pressure air at 5 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.

   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 10 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 Township.

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.

1.04. 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. Gaskets, couplings, adapters and other appurtenances.

B. Make submittals to Township Engineer and Third-Party Engineer prior to start of construction.

1.05. 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

2.01. MATERIALS

A. All pipe material will be SDR 35 PVC except if pipe has less than three (3) feet of cover which is located in an area where any type of vehicular traffic will occur, then the pipe material must be made of Ductile Iron.

B. The use of Schedule 40 PVC is prohibited (except for making repairs to existing Schedule 40).

C. PVC Pipe (4 or 6-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.

e. Double Sweeping Tee: Fabricated from SDR 26 PVC material and as manufactured by Multi Fittings or GPK.

f. Schedule 40 to SDR 35 adapter for connection to interior plumbing: SDR 26 PVC fitting “long neck” as manufactured by Multi Fittings or GPK.

2. Saddles

    a. Approval from the Township for the use of a saddle and for connecting a new lateral into a CIPP lined main, must be obtained prior to installation. The use of saddles and connecting a new lateral into a CIPP lined main, will be on a case-by-case basis. The typical connection to the sanitary sewer main will be by cutting the pipe and installing a WYE connection. See Part 3.03 for new connection into a CIPP lined main.

    b. All holes cut into the mainline shall be cored by using a coring machine.

    c. All tee saddles shall bear the manufacturer's identifying mark and size.

    d. Saddles to be used for non-PVC and non-CIPP lined main:

    e. Gasketed PVC bell inlet connection with stainless steel bands, clamps, bolts and fittings.

    f. PVC material shall conform to ASTM D5926.

    g. Approved products and manufacturers.

        (1) Fernco.

        (2) Grainger.

        (3) Engineer approved equal.

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.

    b. Plastic Trends.

    c. JM Eagle.

    d. 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

    b. Or Equal

F. Ductile Iron Pipe (DIP) or Cast Iron Pipe to SDR 35 Polyvinyl Chloride (PVC) Pipe Transition Gaskets:

1. *Gasket Construction*: Virgin SBR in accordance with ASTM D 2000 MBA 710, compounded for sewer service. Designed for use in cast iron mechanical joint fittings for adapting PVC sewer pipe.

2. Acceptable Manufacturers:

    a. Romac Industries, Inc.

    b. Or Equal

G. Cleanouts

1. Construction shall be in accordance with latest International Plumbing Code.

2. Test tees 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°. Where changes in direction are less than 45°, 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 or building sewer.

6. Cleanouts shall have a threaded cap or plug.

7. All cleanouts shall have a cast iron cleanout box and cover plate over it.

H. Cleanout Caps or plugs

1. Cleanout Cap Construction: In non-traffic areas, provide Panella-type push-on clean out cover with cast iron body and brass cap with countersunk lug.

2. Cleanout Plugs shall be installed above grade and only in non-traffic areas.

I. Cast Iron Cleanout Covers

1. Cleanout cover shall be cast iron.

2. Acceptable Manufacturers

a. East Jordan Iron Works, Inc.

b. Neenah Foundry Company

c. Or approved equal

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 in Section 02700.

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 observation tee and 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 6 inches shall be laid at a grade not less than 1/8 inch per foot (1%).

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 Curb Line and/or Right-of-Way line, so as to be behind future utilities, terminate with a bell end and plug.

R. Two different utilities may not be laid in the same ditch.

S. The Developer, as part of the sanitary sewer construction, shall install the Service Lateral to the curb line and/or rights-of-way line and install the 2-Way cleanout at no cost to the Township. On an existing sewer main, if the Service Lateral and/or Building Sewer do not exist then it shall be the responsibility of the property owner to install and pay for the installation from the main to the building.

T. All Building Sewers shall be installed at the property owner's expense.

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 to the sewer main. Saddles will only be permitted on a case by case basis.

B. Pipe to pipe connections shall be made in accordance with Pipe Reconnection Detail in Section 02700.

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 or at the right-of-way line.

D. All sewer laterals shall pass an air test before Township acceptance.

3.03. CONNECTION OF NEW SERVICE LATERAL TO EXISTING CIPP LINED SEWER MAIN

A. Connection of the service lateral to a CIPP Lined main shall be made using the LMK Lined Main Tap Saddle Installation System or approved equal.

B. Remove a portion of the host pipe to expose enough of the CIPP liner so that the tap saddle can connect entirely to the CIPP Liner.

C. A 6-inch hole shall be cut into the CIPP liner to accept the flow from the new lateral. All cut edges of the CIPP liner shall be ground down to avoid catching debris.

D. The universal LMK adhesive shall be used to bond the saddle to the CIPP liner, providing a leak free main to lateral connection. The saddle shall tie into the SDR 35 PVC lateral pipe/fittings.

E. 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 or at the right-of-way line.

F. All sewer laterals shall pass an air test before Township acceptance.

3.04. CLEANOUTS

A. All service laterals and building sewers shall have cleanouts located not more than 90 feet apart. The first cleanout should be 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 and as indicated on the details. 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.

3.05. 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 Township.

3.06. AIR TESTING

A. 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 plugs required. The pressure gauge for measuring internal pipe pressure shall be oil-filled gauge measuring from zero to 10 psi, in one (1) pound increments. To prevent overloading the test section with the full pressure of the compressor, the test equipment must be provided with a 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 the Township.

B. Immediately following the pipe cleaning, the pipe installation between the sweeping and sanitary tees shall be tested with low-pressure air at 4 psi in excess of the ground water pressure above the top of the lateral. (Pressure should not exceed 5 psi above the ground water pressure.) At least 2 minutes shall be allowed for temperature stabilization, add only the amount of air required to maintain pressure.

C. The pipe shall hold the required test pressure for five (5) minutes, excluding the two (2) minutes stabilization, if any air had to be added.

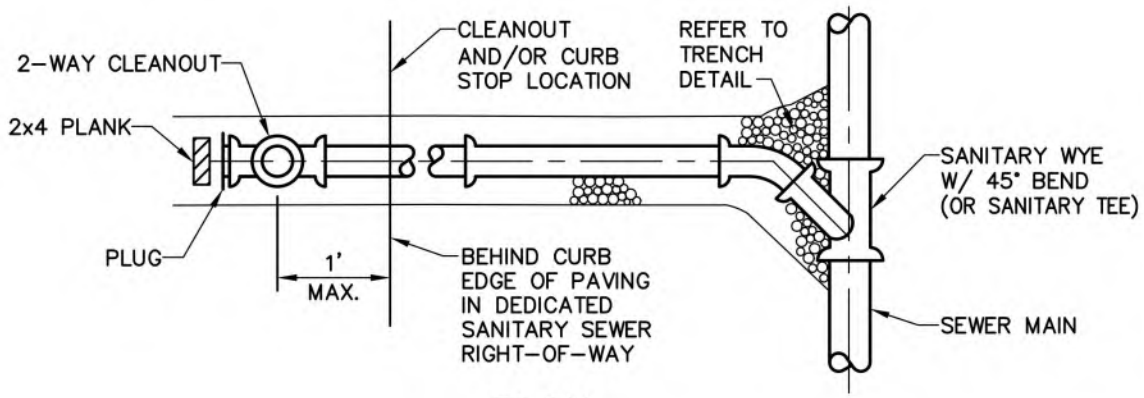
D. Repair and retest sections of lateral not meeting test requirements.

3.07. CONNECTION OF SUMP PUMPS TO THE SANITARY SEWER

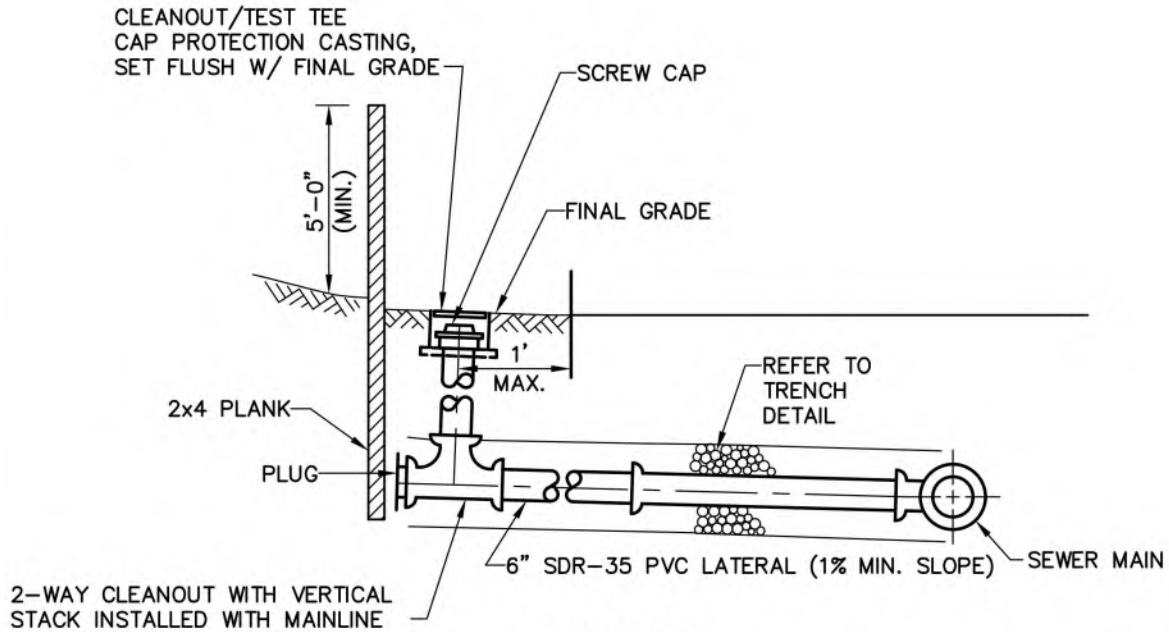
A. Any device, including sump pumps, roof leaders, etc. capable of transmitting ground or surface water into the sanitary sewer system, is prohibited.

B. 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.) 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.

END OF SECTION



PLAN



SECTION

NOTES:

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

EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

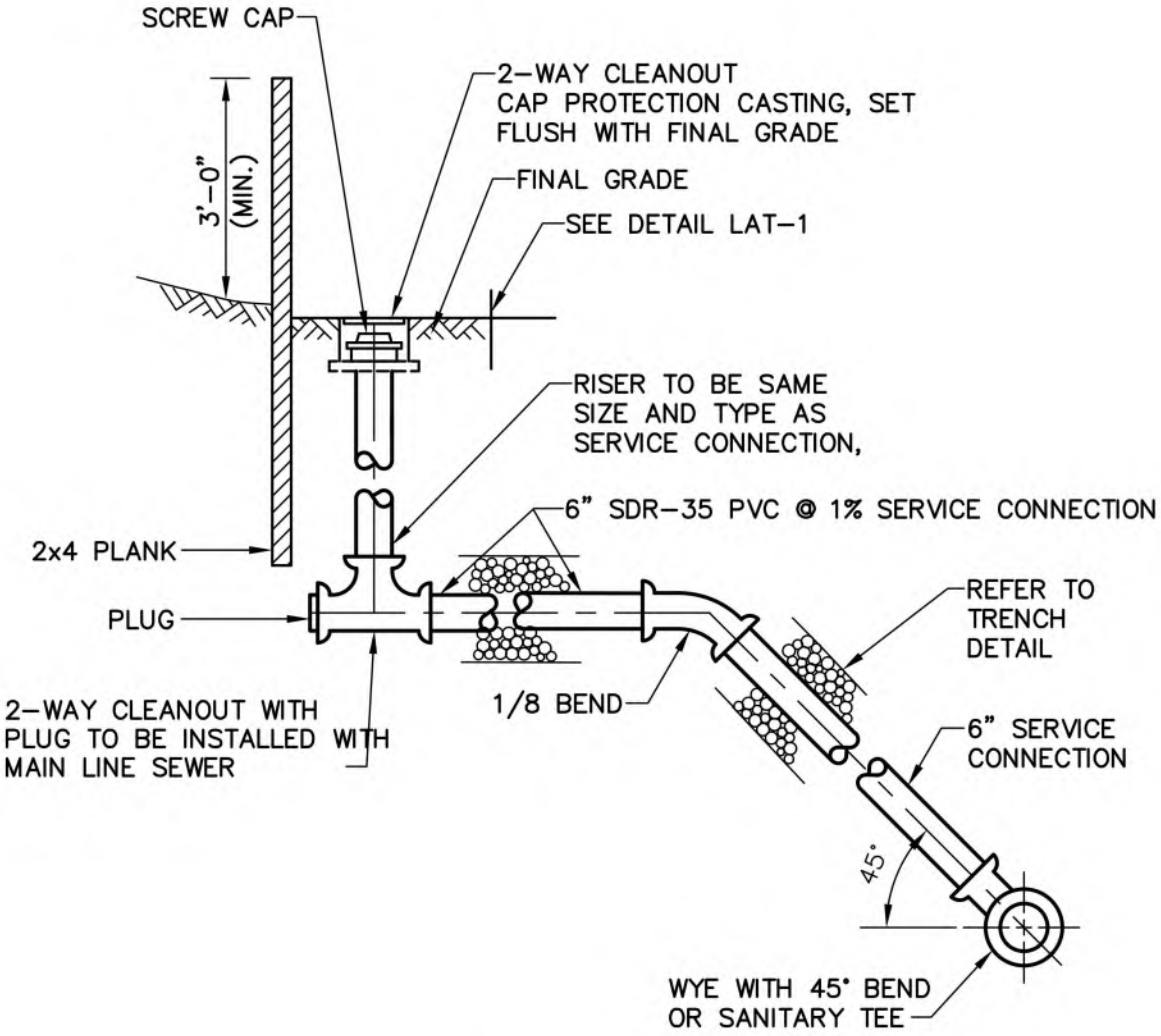
GHD

225 GRANDVIEW AVENUE SUITE 403, CAMP HILL, PA
PHONE (717) 541-0622
WWW.GHD.COM

SERVICE LATERAL - SHALLOW SEWER DETAIL

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	8/1/2023
DWG. NO.	EPT02720-1
FILE NO.	4833.9.02.00



ELEVATION

NOTES:

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

EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

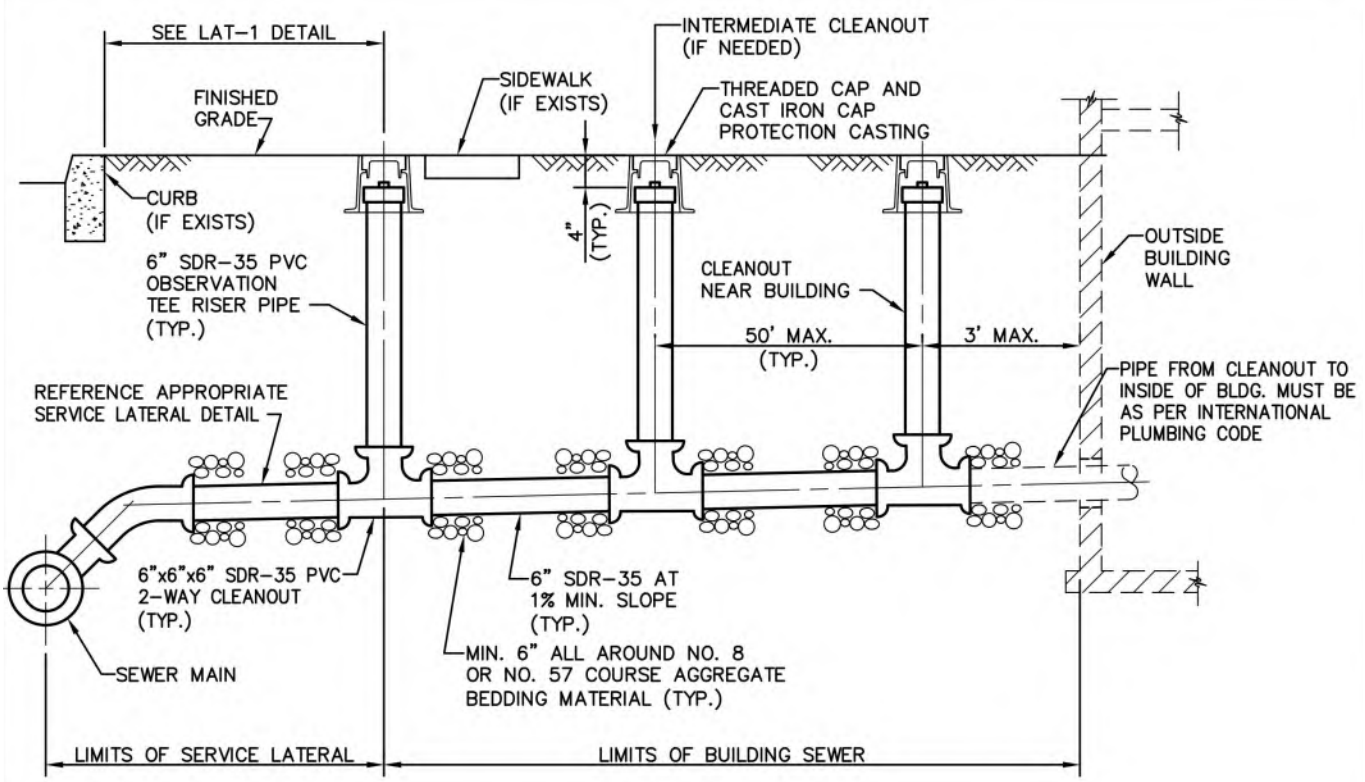
GHD

225 GRANDVIEW AVENUE SUITE 403, CAMP HILL, PA
PHONE (717) 541-0622
WWW.GHD.COM

SERVICE LATERAL - DEEP SEWER DETAIL

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	8/1/2023
DWG. NO.	EPT02720-2
FILE NO.	4833.9.02.00



ELEVATION

NOTES:

1. PIPE SIZES AND MATERIALS TO BE IN ACCORDANCE WITH TOWNSHIP REQUIREMENTS.
2. CLEANOUT/TEST TEE SPACING IS 50' MAXIMUM.
3. ANY PIPE LESS THAN 3 FEET OF COVER SHALL BE DUCTILE IRON.
4. THERE SHALL BE A 10 FOOT HORIZONTAL SEPARATION BETWEEN WATER SERVICE AND SERVICE LATERAL/BUILDING SEWER.

EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

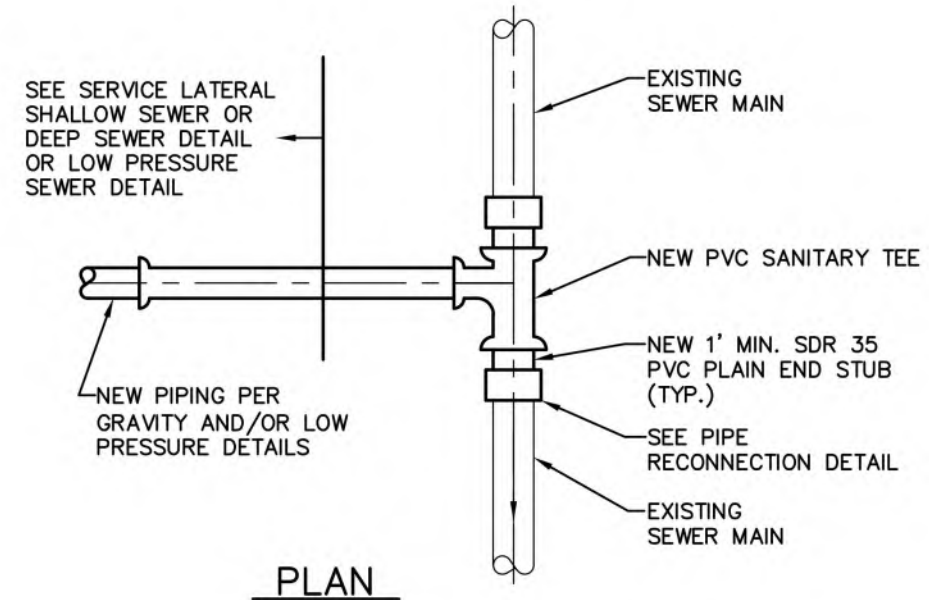
GHD

225 GRANDVIEW AVENUE SUITE 403, CAMP HILL, PA
PHONE (717) 541-0622
WWW.GHD.COM

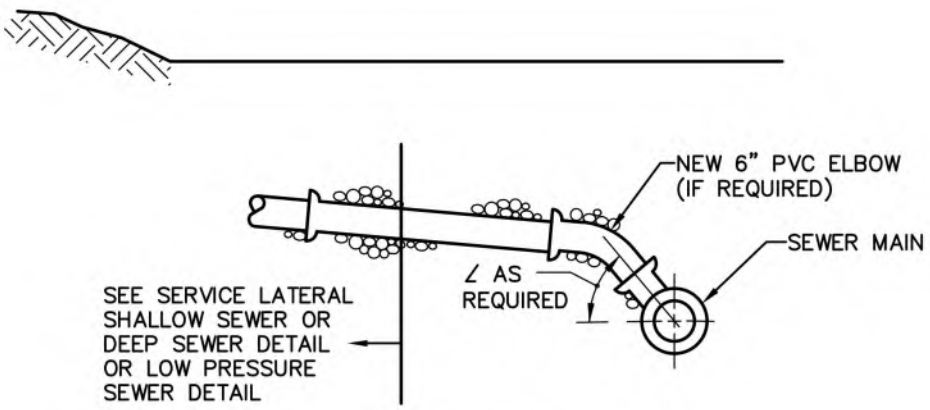
BUILDING SEWER DETAIL

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	8/1/2023
DWG. NO.	EPT02720-3
FILE NO.	4833.9.02.00



PLAN



ELEVATION

NOTES:

1. EXISTING MAIN SEWER TO BE SAW CUT.

EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

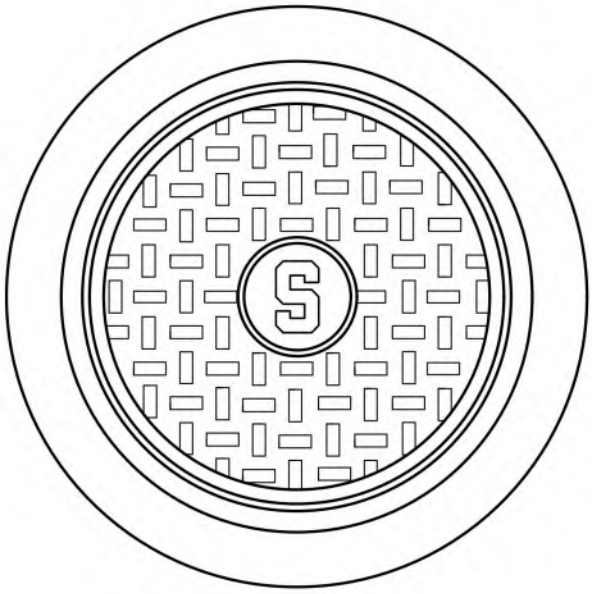
GHD

225 GRANDVIEW AVENUE SUITE 403, CAMP HILL, PA
PHONE (717) 541-0622
WWW.GHD.COM

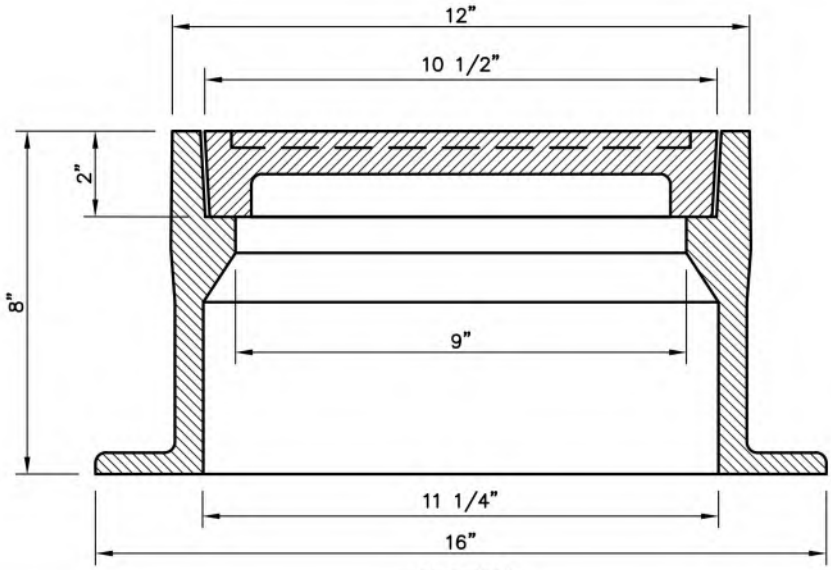
SERVICE LATERAL CONNECTION TO EXISTING SEWER MAIN

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	8/1/2023
DWG. NO.	EPT02720-4
FILE NO.	4833.9.02.00



PLAN



SECTION

EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

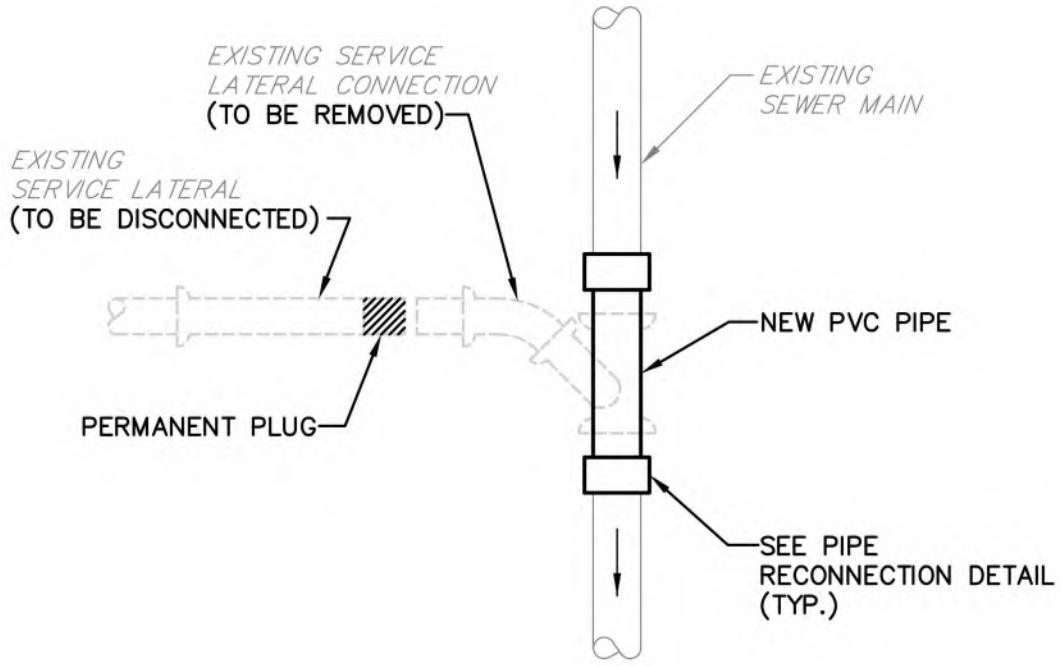
GHD

225 GRANDVIEW AVENUE SUITE 403, CAMP HILL, PA
PHONE (717) 541-0622
WWW.GHD.COM

CLEANOUT/TEST TEE
CAP PROTECTION CASTING

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	8/1/2023
DWG. NO.	EPT02720-5
FILE NO.	4833.9.02.00



PLAN

NOTES:

1. EXISTING MAIN SEWER TO BE SAW CUT.

EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

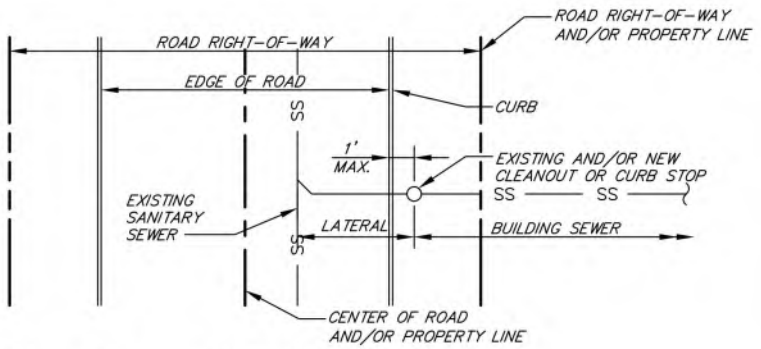
GHD

225 GRANDVIEW AVENUE SUITE 403, CAMP HILL, PA
PHONE (717) 541-0622
WWW.GHD.COM

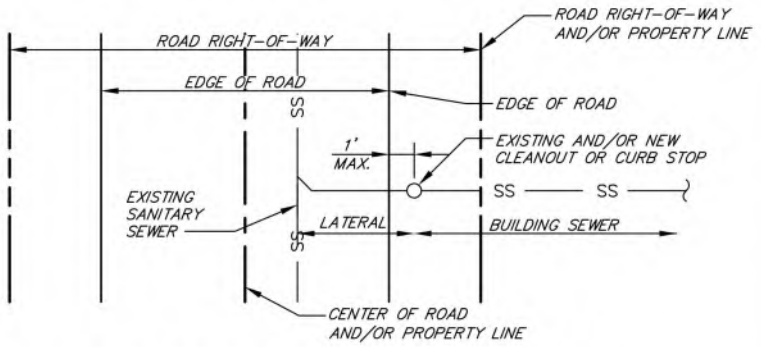
SERVICE LATERAL DISCONNECTION
FROM EXISTING SEWER MAIN

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

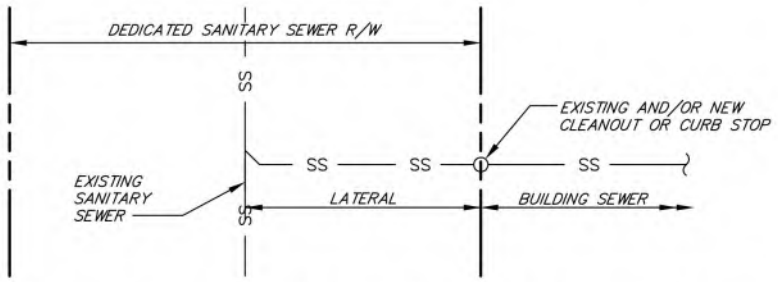
DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	8/1/2023
DWG. NO.	EPT02720-6
FILE NO.	4833.9.02.00



TYPICAL PLAN – CLEANOUT WITH CURB



TYPICAL PLAN – CLEANOUT WITH EDGE OF ROAD



TYPICAL PLAN – CLEANOUT IN DEDICATED SANITARY SEWER R/W

EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

GHD

225 GRANDVIEW AVENUE SUITE 403, CAMP HILL, PA
PHONE (717) 541-0622
WWW.GHD.COM

CLEANOUT LOCATION PLAN

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	8/1/2023
DWG. NO.	EPT02720-7
FILE NO.	4833.9.02.00

SECTION 02721

GREASE INTERCEPTORS/ OIL SEPARATORS AND SAMPLING MANHOLE

PART 1 GENERAL

1.01. DESCRIPTION

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

1. Installation of grease interceptor or oil separator and sampling manhole.

B. Related Work Specified Elsewhere:

1. Trenching, backfilling and compacting: ..... Section 02221
2. Manholes: ..... Section 02605
3. Service Lateral and Building Sewer Installation:..... Section 02720

C. Definitions: None

D. Applicable Standard Details:

1. EPT 02721-1 ..... Typical Grease Interceptor to Sampling Manhole Connection

1.02. QUALITY ASSURANCE

A. Grease interceptors/oil separators/sampling manholes 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 interceptor/separator components/sampling manholes and piping.

1.03. SUBMITTALS

A. Submit shop drawings or catalogue 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 interceptor/separator.
2. Gaskets, couplings, adapters, and other appurtenances.
3. Manhole covers and frames.
4. Stone certification.

B. Sketch of proposed/existing interior and exterior plumbing and how it relates to the grease interceptors/oil separators.

C. Make submittals prior to start of construction. Make submittals to Township Engineer and Third Party Engineer.

1.04. 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 interceptors/oil separators/sampling manholes 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.

C. The grease interceptors/oil separators/sampling manholes 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.

D. The grease interceptors/oil separators/sampling manholes 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

2.01. 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 Township'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.

B. Oil Separators- oil separators are required at repair garages, car-washing facilities, factories, and similar facilities in which servicing, repairing or washing is being performed:

1. Oil separators shall be constructed of reinforced concrete or steel.

2. Sizing of oil interceptors shall be based on wastewater flows and oil retention capacity, minimum size shall be 350 gallon. The minimum capacity of an oil interceptor is 6 cubic feet for the first 100 square feet of area to be drained plus 1 cubic foot for each additional 100 square feet of area to be drained into the separator.

3. Acceptable manufacturers:

a. Highland Tank, Inc.

b. Monarch.

c. Or approved equal.

C. Sampling Manholes – shall be constructed in accordance with Section 02605 Manholes and the Detail Drawings.

PART 3 EXECUTION

3.01. GREASE INTERCEPTOR/OIL SEPARATOR/SAMPLING MANHOLE INSTALLATION

A. Grease interceptors shall be located within 20 to 30 feet from the plumbing fixtures to be served.

B. Grease interceptors /oil separators/sampling manholes shall be located outside the rear of the building, in an area where all components are readily accessible for cleaning, maintenance, and visual inspection, and in non-traffic areas. Where an interceptor/ separator/sampling manholes must be located in a traffic area, the covers shall be designed for heavy traffic loading.

C. Grease interceptors /oil separators shall be buried so as to intercept the Service Lateral. Service Lateral for sanitary facilities should connect downstream of interceptors/ separators. The lateral may connect into the sampling manhole as a separate line from the interceptor's discharge pipes and shall not combine with any other flow.

D. The manhole entry of the grease interceptor/oil separator/sampling manholes shall be finished to grade.

E. For grease interceptor, 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.

F. The sampling manhole shall be placed after the grease interceptors/oil separators discharge 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 or oil concentration is in excess of the limits set forth by the Sewer Use Ordinance. For sampling manhole requirements, refer to the Detail Drawings attached and Section 02605, Part 2.01.

G. The grease interceptor/oil separator/sampling manholes shall be accessible at all times to the Township Plumbing Inspector and AUTHORITY personnel.

H. The grease interceptor/oil separator/sampling manholes shall be pressure tested at 3-5 psig.

END OF SECTION

NOTES:

1. MINIMUM SIZE OF OF GREASE TRAP PERMITTED IS 1,000 GALLONS.
2. GREASE INTERCEPTOR SIZE AND DESIGN SHALL BE IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
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.

EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

GHD

225 GRANDVIEW AVENUE SUITE 403, CAMP HILL, PA
PHONE (717) 541-0622
WWW.GHD.COM

TYPICAL GREASE INTERCEPTOR
TO SAMPLING MANHOLE CONNECTION

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	8/1/2023
DWG. NO.	EPT02721-1
FILE NO.	4833.9.02.00

SECTION 02725

PIPED UTILITIES - FORCE MAINS AND PRESSURE SEWERS

PART 1 GENERAL

1.01. WORK INCLUDED

A. Installation of force mains and pressure sewers.

B. Related Work Specified Elsewhere:

1. Trenching, Backfilling, and Compacting ..... Section 02221
2. Trench Paving and Restoration ..... Section 02575

C. Applicable Standard Details:

1. EPT 02725-1..... ..... In-Line Valve Pit Detail Building Sewer For Non Traffic Areas
2. EPT 02725-2 ..... Flush Chamber
3. EPT 02725-3 ..... Air Release Valve Chamber
4. EPT 02725-4 ..... Forcemain Locator Assembly
5. EPT 02725-5 ..... Concrete Thrust Block Details Force Main Typical Electrical Layout
6. EPT 02725-6 ..... Low Pressure Service Line Connection at Gravity/Pressure Main
7. EPT 02725-7 ..... Low Pressure Sewer Discharge Manhole
8. EPT 02725-8 ..... In-Line Cleanout/Valve Pit for Low Pressure Sewer Main
9. EPT 02725-9 ..... In-Line Terminal Cleanout for Low Pressure Main

1.03. 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 (10) years, have supplied such materials for at least five (5) years of the ten-year period, and have at least five (5) installations in successful operation for at least five (5) years.

B. Repair or replace defective piping or specials.

C. Pressure Testing of Force Mains (Hydrostatic Test)

1. Testing of Pressure Piping to be performed in accordance with AWWA C-600 (DIP) and AWWA C605 (PVC).

2. Conduct pressure testing with Engineer or Township representative present and provide 72 hours notice prior to testing.

3. Provide pressure gage with the correct range for the pressure for the test.

4. All completed pipe shall be tested for leakage between valves and bulkheads to encompass the entire length of the force main.

5. Piping shall hold the test pressure for 2 hours without pumping. Repair any visible leaks.

6. 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.

7. 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.

8. 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.

9. After the pipeline has been filled with water for 24 hours, the Contractor shall conduct a hydrostatic test. Each section of force main shall be tested at 1½ 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.

10. Leakage Allowance: loss of water pressure during the test shall not exceed 5 psi in a 2 hour period.

11. Should test results show displacement, damage or leakage in excess of allowable, repair displacement and replace damage, eliminate leakage, and retest until amount specified conditions are met, at no cost to the Township.

1.04. 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, Air Release Valve, Gate Valves and Valve Boxes.

2. Stone Certifications.

3. Gaskets, Adapters, Cleanout Covers and Accessories and Other Appurtenances.

4. Detection Cable

B. Submit manufacturer's Certification of Compliance in accordance with Section 01300.

C. Make submittals prior to start of construction. Make submittals to Engineer(s).

1.05. REQUIREMENTS FOR USE OF FORCE MAINS OR PRESSURE SEWERS

A. Extensions to the Township's sanitary sewer system are to be conventional gravity sewage collection systems unless the Developer demonstrates to the satisfaction of the Township that it is not feasible to serve the proposed development without pumping of wastewater.

B. If the Township approves use of pumping stations or grinder pumps, the design capacity of the stations and force mains, and location of force main connection to the existing system must be approved by the Township prior to design of the proposed pumping and force main facilities.

C. Upon determination of force main size and anticipated head conditions, specifications for the force main materials and construction will be provided.

D. Minimum cover over force main is five (5) feet, unless approval is granted by the Township.

E. Forcemains 1.5 inches through 4 inches shall be designed with flushing access points with appropriate valves and quick connects in the system for maintenance.

F. Forcemains 6 inches and larger shall be designed with maintenance access points for pigging to launch and receive, access to retrieve at each bend that a pig is unable to navigate or could get stuck, and quick disconnects for bypass pumping.

G. No lateral connections are permitted to force mains that serve pumping stations.

H. New lateral connections to low pressure force mains must be reviewed and approved by the Township.

I. The Township reserves the right to retest at the Developer's expense, any piping throughout the duration of the Construction Period.

J. Make repairs to piping found defective by such Township conducted tests.

K. The warranty period will begin with all conditions being satisfactory to the Township in its final inspection and Dedication.

PART 2 PRODUCTS

2.01 FORCE MAIN - 1.5 INCHES THROUGH 4 INCHES:

A. PVC Pipe:

1. PVC pipe will conform to the AWWA C900 specifications, with gaskets meeting ASTM F 477 and joints in compliance with ASTM D3139. Pipe will be DR 14 (200psi) and green in color or ASTM D2241 Type 1, Grade 1 PVC Pressure Pipe SDR 21 or SDR 26 (200 psi) and green in color.

2. Joints shall be restrained with a Uni-Flange as manufactured by Ford or approved equal. Joint restraints are required for four (4) joints on either side of any fitting or bend (not including the fitting or bend).

3. Fittings: Furnish joints with required accessories including Mega-Lugs for PVC. Mega-Lugs shall be as manufactured by EBBA Iron Works. Joints shall be mechanical joint in accordance with ANSI A21.11. Furnish joints with required accessories including Mega-Lugs for PVC. Mega-Lugs shall be as manufactured by EBBA Iron Work.The interior of all ductile iron fittings is to be lined with Protecto 401 Ceramic Epoxy Lining, in accordance with the manufacture's specifications. Manufacturer's standard asphaltic coating, approximately one mil thick in accordance with AWWA C151, applied to the outside of fittings. Furnish gaskets in accordance with ANSI A21.11.

B. HDPE:

1. High-density polyethylene (HDPE) pressure pipe, tubing, and fittings for force main piping shall be SDR 11. Manufacturers shall verify the suitability of pipe for the intended applications. HDPE will be green in color.

2. Materials used for the manufacturer of polyethylene pipe and fittings shall be high-density, black PE 3408 meeting the following physical property requirements.

Property	Test Method[(1)]	Nominal Value
Material Designation	PPI/ASTM	PE 3408
Material Classification	D3350	345444C
Density	D1505	0.957
Flow Rate	D1238 (190/21.6)	8.5
Flexural Modulus	D790	136,000
Tensile Strength @ Yield	D638	3,500
ESCR	D1693	F_0>10,000
ESCR, Compressed Ring	F1248	F_0>10,000
UV Stabilizer ©	D1603	2.5
Elastic Modulus	D638	125,000
Brittleness Temperature	D746	≤180
Melting Point	D789	261
Vicat Softening Temperature	D1525	255
Hardness	D2240	64
Thermal Expansion	D696	1.1×10^{-4}
Volume Resistivity	D991	2.6×10^{16}
HDB @ 73.4°F	D2837	1,600
HDB @ 140°F	D2837	800
Molecular Weight Category		Extra High
Molecular Weight	GPC	330,000
[(1)]Test procedures are ASTM unless otherwise specified. (PPI = Plastics Pipe Institute and GPC = Gel Permeation Chromatography.)		

3. Pipe and fittings shall be manufactured from identical material meeting the requirements listed and shall be designed for a 100 psi working pressure. The manufacturer shall certify that samples of the manufacturer's production pipe have been tested in-house, in accordance with ASTM D-2837 and validated in accordance with the latest revisions of PPI TR-3. Under these procedures, the minimum hydrostatic design basis shall be certified by the manufacturer to the 1,600 psi at 73.4°F and 800 psi at 140°F. The pipe and fitting manufacturer shall have an independent PPI Material Listing in accordance with PPI TR-3 and TR-4.

4. Pipe and fittings shall be produced by the same manufacturer.

5. Pipe shall be manufactured in accordance with ASTM F-714. Dimensions and tolerances for pipe outside diameter and minimum wall thickness shall be in accordance with ASTM F-714.

6. Fittings shall be manufactured to the requirements of ASTM D-3261 and as follows:

   a. Fabricated fittings shall be manufactured from pipe of at least one SDR heavier pipe than the system piping, and shall be pressure rated to match the system piping.

   b. The butt fusion outlets of fabricated fittings shall be machined to the same SDR as the system piping to which they are to be fused.

   c. The manufacturer shall subject samples from each molded fittings production lot to x-ray inspection for voids. Voids shall not be permitted, and if found in the samples, the entire production lot shall be x-ray inspected. If additional voids are found, the production lot shall be rejected.

7. Air Release Valve fittings will be Electorfusion Corp Saddles. Outlets shall be 2-inch NPT. Saddles will be as manufactured by Central Plastics Company.

8. Ductile Iron Pipe conforming to ANSI 21.50 and 21.51, Class 52 minimum. The interior of all ductile iron pipe is to be lined with Protecto 401 Ceramic Epoxy Lining.

2.02 FORCE MAIN - 6 INCHES AND LARGER:

A. Ductile Iron Pipe conforming to ANSI 21.50 and 21.51, Class 52 minimum.

   1. The interior of all ductile iron pipe is to be lined with Protecto 401 Ceramic Epoxy Lining.

   2. Fittings shall be in accordance with ANSI 21.10 250 psi rating or ANSI 21.53 350 psi rating.

   3. Joints shall be push-on or mechanical joint in accordance with ANSI A21.11. Furnish joints with required accessories.

   4. Tar coat exterior of all ductile iron pipe and fittings.

B. AWWA C-900, DR 14, 200 PSI PVC where excessive H2S is determined to be an issue. Same fittings as noted above.

2.03 DETECTION CABLE AND FORCE MAIN LOCATOR ASSEMBLY

A. Detection cable is required for all force mains.

B. Detection cable shall 12 gage multi-strand stainless steel cable. Detection cable is to be required for HDPE & PVC force mains. Valve boxes will be placed every 450 feet.

C. Forcemain locator assembly shall consist of a new valve box, rod with eye end and detection cable as noted in the details.

2.04 STEEL CASING PIPE AND CASING SPACERS:

A. Smooth steel wall casing pipe conforming to ASTM A-139 Grade B, minimum plate thickness will be 0.375-inches. Casing shall be uncoated. Minimum yield strength of 35,000 psi.

B. Casing spacer bands shall be 304 stainless steel, 14 gauge.

C. Casing shall be filled with sand and/or stone chips and ends of casing pipe sealed water tight with brick.

D. Casing spacers shall be manufactured by PSI, Inc. of Houston, Texas or equal.

E. Contractor to submit welders certifications. All welds will be full length.

F. Submit manufacturer's certification in accordance with Section 01300 - Submittals.

2.04 VALVES AND SPECIALS

A. Gates Valves.

1. Gate valves shall be resilient seated meeting of exceeding AWWA C509. Gate valves shall have mechanical joint ends and be equipped with a 2-inch operating nut and be suitable for buried applications. Valves shall open when turned to the left. Valve shall have fusion-bond epoxy coating on the inside and outside of the valve. Valve will have an extension stem which extends to a minimum of two (2) feet below the ground. The valve shall be as manufactured by American Darling or approved equal.

B. Air and Vacuum Release Valve.

1. Air and vacuum release valve shall be designed to operate (open) while pressurized, allowing entrained air to escape through the air release orifice. Valve shall operate from 0 through 250 psi, close watertight when liquid enters even when fluid is rising without pressure, allow air to enter in the event of a vacuum.

2. Valve body shall be stainless steel (316Ti).

3. Valve shall be equipped with an stainless steel isolation device.

4. Float to be delrin and spindle shall be stainless steel (316Ti).

5. Valve shall be supplied with a flushing attachment consisting of a bronze or stainless steel shut-off valve, quick connect couplings and rubber hose for backwashing with clear water.

6. Valve for the raw wastewater pump station discharge piping shall be a 2" H-TEC (986 w/ Isolation Device).

2.05 MECHANICAL COUPLINGS:

A. *General*: Steel mechanical couplings of the gasketed, sleeve type shall be furnished and installed as required. The coupling shall be of the proper diameter to make a tight joint. The coupling shall not have stops. All couplings shall be for 150 psi working pressure.

B. *Material*: Each coupling shall consist of one middle ring of a thickness and length suitable for the proposed application and test pressures; two followers; two rubber compounded wedge section gaskets and sufficient trackhead bolts to properly compress the gaskets.

1. Manufacturer:

a. American Darling.

b. Mueller.

c. Or approved equal

C. Valves Boxes.

1. All valves buried in the ground where applicable shall be provided with cast iron extension type valve boxes of the roadway type.

2. The valve boxes shall be of three-piece construction, and shall be of the screw type.

3. The valve boxes shall have a 5 1/4-inch shaft, and shall be furnished with covers. Cover will be marked “SEWER”.

4. The valve boxes shall be hot coated inside and out with a tar or asphalt compound.

5. Acceptable Manufacturers.

a. Bingham and Taylor, Culpeper, VA.

b. BIBBY-STE-CROIX Foundries, Inc., PA.

c. Or approved equal

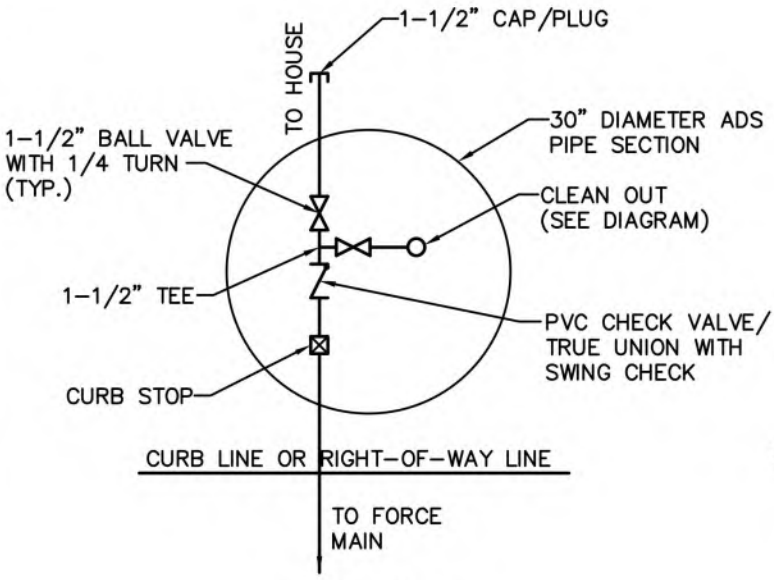
D. Miscellaneous Valves and Piping (Inside Air Release Chamber and Flushing Manhole).

1. Lever operated ball valve will be bronze suitable for 225 pounds of service. Valve shall be one piece body design, blowout proof stem, reinforced Teflon seats and seals, threaded ends and lever operated. Valve will be manufactured by Stockham, NIBCO or Crane.

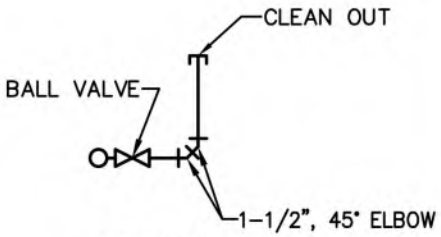
2. All piping, couplings and unions shall be stainless steel or PVC as noted on the details.

3. All chanbers shall be large enough for maintenance and ease of accesses.

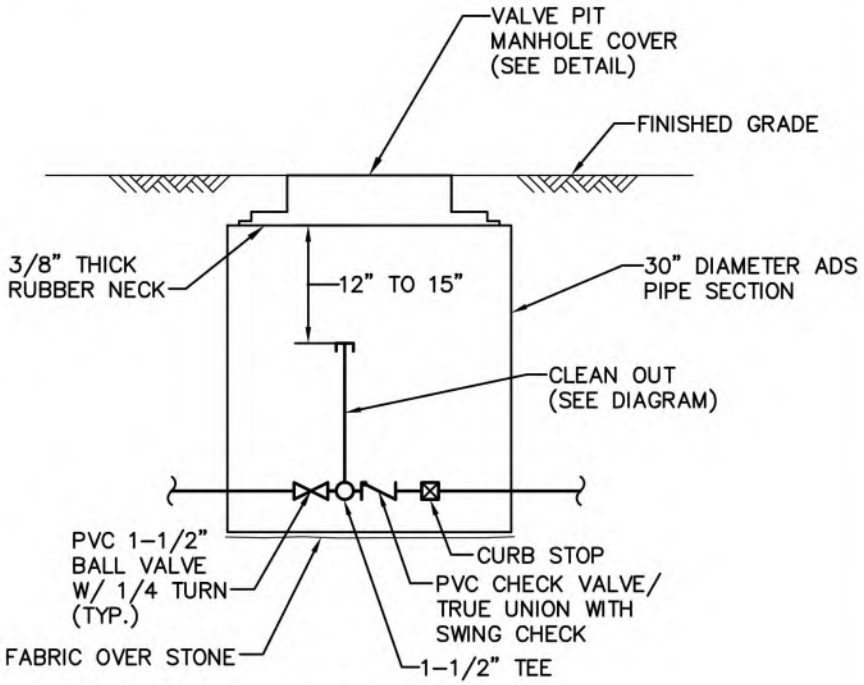
END OF SECTION



PLAN VIEW



TEE DIAGRAM



SECTION VIEW

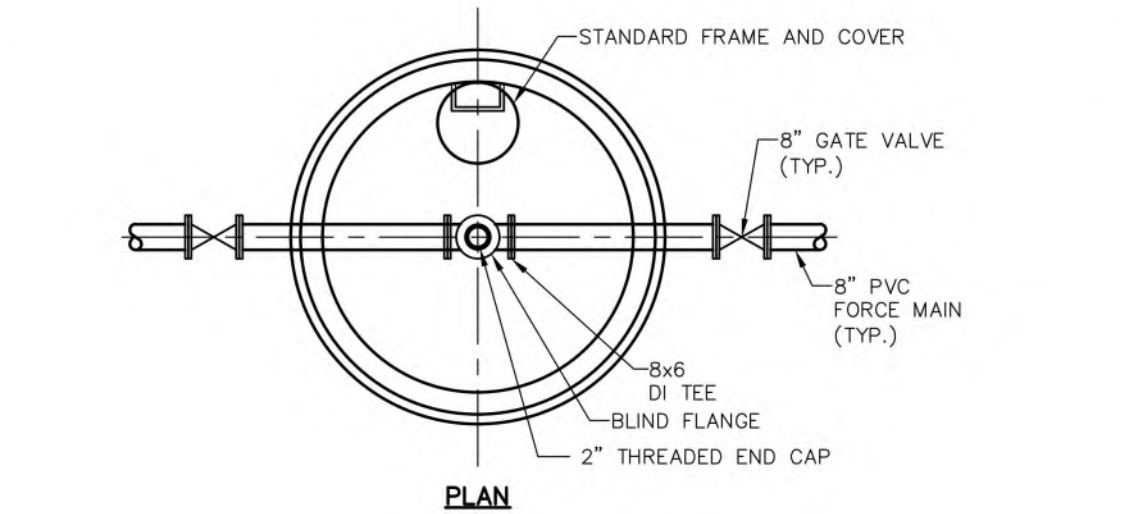
EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

225 GRANDVIEW AVENUE SUITE 403, CAMP HILL, PA
PHONE (717) 541-0622
WWW.GHD.COM

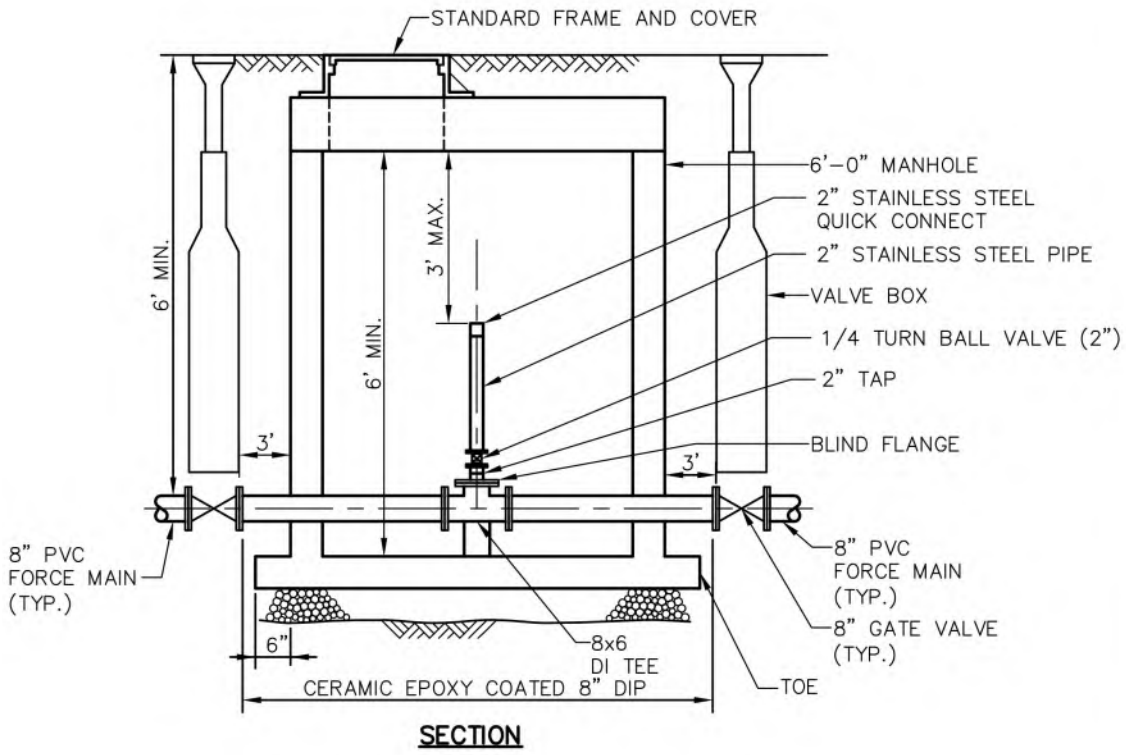
IN LINE VALVE PIT DETAIL
BUILDING SEWER
FOR NON-TRAFFIC AREAS

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	8/1/2023
DWG. NO.	EPT02725-1
FILE NO.	4833.9.02.00



PLAN



SECTION

EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

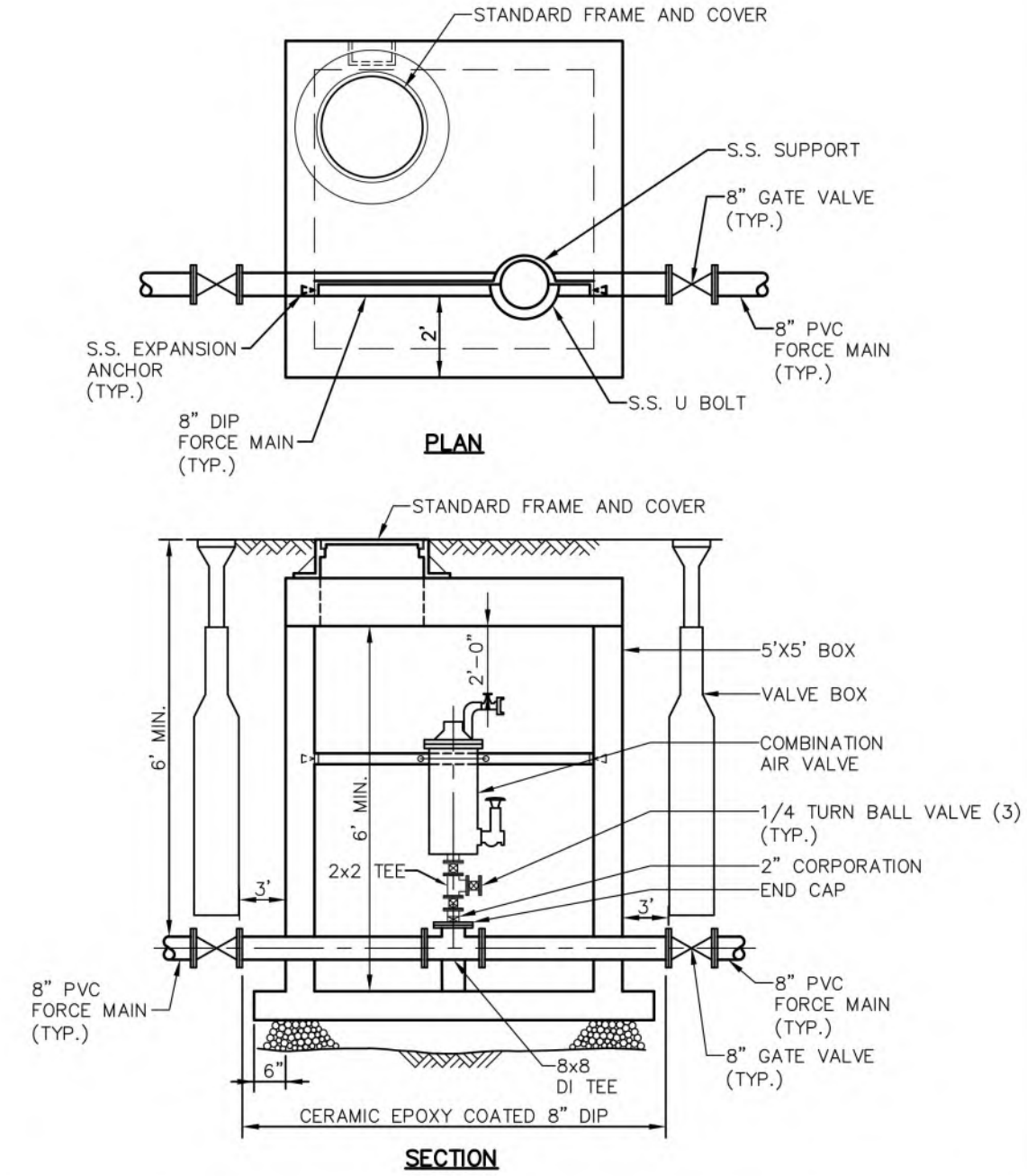
GHD

225 GRANDVIEW AVENUE SUITE 403, CAMP HILL, PA
PHONE (717) 541-0622
WWW.GHD.COM

FLUSH CHAMBER

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	8/1/2023
DWG. NO.	EPT02725-2
FILE NO.	4833.9.02.00



EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

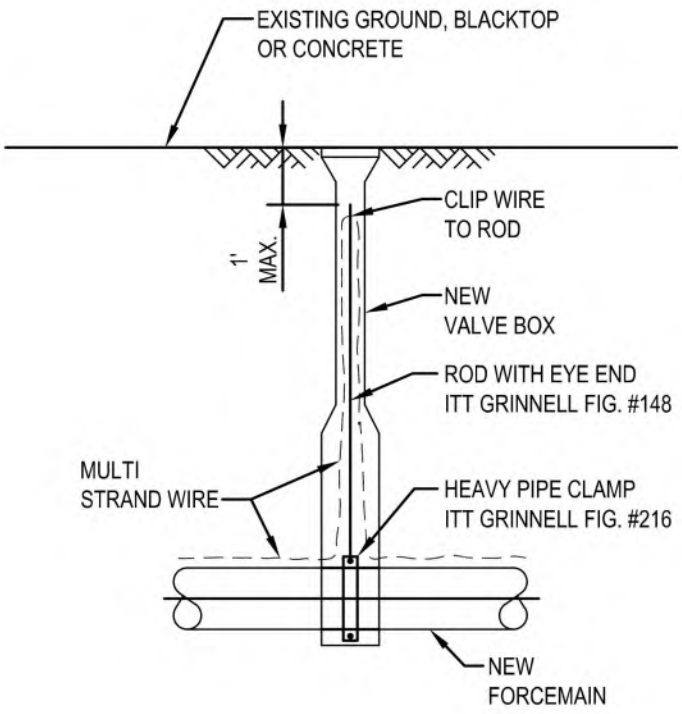
GHD

225 GRANDVIEW AVENUE SUITE 403, CAMP HILL, PA
PHONE (717) 541-0622
WWW.GHD.COM

AIR RELEASE VALVE CHAMBER

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	8/1/2023
DWG. NO.	EPT02725-3
FILE NO.	4833.9.02.00



EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

GHD

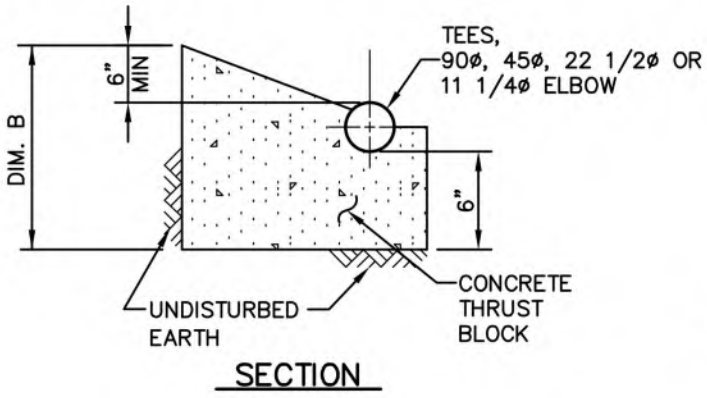
225 GRANDVIEW AVENUE SUITE 403, CAMP HILL, PA
PHONE (717) 541-0622
WWW.GHD.COM

FORCEMAIN LOCATOR ASSEMBLY

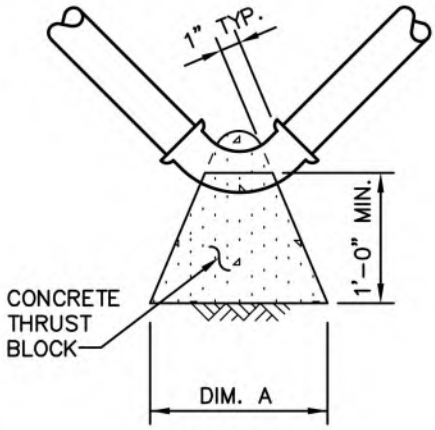
EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	8/1/2023
DWG. NO.	EPT02725-4
FILE NO.	4833.9.02.00

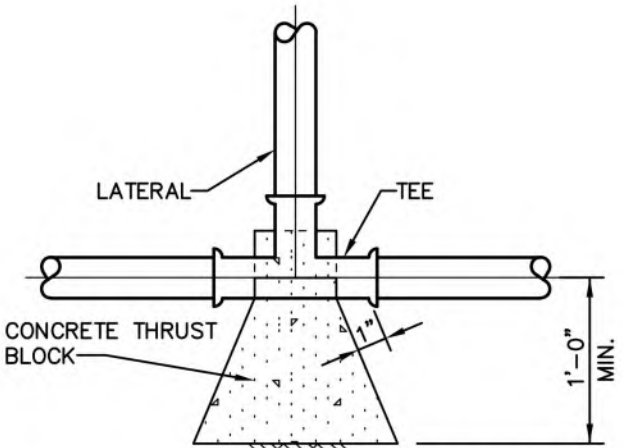
ELBOW DIMENSION SCHEDULE											
DIM.	3"–90°	3"–45°	3"–22 1/2°	3"–11 1/4°	2 1/2"–90°	2 1/2"–45°	2 1/2"–22 1/2°	2"–90°	2"–45°	1 1/2"–90°	1 1/2"–45°
A	20"	18"	16"	12"	18"	16"	14"	16"	14"	14"	12"
B	15"	15"	15"	14"	15"	15"	15"	14"	14"	14"	14"



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"

EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

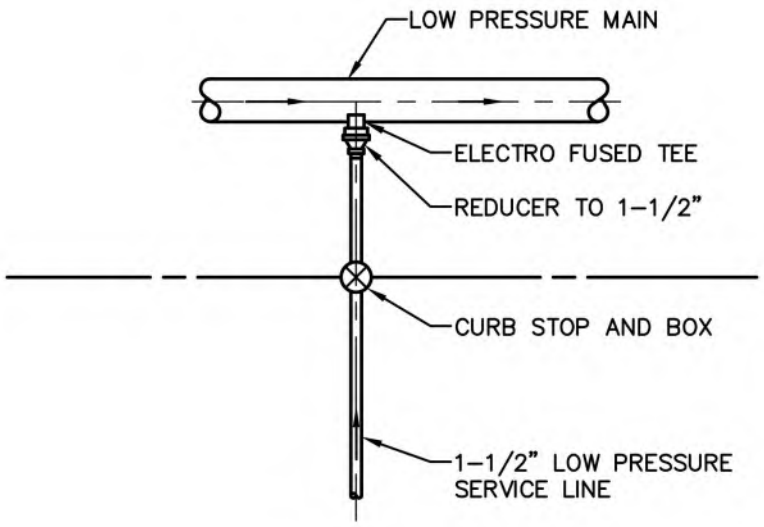
GHD

225 GRANDVIEW AVENUE SUITE 403, CAMP HILL, PA
PHONE (717) 541-0622
WWW.GHD.COM

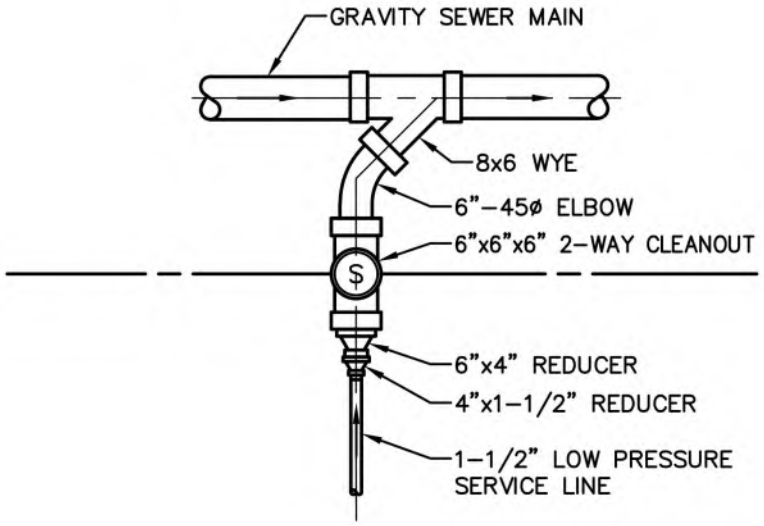
CONCRETE THRUST BLOCK DETAILS
FORCE MAIN

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	8/1/2023
DWG. NO.	EPT02725-5
FILE NO.	4833.9.02.00



PLAN



PLAN

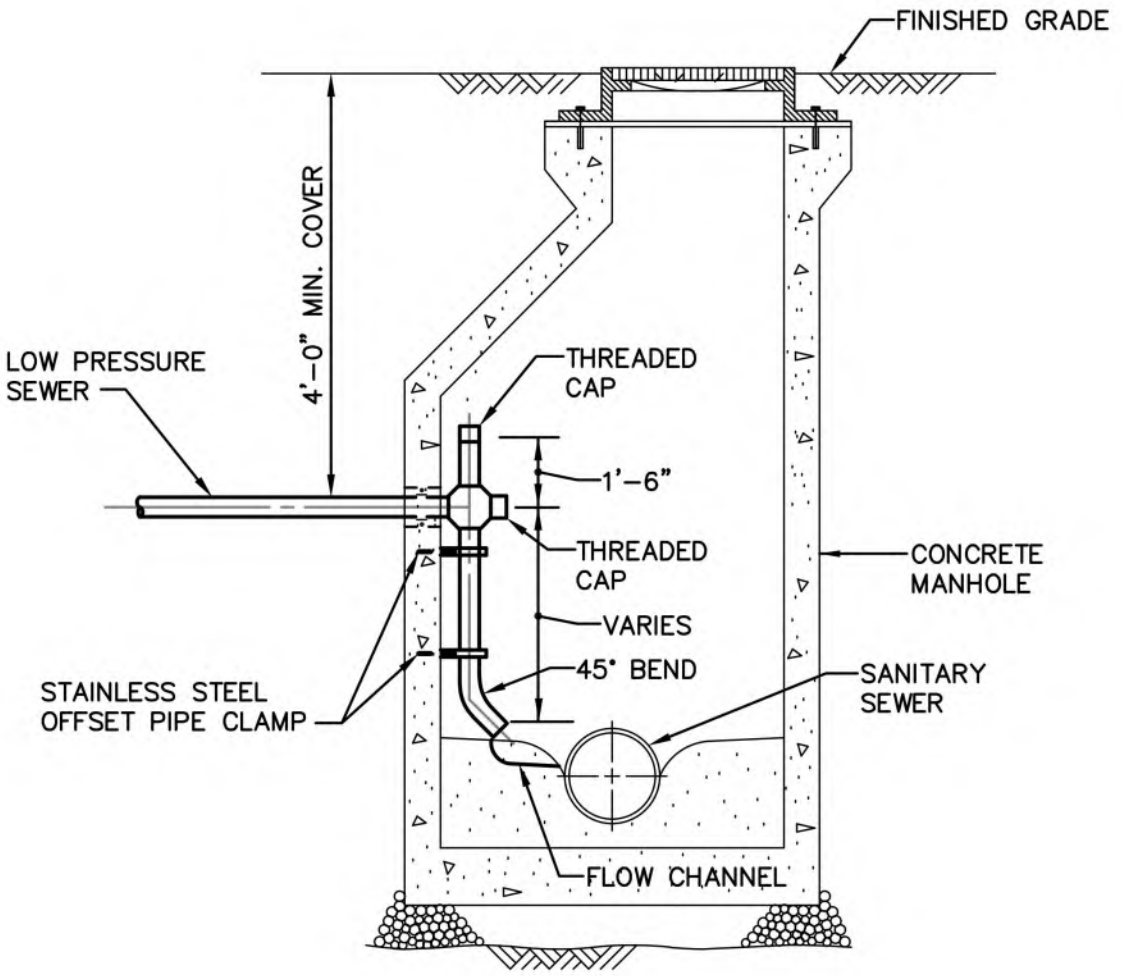
EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

225 GRANDVIEW AVENUE SUITE 403, CAMP HILL, PA
PHONE (717) 541-0622
WWW.GHD.COM

LOW PRESSURE SERVICE LINE
CONNECTION AT
GRAVITY/PRESSURE MAIN

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	8/1/2023
DWG. NO.	EPT02725-6
FILE NO.	4833.9.02.00



NOTE:

1. MANHOLE TO BE LINED.

EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

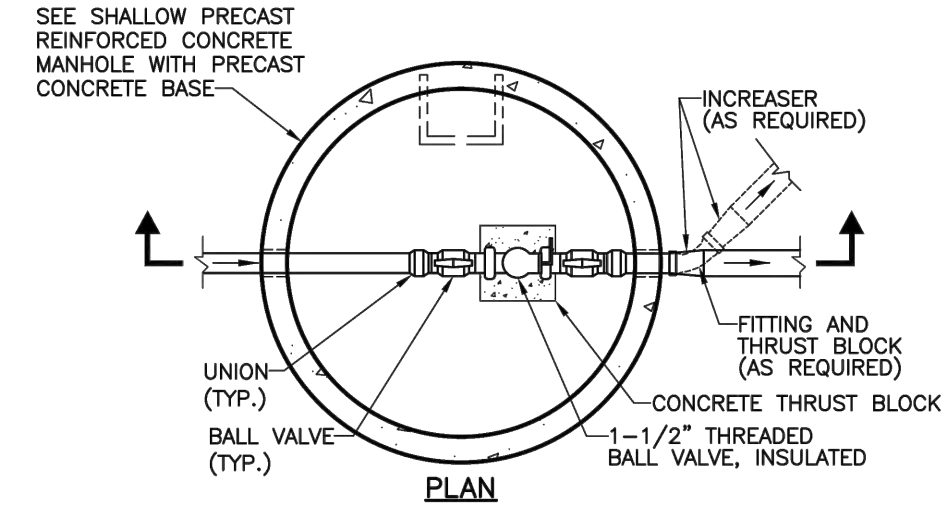
GHD

225 GRANDVIEW AVENUE SUITE 403, CAMP HILL, PA
PHONE (717) 541-0622
WWW.GHD.COM

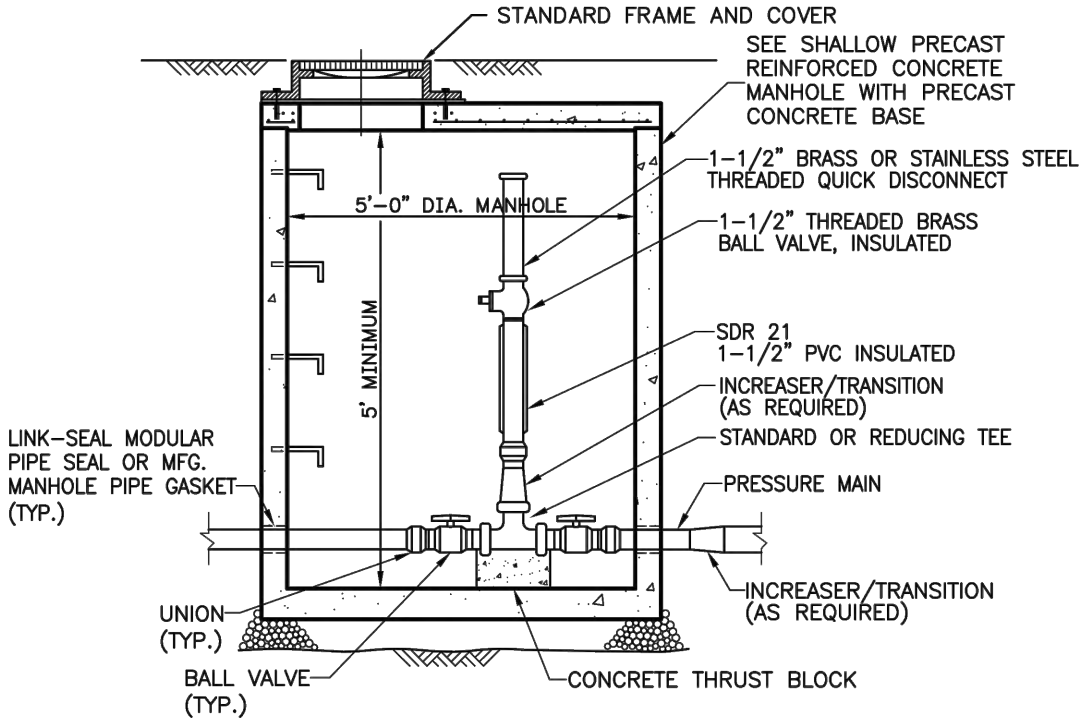
LOW PRESSURE SEWER
DISCHARGE MANHOLE

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	8/1/2023
DWG. NO.	EPT02725-7
FILE NO.	4833.9.02.00



PLAN



SECTIONAL ELEVATION

EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

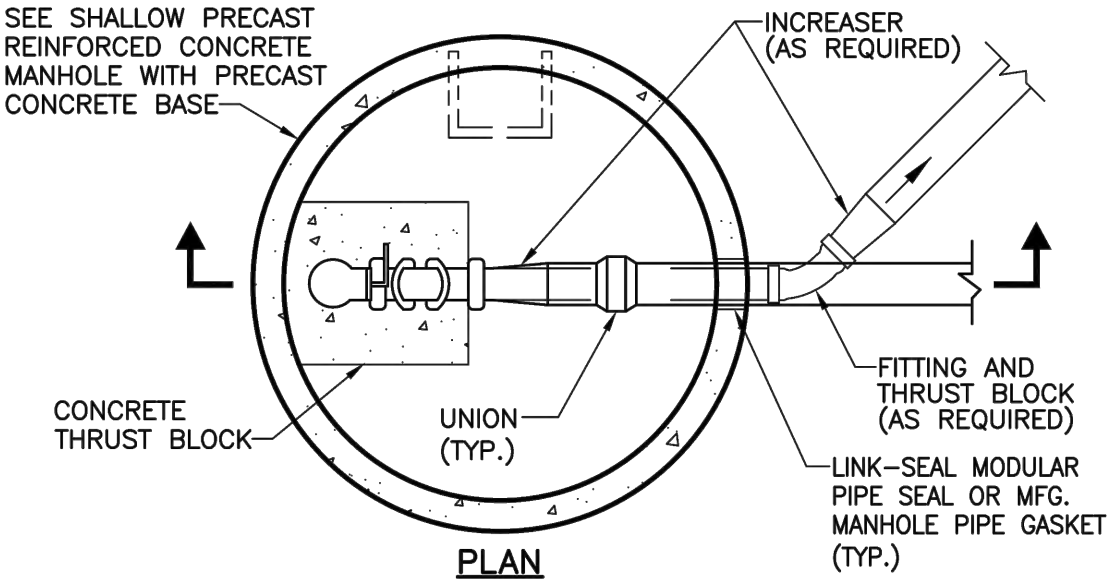
GHD

225 GRANDVIEW AVENUE SUITE 403, CAMP HILL, PA
PHONE (717) 541-0622
WWW.GHD.COM

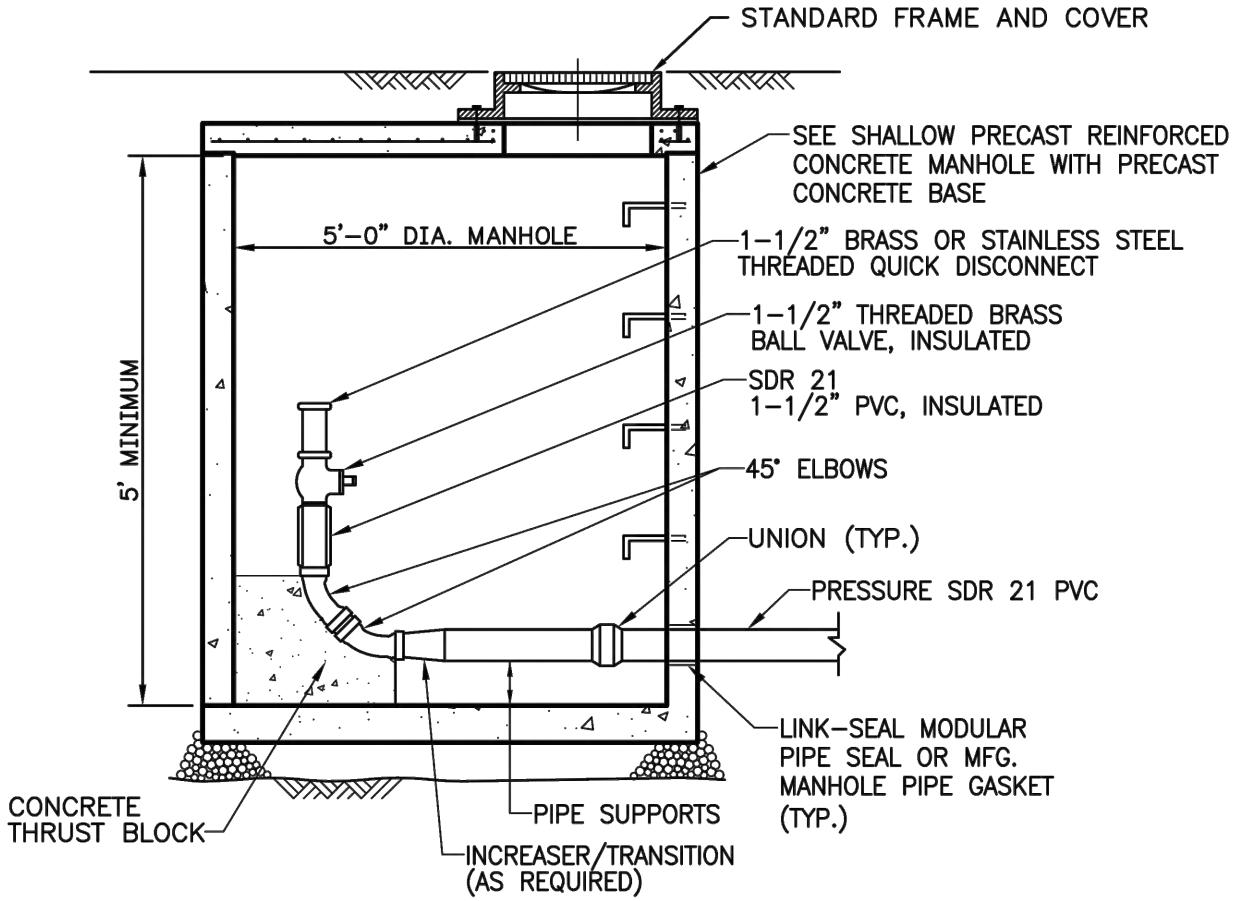
IN-LINE CLEANOUT/VALVE PIT
FOR LOW PRESSURE SEWER MAIN

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	8/1/2023
DWG. NO.	EPT02725-8
FILE NO.	4833.9.02.00



PLAN



SECTIONAL ELEVATION

EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

GHD

225 GRANDVIEW AVENUE SUITE 403, CAMP HILL, PA
PHONE (717) 541-0622
WWW.GHD.COM

IN-LINE TERMINAL CLENAOUT
FOR LOW PRESSURE MAIN

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	8/1/2023
DWG. NO.	EPT02725-9
FILE NO.	4833.9.02.00

SECTION 02760

PAVEMENT MARKINGS

PART 1 GENERAL

1.01 DESCRIPTION

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

1. Application of traffic lines, markers or legends on roadway surfaces.
2. Surface preparation.
3. Removal of any conflicting pavement markings.
4. Inlaid thermoplastic pavement markings.

B. Related Work Specified Elsewhere:

1. Bituminous paving and surfacing:..... Section 02500
2. Trench paving and restoration: ..... Section 02575

1.02 QUALITY ASSURANCE

A. Reference Standards:

1. Pennsylvania Department of Transportation (PennDOT), latest revision:

   Publication 408, Specifications.

   Publication 68 Regulations – Traffic Signs, Signals and Markings

   Publication 213, Temporary Traffic Control Guidelines

2. American Society for Testing and Materials (ASTM), latest revision:

   D868 Standard Method of Evaluating Degree of Bleeding of Traffic Paint

   D4505 Standard Specification for Preformed Retroreflective Pavement Marking Tape for Extended Service Life

   E1710 Standard Test Method for Measurement of Retroreflective Pavement Marking Materials with CEN-Prescribed Geometry Using a Portable Retroreflectometer

3. The Institute of Transportation Engineer (ITE):

   "A Model Performance Specification for the Purchase of Pavement Marking Paints and Powders", approved September 25, 1977.

4. American Association of State Highway and Transportation Officials (AASHTO):

   M247 Glass Beads Used in Traffic Paints

   M249 White and Yellow Reflective Thermoplastic Striping Materials (Solid Form)

5. Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), latest edition.

B. Qualifications:

1. Installer shall specialize in application of traffic lines and pavement markings and have five (5) years documented experience in Pennsylvania.

2. Contractor shall meet PennDOT standards for installing pavement markings.

1.03 SUBMITTALS

A. Letter of certification from the paint manufacturer stating that traffic line paint supplied meets either PennDOT' spec for Traffic Line Paint (required type) or the referenced ITE spec. This letter shall accompany the delivery of the material and be given to the Township prior to the installation of pavement markings. Contractor shall supply certification (CS-4171).

B. Application method, material, and manufacturer's required mixing instruction and surface preparation details.

C. Schedule of operations.

D. Inlaid thermoplastic pavement markings:

1. Product data sheet from manufacturer.

2. A four (4) square foot pre-cut sample of each lot or batch for each color for testing physical properties, if required.

3. Certification from manufacturer that the Contractor has been properly trained in the handling and installation of the product.

1.04 JOB CONDITIONS

A. Control of Traffic:

1. Take measures to control traffic during line painting operations. Line painting machine shall not appreciably impede traffic flow in adjacent lanes while painting centerline and one lane shall be left completely open to traffic when painting edge lines.

2. Employee traffic control measures in accordance with Publication 213, Temporary Traffic Control Guidelines.

B. Temperature and Weather Restrictions:

1. Painted traffic lines and markings shall not be placed when the ambient temperature is less than 40 degrees Fahrenheit.

2. Cold plastic markers or legends shall be applied only when the surface temperature is 60 degrees Fahrenheit or higher, unless otherwise directed by the Township.

C. Protection of Markings:

1. Protect markings during and after application using barrier cones or other devices to keep traffic off newly applied markings until track free.

D. Environmental Requirements:

1. Adhere to manufacturer's data on air and surface temperature limits and relative humidity during application and curing of coatings. Schedule coating work to avoid dust and airborne contaminants.

E. Material Storage:

1. If paint is stored for more than two (2) months, invert container several days prior to use.

2. Store glass bead in a cool, dry place.

3. All products shall be protected from weather and freezing.

1.05 WARRANTY

A. The Contractor shall guarantee to replace, at his expense, that portion of the pavement marking installed which, in the opinion of the Township, has not remained effective in performing useful daylight and nighttime service for a period of 6 months from the date of installation. The required service is defined as 90% of markings being effective and in place.

PART 2 PRODUCTS

2.01 PAINT

A. Paint shall be PennDOT Paint Type I, unless otherwise noted, and shall consist of either an alkyd resin type or a combination of alkyd resin type modified with chlorinated rubber ready-mixed white and yellow traffic paints, for use on bituminous and Portland cement concrete pavements. These paints shall be reflectorized for night visibility, if specified, by adding reflective spheres before the paint dries or sets, using the drop-on or pressurized methods.

B. Traffic paint shall consist of ready-mixed pigmented binder in a one package system. When applied at the wet-film thickness of 15 mils, the paint shall be suitable for application to traffic bearing surfaces such as Portland cement concrete, bituminous pavements, and plain or vitrified brick surfaces of streets, highways, bridges, tunnels and parking lots.

C. Pigments:

1. *White* - Any combination of pigments provided the finished paint meets all the requirements specified herein. Sufficient suspending and dispersing agents shall be used to prevent excessive settling.

2. *Yellow* - Any organic yellow pigment provided it does not contain any of the metals listed in EPA Code of Regulations 40. Sufficient suspending and dispersing agents shall be used to prevent excessive settling. Color of dry paint film shall match Color No. 33538 of Federal Standard 595a.

D. Binder:

1. The supplier may use any combination of ingredients, except tall oil resins, provided the finished paint meets all the requirements herein. Sufficient amounts of anti-skinning agents shall be used to prevent skinning. Sufficient resin solids, compatible thinners and driers, if necessary, shall be used.

2.02 GLASS SPHERES

A. Glass spheres shall meet the requirements of Publication 408, Section 1103.14 (a) 2. and all current supplements.

B. Glass beads shall be in units of 50 lbs. and packed in moisture-proof bags. The beads shall be stored in a cool dry place.

2.03 COLD PLASTIC PAVEMENT MARKINGS

A. Pigmented plastic which contains glass beads and capable of being attached to bituminous and/or cement concrete pavement by means of a factory applied, pressure-sensitive adhesive.

B. Pigments shall meet requirements in Section 1103.14 (a) 1. in Publication 408.

C. Glass beads - AASHTO M247.

2.04 HEAT APPLIED THERMOPLASTIC MARKINGS

A. A durable, retro-reflective pavement marking material suitable for use as roadway, intersection, commercial or private delineation markings. Must be composed of hydrocarbon resin, aggregate, pigments, binders and glass beads which have been factory produced as a finished product, and is designed to meet the requirements of the current edition of the MUTCD. The thermoplastic material conforms to AASHTO M249, with the exception of the relevant differences due to supplying the material in a preformed state.

B. The markings must be a resilient white or yellow hydrocarbon thermoplastic product with uniformly distributed glass beads throughout the entire cross section area. Lines, legends and symbols are capable of being affixed to bituminous and/or Portland concrete pavements by the use of the normal heat of a propane type of torch. Other colors shall be available as required.

C. The markings must be capable of conforming to pavement contours, breaks and faults through the action of traffic at normal pavement temperatures. The markings shall have resealing characteristics, such that it is capable of fusing with itself and previously applied thermoplastic when heated with the torch.

D. The markings must be able to be applied in temperatures down to 32 degrees Fahrenheit without any special storage, preheating or treatment of the material before application.

E. Pigments:

1. *White*: Sufficient titanium dioxide pigment is used to ensure a color similar to Federal Highway White, Color No. 17886, as per Federal Standard 595a.

2. *Yellow*: Sufficient yellow pigment is used to ensure a color similar to Federal Highway Yellow, Color No. 15358, as per Federal Standard 595a. The yellow pigment must be of organic origin only.

F. *Environmental Resistance*: The material must be resistant to deterioration due to exposure to sunlight, water, oil, gasoline, salt or adverse weather conditions.

2.05 METHYL METHACRYLATE MARKINGS (MMA)

A. A durable, cold applied, 2 component material composed of resins in reactive monomers, pigment, plasticizer, fillers and/or glass beads and is to be reacted just prior to application with a benzoyl-peroxide catalyst. It shall be suitable for use as roadway intersection, commercial or private delineation markings on asphaltic or Portland cement surfaces.

B. Color shall be as required by project (white and/or yellow).

C. MMA shall be lead free and cure to a minimum 99% solids when reacted as per the manufacturer's instructions. All mixed material shall cure to a no track condition within 15 minutes of application at min. 40 mils wet at 77˚F.

D. Applied markings shall not deteriorate due to ultraviolet light, water, oil, pavement oil, salt and adverse weather conditions.

E. Material shall be capable of conforming to pavement contours, breaks and faults through action of traffic at normal pavement temperatures.

2.06 RAISED PAVEMENT MARKERS

A. Plowable or non-plowable as per Section 1103.05(c) in Publication 408 and the drawings.

1. Plowable: Shaped to fit in a depression in the pavement.

2. Non-plowable: Attached to roadway surface by use of pressure sensitive adhesive.

B. Plastic, retro-reflective surface, color and one-way or two-way marker as indicated on drawings.

1. Retroreflectors shall be prismatic type, acrylic plastic molded polycarbonate or other suitable material designed to provide strength, abrasion resistance, impact resistance, resilience and adhesion. The retroreflective shall be ultraviolet stabilized grade material which provides resistance to color change over long periods of outdoor exposure.

2. The retroreflective surface shall contain two (2) prismatic reflective faces to reflect light in two (2) directions. The surface of the reflective face shall be protected by a permanently bonded glass face or other transparent, abrasion resistant material. Reflective face colors shall be selected by the Township.

2.07 INLAID THERMOPLASTIC PAVEMENT MARKINGS

A. The inlaid thermoplastic pavement markings shall be provided pre-cut in sizes to conform to the specified pattern, widths and shapes shown on the drawings. The material shall be packaged in accordance with accepted commercial standards and, when stored in cool dry area indoors, shall be suitable for use for one year after the date of purchase.

B. Accepted pre-cut reflectorized inlaid thermoplastic pavement markings materials shall be the thermoplastic material for inlay into hot mix asphalt (HMA). The inlaid thermoplastic material shall have a minimum thickness of 90 mils (2.3mm), and consist of a mixture of high quality polymeric materials, pigments, fibers, and glass beads distributed throughout the cross-section, and with a reflective layer of glass beads bonded to the top surface.

C. *Softening Point*: The softening point shall be measured by the Ring and Bell method, as described in ASTM D-36-95 (2000). Acceptable range shall be 210-250˚ F (100-120˚ C).

D. *Bond Strength*: Thermoplastic bond strength to asphalt substrate shall be measured by Cross-Cut Test, as described in ASTM D-3359. A minimum of 50% of thermoplastic bond surface shall exhibit attached particles of asphalt.

E. Acceptable manufacturer for inlaid thermoplastic marking is Streetprint Duratherm at (800).688.5653, unless noted on the drawings.

PART 3 EXECUTION

3.01 SURFACE PREPARATION

A. Clean the surface of the roadway before application of traffic lines or pavement markings to provide a clean, dry roadway surface which is free of loose dirt and other debris, to the satisfaction of the Township.

B. The surface cleaning for Cold Plastic markings shall include as a last operation the use of compressed air or a fine bristled broom over the application area to provide a dust-free surface.

C. New concrete road surfaces shall be cured at least seven (7) days prior to marking. Remove curing compounds prior to applying markings.

D. MMA markings may be placed on top of existing MMA markings which are in good condition. Other non-MMA markings must be mechanically removed prior to placement of new MMA markings. Remove chipped or flaking MMA markings prior to placing new MMA markings.

3.02 APPLICATION OF PAINTED MARKINGS

A. *Paint*: Paint shall be dispensed in a wet film thickness of 15+1 mils. The rate of application of paint on bituminous surface treatment roads may be 25% greater. The Township will determine whether roadways require an increased application rate.

B. *Glass Beads*: Glass beads shall be applied at a rate of six (6) pounds per gallon of paint.

C. Apply new pavement markings and "touch-up" existing markings within the limits of work. The finished project shall match the drawings.

3.03 EQUIPMENT FOR PAINTED MARKINGS

A. The line painting machine type shall be such that it shall not appreciably impede the traffic flow in adjacent lanes while painting the centerlines of the roadway and one lane shall be left completely open to traffic when painting edge lines.

B. The line painting machines used on this project shall be capable of a simultaneous application of two parallel lines in either a solid or broken pattern in forming the centerline. It shall also be capable of the automatic dispensing of glass beads onto the painted surface at the required application rate, by the pressurized glass gun method.

C. The machinery shall also be capable of providing a paint line in 4-inch, 6-inch and 8-inch widths.

D. Each piece of machinery used to apply centerlines and edge lines shall be equipped with a measuring device which automatically and continuously measures to the nearest foot, the length of each line placed.

E. Legends shall be applied with equipment approved by the Township; hand brushes or rollers are not permitted. Glass beads may be hand applied.

3.04 CENTERLINE APPLICATION

A. Where existing centerlines are visible and properly located, the new centerlines shall be applied directly over the existing pattern. Where centerlines do not exist, or existing centerlines are improperly located, as determined by the Township, the new centerlines shall be applied at the correct location. If the existing markings have to be removed to allow correct placement of the new markings, such work shall be done in accordance with Section 963 of Publication 408. This work is incidental to the application of the new centerline.

B. In general, on two-lane roadways, the centerline shall evenly divide the roadway; however, if a portion of the roadway on either or both sides is to be utilized for parking, the centerline shall evenly divide the traveled way.

C. Apply the centerline in its proper location; any centerline pattern placed more than six (6) inches from the center of the roadway or traveled way shall be removed and replaced by the Contractor at his own expense.

3.05 EDGELINE APPLICATION

A. Field-check all roadways shown on the drawings which require application of edge lines. Only those roadway sections which are 20 feet or greater in width for more than 50 percent of their length shall be painted with edge lines.

3.06 APPLICATION OF COLD PLASTIC MARKINGS

A. *Inlaids*: Place material on new bituminous surface just before final compaction. Roll material into new surface to achieve flush finished surface.

B. *Surface applied*: Apply onto the existing, cleaned surface of concrete or bituminous roadways.

C. Use compatible "adhesive activator" or "primer sealer", if recommended by adhesive manufacturer.

3.07 APPLICATION OF HEAT APPLIED THERMOPLASTIC MARKINGS

A. *Asphalt*: The materials shall be applied using the propane torch method recommended by the manufacturer. The material must be able to be applied at ambient and road temperatures down to 32 degrees F. without any preheating of the pavement to a specific temperature. The pavement shall be clean, dry and free of debris. Supplier must enclose application instructions with each box/package.

B. *Portland Concrete*: The same application procedure shall be used as described under above Paragraph 3.07A. However, a compatible primer sealer may be applied before application to assure proper adhesion.

3.08 APPLICATION OF METHYL METHACRYLATE MARKINGS

A. Apply MMA markings using one method chosen from the three listed below, depending on project type and size:

1. Extrude using trowel, drag box, push cart or shoe. (Applicable for all types of markings). Recommended film thickness is 90 mils, drop on glass rate of 10 lbs. /100 sq. ft.

2. Stencil Spray using spray applicator (for all types of markings). Recommended film thickness for transverse markings and symbols is 90 mils; 60 mils for longitudinal markings.

3. Truck Spray using driven vehicle and paint guns to apply longitudinal lines. Recommended film thickness is 40 mils with a double drop of glass beads.

3.09 RAISED PAVEMENT MARKERS

A. Install markers as per manufacturer's requirements and the drawings, according to the MUTCD. Installation shall be performed so as not to cause damage to the surrounding pavement. The Contractor shall be responsible for repairing any damaged pavement surfaces at no additional cost. The edges of pavement markers shall be a minimum of four (4") inches from pavement joints.

1. The pavement shall be cut to the dimensions and depth recommended by the manufacturer.

2. All cutting shall be performed to minimize airborne dust and similar dust. All debris from cutting shall be vacuumed up from the pavement cut and adjacent pavement surfaces and disposed of properly.

3. Only install raised pavement markers when the ambient and pavement temperatures are above 50˚F.

4. The epoxy resin adhesive material shall follow manufacturer's recommendations for proportioning, mixing and application.

5. The pavement markers shall be immediately placed into the epoxy-filled pavement cut.

B. Contractor shall provide manufacturer PennDOT certification (CS-4171) that all raised pavement markers meet all current Federal and State regulations previously stated.

3.10 INLAID THERMOPLASTIC PAVEMENT MARKINGS

A. Pre-cut inlaid thermoplastic pavement marking material shall be furnished and installed by the Contractor at the locations and with the proper dimensions or as directed by the Township at the appropriate time after the completion of the asphalt surface.

B. The surface shall be clean and free of all dust, silt, debris and, most importantly, chemical residue from de-icing materials. If de-icing material has been used on the road in the past, cleaning shall be carried out using pressure washing.

C. Placement shall be in accordance with the Manufacturer's recommendations and the installers shall posses an appropriate Certification of training from the Manufacturer.

D. Layout and imprinting of the pattern into the surface of the asphalt shall be as per the drawings. Imprinting shall be carried out after the paving work has been completed. The asphalt surface shall be re-heated to make the upper portion of the asphalt surface pliable enough to accept the imprint of the template. The application of heat to existing asphalt surface shall be done using reciprocating infra-red re-heating equipment.

E. The asphalt surface temperature shall not exceed 325˚ F (163˚C). The temperature of the asphalt surface shall be regularly monitored during the reheating process, to avoid over heating and degradation of the asphalt cement. Direct flame heaters and non-reciprocating heaters shall not be allowed to be used for this purpose. Once the asphalt has reached imprinting temperature, the templates shall be place in position and pressed into the surface using vibratory plate compactors.

F. Supply and install the inlaid thermoplastic panels on completely dry asphalt, in the imprinted area. Heat shall be gently applied to the surface using reciprocating infra red heaters, slowly raising the surface temperature until the thermoplastic material in the panels starts to liquefy and flow, but no higher than 325˚F. Once the thermoplastic material has liquefied, the heat source shall be removed and the surface allowed cooling to ambient temperature. Only once the asphalt surface and the thermoplastic have reached ambient temperature may the road be opened to traffic.

END SECTION

SECTION 02852

GUIDE RAIL

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The work of this section includes installation of steel guide rail on bridges and along roadways, including any excavation, concrete work, and restoration of paved or unpaved surfaces.

B. Related work specified elsewhere:

1. Bituminous paving and surfacing:..... Section 02500
2. Plain and reinforced cement concrete: ..... Section 03000

1.02 QUALITY ASSURANCE

A. Reference Standards:

1. Pennsylvania Department of Transportation (latest revisions):

Publication 408, Specifications

Publication 72M, Standards for Roadway Construction (RC)

Publication 219M, Bridge Construction Standards (BC)

B. Qualifications:

1. *Guide Rail Installer* - shall be a firm that specializes in this work, has minimum 5 years experience and is PennDOT pre-qualified to perform this work.

1.03 JOB CONDITIONS

A. Control of traffic

1. Employ traffic control measures only after requesting traffic alterations, in writing to the Township.

2. The Contractor will employ traffic control measures in accordance with the MUTCD and with PennDOT Publication 213.

3. Notify Township, Engineer and Cumberland County Emergency Services (911) at least 72 hours in advance of any operations requiring changes to existing traffic patterns.

B. Protection of existing utilities and structures:

1. Take all precautions to protect existing utilities and structures. Comply with requirements of Pennsylvania Underground Utility Protection Law.

2. Advise each person operating power equipment for excavation of the type and location of utility lines at the job site.

3. Immediately notify utility owner and Township of any damage to a utility line.

PART 2 PRODUCTS

2.01 GUIDE RAIL

A. All rail elements, posts, offset brackets, base plates, other hardware and end sections shall be in accordance with PennDOT Publication 408, Section 1109, including galvanizing.

2.02 ANCHOR BOLTS

A. Anchor bolts shall be in accordance with PennDOT Publication 408 Specifications, Section 1105 and as shown on approved drawings.

2.03 CONCRETE

A. Concrete for end anchorage shall be Class A cement concrete in accordance with PennDOT Publication 408 Specifications, Section 704.

PART 3 EXECUTION

3.01 APPROACH GUIDE RAIL

A. Remove any existing railing and install new guide rail in accordance with PennDOT Publication 408 Specifications, Section 620.

B. Install guide rail at the post spacing's, lengths and with end treatments complying with the Contract Drawings and Penndot Publication 408, 219M and 72M. Restore ground surface to pre-existing conditions.

3.02 STRUCTURE MOUNTED RAILING

A. Install new guide rail on the new or existing structure as shown on the drawings.

3.03 CLEAN UP

A. Clean up debris and unused material and remove from the site.

END OF SECTION

SECTION 02901

LANDSCAPE PLANTING

PART 1 GENERAL

1.01 DESCRIPTION

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

1. Furnishing and planting trees, shrubs and grasses.
2. Transporting trees and shrubs.
3. Maintenance.
4. Fertilizing and mulching.

B. Related Work Specified Elsewhere:

1. Finish grading, seeding and sodding:..... Section 02485

C. Definitions:

1. *Weeds* - vegetative species other than specified species to be established in a given area. Weeds include dandelion, crabgrass, chickweed, poison ivy, bermuda grass, thistles, and similar species.

D. Applicable Standard Details:

1. PennDOT Publication 72M, Standard for roadway construction, latest edition.

2. See Approved Drawings.

1.02 QUALITY ASSURANCE

A. Reference Standards:

1. Horticultural Standards, Latest edition of rules and grading, adopted by the American Association of Nurserymen.

2. Standardized Plant Names, American Joint Committee on Horticulture Nomenclature.

3. ANSI 260.1 of American Association of Nursery.

B. Qualifications:

1. *Nursery*: Company specializing in growing and cultivating plants with five (5) years of experience.

2. *Installer*: Company specializing in installing and planting plants and placing mulch, with five (5) years of experience.

1.03 JOB CONDITIONS

A. Protect underground utilities and structures. Comply with local and State requirements to locate facilities to avoid damage.

B. Control of Traffic:

1. Traffic on Township streets may be limited as required with advance approval from the Township. The Contractor must notify the Township three (3) days in advance for traffic limitations.

C. Protection of Adjacent Areas:

1. Precautions shall be taken in regard to the damage of Township's or State streets by any other heavy equipment.

D. Coordination with Utilities:

1. The Contractor will be responsible to place any and all PA One Calls. Contractor shall provide all serial numbers to the Township prior to commencing work.

2. Coordination with utility companies for any utility adjustments is the responsibility of the Contractor.

E. Safety Precautions:

1. All open trenches, excavation areas, and the perimeter of the project shall be fenced and barricaded during non-construction periods.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Comply with local, State and Federal laws relative to plant material shipment.

B. Contractor shall identify any stockpile locations to Township prior to construction.

C. During loading, transporting and unloading material, Contractor shall exercise care to prevent damage.

PART 2 PRODUCTS

2.01 PLANT STOCK

A. All plant material shall be true to type and name, in accordance with the current edition of Standardized Plant Names. Each plant or plant group shall be labeled with not less than the plants common name and size. Each plant shall be typical of the species or variety specified. All stock shall be free from disease, insect infestations, mechanical injuries, broken branches, or other defects and also meeting the following requirements.

1. Nursery Stock shall have been grown in a certified nursery for a period of at least two (2) full growing seasons. The use of mechanical digging equipment at the nursery will be permitted only when its use is not deemed detrimental to nursery stock survival.

2. Plants shall not be collected from native areas.

3. Balled and Burlapped Plants (B&B) shall have a firm ball composed of original, undisturbed soil, wrapped with untreated burlap and laced with biodegradable lacing to hold the root ball firm and intact. All plants found with broken, loose or manufactured root balls, will be rejected. Trees shall have a well-developed root system and a straight stem.

4. Container-Grown Plants shall have been grown for a least one (1) year, but not more than two (2) years, in the same container and shall not exist in a “pot-bound” condition.

5. Bare Root Plants shall have a live, well-balanced root system with moist, fibrous root hairs free from rot and mold.

B. Plant material shall be handled, packed, and stored using good nursery practices. Materials shall be available for inspection in the nursery before digging. The Township reserves the right to tag selected plants, indicating acceptable form, shape, and culture practices, in compliance with detailed specifications.

C. Any plant material which is designated as rejected material shall be segregated and removed from the planting site within 48 hours.

D. All plant material shall be free of insect, disease, and any mechanical injury.

E. Tree types shall be in accordance with drawings.

2.02 WRAPPING MATERIAL

A. Approved wrapping material shall be crinkle-Kraft waterproof paper 30-30-30 in 4” widths or approved equal.

2.03 FERTILIZER

A. Commercial fertilizer shall conform to the requirements of the Pennsylvania Soil Conditioner and Plant Growth Substance Law, Act of December 1, 1977, P.L. 258, No. 86 (3P.S.68.2), as amended. Fertilizer shall have an analysis of 0-20-0, 20-10-5 (10 gram tablets) or 16-8-16 and shall be packaged in 4 ounce, individual, heat-sealed, polyethylene envelopes. Add fertilizer to plant pits at the rate recommended by the manufacturer.

B. Balance root system with moist, fibrous root hairs free from rot and mold.

2.04 MULCH

A. All mulch shall be free from foreign material, coarse stems, and any substances toxic to plant growth. Material shall be suitable, shredded not decomposed, between 1/4" and 2" in any dimension.

B. The color of the mulch shall be selected by the Township.

2.05 BACKFILL MIX FOR PLANTINGS

A. Backfill mix, if needed, shall consist of a homogeneous mixture of 20% peat (either shredded reed sedge peat or spaghnum moss peat, or a combination of both from fresh water sites) and 80% topsoil by volume.

B. Construction debris may not be used as backfill mix.

2.06 STAKES AND GUYS

A. Where required, stakes shall be rough-sawn, red or white cedar, southern yellow pine, or acceptable hardwoods free from knots, rot, or other defects which may impair the strength of the stake. Steel channel bar posts, rolled from Standard Carbon Steel Rails, and meeting ASTM A499 may be used in lieu of wood stakes.

B. All wire for bracing and guying trees shall be #12 gage, galvanized, and shall meet ASTM A392, Class II requirements.

2.07 HOSE GUARD

A. To protect trees and shrubs from guy wire damage, an acceptable hose guard shall be utilized.

2.08 WEED BARRIER MAT

A. Each area where a tree is proposed to be planted shall have nonwoven 100% polyester fiber fabric manufactured for this specific purpose. The weed barrier mat shall extend to the limits of the planting island.

2.09 TREE PROTECTORS

A. If shown on the drawings, all newly planted trees shall have a tree protector device installed around the base. The protector shall be corrugated polyethylene solid pipe (ASTM D1248, ASTM F405) of a minimum diameter of 2X greater than the caliper of the tree, and a length of 18". Galvanized steel or aluminum, perforated protectors may be used but must have a rubber hose guard lining at the top.

B. Before placing, samples or manufacturers catalog cuts of the devices shall be submitted for review and acceptance.

PART 3 EXECUTION

3.01 TEMPORARY STORAGE

A. All plant material not planted immediately shall be properly stored. Obtain, provide, and prepare a suitable healing-in site or arrange for a well-ventilated and cool storage shed located near the planting site. Temporarily store container-grown or balled and burlapped plants in a protected area, with containers or balls 6 inches apart. Fill all voids with moist mulch to the top of the container or ball.

B. Bare root plant material which arrives at the planting site shall be immediately removed from the transport vehicle. Roots shall be covered with wet burlap or mulch to prevent drying. Protect the plant material from sun and wind and keep fresh by fine mist spraying, or by other acceptable methods.

C. Protect plants at all times. All material left out of the ground, unprotected overnight, with roots exposed to sun and wind, or unprotected during transit, unloading, storage, heating in or during actual planting operations will be rejected.

D. The planting areas shall be stripped of existing mulch and topsoil, (which can be stored for reuse).

3.02 LAYOUT OF PLANTINGS

A. Delineate the tree installation locations, bed and planting area outlines. Identify the plants to be placed at the delineated locations. Do not start excavation or cultivation until the locations and outlines have been accepted by the Township.

B. Should obstructions prevent planting at the indicated locations, alternate locations or deletions will be determined by the Township.

3.03 BED PREPARATION

A. For areas indicated for tree installation, prepare the area in the following manner to attain the designed finished grade:

1. Where indicated on drawings, remove existing tree or stump, including any existing concrete, bricks or blocks. Remove sod and all undesirable growth, add additional topsoil, if required to re-establish grade. Each planting area shall promote positive drainage when complete.

2. Uniformly spread 3 inches of peat, and then thoroughly incorporate it into the soil to a minimum depth of 6 inches. As directed during this blending operation, remove and dispose of undesirable material larger than 2 inches in any dimension.

3. Each planting area shall have a minimum of 3" of settled mulch on top of the plantings.

3.04 PREPARATION OF PLANTS

A. For bare root shrubs, vines, and seedling transplants, dig pits with vertical sides and flat bottoms large enough to accommodate roots without crowding. For balled and burlapped plants, the pit shall be twice the width of the ball diameter. For common periwinkle, pachysandra, and ivy, provide only four (4) inches of backfill mix beneath and around all sides of the root system.

B. All plant pits designated for bare root or balled and burlapped plant stock shall be dug prior to removing plants from temporary storage. Immediately before planting, scarify, loosen, or roughen the sides of the plant pit.

3.05 PRUNING

A. Broken or badly bruised branches shall be removed with a clean cut. Pruning cuts over 3/4" diameter shall be painted over with approved tree paint.

B. Root pruning shall only be performed to remove damaged or broken main roots. Cut immediately above the damage with a clean oblique cut.

C. Typical top pruning, as directed, shall be performed appropriately for each species, variety, size, or planting location. Typical pruning samples will serve as a guide for subsequent pruning throughout the project.

D. Prune the tops of deciduous shrubs prior to or immediately following planting. Prune according to best horticultural practices regarding natural or desired form and growth characteristics of the individual species. Unless otherwise directed, remove one-fourth to one-third of the potential leaf bearing surface from deciduous plants. Only trim or thin evergreens when and as directed.

3.06 PLANTING OR TRANSPLANTING

A. Planting shall be performed when soil and climatic conditions are favorable, and according to the following schedule. Where local conditions warrant and at the direction of the Township, these dates may be extended:

1. Deciduous Trees and Shrubs: October 15- June 15

2. Evergreen Trees: March 1- May 15 and August 1- September 15

3. Seedlings and Seedling Transplants: March 1- May 15

B. Plants shall be set plumb and at the specified depth. Plant material shall be handled by the packaging material and not by the stem or branches. Remove plant containers or pre-formed root protection devices which restrict root development immediately prior to planting. Balled and burlapped material shall be placed in the plant pits intact. Set the root collar at the finished grade.

C. Bare root material shall be planted immediately. To prevent root drying, use wet burlap, straw, hay or other protective measures.

D. Fertilize in accordance with the fertilizer schedule. Cultivate and completely tamp backfill mix around the ball or toots, in a manner that fills voids and eliminates air pockets. Use extreme care to avoid damaging roots during backfilling and tamping operations. When backfilling is two-thirds complete, on balled and burlapped material, cut the lacing around the main stem or trunk then lay the burlap back. Thoroughly water the plant. After absorption of all water, complete the backfill operation and water again.

E. For each planting area, install the weed barrier mat to match the diameter of the plant pit or other designated area and staple. The weed barrier mat shall be installed to the extent of the planting island. Mulch areas required. The weed barrier mat shall have a minimum of 3” of mulch on top of it.

F. Wrap deciduous shade flowering tree trunks from the ground line to the lowest main branches, overlapping the wrap. Tie the wrapping at the top middle, and bottom and at a minimum of two other places.

G. If staking and guying is required, perform that operation immediately after completion of backfilling.

H. Install tree protectors around the base of deciduous and flowering trees with the bottom of the protector extending through the mulch and being in contact with the backfill material.

3.07 MULCH APPLICATION

A. All plants shall be mulched with tanbark shredded mulch to a uniform depth of 3”, settled depth, placed after planting.

B. Remove weeds and deleterious materials prior to placing mulch. Place mulch within two (2) days after planting.

C. Rake mulch surface smooth and even. Soak full depth of mulch thoroughly with water the same day.

3.08 MAINTENANCE OF PLANTING

A. All plants shall be maintained in a living, healthy condition until the entire project has been accepted. Plants are required to be growing in place at least 60 days prior to project acceptance. During this period of establishment, perform necessary maintenance functions such as weeding, spraying, remulching, and watering, as required or directed.

B. Watering shall be performed during the period of establishment promptly and with sufficient personnel and equipment to complete any directed operation within five (5) calendar days of such direction.

C. Tighten guys and stakes that may become loosened. At the end of the guarantee period, Contractor shall remove all guying material.

3.09 CLEAN UP

A. The planting site shall be left in an acceptable condition, with all debris and undesirable excavated material satisfactorily removed from the site and suitably disposed of. The acceptable condition may also require seeding and mulching of disturbed areas within the limits of work.

3.10 REPLACEMENT AND GUARANTEE

A. Within the required establishment period and prior to acceptance of the project, all plants determined by the Township not to be alive or in a healthy condition shall be replaced with plants of the same species, size, and quality as originally indicated and specified. Replacement may be directed to be made at the beginning of the next planting seasons.

B. Contractor shall guarantee all plants for a period of one (1) year from the date of acceptance. Date of acceptance is defined as the inspection after the last of total planting is installed. Inspection will be performed by the Township when requested by the Contractor.

C. Contractor shall maintain all plantings for 90 days following project completion and provide maintenance instructions for the owner.

END OF SECTION

SECTION 03000

PLAIN AND REINFORCED CEMENT CONCRETE

PART 1 GENERAL

1.01 DESCRIPTION

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

1. Construction of cast-in-place plain and reinforced cement concrete structures, excluding structures that are in direct contact with sewage.
2. Concrete curbs and sidewalks
3. Trench restoration of concrete roadways and driveways.
4. Testing of cast-in-place concrete for curbs, sidewalks, and utility related structures.

B. Related Work Specified Elsewhere:

1. Cement concrete curb and sidewalk: ..... Section 02525

C. Definitions:

1. *Exposed construction* - permanently exposed to view.

2. *Concrete* - Normal weight concrete for which density is not a controlling attribute, made with aggregates of the types covered by ASTM C33, and having unit weights in the range of 135 to 160 lb. per cubic foot.

3. *f'c* - The design compressive strength of the hardened concrete at an age of 28-days.

D. Applicable Standard Details: NONE

E. Work shall conform to all requirements of ACT 301-05, published by the American Concrete Institute, Farming Hill Michigan except as modified by the specifications.

1.02 QUALITY ASSURANCE

A. Reference Standards:

1. American Concrete Institute (ACI)

ACI 117 Standard Specifications for Tolerance for Concrete Construction and Materials.

ACI 301 Specifications for Structural Concrete.

ACI 315 Details and Detailing of Concrete Reinforcement.

ACI 318 Building Code Requirements for Reinforced Concrete.

2. American Society for Testing and Materials (ASTM)

A185	Standard Specification for Welded Steel Wire Fabric for Concrete Reinforcement
A615	Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
C31	Standard Method of Making and Curing Concrete Test Specimens in the Field
C33	Standard Specification for Concrete Aggregates
C39	Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
C42	Standard Method of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
C94	Standard Specification for Ready-Mixed Concrete
C138	Standard Test Method for Unit Weight, Yield, and Air Content (Gravimetric) of Concrete
C143	Standard Test Method for Slump of Portland Cement Concrete
C150	Standard Specification for Portland Cement
C171	Standard Specification for Sheet Materials for Curing Concrete
C172	Standard Method of Sampling Freshly Mixed Concrete
C173	Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
C192	Standard Method of Making and Curing Concrete Test Specimens in the Laboratory
C231	Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
C260	Standard Specification for Air-Entraining Admixtures for Concrete
C309	Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
C494	Standard Specification for Chemical Admixtures for Concrete
D698	Tests For Moisture-Density Relations of Soils
D994	Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type)
D1751	Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
D1752	Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction
E329	Standard Recommended Practice for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as Used in Construction

3. National Ready-Mixed Concrete Association, 900 Spring Street, Silver Spring, MD 20910: Check list for certification of ready-mixed concrete production facilities.

B. Testing Agencies:

1. Testing services shall be performed by an independent testing agency acceptable to the Municipality at the Contractor's expense.

2. All testing agencies shall meet the requirements of ASTM E329.

1.03 SUBMITTALS

A. Submit manufacturer's or supplier's certification for the following materials verifying compliance with these Specifications:

1. Portland cement
2. Coarse and fine aggregates
3. Any specified concrete admixtures
4. Reinforcing steel
5. Joint forming and filling materials
6. Form coating materials
7. Concrete curing compounds

B. Submit concrete mix designs, including strength test records, for review and approval.

C. Submit certified results of compressive strength cylinder tests.

D. Submit copies of concrete batch slips.

PART 2 PRODUCTS

2.01 CONCRETE

A. *Cement* - Unless otherwise specified, portland cement shall be Type I cement conforming to ASTM C150.

B. *Aggregates* - Aggregates for normal weight concrete shall meet the requirements of ASTM C33.

C. *Water* - Mixing water for concrete shall be clean, potable water meeting the requirements of ASTM C94.

D. *Admixtures* - Concrete admixtures, when required and/or approved for use by the Municipality shall conform to the following Specifications:

1. Air-entraining admixtures - ASTM C260.

2. Water-reducing, retarding and accelerating admixtures - ASTM C494.

2.02 REINFORCEMENT

A. *Reinforcing Bars* - All reinforcing bars shall be deformed, except spirals, which may be plain bars. Reinforcing bars shall be Grade 60, billet-steel conforming to the requirements of ASTM A615, including supplementary requirement on the drawings.

B. *Welded Wire Fabric* - Welded wire fabric shall be fabricated from smooth or deformed wire of the size and spacing required on the drawings and shall conform to the requirements of ASTM A185, except welded intersections shall be spaced not farther apart than 12 inches in the direction of the principal reinforcement.

PART 3 EXECUTION

3.01 PROPORTIONING

A. *General* - Concrete for all parts of the work shall be of the specified quality and capable of being placed without excessive segregation. When hardened, concrete shall develop all characteristics required by these Specifications.

B. *Strength* - Unless otherwise specified, the minimum 28-day compressive strength of the concrete, f'c, shall be 3000 psi.

C. *Durability* - All concrete which will be subjected to potentially destructive exposure, including freezing and thawing, weather, and/or deicer chemicals, shall be air-entrained and shall conform to the air content limits in ACT 301 moderate exposure.

3.02 REINFORCEMENT

A. *Welding* - Welding of crossing bars (tack welding) for assembly of reinforcement is prohibited.

B. Fabricate and place all reinforcing in accordance with ACI 117.

3.03 EMBEDDED ITEMS

A. All sleeves, inserts, anchors, and embedded items required for adjoining work or for its support shall be placed prior to concreting.

B. All contractors whose work is related to the concrete or must be supported by it shall be given ample notice and opportunity to introduce and/or furnish embedded items before the concrete is placed.

C. Placing Embedded Items - Expansion joint material, waterstops, and other embedded items shall be positioned accurately and supported against displacement. Voids in sleeves, inserts, and anchor slots shall be filled temporarily with readily removable material to prevent the entry of concrete into the voids.

3.04 PRODUCTION OF CONCRETE

A. *Production Method* - All concrete shall be ready-mixed concrete batched, mixed and transported in accordance with ASTM C94. Plant equipment and facilities shall conform to "Certification of Ready-Mixed Concrete Production Facilities (Checklist with Instructions)" of the National Ready-Mixed Concrete Association.

B. When concrete arrives at the project with slump below that suitable for placing, as indicated by the designer's Specifications, water may be added only if neither the maximum permissible water-cement ratio nor the maximum slump is exceeded. The water shall be incorporated by additional mixing equal to at least half of the total mixing required. Discharge of the concrete shall be completed within 1-1/2 hours, or before the truck drum has revolved 300 revolutions, whichever comes first, after the introduction of the mixing water to the cement and aggregates or the introduction of the cement to the aggregates. Truck batch slips must include time of batching, total drum revolutions upon arrival at site, and quantity of water (in gallons) per cubic yard available to be added to attain the maximum design water-cement ratio.

3.05 PLACING

A. Preparation Before Placing:

1. Hardened concrete and foreign materials shall be removed from the inner surfaces of the conveying equipment.

2. Formwork shall be completed; snow, ice and water shall be removed; reinforcement shall be secured in place; expansion joint material, anchors, and other embedded items shall be positioned; and the entire preparation shall be accepted.

3. Concrete shall not be placed on frozen ground. Concrete shall also not be placed on unstable saturated ground.

B. Conveying:

1. Concrete shall be handled from the mixer to the place of final deposit as rapidly as practicable by methods which will prevent segregation or loss of ingredients and in a manner which will assure that the required quality of the concrete is maintained.

2. Conveying equipment shall be of a size and design such that detectable setting of concrete shall not occur before adjacent concrete is placed. Conveying equipment shall be cleaned at the end of each operation or work day. Conveying equipment and operations shall conform to the following additional requirements:

a. Truck mixers, agitators and non-agitating units and their manner of operation shall conform to the applicable requirements of ASTM C94.

b. Belt conveyors shall be horizontal or at a slope which will not cause excessive segregation or loss of ingredients. Concrete shall be protected against undue drying or rise in temperature. An acceptable arrangement shall be used at the discharge end to prevent segregation. Mortar shall not be allowed to adhere to the return length of the belt. Long runs shall be discharged into a hopper or through a baffle.

c. Chutes shall be metal or metal-lined and shall have a slope not exceeding 1 vertical to 2 horizontal and not less than 1 vertical to 3 horizontal. Chutes more than 20 ft. long and chutes not meeting the slope requirements may be used provided they discharge into a hopper before distribution.

d. Pumping or pneumatic conveying equipment shall be capable of pumping the specified mix with adequate pumping capacity. Pneumatic placement shall be controlled so that segregation is not apparent in the discharged concrete. The loss of slump in pumping or pneumatic conveying equipment shall not exceed 2 in. Concrete shall not be conveyed through pipe made of aluminum or aluminum alloy.

C. Depositing:

1. *General* - Concrete shall be deposited continuously, or in layers of such thickness that no concrete will be deposited on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness within the section. If a section cannot be placed continuously, construction joints shall be located as indicated on the drawings. Placing shall be carried on at such a rate that the concrete which is being integrated with fresh concrete is still plastic. Concrete which has partially hardened or has been contaminated by foreign materials shall not be deposited. Temporary spreaders in forms shall be removed when the concrete placing has reached an elevation rendering their service unnecessary. They may remain embedded in the concrete only if made of metal or concrete and if prior acceptance has been obtained.

2. *Segregation* - Concrete shall be deposited as nearly as practicable in its final position to avoid segregation due to re-handling or flowing. Concrete shall not be subjected to any procedure which will cause segregation.

3. *Consolidation* - All concrete shall be consolidated by vibration, spading, rodding or forking so that the concrete is thoroughly worked around the reinforcement, around embedded items, and into corners of forms, eliminating all air or stone pockets which may cause honey-combing, pitting, or planes of weakness. Internal vibrators used shall be the largest size and the most powerful that can be properly used in the work. They shall be operated by competent workmen. Use of vibrators to transport concrete within forms shall not be allowed. Vibrators shall be inserted and withdrawn at points approximately 18 in. apart. At each insertion, the duration shall be sufficient to consolidate the concrete but not sufficient to cause segregation, generally from 5 to 15 seconds. A spare vibrator shall be kept on the job site during all concrete placing operations. Where the concrete is to have an as-cast finish, a full surface of mortar shall be brought against the form by the vibration process, supplemented if necessary, by spading to work the coarse aggregate back from the formed surface.

D. Protection:

1. Unless adequate protection is provided, concrete shall not be placed during rain, sleet, or snow.

2. Rainwater shall not be allowed to increase the mixing water nor to damage the surface finish.

3. The temperature of the concrete as placed shall not be so high as to cause difficulty from loss of slump, flash set, or cold joints and should not exceed 90°F. When the temperature of the steel is greater than 120°F, steel forms and reinforcements shall be sprayed with water just prior to placing the concrete.

3.06 FINISHING OF FORMED SURFACES

A. If the finish is not designated on the drawings, the following finishes shall be used as applicable:

1. Rough form finish - For all concrete surfaces not permanently exposed. Tie holes and defects shall be patched and fins over 1/4" in heights rubbed off.

2. Smooth rubbed finish - For all concrete surfaces permanently exposed. Apply on newly hardened concrete within one day following form removal. Surfaces shall be wetted and rubbed until uniform color and texture are produced.

3.07 SLABS

A. *General* - Concrete for slabs shall be as specified in Article 3.01.

B. Preparation of subgrade for slabs on ground within public rights-of-way:

1. The subgrade shall be well drained and of adequate and uniform loadbearing capacity. The minimum in-place density of the subgrade soils shall be not less than 95% of its maximum dry weight density at its optimum moisture content, plus or minus 2%, as determined by ASTM D698.

2. The subgrade shall be free of frost before concrete placing begins. If the temperature inside a building where concrete is to be placed is below freezing it shall be raised and maintained above 50˚F long enough to remove all frost from the subgrade.

3. The subgrade shall be moist at the time of concreting. If necessary, it shall be dampened with water in advance of concreting, but there shall not be standing water on the subgrade nor any muddy or soft spots when the concrete is placed.

C. Finishes:

1. *Floated finish* - After the concrete has been placed, consolidated, struck off, and leveled, the concrete shall not be worked further until ready for floating. Floating with a hand float or with a bladed power trowel equipped with float shoes, or with a powered disc float shall begin when the water sheen has disappeared and when the surface has stiffened sufficiently to permit the operation. During or after the first floating, planeness of surface shall be checked with a 10-ft. straightedge applied at not less than two different angles. All high spots shall be cut down and all low spots filled. The slab shall then be refloated immediately to a uniform sandy texture.

2. *Broom or belt finish* - Immediately after the concrete has received a float finish, it shall be given a coarse transverse scored texture by drawing a broom or burlap belt across the surface.

3. *Unspecified Finish* - When type of finish is not specified on the drawings, use broom finish.

3.08 CURING AND PROTECTION

A. *General* - Beginning immediately after placement, concrete shall be protected from premature drying, excessively hot or cold temperatures, and mechanical injury, and shall be maintained with minimal moisture loss at a relatively constant temperature for the period necessary for hydration of the cement and hardening of the concrete.

B. Preservation of Moisture:

1. For concrete surfaces not in contact with forms, one of the following procedures shall be applied immediately after completion of placement and finishing:

   a. Application of acceptable moisture-retaining covering as approved by the Municipality.

   b. Application of a curing compound conforming to ASTM C309. The compound shall be applied in accordance with the recommendations of the manufacturer immediately after any water sheen which may develop after finishing has disappeared from the concrete surface. It shall not be used on any surface against which additional concrete or other material is to be bonded unless it is proven that the curing compound will not prevent bond, or unless positive measures are taken to remove it completely from areas to receive bonded applications.

2. Moisture loss from surfaces placed against wooden forms or metal forms exposed to heating by the sun shall be minimized by keeping the forms wet until they can be safely removed. After form removal the concrete shall be cured.

3. Curing shall be continued for at least 7 days. Alternatively, if tests are made of cylinders kept adjacent to the structure and cured by the same methods, moisture retention measures may be terminated when the average compressive strength has reached 70 percent of the strength, f'c. Moisture retention measures may also be terminated when the temperature of the concrete is maintained at least at 50˚F for the same length of time that laboratory-cured cylinders, representative of the concrete in-place, require to achieve 85 percent of f'c.

C. Temperature, Wind, and Humidity:

1. *Cold weather* - When the mean daily outdoor temperature is less than 40°F, the temperature of the concrete shall be maintained between 50° and 70°F for the required curing period. When necessary, arrangements for heating, covering, insulating, or housing the concrete work shall be made in advance of placement and shall be adequate to maintain the required temperature without injury due to concentration of heat. Combustion heaters shall not be used during the first 24 hr. unless precautions are taken to prevent exposure of the concrete to exhaust gases which contain carbon dioxide.

2. *Hot weather* - When necessary, provision for windbreaks, shading, fog spraying, sprinkling, ponding, or wet covering with a light colored material shall be made in advance of placement, and such protective measures shall be taken as quickly as concrete hardening and finishing operations will allow.

3. *Rate of temperature change* - Changes in temperature of the air immediately adjacent to the concrete during and immediately following the curing period shall be kept as uniform as possible and shall not exceed 5°F in any 1 hr. or 50°F in any 24-hr. period.

D. *Protection from mechanical injury* - During the curing period, the concrete shall be protected from damaging mechanical disturbances, such as load stresses, heavy shock, and excessive vibration. All finished concrete surfaces shall be protected from damage by construction equipment, materials or methods, by application of curing procedures, and by rain or running water.

3.09 TESTING

A. *General* - Concrete materials and operations will be tested and inspected as the work progresses. Failure to detect any defective work or material shall not in any way prevent later rejection when such defects are discovered nor shall it obligate the Municipality for final acceptance.

B. *Testing Services* - The following testing services shall be performed by the offices of the Township's Engineering Representative at the Contractor's expense:

1. Conduct strength tests of the concrete during construction in accordance with the following procedures:

a. Secure composite samples in accordance with ASTM C172. Each sample shall be obtained from a different batch of concrete on a random basis, avoiding any selection of the test batch other than by a number selected at random before commencement of concrete placement.

b. Mold and cure four (4) specimens from each sample in accordance with ASTM C31. Any deviations from the requirements of this Standard shall be recorded in the test report.

c. Test specimens in accordance with ASTM C39. Two (2) specimens shall be tested at 28 days for acceptance and two (2) shall be tested at 7 days for information. The acceptance test results shall be the average of the strengths of the specimens tested at 28 days. If one specimen in a test manifests evidence of improper sampling, molding or testing, it shall be discarded and the strength of the remaining cylinder shall be considered the test result. Should both specimens in a test show any of the above defects, the entire test shall be discarded.

d. Make at least one strength test for each 50 cu. yd., or fraction thereof, of each mixture design of concrete placed in any 1 day. When the total quantity of concrete with a given mixture design is less than 20 cu. yd., the strength tests may be waived by the Engineer if, in his judgment, adequate evidence of satisfactory strength is provided, such as strength test results for the same kind of concrete supplied on the same day and under comparable conditions to other work or other projects.

2. Determine slump of the concrete sample for each strength test and whenever consistency of concrete appears to vary, using ASTM C143.

3. Determine air content of the concrete sample for each strength test in accordance with either ASTM C231, ASTM C173, or ASTM C138.

4. Determine temperature of the concrete sample for each strength test.

C. *Additional Services When Required* - The following services shall be performed by the offices of the Township's Engineering Representative, when required by the Township at the Contractor's expense:

1. Inspect concrete batching, mixing and delivery operations to the extent deemed necessary by the Township.

2. Sample concrete at point of placement and perform required tests.

3. Review the manufacturer's report for each shipment of cement and reinforcing steel and conduct laboratory tests or spot checks of the materials as received for compliance with specifications.

4. Mold four (4) additional specimens from each sample in accordance with ASTM C31 and field cure in or on the structure providing the same method of cure for the specimens as that which the structure receives.

D. *Other Services As Needed* - The following services shall be performed by the Township's Engineering Representative at the Contractor's expense:

1. Additional testing of materials or concrete occasioned by their failure by test or inspection to meet specification requirements.

2. Additional testing and inspection required because of changes in materials or proportions requested by the Contractor.

E. Duties and Authorities of Designated Testing Agency:

1. Representatives of the agency shall inspect, sample, and test the materials and the production of concrete. When it appears that any material furnished or work performed by the Contractor fails to fulfill specification requirements, the testing agency shall report such deficiency to the Municipality and the Contractor.

2. The agency shall report all test and inspection results to the Municipality and Contractor immediately after they are performed. All test reports shall include the exact location in the work at which the batch represented by a test was deposited. Reports of strength tests shall include detailed information on storage and curing of specimens prior to testing.

3. The testing agency and its representatives are not authorized to revoke, alter, relax, enlarge or release any requirement of the Documents, nor to approve or accept any portion of the work.

F. Responsibilities and Duties of Contractor:

1. The Contractor shall provide the necessary testing services for the following:

   a. Qualification of proposed materials and the establishment of mixture designs.

   b. Other testing services needed or required by the Contractor.

2. The use of testing services shall in no way relieve the Contractor of the responsibility to furnish materials and construction in full compliance with these specifications.

3. The Contractor shall submit to the Municipality the concrete materials and the concrete mix designs proposed for use with a written request for acceptance. This submittal shall include the results of all testing performed to qualify the materials and to establish the mix designs. No concrete shall be placed in the work until the Contractor has received such acceptance in writing.

4. To facilitate testing and inspection, the Contractor shall:

   a. Furnish any necessary labor to assist the testing agency in obtaining and handling samples at the project or other sources of materials.

   b. Advise the testing agency sufficiently in advance of operations to allow for completion of quality tests and for the assignment of personnel.

   c. Provide and maintain for the sole use of the testing agency adequate facilities for safe storage and proper curing of concrete test specimens on the project site for the first 24 hrs. as required by ASTM C31.

END OF SECTION

SECTION 03050

CEMENT CONCRETE FOR UTILITY CONSTRUCTION

PART 1 GENERAL

1.01 DESCRIPTION

A. The work of this section includes, but is not limited to cast-in-place cement concrete for:

1. Reaction and support blocking
2. Cradles and encasements
3. Miscellaneous utility related cast-in-place cement concrete construction

B. Related work specified elsewhere:

1. Trenching, backfilling and compaction ..... Section 02221
2. Trench paving and restoration..... Section 02575
3. Storm inlets, catch basins, endwalls ..... Section 02602
5. Sanitary sewer pipe..... Section 02610
6. Plain and reinforced cement concrete ..... Section 03000

C. Definitions: NONE

D. Applicable Standard Details:

1. EPT 03050-1 ..... Concrete Encasement Detail
2. EPT03050-2 ..... Concrete Anchor Detail
3. EPT 03050-3 ..... Thrust Blocking Details
4. EPT 03050-4 ..... Special Concrete Encasement for Frost Protection Detail

1.02 QUALITY ASSURANCE

A. Reference Standards:

1. Pennsylvania Department of Transportation (PennDOT), latest revision:

   Publication 408, Specifications

B. Inspections:

1. Inspections by the Township will, at a minimum, be made of the subgrade, formwork, supports, and reinforcement prior to placement of the concrete; and of the concrete prior to backfilling.

C. Testing:

1. As specified in Section 03000, Paragraph 3.09.

1.03 SUBMITTALS

A. Submit concrete mix designs, including strength test records, for review and approval.

B. Submit certified results of compressive strength cylinder tests.

C. Submit copies of concrete batch slips.

PART 2 PRODUCTS

2.01 CEMENT CONCRETE

A. As specified in Section 03000.

B. For work involving a time constraint, use PennDOT Class HES (High Early Strength).

2.02 REINFORCEMENT STEEL

A. As specified in Section 03000.

PART 3 EXECUTION

3.01 CONSTRUCTION

A. Comply with Section 03000 for construction requirements including placement, curing, and protection of cement concrete.

B. Excavate and shape trench bottoms and sides to accommodate thrust block forms, encasements, manhole bases, drop connections, inlets, and vaults.

C. Support pipes, valves, and fittings at the required elevation with brick or concrete block. Do not use earth, rock, wood, or organic materials as supports.

D. Provide spacers, chairs, bolsters, ties, and other devices for properly placing, spacing, supporting, and fastening reinforcement in place.

E. Place concrete utilizing all possible care to prevent displacement of pipes or fittings. Return displaced pipes or fittings to line and grade immediately.

F. Ensure tie rods, nuts, bolts, and flanges are free and clear of concrete.

G. Do not backfill structures until concrete has achieved its initial set and forms are removed.

H. Perform backfilling and compaction as specified in Section 02221, Paragraph 3.11.

END OF SECTION

K:\483390200\Design\Constuction & Material Specs\SECTION 03050-CEMENT CONCRETE FOR UTILITY CONSTRUCTION.doc

SECTION 11330

ABOVE GROUND PUMP STATIONS

PART 1 GENERAL

1.01. WORK INCLUDED

A. Above Ground Pump Station and Accessories

B. Pump Force Main

C. Applicable Standard Details:

1. EPT 11330-1 .....Typical Pump Station Layout with Toilet Facilities & Chemical Room

1.02. REQUIREMENTS FOR ABOVE GROUND PUMP STATIONS

A. Above Ground pump stations shall meet the following requirements:

1. Receive station approval from Township's Engineer.

2. The Township has preferences to the types of pumps used for above ground stations. The Developer is reminded to consult with the Township prior to design of any station.

3. Meet the requirements set forth in this Section and in the Manual.

B. Above Ground Pump Station Applications

1. The Developer shall submit for approval by the Engineer/Township an summary of information containing the following information:

a. Applications can be obtained from the Township.

b. Name and address of developer.

c. Project location.

d. Name of manufacturer and model number of equipment to be used.

e. Site plan drawings showing the location of proposed pump station and location of the proposed force main.

PART 2 MATERIALS

2.01. ABOVE GROUND PUMP STATION

A. General

1. The station shall meet at a minimum all the design criteria as indicated in the DEP Domestic Wastewater Facilities Manual.

2. A minimum of two (2) pumps shall be provided. However, pumping capacity must be provided so that if the largest pump were out of service the peak flow would still be pumped. Pumps shall be of the suction lift variety if feasible.

3. Pre-cast concrete wet well with a lockable stainless steel access hatch. The wet well shall also include a stainless steel ladder with an attached safety device.

4. Heated brick and block building with exterior lighting.

5. Shingled roof.

6. Lifting devices including beam and/or a removable hoist for removal of pumps.

7. Emergency backup power with an automatic transfer switch.

8. Emergency dialer system with phone service.

9. Visible exterior alarm light.

10. Water service both inside and outside of the building.

11. All sewage piping including suction and discharge shall be cement-lined class 52 ductile iron pipe.

12. All force main piping shall be cement-lined class 52 ductile iron pipe with restrained joints.

13. Mercury bubbler level control system with an emergency high-level float.

14. Air release valve(s) as required.

15. Provisions for odor control such as a chemical pump and chemical injection system.

16. All other reasonable requests of the Township.

B. Submittals

1. Design calculations indicating adequate pump capacity for future conditions. The Engineer shall review and provide approval of the design calculations to assure adequate pump capacity.

2. Site plan and elevation drawings showing:

   a. Location of building(s), structural and architectural details and sections, mechanical, HVAC and electrical drawings and geotechnical reports.

   b. Location and elevations of gravity sewers to the station.

   c. Location and elevations of the force main.

   d. Location and elevations of any air release valves that may be necessary.

3. Calculations justifying pump horsepower and impeller diameter selection.

4. Calculations justifying the anti-flotation system.

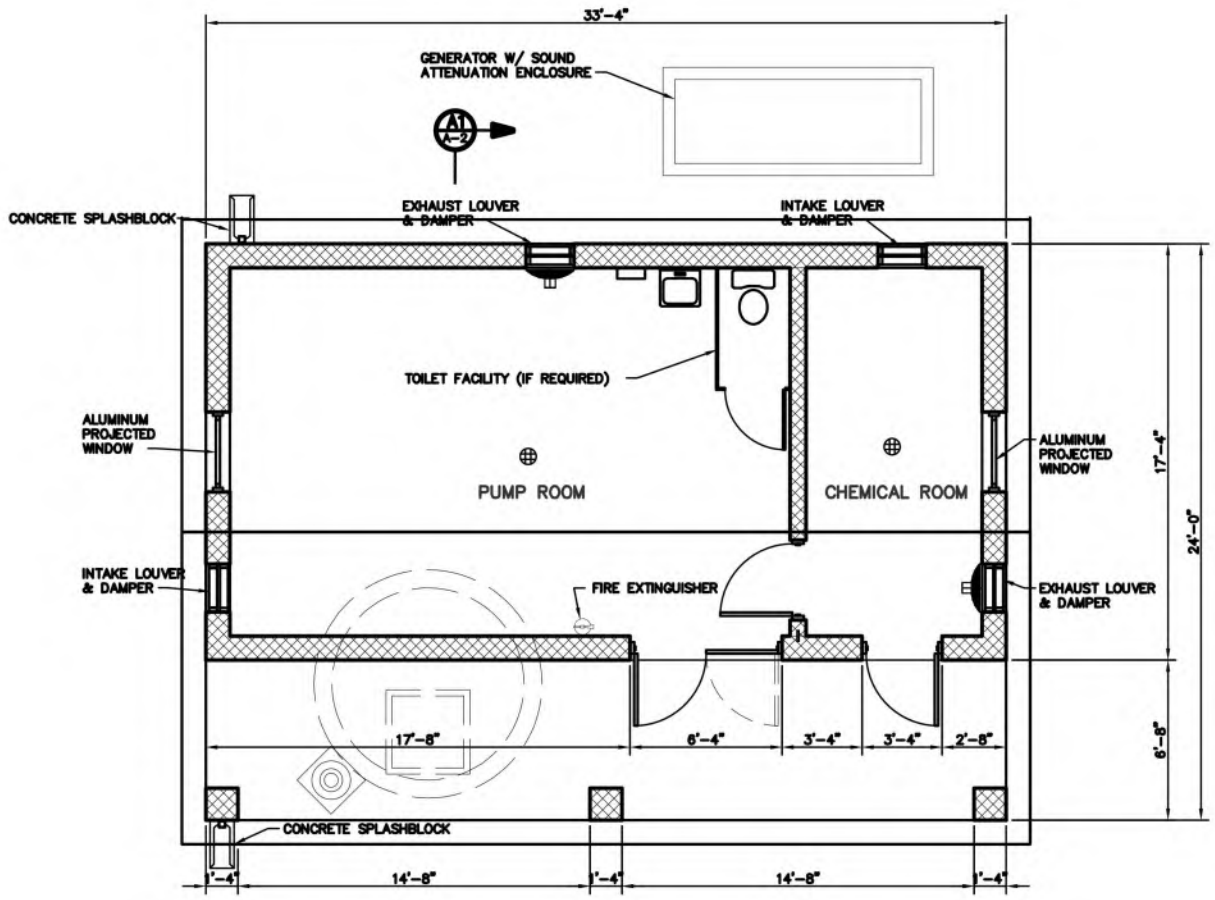
5. Shop drawings on all equipment and materials to be provided in the station.

PART 3 EXECUTION

3.01. START-UP TESTING

A. The Developer is responsible for all start up testing of the new station as well as training of Township personnel prior to acceptance of the station.

END OF SECTION



EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

GHD

225 GRANDVIEW AVENUE SUITE 403, CAMP HILL, PA
PHONE (717) 541-0622
WWW.GHD.COM

TYPICAL PUMP STATION LAYOUT
WITH TOILET FACILITIES
& CHEMICAL ROOM

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	8/1/2023
DWG. NO.	EPT11330-1
FILE NO.	4833.9.02.00

SECTION 11400

SUBMERSIBLE GRINDER PUMP STATIONS

PART 1 GENERAL

1.01. WORK INCLUDED

A. Submersible Grinder Pump Station and Accessories

B. Applicable Standard Details:

1. EPT 11400-1….. ..... Typical Grinder Pump Installation Detail
2. EPT 11400-2 ..... Typical Grinder Pump Installation Detail
3. EPT 11400-3 .. Environment one grinder pump outdoor installation poured in-place
4. EPT 11400-4 ..... Simplex Sewage Grinder Pump Station
5. EPT 11400-5 ..... Typical Electrical Layout

1.02. REQUIREMENTS FOR SUBMERSIBLE GRINDER PUMP STATIONS

A. Submersible grinder pump stations shall meet the following requirements:

1. Receive Grinder Station approval from Township's Engineer.
2. Meet the requirements set forth in this Section and in the Manual.

B. Grinder Pump Station Applications

1. Details for submersible grinder pumping station are included in this manual.
2. For each project where the use of grinder pumps has been proposed, the Developer shall submit for approval by the Engineer an application containing the following information:

a. Applications can be obtained from the Township.

b. Name and address of developer.

c. Project location.

d. Name of manufacturer and model number of equipment to be used.

e. Site plan and elevation drawings showing the location of building(s) using grinder pump stations, location and elevations of gravity sewers to the grinder pump stations, elevations of the top and the base of each grinder pump station, and location and elevations of the pressure sewers.

f. Calculations justifying pump horsepower and impeller diameter selection.

g. Calculations justifying the anti-flotation system.

PART 2 MATERIALS

2.01. SUBMERSIBLE GRINDER PUMP STATION

A. General

1. Simplex grinder pump unit shall be used at each residential property location.

2. Grinder pump station shall be installed in a fiberglass-reinforced polyester basin for outdoor installation only. Indoor installation will not be permitted.

3. Grinder pump station shall consist of submersible grinder pump and motor, complete with fiberglass basin, junction box and all internal wiring, slide away mounting system, mercury float switch system, high water alarm, piping and valves, and motor controlled.

4. A control panel shall be provided for each unit and installed on the exterior of each home.

5. The manufacturer of the grinder pump station shall be:

a. Hydromatic Pump Co. Division (Centrifugal Pumps)

b. Environment One (Positive Displacement Pumps)

c. Or equal, which must be approved by the Township.

B. Grinder Pump and Accessories – Centrifugal Grinder Pump

1. Grinder Pump

a. The pump unit shall be driven by a minimum 2 HP 3,450 RPM motor. The Developer shall submit calculations justifying the pump horsepower and impeller diameter selected.

b. The grinder shall be capable of shearing and reducing to a fine slurry all material normally found in domestic sewage. Impeller and pump housing shall be designed with passages capable of passing all materials macerated by the grinder assembly without clogging or nuisance roping within the pump chamber. Pump discharge shall be 1¼ inches.

c. Major components of the pump end, such as casing, impeller, seal plate and intermediate housing, shall be of ASTM class 30 cast iron construction. Pump shaft and hardware shall be 300 series stainless steel.

2. Pump Motor

a. The pump motor shall be a submersible type, full 2 horsepower, 3450 RPM, suitable to operate on a 230 volt, 60 Hz, single phase service. Stator windings shall be of proper size to drive the pump at any point on the pump curve. Single phase motor shall have start winding as well as run winding thermal protection to prevent stator burn out under high torque starting or operating conditions.

b. The motor shall be oil filled to lubricate upper and lower motor ball bearings as well as to act as a cooling medium for the stator.

c. The motor shall be provided with an electric sensing probe to detect any water leakage past the lower seal before damage is done to the motor. The seal probe circuit sensitivity shall not be affected by cable length between the motor and the seal probe circuitry in the control panel.

d. The stator windings shall be mounted in a corrosion-resistant, hermetically sealed submersible type housing. The Stator windings shall have Class B insulation, (130°C or 266°F), NEMA L design or MG1 (single phase) and shall be potted in a heat-dissipated epoxy, forming a high strength leak proof assembly to prohibit liquid or other contaminants from entering the windings.

e. The motor shall be provided with a heat sensor thermostat in the motor windings to detect an overheat condition and stop the pump. When the temperature drops to a safe level, the pump will automatically reset.

f. Motor power and control wires shall be sealed between the motor and terminal housings to prevent oil from entering the terminal housing as well as to act as a secondary barrier in the event water enters the terminal housing. A watertight compression type fitting shall provide further protection for each cable.

g. Motor housing, terminal housing, and end plate shall be constructed of cast iron of no lesser grade than Class 30. Motor shaft and hardware shall be 416 stainless steel.

3. Pump Suspension System

a. The pump suspension system shall enable the pump to be removed from the basin by lifting the grinder pump unit only. Systems requiring removal of pump hardware or breaking of unions (or couplings) will not be acceptable.

b. Mounting system shall be serviceable without entering the basin to replace or adjust components mounted on the bottom of the basin.

c. The slide rail assembly shall consist of 304 stainless steel upper guide rail brackets with the slide rail assembly of 14 gauge 304 stainless steel. The stationary and movable portions of the hydraulically sealed discharge coupling assembly shall be machined cast iron. The upper guide rail bracket shall mount to the basin wall and position the upper end of the stainless steel guide rail while the discharge pipe positions the lower end of the guide rail.

d. Stainless steel guide brackets shall be attached to the pump for positioning of the unit on the guide rail during installation or removal of the unit within the basin.

4. Level Control

a. Level control shall be by means of mercury float switches, single action design, capable of withstanding water penetration under 25 feet of water with at least a 3 to 1 safety factor. Float switches shall be mounted firmly in place in such a way that prevents tangling or fouling in the basin.

b. Two float switches shall be used to control level; one for pump turn on, and one for pump turn off. A third switch shall be provided for high water alarm.

5. Junction Box

    a. NEMA 4X watertight junction box shall be installed in the basin for connection of the pump and control wiring. The box shall be constructed of self-extinguishing ABS plastic with minimum wall thickness of 3/16 inch. The box cover shall be bolted on with stainless steel fasteners and sealed with a neoprene gasket. Individual corrosion-resistant and liquid tight cable connectors constructed of thermoplastic with neoprene bushing and sealing ring shall be provided. The box and all connections shall be completely watertight and shall be capable of withstanding an external liquid pressure of 10 PSI. The junction box and fittings shall be of waterproof design. All fittings and hardware shall be of non-corrosive construction.

    b. Conduit and wiring between basin and control panel shall be installed in accordance with National Electric Codes and all electrical codes.

    c. The junction box shall be mounted within easy reach from ground level and must open in such a manner that all connections within can be viewed from the surface without leaning into the basin.

6. Valves, Fittings, and Piping shall meet or exceed properties provided herein.

    a. Influent connection shall be a four (4)-inch cast iron or thermoplastic caulking hub shipped loose for field mounting by the installer. The hub shall be designed to be installed without personnel having to enter the basin. The hub shall be beveled approximately 3° to accommodate the gravity pipe. The influent hub shall have a textured surface in order to provide better caulking adhesion.

    b. The discharge piping shall consist of schedule 40 stainless steel pipe or SCH 80 PVC. A ball check valve shall be installed between the pump discharge and the movable fitting.

    c. The design of the check valve shall be such that the ball shall not impede flow through the valve. The operating flow area shall be equal to the nominal size of the valve. The ball shall clear the waterway providing “full flow” equal to the diameter of the pump discharge piping. It shall be non-clog in design. The ball shall be resistant to material normally found in sewage. The body and access plug shall be gray cast iron, ASTM Class 30 or better.

    d. The movable fitting shall be positive seal, slide design having a working pressure rating of no less than 150 psi. The movable fitting, when in position shall be held against the stationary fitting by the construction of the stainless steel rail, aligning the movable fitting for proper sealing of the two surfaces under pressure. A stainless steel lifting cable with a minimum breaking strength of 2,100 pounds shall be provided for pump installation and removal.

    e. A bronze gate valve shall be installed in the discharge piping to provide shut-off capabilities during pump removal, and shall be fitted with an integral stainless steel extension handle. The extension handle shall extend up to within six (6) inches of the top of the basin and shall be secured at the top of the basin with a stainless steel bracket.

f. A flushing connection shall be provided in the discharge line past the check and isolation valves. The connection shall include a bronze gate valve, 1¼-inch stainless steel pipe, and a female "Ever-Tite" quick disconnect coupling. The connection point shall be 6 inches below the top of the basin. The flushing valve shall be furnished with a handle of identical construction to that furnished for the isolation valve.

7. Grinder Pump Station Basin

a. The basin shall be constructed of fiberglass-reinforced polyester with molded top flange and bottom. The basin shall be free of imperfections, sound, watertight, and of high-quality workmanship. The polyester laminates shall provide a balance of mechanical, chemical, and electrical properties to ensure a long life. They must be impervious to microorganisms, mildew, mold, and fungus, and non-corrosive inside and outside when installed in soils deleterious to metal or concrete structures.

b. The basin shall have a minimum diameter of 36 inches and have other dimensions as shown in the Detail Drawings. Basin shall have a minimum storage capacity of 250 gallons.

c. Basin wall thickness shall be suitable to withstand wall collapse under a hydrostatic pressure of 120 pounds per cubic foot. Basin walls and bottom must be capable of withstanding at least two times the actual imposed loading at basin depth.

d. An anti-flotation collar or bottom plate shall be furnished on the basin.

e. Each basin shall be furnished with a 2-inch PVC rainproof vent, with the opening covered with a corrosion-resistant screen. The vent shall be installed in the basin cover and terminate in a down-turned position.

C. Grinder Pump and Accessories- Positive Displacement Pumps:

1. Grinder Pump:

a. The pump shall be a custom designed, integral, vertical rotor, motor-driven, solids handling pump of the progressing cavity type with a single mechanical seal. Double radial O-ring seals are required at all casting joints to minimize corrosion and create a protective barrier. All pump castings shall be cast iron, fully epoxy coated to 8-10 mil Nominal dry thickness, wet applied. The rotor shall be through-hardened, highly polished, precipitation hardened stainless steel. The stator shall be of a specifically compounded ethylene propylene synthetic elastomer. This material shall be suitable for domestic wastewater service. Its physical properties shall include high tear and abrasion resistance, grease resistance, water and detergent resistance, temperature stability, excellent aging properties, and outstanding wear resistance. Buna-N is not acceptable as a stator material because it does not exhibit the properties as outlined above and required for wastewater service.

b. As a maximum, the motor shall be a 1 HP, 1725 RPM, 240 Volt 60 Hertz, 1 Phase, capacitor start, ball bearing, air-cooled induction type with Class F installation, low starting current not to exceed 30 amperes and high starting torque of 8.4 foot pounds. The DEVELOPER shall submit calculations justifying the pump horsepower and impeller diameter selected.

c. The grinder shall be capable of shearing and reducing to a fine slurry all material normally found in domestic sewage. Impeller and pump housing shall be designed with passages capable of passing all materials macerated by the grinder assembly without clogging or nuisance roping within the pump chamber.

2. Grinder Assembly:

   a. The grinder shall be capable of reducing all components in normal domestic sewage, including a reasonable amount of "foreign objects," such as paper, wood, plastic, glass, wipes, rubber and the like, to finely-divided particles which will pass freely through the passages of the pump and the discharge piping.

3. Pump Motor:

   a. As a maximum, the motor shall be a 1 HP, 1725 RPM, 240 Volt 60 Hertz, 1 Phase, capacitor start, ball bearing, air-cooled induction type with Class F installation, low starting current not to exceed 30 amperes and high starting torque of 8.4 foot-pounds. The motor shall be press-fit into the casting for better heat transfer and longer winding life. Inherent protection against running overloads or locked rotor conditions for the pump motor shall be provided by the use of an automatic reset, integral thermal overload protector incorporated into the motor. This motor protector combination shall have been specifically investigated and listed by Underwriters Laboratories, Inc., for the application. Non-capacitor start motors or permanent split capacitor motors will not be accepted because of their reduced starting torque and consequent diminished grinding capability. The wet portion of the motor armature must be 300 Series stainless. To reduce the potential of environmental concerns, the expense of handling and disposing of oil, and the associated maintenance costs, oil-filled motors will not be accepted.

   b. The pump/core shall be provided with a mechanical shaft seal to prevent leakage between the motor and pump. The seal shall have a stationary ceramic seat and carbon rotating surface with faces precision lapped and held in position by a stainless steel spring.

4. Pump Suspension System:

   a. The grinder pump core, including level sensor assembly, shall have two lifting hooks complete with lift-out harness connected to its top housing to facilitate easy core removal when necessary. The level sensor assembly must be easily removed from the pump assembly for service or replacement. All mechanical and electrical connections must provide easy disconnect capability for core unit removal and installation. Each EQD half must include a water-tight cover to protect the internal electrical pins while the EQD is unplugged. A pump push-to-run feature will be provided for field troubleshooting. The push-to-run feature must operate the pump even if the level sensor assembly has been removed from the pump assembly. All motor control components shall be mounted on a readily replaceable bracket for ease of field service. Systems requiring removal of pump hardware or breaking of unions (or couplings) will not be acceptable. Removal of grinder pump shall consist of:

      1) Removing basin cover

2) Shutting isolation valve.

3) Lifting out pump assembly

4) Removing pump cables from easily accessible waterproof junction box

b. Mounting system shall be serviceable without entering the basin to replace or adjust components mounted on the bottom of the basin.

c. The slide rail assembly shall consist of PVC upper guide rail brackets with the slide rail assembly made from fiberglass channel section. The stationary and movable portions of the hydraulically sealed discharge coupling assembly shall be PVC. The upper guide rail bracket shall mount to the basin wall and position the upper end of the fiberglass guide rail while a stainless steel base positions the lower end of the guide rail.

5. Level Control:

a. Level control shall be by means of mercury float switches, single action design, capable of withstanding water penetration under 25 feet of water with at least a 3 to 1 safety factor. Float switches shall be mounted firmly in place in such a way that prevents tangling or fouling in the basin.

b. Two float switches shall be used to control level; one for pump turn on, and one for pump turn off. A third switch shall be provided for high water alarm.

6. Junction Box:

a. NEMA 4X watertight junction box shall be installed in the basin for connection of the pump and control wiring. The box shall be constructed of self-extinguishing ABS plastic with minimum wall thickness of 3/16 inch. The box cover shall be bolted on with stainless steel fasteners and sealed with a neoprene gasket. Individual corrosion-resistant and liquid tight cable connectors constructed of thermoplastic with neoprene bushing and sealing ring shall be provided. The box and all connections shall be completely watertight and shall be capable of withstanding an external liquid pressure of 10 PSI. The junction box and fittings shall be of waterproof design. All fittings and hardware shall be of non-corrosive construction.

b. Conduit and wiring between basin and control panel shall be installed in accordance with National Electric and all other applicable electrical codes.

c. The junction box shall be mounted within easy reach from ground level and must open in such a manner that all connections within can be viewed from the surface without leaning into the basin.

D. Valves, Fittings and Piping- Positive Displacement Pumps:

1. Valves, fittings, and piping shall conform with the detail drawings and meet or exceed properties provided herein:

    a. Influent connection shall be a four (4) inch cast iron or thermoplastic caulking hub shipped loose for field mounting by the installer. The hub shall be designed to be installed without personnel having to enter the basin. The hub shall be beveled approximately 3° to accommodate the gravity pipe. The influent hub shall have a textured surface in order to provide better caulking adhesion.

    b. The discharge piping shall consist of 1¼-inch stainless steel. A ball check valve shall be installed between the pump discharge and the movable fitting.

    c. The design of the check valve shall be such that the ball shall not impede flow through the valve. The operating flow area shall be equal to the nominal size of the valve. The ball shall clear the waterway providing "full flow" equal to the diameter of the pump discharge piping. It shall be non-clog in design. The ball shall be resistant to material normally found in sewage. The body and access plug shall be PVC

    d. The movable fitting shall be positive seal, slide design having a working pressure rating of no less than 80 PSI. The movable fitting, when in position shall be held against the stationary fitting by the construction of the fiberglass rail, aligning the movable fitting for proper sealing of the two surfaces under pressure. Nylon rope shall be provided for pump installation and removal.

    e. A 1¼ PVC plunger valve shall be installed in the discharge piping to provide shut-off capabilities during pump removal, and shall be fitted with an integral PVC extension handle. The extension handle shall extend up to within six (6) inches of the top of the basin and shall be secured at the top of the basin within the guide rail channel.

E. Grinder Pump Station Basin- Positive Displacement Pumps:

1. The tank shall be a wetwell design consisting of a single wall, laminated fiberglass construction. The resin used shall be of a commercial grade suitable for the environment. The reinforcing material shall be a commercial grade of glass fiber capable of bonding with the selected resin. The inner surface shall have a smooth finish and be free of cracks and crazing. The exterior tank surface shall be relatively smooth with no exposed fiber or sharp projections present.

2. The tank wall and bottom shall be of sufficient thickness and construction to withstand the imposed loading due to saturated soil at the specified burial depth for each available tank height. All station components must function normally when exposed to the external soil and hydrostatic pressures developed at the specified burial depth. The tank bottom shall be reinforced with a fiberglass plate extending beyond the tank walls to support concrete anchoring, as required, to prevent flotation.

3. The Fiberglass tank shall have a stainless steel discharge bulkhead which terminates outside the tank wall with a 1-1/4" female pipe thread. The discharge bulkhead shall be factory-installed and warranted by the manufacturer to be watertight. The tank shall be furnished with a field-installed EPDM grommet to accept a 4.50" OD (4" DWV or SCH 40) inlet pipe.

4. The power and control cable shall connect to the pump by means of the provided NEMA 6P Electrical Quick Disconnect (EQD) and shall enter the tank through a field-installed watertight strain relief connector supplied by the manufacturer. An electrical junction box shall not be permitted in the tank. Installation of the inlet grommet and cable strain relief shall require field penetration of the tank wall by the installing party. The tank shall also be vented to prevent sewage gases from accumulating inside the tank by means of a factory-provided, field-installed mushroom vent. The station cover shall be factory-drilled to accept the mushroom vent. The tank and stainless steel discharge bulkhead shall be factory-tested to be watertight.

5. The basin minimum diameters shall be as follows:

    a. Simplex system – 30-inch diameter.

    b. Duplex system – 36-inch diameter.

6. Basin wall thickness shall be suitable to withstand wall collapse under a hydrostatic pressure of 120 pounds per cubic foot. Basin walls and bottom must be capable of withstanding at least two times the actual imposed loading at basin depth.

7. An anti-flotation collar or bottom plate shall be furnished on the basin. The bottom plate shall be at least six (6) inches larger in diameter than the basin bottom. The bottom shall be an integral part of, and permanently bonded to, the basin.

8. The fiberglass basin shall be equipped with a fiberglass cover. Covers shall be securely held in place by a minimum of six (6) stainless steel bolts threaded into stainless steel inserts in the top collar of the basin.

F. Controls

1. Control Components

    a. The control components for operation and protection of the grinder pump station shall consist of the following:

        1) Control transformer for supplying 24 volt A.C. power for all control apparatus plus an adequate amount of additional power for external alarm devices. The transformer shall have secondary protection accessible without opening the inner swing panel.

        2) A power disconnect with an operator handle extending through the inner swing panel without exposing live parts inside the control enclosure.

        3) Short circuit, lightning, overload and motor running overload protection, which meet the National Electric Code standards.

4) Locked rotor protection for de-energizing the pump motor to protect the run windings of all motors and start windings of single-phase motors. The circuitry shall contain a manual reset and shall not be subject to nuisance trips even during periods of power failure.

5) Motor start and under voltage release by means of an open frame, across the line magnetic motor contactor with contacts made of silver cadmium oxide.

6) A “Manual-Off-Automatic” selector switch shall be provided within the control panel for operating the pump manually when in “Manual”, pump disable when in “Off”, and normal operation when in “Automatic” position. The selector switch shall not disable the alarms under any condition.

7) Pump run light to indicate the pump motor has been energized.

8) Mercury Float switch mounted in the basin which energizes the high water light, alarm light and alarm.

9) Solid-state moisture sensing device to detect moisture signal from pump, which energizes seal failure light and alarm light.

10) A 24 volt A.C. 25 watt flashing alarm light with a red globe shall be included and mounted in a manner to prevent rain water from standing or collecting in any gasketed area of the fixture.

11) A 24 volt A.C. alarm horn with a rainproof conduit box and mounting fixture shall be included which is rated at a minimum of 106 DB at one (1) foot. A panel-mounted switch shall permit silencing of an external alarm device as well as a test mode to assure the alarm device is operable.

12) Overload reset device operable without opening the inner swing panel.

b. The control assembly shall be completely factory wired except for power feed lines, motor connections and mercury float switches. Wiring shall be done in accordance with all applicable standards set forth by the National Electric Code and shall be color coded and numbered as indicated on factory wiring diagrams.

c. All components shall be electrically grounded to a common ground screw mounted on the removable back panel. Upon installation of the control assembly, and before connection of any power feed lines, installer shall extend a grounding wire from the control panel main ground screw to external ground in accordance with NEC and local electrical codes.

2. Control Enclosure

   a. The pump control enclosure shall be of fiberglass or stainless steel construction designed for corrosion resistance in compliance with NEMA 4X standards. The enclosure shall have a full inner swing panel mounted on a continuous piano type hinge. The inner swing panel shall be fabricated from steel having a minimum thickness of 0.06 inches (16 gauge). The inner swing panel shall have provisions for mounting all basic controls and instruments. It shall have a minimum horizontal swing of 90 degrees and shall be held in closed position by quarter-turn door latches. The outer door shall have a minimum horizontal swing of 180 degrees and shall be held in a closed position by a padlock keyed to the Township system. The outer door shall be mounted on a stainless steel continuous hinge and have a seal around its entire perimeter.

   b. The enclosure shall have a removable back panel of a minimum thickness of 0.078 inches (14 gauge), secured to the enclosure on collar studs or weld nuts. The back panel shall be pre-drilled and tapped to accept mounting of control components. Self-tapping screws shall not be used to mount any component.

   c. The enclosure shall be mounted at a position where it is visible from the sewage grinder pump station.

PART 3 EXECUTION

3.01. INSTALLATION

A. Grinder Pump Station

1. The Developer shall submit the following to the Township for approval:

   a. Site plan showing location of grinder pump station, routing of all piping and electrical wiring.

   b. Manufacturer's catalog data to demonstrate compliance with specifications and figures.

   c. Installation details.

2. The grinder pump station shall be installed at a location to be determined by the property owner or Developer.

3. The depth of the grinder pump station will be dependent upon the location and depth of the existing house service. The influent to the basin shall be set so that a minimum grade of two percent for the new gravity service line can be maintained. The minimum total unit depth from the invert of the sump to the top of the entry hatch shall be no less than six (6) feet and no greater than twelve (12) feet. The top of the station shall be 6 inches above final grade.

4. All grinder pump stations shall be installed on a bed consisting of AASHTO No. 8 or No. 57 Coarse Aggregate and shall have a concrete anti-flotation collar poured around the bottom. The basin shall be set on a concrete pad with the anti-flotation collar secured to the concrete with bolts or steel clips; or, the concrete shall be poured around the perimeter of the basin above the anti-flotation collar. In either case, the Contractor shall submit calculations justifying the method chosen and the volume of concrete to be used.

5. The remaining excavated area shall be backfilled to six (6) inches below grade with excavated material containing no soil lumps, stones, concrete or foreign objects larger than one (1) inch in maximum dimension. Six (6) inches of topsoil with seed and supplements shall be placed to grade the surrounding area.

6. If the excavated material does not meet the requirements described above, a backfill material consisting of AASHTO No. 8 or No. 57 Coarse Aggregate shall be used to a point six (6) inches below the finished grade.

7. The Developer shall schedule an inspection by the Township before beginning work, before backfilling equipment and piping and at completion of work. The installation shall be approved by the Township. The Developer shall be responsible for complete and approved installation.

8. Pressure sewer shall be hydrostatically tested by the installer to the satisfaction of the Engineer in accordance with the procedures and requirements established in the sewer manual.

9. Electrical system shall meet all of the latest requirements of the National Electric Code and the public utility furnishing power to the system. Nothing contained in this manual shall be construed to conflict with these requirements and should a conflict occur, these requirements shall apply.

B. Pressure Pipe

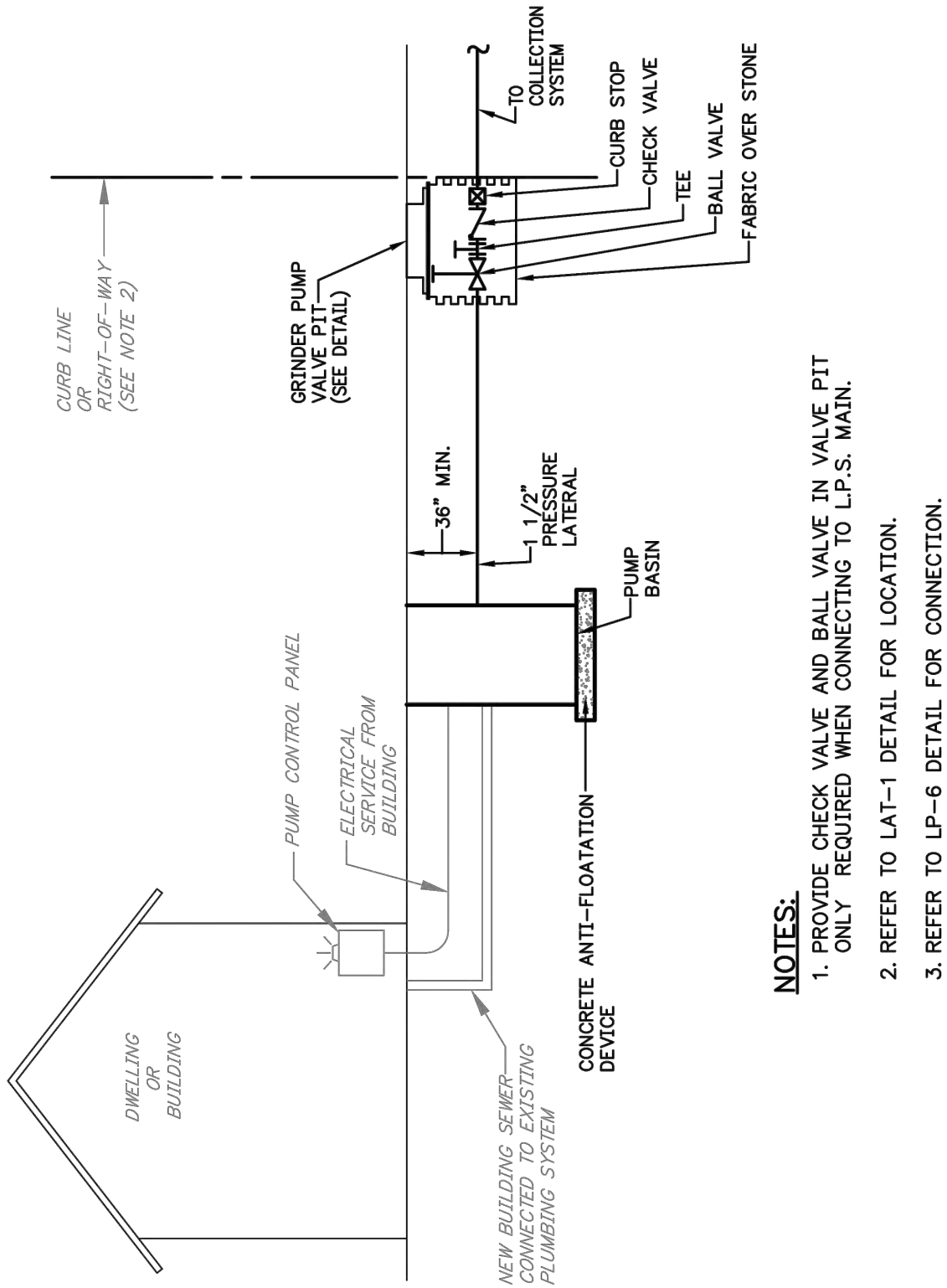
1. Pressure sewer shall be hydrostatically tested by the installer to the satisfaction of the Engineer in accordance with the procedures and requirements established in the sewer manual.

2. Pipe to be installed with appropriate bedding and backfill as indicated on the Sewer Detail Drawings.

3. Connections to manholes shall be made via core-drill and installation of rubber boot.

4. Connections to sewer mainline will only be reviewed on a case by case basis by the Engineer.

END OF SECTION



NOTES:

1. PROVIDE CHECK VALVE AND BALL VALVE IN VALVE PIT ONLY REQUIRED WHEN CONNECTING TO L.P.S. MAIN.
2. REFER TO LAT-1 DETAIL FOR LOCATION.
3. REFER TO LP-6 DETAIL FOR CONNECTION.

EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

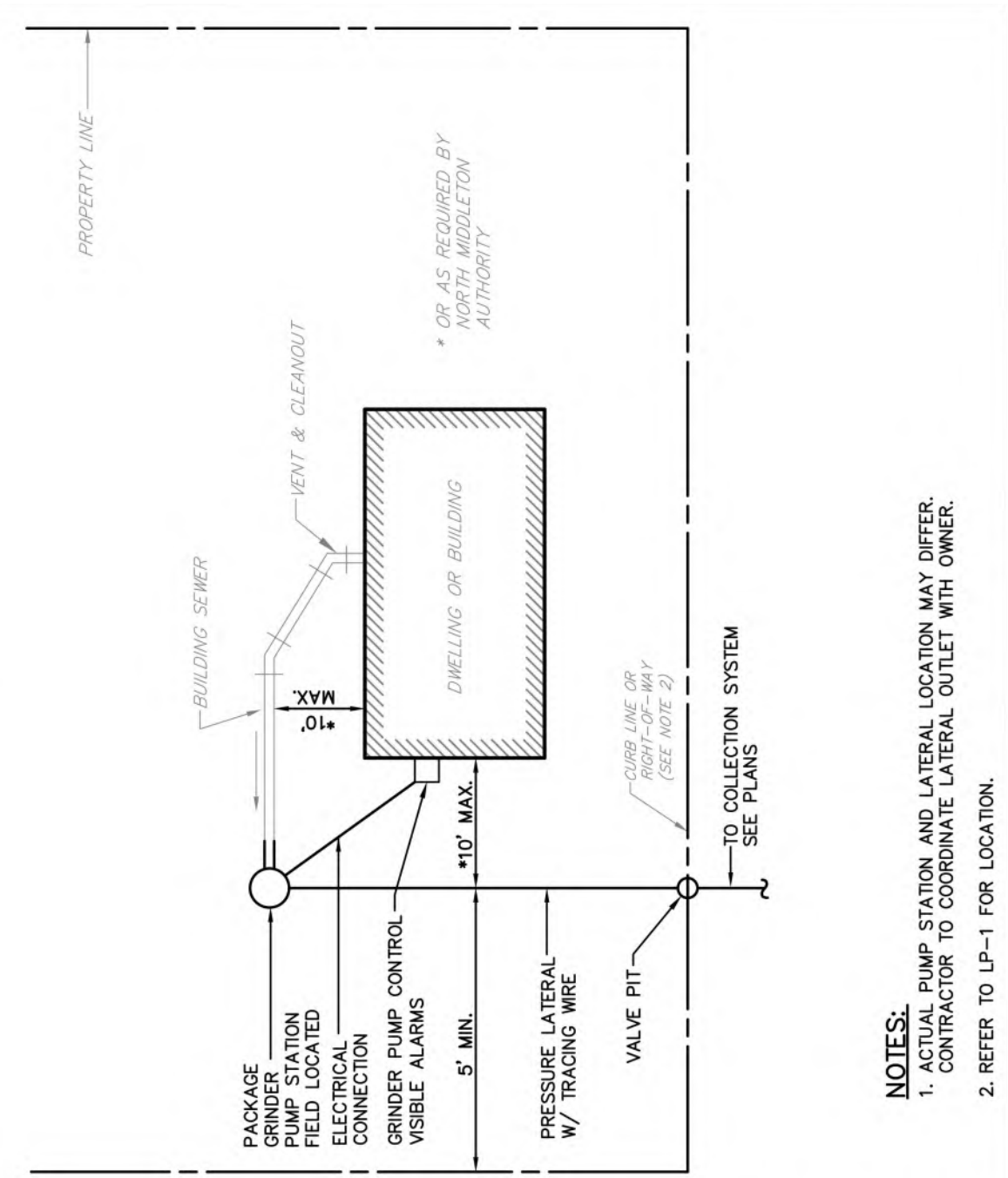
GHD

225 GRANDVIEW AVENUE SUITE 403, CAMP HILL, PA
PHONE (717) 541-0622
WWW.GHD.COM

TYPICAL GRINDER PUMP INSTALLATION DETAIL

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	8/1/2023
DWG. NO.	EPT11400-1
FILE NO.	4833.9.02.00



NOTES:

1. ACTUAL PUMP STATION AND LATERAL LOCATION MAY DIFFER. CONTRACTOR TO COORDINATE LATERAL OUTLET WITH OWNER.
2. REFER TO LP-1 FOR LOCATION.

EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

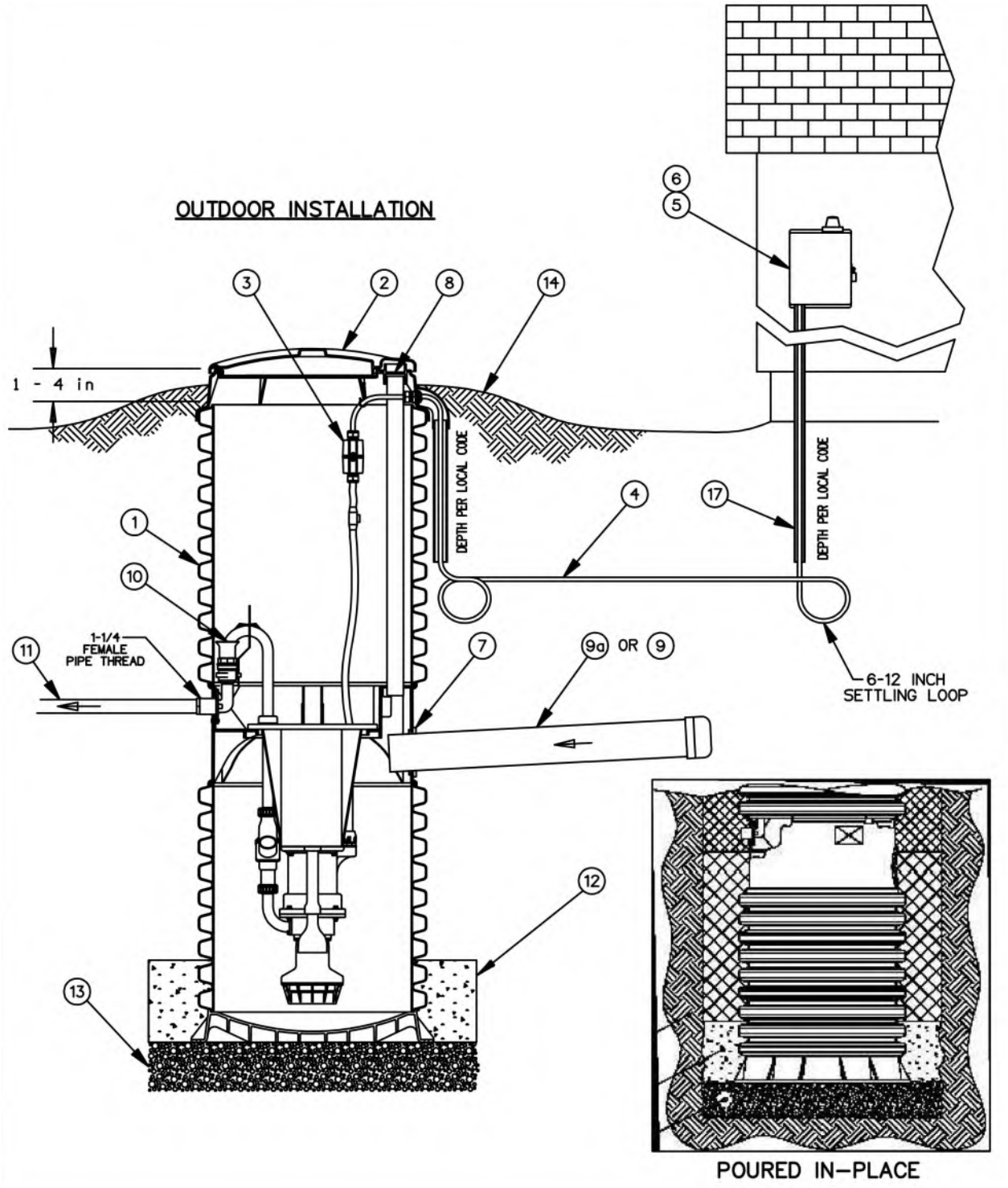
GHD

225 GRANDVIEW AVENUE SUITE 403, CAMP HILL, PA
PHONE (717) 541-0622
WWW.GHD.COM

TYPICAL GRINDER PUMP INSTALLATION DETAIL

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	8/1/2023
DWG. NO.	EPT11400-2
FILE NO.	4833.9.02.00



EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

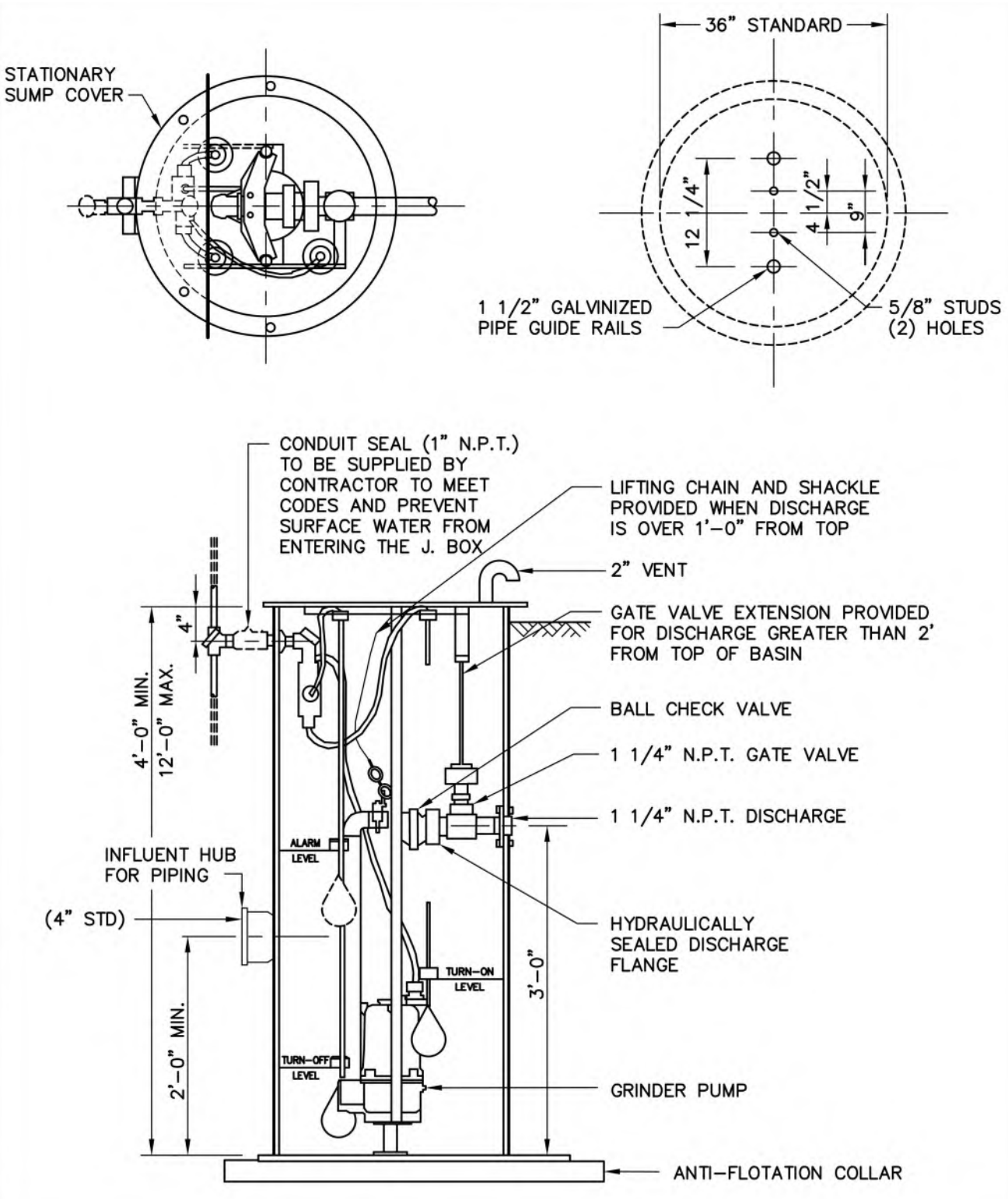
GHD

225 GRANDVIEW AVENUE SUITE 403, CAMP HILL, PA
PHONE (717) 541-0622
WWW.GHD.COM

ENVIRONMENT ONE GRINDER PUMP
OUTDOOR INSTALLATION
POURED IN-PLACE

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	8/1/2023
DWG. NO.	EPT11400-3
FILE NO.	4833.9.02.00



EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

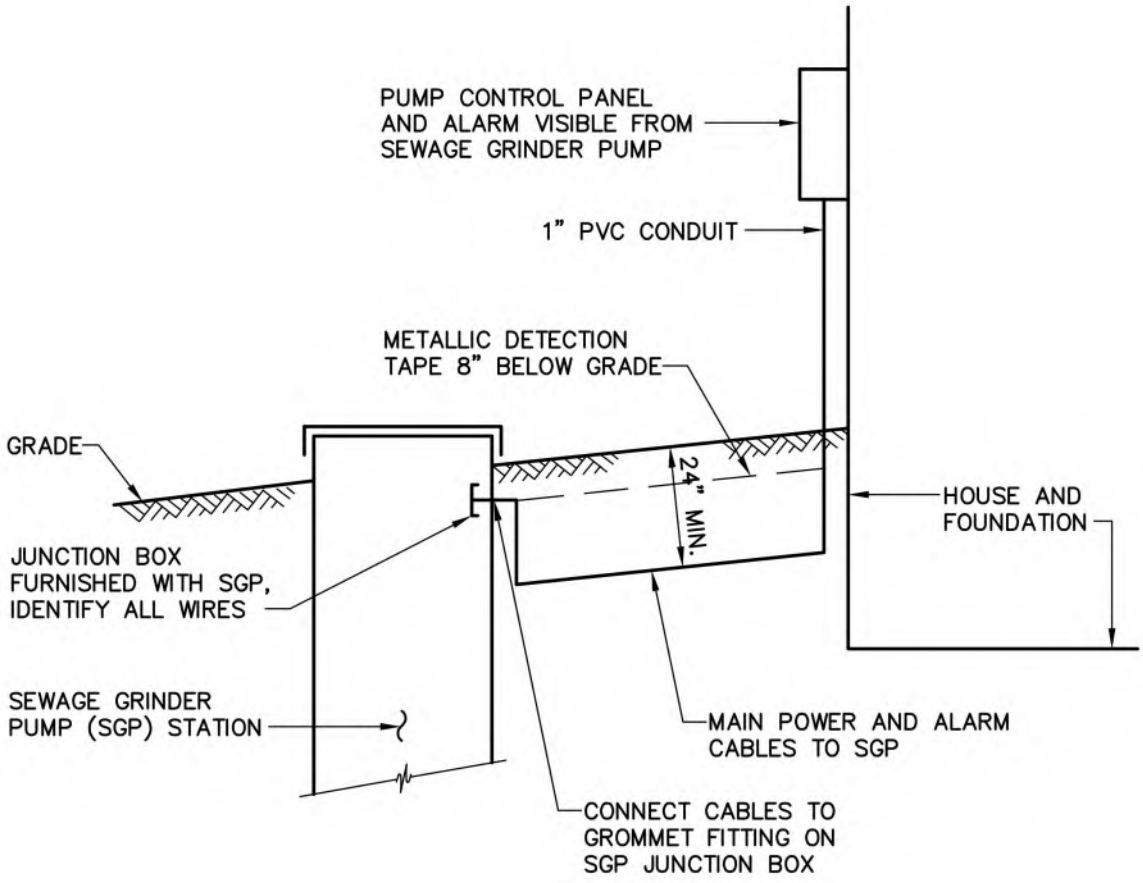
GHD

225 GRANDVIEW AVENUE SUITE 403, CAMP HILL, PA
PHONE (717) 541-0622
WWW.GHD.COM

SIMPLEX SEWAGE GRINDER
PUMP STATION

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	8/1/2023
DWG. NO.	EPT11400-4
FILE NO.	4833.9.02.00



EAST PENNSBORO TOWNSHIP CONSTRUCTION & MATERIAL SPECIFICATIONS

225 GRANDVIEW AVENUE SUITE 403, CAMP HILL, PA
PHONE (717) 541-0622
WWW.GHD.COM

TYPICAL ELECTRICAL LAYOUT

EAST PENNSBORO TWP. CUMBERLAND COUNTY , PENNSYLVANIA

DRAWN BY	EMN
CHECKED BY	
SCALE	N.T.S.
DATE	8/1/2023
DWG. NO.	EPT11400-5
FILE NO.	4833.9.02.00

APPENDIX A

Per Section 01010.2.10.C

The Contractor shall provide detailed locations of all sanitary sewer locations, depth, and length. The Contractor shall provide detailed lateral locations of all water service locations, including depth and length. Sewer laterals shall be located using manholes as a reference point and stationary from that point. Water service curb stops shall be located using distance from property lines. The Contractor shall survey with GPS all structures and manholes and provide the information to the Engineer. An East Pennsboro Township As-Built Sanitary Sewer Lateral Locations form is provided in Appendix A for use by the Contractor.

EAST PENNSBORO TOWNSHIP
AS-BUILT SANITARY SEWER LATERAL LOCATIONS

Project				Length	L.F.
Street		Pipe Size		Type	
Contractor		Grade	%	Max Depth	Ft.
Engineer		Air Test		Lbs	Secs.
Submitted		Internal		Final	

House/Lot No.	Depth at End	Lateral Length	Station of "T"	MH / Invert	Station of "T"	Lateral Length	Depth at End	House/Lot No.
				STA 0+00				
				MH / Invert				