CONSTRUCTION SPECIFICATIONS MANUAL
AND SANITARY SEWER LINE EXTENSION PROCEDURES

PETERS CREEK SANITARY AUTHORITY
WASHINGTON COUNTY, PENNSYLVANIA

APPROVED
JUNE 28, 2021

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CONTENTS

1.0 INTRODUCTION

The existing sanitary sewer collection system within the Finleyville Borough, Nottingham Township, Peters Township, Union Township, and a small portion of North Strabane Township consists of lateral sewers, trunk sewers, and interceptor sewers. These facilities are owned, operated, and maintained by the Peters Creek Sanitary Authority (hereinafter "Authority" or "PCSA").

By Service Agreement with the Clairton Municipal Authority (CMA) for treatment, the Authority may accept wastewater flows from the areas identified in the PCSA Act 537 Plan. With the continued development of the Townships and Borough now and in the future, it can be expected that additional sewerage facilities will be provided by developers.

The Authority considers it of prime importance that all new facilities meet uniform standards of design and construction. So this uniformity can be achieved to the benefit of both the Authority and the developers, it is the purpose of the manual to state clearly the procedures and requirements for planning and constructing all sanitary sewage facilities to be owned by the Authority. In particular, this manual is intended as a guide for subdivision developers and contractors in the planning and construction of sewerage facilities.

To further aid in reviewing this manual, attention is directed to the Definitions contained in Appendix A regarding the terms used herein.

2.0 LAWS AND REGULATIONS PERTAINING TO NEW SEWER CONSTRUCTION

The Pennsylvania Sewage Facilities Act requires the submission by municipalities of revisions to the Official Sewage Facilities Plan to the Pennsylvania Department of Environmental Protection (PADEP) for approval. In order to accomplish the approval of plan revisions, the PADEP has designed a Sewage Facilities Planning Module. The Module, which must be completed by the Developer, has four components that must be completed depending on the type of sewage disposal and size of land development project. Application Forms can be obtained from PADEP, 400 Waterfront Drive, Pittsburgh, PA 15222. This Module is applicable for developments proposing construction of 250 Equivalent Dwelling Units (EDUs) or less. If the project proposes more than 250 EDUs, a PADEP Part II Water Quality Management Permit is required in addition to an approved Sewage Facilities Planning Module. The application for the Permit can be obtained from the same address as the Planning Module.

The actual submittal of this Part II Permit Application will be by the Authority; however, the Developer must prepare the Application. A review period is required by the PADEP to process and review the completed application. Because construction cannot proceed without PADEP approval, the review period should be taken into account in the original planning of the sewerage project.

2.1 ADDITIONAL PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION REQUIREMENTS

Additional permits and approvals may be required to be obtained from PADEP pertaining to land development and sanitary sewer construction (e.g. installation of sanitary sewers in, along, across, or projecting into all streams and bodies of water of the Commonwealth, earth disturbance greater than one acre, etc.) Application for any such Permits as may be required related or incident to sanitary sewer construction will be made by the Developer proposing the new sewerage facilities. Application forms can be obtained by writing to the PADEP. Copies of all permit approvals are to be submitted to PCSA.

2.2 PENNSYLVANIA DEPARTMENT OF TRANSPORTATION (PennDOT)

When any proposed construction is to be undertaken within the right-of-way of any state-owned public roadway, the Pennsylvania Department of Transportation requires that a Highway Occupancy Permit (HOP) be obtained from the Department. The Developer proposing the new sewerage facilities shall be responsible for obtaining the HOP. PennDOT may require applications be submitted by the Authority and in the name of the Authority. All applications shall be completed by the Developer and submitted to the Authority for review and submission.

2.3 OTHER ORDINANCES AND REGULATIONS

In addition to State laws and regulations, the member municipalities comprising PCSA municipalities (Finleyville Borough, Nottingham Township, Peters Township, Union Township, and a small portion of North Strabane Township) enforce certain requirements pertaining to the construction of sewerage facilities. These include, but are not limited to, Zoning Ordinances, Subdivision and Land Development Ordinances, Surface Restoration Ordinances, Sewers and Sewage Disposal Ordinances, etc. The Developer shall be responsible for compliance with all applicable Ordinances of the municipality where the work is located.

Work within or near locally owned roadways, is subject to all applicable local regulations and requirements including, but not limited to, maintenance and protection of traffic, road opening requirements, backfill/compaction etc.

The special requirements of the Borough and Townships shall be considered as the official regulations of the Authority. From time to time, the present laws and regulations of the State and the authority pertaining to sewerage may be revised and amended. It is also likely that new laws and regulations will be formulated. The final responsibility for compliance with all applicable laws will rest with the Developer undertaking the construction project, regardless of whether such laws and regulations have or have not been brought to the attention of the Developer by the Authority.

3.0 PROCEDURE FOR PLAN APPROVAL

The Developer shall follow the specified procedure to obtain the Authority's approval of his plans. The plan submission, review, and approval procedure is generally described below and further illustrated on the attached Peters Creek Sanitary Authority Sanitary Sewer Extension Procedure Flow Diagram and Checklist.

The following procedure and the attached PCSA Sanitary Sewer Extension Procedure Flow Diagram and Checklist are intended to generally detail the requirements for approval and acceptance of developments. The Developer's Agreement between the Developer and Authority may contain additional requirements not specifically identified herein.

3.1 LETTER OF APPLICATION

Submit to the Authority a letter of application regarding the proposed development or schedule a meeting with the Authority to discuss the proposed development. The Developer shall include in the letter, or be prepared to discuss at the meeting, the following: Developer's full name, address, and telephone number; type of project; brief description of location of plan; proposed subdivision of lots; proposed number of lots; approximate lineal feet of sewer line; approximate number of manholes; proposed point of connection to existing sanitary sewer system; design of sanitary sewer system (i.e. gravity flow or any grinder pumps, etc.); proposed development schedule; whether lots will be developed for sale or whether lots and houses will be sold as packages on a speculative bases; whether the Developer had completed any past projects (including name last project); total acreage in plan and acreage proposed to be laid out in lots.

3.2 DEVELOPER/AUTHORITY AGREEMENT

Following Developer's application/meeting with the Authority, PCSA will review their existing facilities and notify the Developer either that additional information is required or to proceed with planning. Following notification to proceed with further planning, the Developer shall deposit $2,500.00 with the Authority to offset the Authority's review cost. The Developer will then be required to enter into an agreement with the Authority by signing the "Developer's Agreement".

For small subdivisions that require sewage facilities planning, the Applicant will be required to submit a $1,000.00 deposit with the Authority to offset the Authority's review cost. Small subdivisions typically propose connection to existing PCSA facilities and do not require construction of a sanitary sewer extension. Determination of what will constitute a small subdivision will be made by the Authority.

The Developer will be required to coordinate with the Authority Solicitor to discuss preparation of the Developer's Agreement. Information required for the Agreement includes an exhibit showing the proposed sewer design or lots to be served. The Developer shall contact the Authority to obtain the Solicitor's telephone number. A typical Developer's Agreement is included with these Specifications as Appendix B.

A Developer's Agreement shall be executed prior to commencement of each phase of the proposed development and all requirements listed in the Developer's Agreement or this document shall be provided individually for each separate phase.

3.3 COST OF DEVELOPMENT

The Developer is responsible for all costs relative to planning and constructing the proposed development, and these costs shall include, but not be limited to, the following:

1. The cost of all sewer lines, of the sizes required for the project, not to be less than eight inches in size, of all manholes and other sewer appurtenances, and of all pump stations and other work.
2. The costs of connections to existing sewers.
3. The cost of all land rights-of-way and land to be conveyed to the Authority.
4. The cost of obtaining all permits, licenses, and such other approvals.
5. The Developer must pay the Authority costs involved in the review of the Planning Approvals, development plans and specifications; field work, if any; legal work; administrative, and such other costs in connection with the project.
6. The cost of a full time Authority's Resident Project Representative furnished by the Authority to observe construction of the project or projects, such costs to be in the per diem rate currently in effect plus mileage costs and expenses.
7. The payment of all tapping, sewage treatment, and other fees.
8. Any such other costs.

3.4 PLANNING MODULE SUBMISSION/PRELIMINARY PLANNING

Following Pre-Application Planning, the Developer will submit preliminary plans to PCSA along with the completed PADEP Planning Module for the development. PCSA will review the Planning Module and provide capacity available letter to Developer. Developer is responsible for obtaining capacity availability letters from the other municipalities (Jefferson Hills Borough and South Park Township) on the Peters Creek Interceptor (PCI) for conveyance and from the CMA for treatment. The Planning Module is also required to be executed by CMA (Section J of the Planning Module).
Once the other capacity availability letters are obtained by the Developer and submitted to PCSA, the Authority will complete their portion of Section J of the Planning Module and provide required executions to the Developer for submission to the Municipality/PADEP.

4.0 DESIGN REQUIREMENTS

The designs for all proposed sewerage facilities must be in complete compliance with the requirements of the PADEP but are also subject to the approval of the Authority's Engineer based on PCSA Standard Construction Specifications, Rules and Regulations, and Industry Standards. The PADEP Sewerage Manual published and distributed by the PADEP is available as a guide for design and plan preparations. A copy can be obtained online or by writing to the PADEP, 400 Waterfront Drive, Pittsburgh, PA 15522.

5.0 PLAN PREPARATION

All final plans submitted to the Authority must be uniform and in accordance the PADEP Sewerage Manual, referred to previously, and must specifically conform to the requirements detailed herein including, but not limited to, the following:

1. The size of each sheet shall be not less than 24 inches by 36 inches.
2. The title of the drawings shall contain a title description, name of project or plan, name of engineer, scale of drawing, and date.
3. Each sheet shall bear the seal of a registered, professional engineer, licensed in Pennsylvania.
4. For sewer drawings, both plan and profile shall be shown.
5. All plans shall be drawn to a scale that permits all necessary information to be shown plainly. For sewer drawings, plan and profiles shall have a horizontal scale of not more than fifty (50) feet to the inch and profiles shall have a vertical scale of not more than ten (10) feet to the inch and horizontal scale consistent with that of the plan view.
6. Plans shall include a legend with consistent line types.
7. Plans and profiles shall include label for sanitary manholes (existing and proposed) including name, stationing, top elevation, and invert elevation(s).
8. Plans and profiles shall include label for proposed sanitary sewers including length, pipe material, and slope from manhole to manhole.
9. Plans shall include other utilities (gas, water, storm). Profiles shall include utility crossings and label vertical separation in feet.
10. Plans and profiles shall include all proposed points of connection to existing PCSA sanitary sewer system.
11. When an existing PCSA manhole is proposed to be replaced or altered, the plan and profile shall include label for existing elevations (top and inverts) and proposed elevations.
12. Plans shall include nearest upstream manhole and proposed Minimum Basement Elevations for each proposed lot illustrating that gravity service is available for the proposed lots.
13. Plans shall identify which proposed lots will require backwater valves in accordance with applicable construction codes.
14. Plans shall include stationing for all laterals for each proposed lot noted on plan view at each lateral location. Stationing to identify lateral distance from the nearest downstream manhole. Also, note length for all laterals.
15. Plan view shall illustrate lateral site tee locations for each proposed lot.
16. All elevations shall be based on the North American Vertical Datum of 1988 (NAVD 88).
17. In addition to other requirements identified herein, Plans shall include the following PCSA standard requirements and shall list notes identifying the same:
    a. A ten-foot horizontal separation and 18” vertical separation between sanitary sewers and other utilities is required.
    b. Laterals extended under roadways will be required to utilize 100% PennDOT 2A Limestone backfill.

c. All connections to existing manholes shall be core drilled and a rubber boot installed, break-in connections are not permitted.
d. Wooden posts measuring 4-inch by 4-inch (nominally) shall be used during construction to identify the location of lateral ends. Said posts shall be surveyed for As-Built record documentation.
e. All sanitary sewer construction shall comply with Peters Creek Sanitary Authority Standard Drawings and Specifications.

The plans should provide typical details for all appurtenances not clearly illustrated in the layout or plan drawings. For certain common appurtenances such as manholes, manhole cover and frame, and stream crossing, etc., the plans must specifically include PCSA Standard Detail Drawings as shown in Appendix A.

All copies of drawing furnished to the Authority should be of the darkline type. Upon completion of project construction, reproducible mylar drawings showing "as-built" conditions shall be furnished to the Authority in accordance with the terms of the Developer's Agreement along with a mylar copy, four bond copies, and an Electronic Disk in AutoCAD Drawing format of the same.

5.1 PRELIMINARY PLANS

The Developer will present to the Authority two complete sets of preliminary sanitary sewer drawings with the aforementioned planning module application. These drawings must bear the seal of a Pennsylvania registered professional engineer. The two sets of plans will be distributed by the Authority as follows: one (1) to the Authority, one (1) to the Authority's Engineer.

Each complete set of drawings shall include, but not be limited to, the following: overall master plan (if development includes multiple phases), construction drawings for the specific phase being submitted, lot layout plan, streets and drainage (including storm sewer plan and profiles), and sanitary sewer construction plan and profile.

Construction plans for phased developments shall be submitted individually for each phase.

5.2 FINAL PLANS

After the Township/Borough has received Planning Module Approval, the Township/Borough or Developer shall notify the Authority of said Approval. If the Developer is proposing to connect greater than 250 EDUs, he must complete a PADEP Part II Water Quality Management Permit. The Part II Permit Application (if required) shall be prepared by the Developer for review and submission by the Authority. The Developer shall also prepare his final plans, including construction drawings and details.

After the Developer has completed his final construction plans and obtained PADEP Part II Water Quality Management Permit (if applicable), he shall submit to the Authority two (2) initial sets of construction plans which will be distributed as follows: one (1) to the

Authority and one (1) to the Authority's Engineer. Sanitary sewer construction plans and profiles for phased developments shall be submitted individually for each phase.

Following submission of the two (2) initial sets of final construction plans, the Authority will review, and if necessary, provide comment. If revisions are required, the Developer will be required to submit two (2) additional sets of construction plans addressing said comments in the same manner as the initial submission. After the Authority's comments have been satisfactorily addressed (and the Part II Permit issued by PADEP if required), the Developer will be notified to submit eight (8) sets of final construction plans which will be approved by the Authority, stamped, and then distributed by the Authority as follows:

1. One (1) set of drawings to the Authority's Engineer.
2. Two (3) sets of drawings to the Authority.
3. One (1) set of drawings to the Developer.
4. One (1) set of drawings to the Developer's Engineer (if applicable).
5. One (1) set of drawings to the Developer's Contractor (if applicable.
6. One (1) set of drawings to the Authority's Resident Project Representative.

5.3 PRE-CONSTRUCTION REQUIREMENTS

Construction of sewerage facilities shall not be started until permit and/or planning approval from the PADEP is issued to the Township/Borough and Developer, the Final Construction Plans have been approved by the Authority, and all administrative items satisfactorily submitted.

Prior to the start of construction, the Developer shall submit an itemized total cost of construction to the Authority for review. Upon review approval of the total cost of construction the Authority will provide Developer with the amount of bonding required. The Developer shall submit a Certificate of Insurance, Performance Bond, and Labor and Material Bond to the Authority. Each bond shall be in the amount of 110% of the cost of construction as approved by the Authority. The Developer may submit a letter of credit or secured funds in lieu of bonding, in a form acceptable to the Authority.

The Developer or their Contractor shall submit material data sheets/shop drawings for the items and materials proposed to be utilized for construction. The Authority and Authority's Engineer will review the material data sheets for conformance to PCSA Standard Construction Specifications, Rules and Regulations, and Industry Standards. The Authority or Authority's Engineer will provide comments back to Developer for each material data sheet submitted. Comments will include either a Furnish as Submitted, Furnish as Corrected, Revise and Resubmit, or Rejected. Developer shall revise based on the Authority's comments and resubmit as required. No materials will be accepted until the material data sheet for said product is approved.

For sewer projects to be constructed by the Developer's own forces, it will be the responsibility of the Developer to completely familiarize his workmen with the requirements of all specifications and to maintain a copy of this Peters Creek Sanitary

Authority Construction Specification Manual and Sanitary Sewer Line Extension Procedures on the job site for referral. For sewer projects to be constructed by contract with a firm separate from that of the Developer, complete compliance with the required specifications shall be a term of the contract and so verified to the Authority.

For projects involving other than sewer construction, such as pumping stations and treatment plants, it will be the responsibility of the Developer's Engineer to submit detailed specifications for such construction. These specifications shall be subject to approval by the Authority and revised, if considered necessary by the Authority to assure that acceptable construction will be performed.

Once the Preliminary and Final Planning process has been completed, all Pre-Construction Requirements met, and pre-construction meeting has been held (See Section 8.0 Below) PCSA will issue a Notice to Proceed notifying the Developer than construction of the sanitary sewers may commence.

6.0 AVAILABILITY OF SEWER SYSTEM PLANNING

Plans for the Authority's sewer system are available for reference at the Authority office. Upon request, prints of any such drawings will be furnished by the Authority at the cost of reproduction at a commercial printing establishment of the Authority's choice. Under no circumstances shall any tracing or drawing be released directly to any person except the representatives of the printing establishment authorized to perform such services for the Authority.

7.0 SPECIFICATIONS

For all sewer construction, the material provided and methods of construction shall conform to the Authority's "Standard Construction Specifications" a copy of which is attached to this guide manual as Appendix A. For special items not covered by these specifications, supplemental specifications will be issued by the Authority for each project. These supplemental specifications will be issued by the Authority upon receipt and review of final construction plans by the Developer.

8.0 OBSERVATION OF CONSTRUCTION

All construction of sewerage facilities to be connected to the PCSA system shall be subject to observation by the Authority's Resident Project Representative to assure that such construction is accomplished in accordance with the approved construction plans and specifications.

The Developer shall notify the Authority of the anticipated starting date of his proposed construction and the schedule of operation through completion of the project. Prior to initiating construction, a meeting shall be arranged between the Developer (or his contractor/representative) and representatives of the Authority to completely review all aspects of the construction project prior to start of construction. This meeting is considered

extremely important both to the interest of the Authority and the Developer. Therefore, this requirement will be strictly enforced, and no construction will be permitted without such a meeting. Following the pre-construction meeting, and if all other administrative requirements have been met, the Authority will issue a Notice to Proceed indicating that the Developer may begin work on the sanitary sewer construction.

Prior to initiating construction, a minimum of 48-hours' notice must be provided to the Authority. At no time shall the Developer undertake any construction work without the knowledge of the Authority's Resident Project Representative. Any covered construction not properly observed must be uncovered at the Developer's expense for observation. Should any questions or controversies arise between the Contractor and the Authority's Resident Project Representative, the Authority's Engineer will request a meeting between the Contractor and the Authority Board so that a final decision can be made by the Board.

9.0 DEVELOPMENT CLOSEOUT

Upon completion of all construction and testing as specified herein or as required by the Developer's Agreement, the Developer shall initiate the Development Closeout which consists of completion of the items identified below and included in the Developers Agreement.

The Developer shall request a detailed final walkthrough and review which shall be made by the Authority and Authority's Engineer to determine that the completed facilities have been constructed in accordance with the approved plans and specifications. Final approval will not be given by the Authority until all discrepancies revealed by this final walkthrough have been satisfactorily corrected.

Once final approval provided by Authority, Developer shall perform survey and prepare As-Built drawings in accordance with Developer's Agreement and submit to the Authority for review and approval. Once Authority approves As-Built drawings, Developer to submit As-Built Drawings and Details in the form of four (4) bond copies of, one (1) mylar copy, and one (1) electronic CADD file.

The Developer is also required to submit the itemized final cost of construction for the Authority's use in determination of the required Maintenance Bond Amount. The cost of construction will be reviewed by the Authority and the required Maintenance Bond amount shall be 15% of the final approved total cost of construction.

The Authority will authorize the Authority Solicitor to prepare a Deed of Easement dedicated all sanitary sewer easements within the Development to the Authority. The Deed of Easement is required to be executed by the Developer and the Authority and will be recorded by the Authority Solicitor.

The Developer will also be required to provide a notarized letter stating that all Labor and Materialmen for the Development have been paid in full. Following the completion of all

administrative items, the Authority will provide Certification of Completion Date to Developer.

The Certification of Completion Date provided by PCSA shall be the date used to initiate the Maintenance Bond Period. Upon posting of the Maintenance Bond, the Developer will request final release of the Performance and Labor and Materialman Bond(s) or other securities provided in lieu of bonding.

Upon completion of all Development Close Out requirements, the Authority will accept and adopt the sanitary sewers into the PCSA system.

Developer shall, at his cost, perform closed-circuit television (CCTV) inspection of the work performed in the presence of the Authority's authorized agent twelve (12) months after the Certification of Completion date. Two electronic copies (flash drive, disc, or similar) of the CCTV inspection and two hard copies of the CCTV inspection reports shall be submitted to the Authority for review. The Developer will be required to correct, at his cost, any deficiencies to the sanitary sewer system discovered during the CCTV inspection to the satisfaction of the Authority.

Authority will release maintenance guarantee security following eighteen (18) month period after the Certification of Completion date provided that all Authority requirements have been met.

The Authority reserves the right to perform additional review of the sanitary sewer system dedicated to the Authority prior to the expiration of the Maintenance Bond.

10.0 RIGHTS-OF-WAY

A permanent right-of-way of at least twenty (20) feet shall be provided for all proposed sanitary sewers. For proposed sewers to be located on property outside the limits of the subdivision plan, right-of-way agreements dedicated to the Authority shall be obtained by the Developer and evidence of such agreement furnished to the Authority prior to requesting final approval of plans. The special requirements of the Authority for these rights-of-way will be discussed with the Developer upon his pre-application and preliminary planning submissions.

11.0 BONDING AND INSURANCE REQUIREMENTS

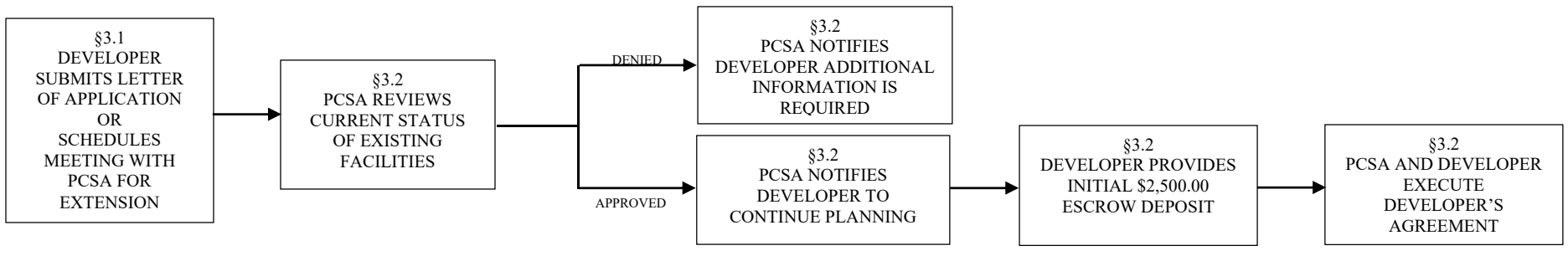
As required by Agreement in Appendix B.

12.0 PENALTIES

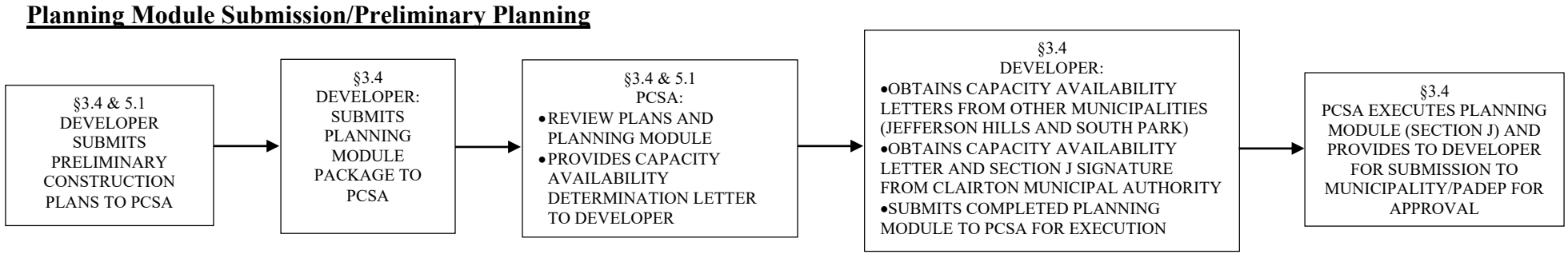
Any violation of the requirements of the Authority for the planning and construction of sewage facilities in the Townships and/or Borough constitutes a violation of the Township's/Borough's Regulations, and a penalty will be assessed based on the individual Ordinance's requirements.

PETERS CREEK SANITARY AUTHORITY
SANITARY SEWER LINE EXTENSION PROCEDURES FLOW DIAGRAM

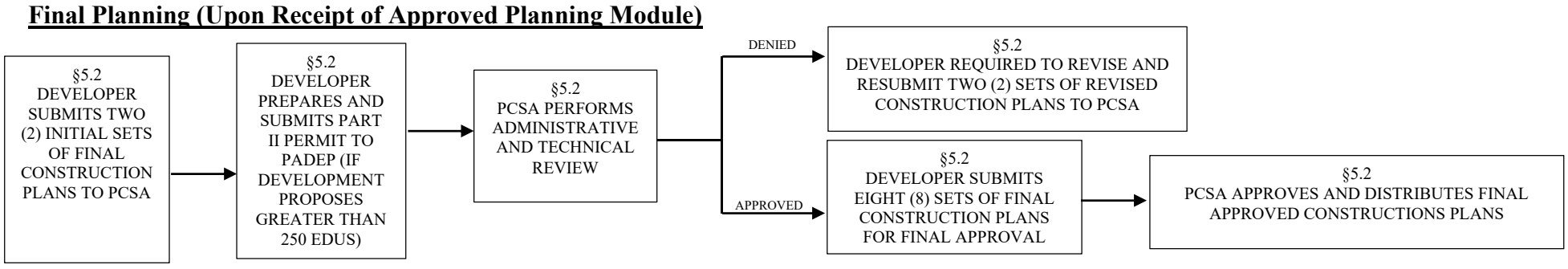
Pre-Application Planning and Developer's Agreement



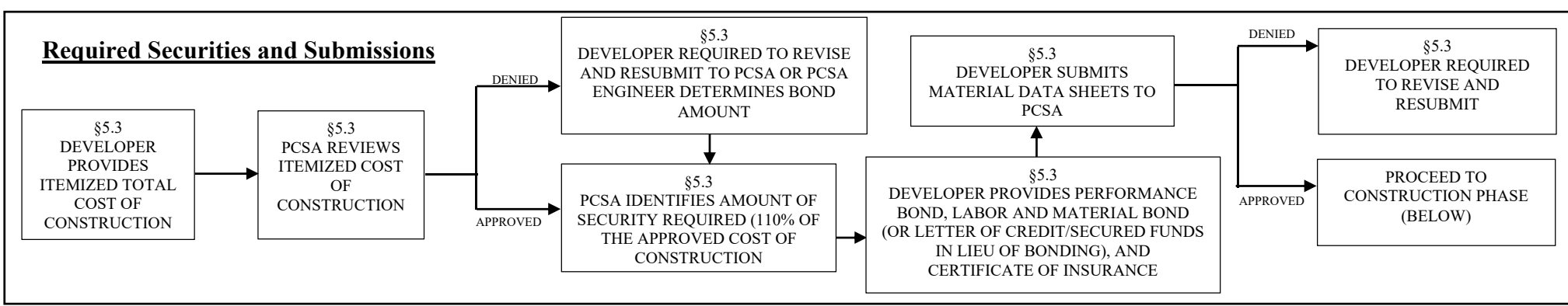
Planning Module Submission/Preliminary Planning



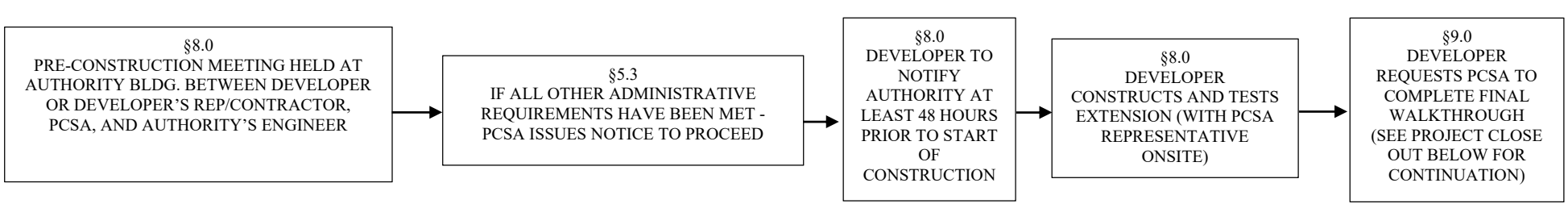
Final Planning (Upon Receipt of Approved Planning Module)



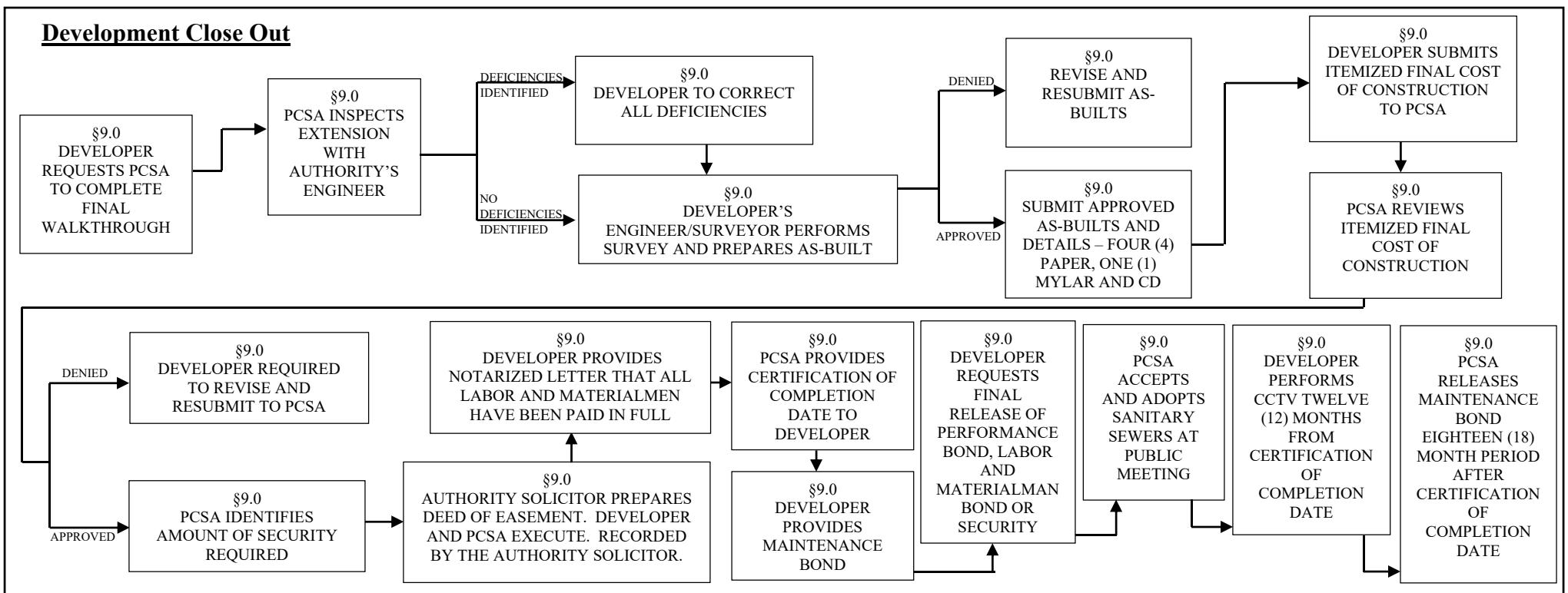
Required Securities and Submissions



Construction



Development Close Out



Developer Checklist for Peters Creek Sanitary Authority

Plan Name **EDU**

Description	Date	Remarks
Application or inquiry for sewer line or schedules meeting with PCSA		
Developer Deposit $2,500		
Execute Developers Agreement-2 copies		
Preliminary plans sent to Engineer by Developer for review with copy to Authority office for review.		
Submit planning module package to PCSA		
Obtain capacity availability letters from Jefferson Hill & South Park. Obtain capacity availability letter and section J signature from CMA. Submit completed planning module to PCSA for execution		
Submit 2 copies of initial final construction plans to PCSA		
Prepare & submit Part II Permit to PA DEP (if plan proposes more than 250 units)		
Submit 2 paper copies of plat for Review		
8 Copies of Construction Plans		
Submit itemized total cost of construction		
Submission of Material Sheets (must revise and resubmit if denied)		
Submission of Performance/Payment Bond		
Submission of Certificate of Insurance		
Upon approval of plat by Engineer, submit mylar for signature		
Once mylar has been recorded supply 2 paper copies		
Pre-Construction Meeting		
Developer to notify Authority at least 48 prior to start of construction		
Construct & test extension with inspector onsite		
Request final walk through		
Correct any deficiencies found in walk through		
Submission by Developer of "As Built"-4 paper, 1 mylar and CD		
Submit cost of construction with supporting documentation		
Submission by Developer of Maintenance Bond		
Request release of Performance Bond		
Execution of Deed of Easement by Developer-2 copies		
Notarized letter stating all labor and materials invoices have been paid		
Submit Completion certification letter (PCSA to provide completion date)		
Submission of Parcel #s, Lot #s and Addresses		
Complete 12 month CCTV inspection		
Submit CCTV documentation		
Date of Maintenance Bond expiration-18 months from after certification of completion		
Request Maintenance Bond Release		

APPENDIX A

PETERS CREEK SANITARY AUTHORITY
WASHINGTON COUNTY, PENNSYLVANIA

SANITARY SEWER STANDARD SPECIFICATIONS

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A. DEFINITIONS

A. DEFINITIONS

Wherever used in the PETERS CREEK SANITARY AUTHORITY CONSTRUCTION SPECIFICATIONS MANUAL AND SANITARY SEWER LINE EXTENSION PROCEDURES, the following items shall have the meanings indicated which shall be applicable to both the singular and plural thereof.

1.1 **BONDS** - Performance and Maintenance Bonds and other instruments of security, furnished by the DEVELOPER and his surety in accordance with Peters Creek Sanitary Authority Requirements.

1.2 **CONTRACTOR** - The person, firm or corporation with whom the DEVELOPER has engaged to perform the Work.

1. 3 **DEVELOPER** - The person, firm or corporation with whom the AUTHORITY has executed the Developer's Agreement for the sanitary sewer extension. DEVELOPER is responsible for all aspects of the Development/Extension and can be substituted where CONTRACTOR appears in the PETERS CREEK SANITARY AUTHORITY STANDARD CONSTRUCTION SPECIFICATIONS. Also includes any Authorized Representative of the Developer.

1.4 **DRAWINGS/PLANS** - The PCSA Approved Construction Plans which show the characteristics and scope of the WORK to be performed and which have been prepared by the DEVELOPER and/or his engineer and approved by Peters Creek Sanitary Authority.

1.5 **AUTHORITY'S ENGINEER** – The person, firm or corporation who is consultant to the Peters Creek Sanitary Authority. The Authority's Engineer may be authorized by PCSA to issue/distribute certain items identified in this manual on behalf of Peters Creek Sanitary Authority.

1.6 **NOTICE TO PROCEED** - Written communication issued by the AUTHORITY to the DEVELOPER authorizing him to proceed with the WORK and establishing the date of commencement of the WORK.

1.7 **PCSA/OWNER/AUTHORITY** - Peters Creek Sanitary Authority.

1.8 **PROJECT/DEVELOPMENT** - The undertaking to be performed as provided in the Developer's Agreement.

1.9 **AUTHORITY'S RESIDENT PROJECT REPRESENTATIVE** - The authorized representative of the AUTHORITY who is assigned to the DEVELOPMENT site or any part thereof.

1.10 **MATERIAL DATA SHEETS/SHOP DRAWINGS** - All drawings, diagrams, illustrations, brochures, schedules and other data which are prepared by the CONTRACTOR, a subcontractor, manufacturer, supplier, or distributor, which illustrate how specific portions of the WORK shall be fabricated or installed.

1.11 **SPECIFICATIONS** - A part of the Developer's Agreement consisting of written descriptions of a technical nature of materials, equipment, construction systems, standards and workmanship.

1.12 **WORK** - All labor necessary to produce the construction required by the Developer's Agreement, and all materials and equipment incorporated or to be incorporated in the DEVELOPMENT.

1.13 **WRITTEN NOTICE** - Any notice to any party of the Developer's Agreement to any part of this Agreement in writing and considered delivered and the service thereof completed, when posted by mail to the said party at his last given address, or delivered in person to said party or his authorized representative on the DEVELOPMENT site.

+ + END OF SECTION+ +

B. GENERAL

B. GENERAL

1.1 All plans shall include the imprint of a seal and signature of a professional engineer currently registered in the Commonwealth of Pennsylvania.

1.2 Ductile iron pipe with restrained joints shall be installed in all fill areas. The use of Field-Lok gaskets is required.

1.3 SDR-35 PVC plastic pipe may be used for sanitary sewer installations up to twenty-two (22) feet in depth and only in virgin ground. Ductile iron pipe will be required for depths in excess of twenty-two (22) feet.

1.4 Vertical separation of a minimum of 1.5 feet shall be maintained at all utility crossings. When at same elevation, a horizontal separation of a minimum of 10 feet shall be maintained with all other utilities.

1.5 Minimum cover over the sanitary sewer shall be four (4) feet.

1.6 Splash type connections shall be required at the intersections with existing lines to avoid conflicts arising from disagreement in invert elevations. Splash connections shall also be required at abrupt changes in grade. An abrupt change shall be considered a difference of ten percent or greater in the slopes of the incoming and outgoing lines.

1.7 All connections to existing manholes shall be core-drilled and a sealed via link seal collar, or Kor-N-Seal expandable boot installed around the new pipe to prevent infiltration. The manhole invert shall be reshaped for the new flow pattern.

1.8 Manholes greater than 20 feet deep shall be a minimum 5 feet in diameter and ventilated.

1.9 Special consideration shall be given during landscaping to maintain the minimum cover over the sewers and to keep the manhole lids visible and slightly above grade.

1.10 The Authority shall be provided with accurate as-built locations of the sanitary sewers along with recorded easements at the conclusion of construction. Further detail for as-built requirements provided on Developer's Agreement.

1.11 When working within existing service areas, the Contractor shall provide temporary pumping facilities as follows:

A. Prior to construction, the Contractor shall provide temporary pumping facilities to isolate that section of the existing sewer which is affected by the work. These facilities shall consist of a minimum of two pumps, with one of the pumps to be a standby in case of mechanical failure. Each pump shall be sized to handle the peak flows from the existing sewer. The

Contractor shall submit to the Authority's Engineer for review the type and size of temporary pump to be used before any construction work is started.

B. The Contractor shall provide a portable generator or make whatever temporary electrical connections are required for operation of the temporary pumps if they are electrically operated.

C. The Contractor shall maintain the temporary pumping facilities at the site until the replacement is accepted by the Authority.

1.12 Contractor shall be responsible for obtaining and paying for all required permits, including Township/Borough Road Occupancy Permit, if required.

1.13 Contractor is required to notify the Authority's Engineer a minimum of 48 hours in advance of starting or stopping work for the scheduling of construction observation.

1.14 The Contractor is required to install "man pans" in all manholes of a type approved by the Peters Creek Sanitary Authority.

1.15 Sanitary sewer mainline and laterals installed within roadways or other improved areas shall be installed with 100% PennDOT 2A Limestone backfill from the top of the pipe zone (12" above the crown of the pipe) for the full depth of backfill as shown on the PCSA Standard Detail Drawings.

1.16 Pressure treated wood posts measuring nominally 4 inch by 4 inch shall be used during construction to identify the location of lateral ends. Final location of said posts shall be determined by field survey and included on the as-built drawing submission.

1.17 Sanitary sewer laterals must be furnished with backwater valves in compliance with the Uniform Construction Code (UCC), International Plumbing Code (IPC), which provides that these valves will be installed where the flood level rims of plumbing fixtures are below the elevation of the manhole cover of the next upstream manhole in the public sewer, and will be installed at the time such laterals are connected.

1.18 Site tees are required for each lot. Site tees to be placed, when possible, at the border of the right-of-way or easement, closest to the proposed or existing building. An additional site tee is to be placed at the top of the slopes in instances where the sanitary sewer mainline elevation compared to the lot building area elevation dictates.

1.19 If an existing PCSA manhole is proposed to be replaced or altered, the Developer must first verify which, if any, existing laterals are to remain or be removed in said manhole.

1.20 PCSA is a gravity flow sanitary sewer system. All individual lots should be designed as gravity flow unless otherwise approved by the Authority.

1.21 Ductile Iron Pipe will be required when the pipe slope is 20% or greater and concrete anchors are used.

1.22 PCSA may, at their discretion, require parallel sewers on either side of proposed roadways where the topography and layout of the development results in a significant amount of sanitary sewer lateral roadway crossings.

1.23 All sanitary sewer service laterals serving proposed lots/houses are to be installed a minimum of five (5) feet from any adjoining parcel property line.

++END OF SECTION++

C. EARTHWORK FOR SANITARY SEWERS

C. EARTHWORK FOR SANITARY SEWERS

PART 1 GENERAL

1.1 SCOPE

A. Description of Work

1. Excavation for pipe and appurtenances and backfill subsequent to their installation in accordance with the construction plans and as specified herein.

1.2 LINES AND GRADES

A. Grades

1. Pipes shall be laid true to the lines and grades shown on the Plans. The grade shown on the profile is the invert to which the work must conform. Work not conforming to the grade shall be corrected to the satisfaction of the Authority or Authority's Engineer.

2. The grade and alignment of the pipe shall be maintained by the following method:

a. By Laser Beams

1) Laser beams shall be operated by trained personnel and the proper safety precautions are adhered to either as suggested by the manufacturer or as required by State Law.

2) The pipe shall be checked with a level between 50 and 100 feet out of the manhole to assure that the laser beam is on the correct grade.

3. Contractor is responsible for maintaining the line and grade.

a. The pipe shall be checked at each manhole to assure that it is on the correct line and grade.

4. Copies of Contractor's cut sheets shall be provided to the Authority's Resident Project Representative and the Authority's Engineer prior to construction for Authority's Engineer's approval.

B. Location of Pipe Lines

1. The location of the proposed lines are shown on the drawings.

2. Proposed depths are shown on the drawings.

3. The Authority reserves the right to review and approve any changes in lines and grades of pipelines, and in locations of pipes and appurtenances.

1.3 TRENCHING REGULATIONS

A. Contractor shall comply with Pennsylvania Act 172-1986, which requires notice by Contractor to all utilities serving the site prior to starting any excavation operations.

B. Contractor shall be governed by the conditions, restrictions, rules and regulations, including those covering "open trenching and backfilling in or along roadways" and the "maintenance and protection of traffic," established by the Pennsylvania Department of Transportation, County Commissioners, Township/Borough Supervisors/Officials and Railroad Officials when working within their respective rights-of-way.

C. All work shall comply with the rules established by the U. S. Occupational Safety and Health Administration (O.S.H.A.).

D. All such rules and regulations, as referred to above, shall be in addition to those set forth in the specification.

PART 2 MATERIALS

2.1 EXCAVATED MATERIAL

A. Present on-site materials excavated in the course of construction which are, in the judgment of the Authority’s Resident Project Representative in consultation with Authority’s Engineer, unsuitable shall be removed from the project site by the Contractor and disposed of in accordance with all laws and regulations.

B. Suitable Materials

1. General

a. Suitable material shall be capable of being compacted as specified in paragraph "Compaction and Testing in Improved Areas" in Part 3 of this Section.

2. Type 1 Material

a. Excavated material from the trench or materials from other sources which are free from large clods, roots or stones larger than two (2) inches.

3. Type 2 Material

a. Excavated material from the trench or materials from other sources which are free from large clods, roots or stones larger than eight (8) inches.

C. All material, whether from on-site excavation or borrow, shall be of such nature that after it has been properly placed and compacted, it will produce a dense, stable backfill. Material shall not be placed when frozen, or water saturated to the extent that material cannot be properly compacted.

2.2 AGGREGATE BACKFILL

A. Only aggregate backfill will be used as backfill in improved areas, unless otherwise specified. Aggregate backfill shall be 100% PennDOT 2A Limestone backfill and shall conform to the gradation requirements of Section 703.2 of the Pennsylvania Department of Transportation Specifications - Form 408, latest edition.

2.3 PIPE ZONE MATERIALS

A. Pipe Zone Bedding and Backfill shall be AASHTO No. 57 Limestone Aggregate conforming to PennDOT Section 703.2, as listed in PennDOT Publication 34, Bulletin 14 and as shown on table below.

AASHTO No. 57 Limestone Aggregate Square Mesh Sieve Size	Percent Passing by Weight
1-1/2 in.	100
1 in.	95 – 100
1/2 in.	25 – 60
No. 4	0 – 10
No. 8	0 – 5

2.4 CONCRETE

A. Concrete for encasement, thrust blocks, or cradles shall be Pennsylvania Department of Transportation Class "A", conforming to the requirements of Section F, CAST-IN-PLACE CONCRETE.

PART 3 EXECUTION

3.1 CONSTRUCTION REQUIREMENTS

A. General

1. If temporary access to such right-of-way is required, Developer or Contractor shall obtain the right to use adjacent property (written permission from the property owner).

2. During the progress of the work, Contractor shall maintain both vehicular and pedestrian traffic and provide access to all dwellings, business establishments, fire hydrants, water and gas va1ves and other such facilities. Metal plates shall be used where traffic must cross open trenches. These plates shall be of substantial thickness and weight to prevent displacement under normal traffic movement. Streets and intersections may be blocked ONLY in half-widths unless the street is closed. Any street closings must be approved by the municipality in which the work is located. If the closing is permitted, Contractor shall post suitable signs so indicating and the necessary detour signs in accordance with all local requirements.

3. Contractor shall keep the work site and public and private property, occupied by him, free from waste and debris resulting from his operations.

4. Adequate provisions shall be made to maintain the flow of sewers, drains, underdrains, culverts and natural watercourses encountered during construction. Any which may have been disturbed shall be immediately repaired by the Contractor to the satisfaction of the Authority or Owner of said facility.

   a. Where existing sewers are encountered and which interfere with construction, the flow in the existing sewer shall be maintained by constructing a satisfactory flume or bypass sewer, or by other means approved by the Authority's Engineer.

5. Contractor shall keep all gutters clear or otherwise provide satisfactory facilities for street drainage. He shall when necessary,

provide temporary channels to allow the flow of all water, either along or across the site, to natural water courses but not through newly laid pipe or existing sewers. Natural watercourses shall not be obstructed.

6. Where concrete gutters or underdrains along State Highways, County and Municipal roads are damaged or destroyed due to Contractor's operations, or removed for convenience of construction, they (including any subdrainage material and/or facilities located beneath the concrete gutter) shall be completely replaced or reconstructed in kind by Contractor. Where construction joints are present in concrete gutter, replacement of only those sections damaged or disturbed will be permitted.

7. Whenever it becomes necessary to remove and replace a building service connection or utility facility, the work shall be performed in accordance with the requirements of the utility concerned by the Contractor.

8. All damage occurring to existing facilities due to Contractor's operations shall be immediately repaired or replaced by the Contractor.

9. Where dead ends shall exist following removal of pipes, such ends shall be carefully and completely plugged with concrete or brick and mortar.

10. The Contractor shall notify the Authority’s Engineer immediately, for his review and determination of treatment, of any of the following occurrences:

    a. Discovery of any unforeseen conflict.

    b. The failure of any temporary support of a pipe, manhole, pole, structure, etc.

    c. Discovery of a particular area where settlement will be undesirable.

    d. The necessity to make any close-by pipe, structure, etc. permanently stable.

3.2 EXCAVATION

A. General

1. Perform all excavation of every description and of whatever type of material encountered to the required depth as shown on the Plans. All excavated materials not required for fill or backfill shall be removed from the site of the work by the Contractor. Side walls of trenches shall be kept as nearly vertical as possible and shall be properly sheathed and braced. Trenches shall be excavated true to line so that the trench width is not more than the width shown on Table 3 hereinafter. When installing Polyvinyl Chloride (PVC) pipe, the sheathing and shoring shall not project below the top of the pipe. When applicable, coupling holes of proper size shall be excavated such that pipe resting for its entire length upon the bottom of the trench. Care shall be taken not to excavate below the depth specified.

B. Excavation Below Grade

1. Where the bottom of the trench is excavated to a greater depth than required, the trench shall be brought back to grade as follows:

    a. When the pipe was to be supported by crushed stone encasement, concrete encasement or concrete cradle, the over-excavation shall be filled with AASHTO No. 57 Limestone Aggregate.

2. Refilling with earth to bring the bottom of the trench to the proper grade will not be permitted.

C. Excavation in Improved Areas

1. The Contractor shall at all times exercise care not to excavate beyond the limiting lines. Limiting lines shall be defined as the trench width PLUS one (1) foot, maximum, on each side of the trench.

D. Rock

1. Excavate rock, if encountered, to the lines and grades indicated on the Plans or as required herein and dispose of the excavated material.

2. Rock in pipe trenches shall be excavated below the bottom of the pipe barrel as follows:

Nominal Pipe Diameter (inches)	Depth Below Pipe (inches)
4 – 16	4
18 – 48	6
54 – 84	10

3. Blasting will not be permitted near existing facilities if the Owner of the facility, (utility company, federal, state, or local agency) prohibits the use of blasting near their facility.

   a. No blasting will be permitted within PennDOT's Rights-of-Way until the Contractor has executed an approved Blasting Bond in an amount to be determined by PennDOT and provided proof of insurance coverage to Owner and;
   b. All blasting approved by and shall be in accordance with the requirements of the municipality in which the project is located.

4. All operations involving explosives shall be conducted by experienced personnel only, with all possible care to avoid injury to persons and damage to property.

5. Blasting shall be done only with such quantities and strengths of explosives and in such manner as will break the rock approximately to the intended lines and grades and yet will leave the rock not to be excavated in an unshattered condition.

6. Care shall be taken to avoid excessive cracking of the rock upon or against which any structure will be built, and to prevent damage to existing pipes or other structures and property above or below ground.

7. Rock shall be well covered with logs, blasting mats, or both, where required.

8. Sufficient warning shall be given to all persons in the vicinity of the work before a charge is exploded. Flagman shall be employed to stop or direct traffic as required.

9. All blasting effects shall be monitored in the field by a professional engineer or geologist who shall be selected and paid by the Developer/Contractor.

10. Before any blasting is carried out the Contractor shall submit to the Authority and Municipality a report prepared by the professional

engineer licensed to practice in the Commonwealth of Pennsylvania or Geologist containing specific recommendations for blasting. The report shall include sketches showing blast locations and adjacent existing utilities, structures, etc., and shall cover amount of charge, firing times, ground velocities, energy ratios, accelerations and displacements, effects on adjacent utilities or structures. The report shall also outline the field monitoring program. Should the report indicate potential damage to existing facilities, the Contractor will not be allowed to utilize blasting.

11. The Contractor shall pre-cut paving before blasting to prevent paving from heaving beyond normal trench width.

12. At the end of each Work day remove all wires from blast holes and pick up and dispose of all blasting wires that are laying around the Work area.

3.3 EXCAVATION NEAR EXISTING STRUCTURES

A. Existing utilities shall be verified through the Pennsylvania One Call System with sufficient notice.

B. Field locate all water or other utility lines well ahead of the work at all times.

C. As the excavation approaches pipes, conduits, or other underground structures, digging by conventional trenching machine methods shall be done with care. Hand dig as required.

D. Excavation near structures will not be allowed closer to the structure than the depth of the excavation below the bottom of the foundation without shoring the excavation with sheathing.

E. Contractor is cautioned to avoid blasting in proximity to all utility facilities and structures.

F. The Contractor shall carefully protect from disturbance and damage all land monuments and property markers until an authorized agent has witnessed or otherwise referenced their locations. These monuments and/or markers shall then only be removed when authorized by the agent or owner.

3.4 PROTECTION OF EXISTING STRUCTURES

A. All existing pipes, poles, wires, fences, curbings, property-line markers, and other structures which must be preserved in place without being temporarily or permanently relocated, shall be carefully supported and protected from damage by the Contractor, and in case of damage, the Contractor shall

notify the appropriate party so that proper steps may be taken to repair any and all damage done. When the owners do not wish to make the repairs themselves, all damage shall be repaired by the Contractor at their sole expense.

B. If the owner of the structure wishes to make his own repairs, the Contractor shall reimburse the owner of the structure for all time and materials required to make the repairs.

C. All utility services shall be supported by suitable means so that the services shall not fail when tamping and settling occurs.

3.5 TRENCHING

A. Trenches shall be excavated to the required depth indicated on the Construction Drawings, adding, however, to such depths, the thickness of the pipe, and bedding if required, that is to be placed in the trench. The width of the trench shall be as shown in the following Table 3. Trenches shall be of such extra width, when required, to permit placement of sheeting, bracing and appurtenances. A recess sufficiently large enough to receive couplings, when applicable, and to permit making joints, shall be cut out of the bottom of the trench to assure that the pipe barrel will lie flat on the trench bottom.

TABLE 3
Suggested Trench Widths at the Top of the Pipe

Nominal Pipe Size (in.)	**Trench Width (in.)**
4	28
6	30
8	32
10	34
12	36
14	38
16	40

B. During installation, upon encountering unstable soil conditions (i.e. quicksand, wet spongy material, etc.), the Contractor shall determine the actual depth of the soft material. Once the depth of the soft material has been determined, one (1) of the following methods of construction work shall be used, as determined by the Authority's Resident Project Representative in consultation with the Authority's Engineer:

1. Installation by Quicksand Excavation Method

2. Undercut Unsuitable Material and Backfill with Stone

3. Concrete Encasement/Cradle

3.6 TRENCHING IN ADVANCE OF PIPE LAYING

A. Performing trenching for the pipe lines in advance of the pipe laying. At no time will the Contractor be permitted to leave the trench open at the end of a working day.

3.7 KEEPING TRENCH DRY

A. All ground water which may be found in the trenches and/or any water which may get into trenches from any cause whatsoever shall be pumped or bailed-out so that the trench shall be dry during pipe laying operation. No water shall be permitted to reach concrete until it has set sufficiently. All water pumped from the trenches shall be disposed of in compliance with the applicable local regulations of the appropriate governing body.

B. The Contractor shall provide and place all necessary flumes or other channels of adequate size to temporarily carry all streams, brooks, stormwater or other water which may flow along or across the lines of the pipe line. All flumes or channels thus utilized shall be tight so as to prevent leakage into the trenches. Water pumped from trenches shall be led to a natural watercourse.

3.8 QUICKSAND EXCAVATION

A. Where quicksand is encountered, the Contractor shall drive either tight tongue and groove wooden sheet piling, or steel sheet piling to a depth which will effectively cut off the flow of sand. Well points and other methods shall then be used to dewater trench. Excavation and construction shall follow as rapidly as possible thereafter. A satisfactory foundation must however, be secured, either by close tongue and groove planking held by piling or other approved means. Where pipe is to be constructed through quicksand, the trench shall be carried to a sufficient depth below the grade line to permit the pipe to be encased in concrete, on a 2-inch x 10-inch plank platform, or cradle.

B. Contractor shall comply with Paragraph 3.9, A, for design of the sheet piling.

3.9 SHEATHING AND SHORING

A. Where sheathing, shoring, bracing or trench boxes are used, they must be designed by a professional engineer licensed to practice in the

Commonwealth of Pennsylvania. The design engineer shall provide the Contractor with a certification signed and sealed by him stating that the design of the sheeting and bracing conforms to all applicable requirements of the Construction Safety Code and the Occupational Health and Safety Act. An informational copy of these data shall be furnished to the Authority for review before the installation of any sheathing, shoring, bracing or trench boxes.

B. Trenches shall, at all times, be properly and adequately sheathed and braced to prevent accidents, caving of the sides of the trench, or breaking of the ground outside of the lines of the trenches proper, or damage to buildings, or other structures along the line of construction. Underground structures of all types shall be protected by the Contractor, who shall use all necessary shoring, bracing or other appliances for the protection of same. Care must be taken not to injure in any way water mains, water service pipes, drain pipes, sanitary or stormwater sewers, gas mains, oil mains, electric conduits or other structures encountered on the lines of the work.

C. When installing PVC pipe, the sheeting and shoring shall not project below a point one (1) foot above the top of the pipe, except during quicksand excavation.

D. No shoring shall be left in place.

E. Sheeting may be removed after the backfilling has been brought up to an elevation such as to permit its safe removal. Sheeting and bracing may be removed only in such a manner to provide adequate protection of the completed pipe and/or structure, and adjacent underground or surface structures and prevent ground disturbance.

3.10 TUNNELING/BORING

A. Tunneling shall be limited to those areas depicted on the Plans, unless special circumstances dictate otherwise; and then only after review, concurrence and approval of the Authority's Engineer. The Authority's approval is of the general scheme but does not include approval of the loads, stresses, strains, strengths of materials and mathematical calculations involved which are the responsibility of the Contractor. Plans shall also be approved by the Municipality in which the work is located before the work commences.

B. Prior to undertaking any tunneling, Contractor shall have a professional engineer, licensed to practice in the Commonwealth of Pennsylvania, prepare a design and outline the proposed tunneling methods and procedures to be followed. Said engineer shall also provide a certification signed and sealed by him that the design for tunneling conforms to

applicable requirements of the Construction Safety Code of the Occupational Health and Safety Act. An informational copy of these data shall be furnished to the Authority before beginning the tunneling.

C. Only the Contractor or Subcontractor fully equipped and experienced in this type of work shall be used. Specific information shall be submitted to the Authority as evidence of his experience.

3.11 TUNNELING UNDER TREES, CURBS, ETC.

A. In areas where specific trees, curbs, etc. are designated to remain in place, excavation may be made by alternate sections of open cut and wedge tunnel. Design of this method of excavation shall be done by the Contractor's engineer as described in paragraph 3.10 above.

B. Backfilling of the tunnel section shall be by the use of mechanical tampers, starting at the wedge and working progressively away from the wedge.

C. If the wedge tunnel is deemed unfeasible, an alternate method of tunneling shall be designed by the Contractor's engineer.

3.12 PIPE BEDDING

A. In accordance with Section 3.16.

3.13 CONCRETE CRADLE

A. Where unstable conditions are encountered, or where directed by the Authority’s Engineer, the pipe shall be supported on Concrete Cradle. Concrete Cradles shall be installed where no suitable supporting solid or rock stratum exists within two (2) feet of the bottom of the pipe.

B. The concrete cradle shall be furnished and installed equal to the "Concrete Encasement", except that only that portion of the encasement at and below the horizontal diameter of the pipe shall be poured, forming a true cradle under the bottom half of the pipe.

3.14 CONCRETE ENCASEMENT

A. For stream crossings, when required by the Plans or directed by the Authority’s Engineer, concrete encasement of the pipe shall be constructed in accordance with PCSA Standard Detail Drawing and PADEP Rules and Regulations.

B. For other areas, when required by the Plans or directed by the Authority’s Engineer, the concrete encasement of the pipe shall be constructed in accordance with PCSA Standard Detail Drawing. Concrete encasement

may also be constructed when excavation has been carried beyond normal limits.

1. The trench shall be excavated to a depth of eighteen (18) inches, minimum, below the bottom of the proposed pipe elevation. AASHTO No. 57 Limestone Aggregate, minimum six (6) inches in depth, shall be placed and compacted; the pipe installed and completely encased in concrete such that the encasement at any point around the outside barrel of the pipe measures twelve (12) inches in thickness.

2. Unless otherwise shown on the Plans or directed by the Authority's Engineer, concrete shall be PennDOT Class A - 3300 psi. Concrete mix, installation, curing, etc. shall be in accordance with SECTION F - CAST-IN-PLACE CONCRETE. Freshly poured concrete shall be maintained free from groundwater for at least twenty-four (24) hours. No backfilling of the trench shall be performed for a minimum period of twenty-four (24) hours after the encasement has been poured. Steel reinforcing, if required by Authority or Authority's Engineer, shall be as shown on the Plans or PCSA Standard Detail Drawings. All encasements shall be float or shovel finished.

3.15 CASING

A. Unless specified on the drawings to be installed by open-cut, all casing to be installed beneath railroads and highways will be done so by boring.

B. The casing shall be installed in a manner so as to prevent the formation of a waterway under the railroad or highway, or the displacement of their respective embankments.

C. In the event casing is shown on the drawings without size and wall thickness, the size of the casing shall be at least eight (8) inches larger than the outside diameter of the carrier pipe. with a wall thickness as follows:

Nominal Diameter of Casing Pipe in Inches	**Wall Thickness**
Under 14	0.251″
14 and 16	0.282″
18	0.313″
20	0.344″
22	0.375″
24	0.407″
26	0.438″

Nominal Diameter of Casing Pipe in Inches	Wall Thickness
28 and 30	0.469″
32	0.501″
34 and 36	0.532″

3.16 BACKFILLING

A. General

1. No backfilling shall be done before the Authority's Resident Project Representative has observed the installation. Backfill material may be deposited in trench either by hand or machine.

2. At least 30 inches of cover over the top of the pipe shall be provided before the trench is wheel-loaded.

3. Trench backfill compaction is performance based. Contractor to select and implement means, methods, techniques, and sequence of trench compaction sufficient to preclude settlement based on materials utilized.

B. Backfill Zones:

1. The Pipe Zone, which begins at a minimum depth of six inches (6") below the bottom of the pipe and ends at a point twelve inches (12") above the crown of the pipe; comprised of the bedding zone describing the zone below the horizontal centerline of the pipe to trench bottom and the initial backfill zone above the horizontal centerline of the pipe to the top of the pipe zone.

2. The Intermediate Zone, which begins at a point twelve inches (12") above the crown of the pipe and ends at a point eighteen inches (18") below finish grade; and

3. The Final Zone that includes the top eighteen inches (18") of trench area.

C. Backfill Restrictions:

1. Do not use in backfilling work materials such as house ashes, putrescible refuse and such other materials. Do not permit excavations to be used as dumping areas for refuse.

2. Do not use frozen backfill materials or place backfill materials on frozen subgrade or trench surfaces.

3. Should there be a deficiency of proper backfill material, provide acceptable borrow material.

4. Except for temporary use in backfilling, no permanent bulkheads or retaining walls will be allowed in the trenches over piping.

5. Do not use frozen or wet materials containing moisture in excess of the amount necessary for satisfactory compaction as backfill.

D. Pipe Zone (Subgrade Preparation):

1. Pipe Zone Subgrade: If the bottom of the trench is found to be of unsuitable material, including but not limited to muck, quicksand, soft clay, ashes, cinders, refuse, vegetable, or other organic material that in the judgment of the Authority's Resident Project Representative in consultation with the Authority's Engineer, is not suitable for pipe foundation subgrade or backfill; excavate and remove such unsuitable material to the width and depth ordered by the Authority's Engineer. Backfill to subgrade with approved stone backfill material in layers.

2. Pipe Bedding: Install pipe bedding a minimum depth of six inches (6") below the bottom of the pipe and along both sides to the horizontal centerline (springline) of the pipe. Hand work material under pipe haunch. Provide uniform support. Use AASHTO No. 57 Limestone Aggregate in trenches made in both earth and rock, or Concrete Encasement or Concrete Cradle, where and as shown on the Contract Drawings or required by the Authority's Engineer. If maximum trench widths specified in 3.5 Table 3 are exceeded, provide Concrete Cradle as specified and in accordance with PCSA Standard Detail Drawings.

3. Initial Backfill: Following pipe bedding, pipe and inline structure installation, backfill pipe zone trench to a height at least one foot above the top of the outside barrel of the pipe with AASHTO No. 57 Limestone Aggregate placed in four inch layers. Place initial backfill in trenches in such manner as not to damage, displace or disturb the pipe.

E. Intermediate Zone Backfill:

1. Backfill in unimproved areas: Backfill remainder of the trench using clean earth backfill material placed in layers not exceeding six

inches in thickness after compaction. Exercise caution to carry backfill up evenly on opposite sides of the piping.

2. Backfill in Roadways: Use backfill materials specified below:

   a. Within the right-of-way limits of State Highways:

      i. Improved Areas: 100% PennDOT 2A Limestone backfill placed and compacted in maximum six inch layers to the bottom of the temporary or permanent pavement.

      ii. Unpaved Shoulders: 100% PennDOT 2A Limestone backfill placed and compacted in maximum six inch layers to existing grade.

      iii. Unpaved Areas: 100% PennDOT 2A Limestone backfill compacted in maximum six inch layers to bottom of topsoil. Replace topsoil to approximate depth of existing as final backfilling operation.

   b. Improved Roadways of Streets Other Than State Highways: After pipe bedding has been installed as specified above, backfill remainder of the trench according to the specific Township/Borough Requirements or with 100% PennDOT 2A Limestone backfill compacted in maximum six inch layers, whichever is more stringent.

   c. Unpaved Shoulders of Streets Other Than State Highways: After pipe bedding has been installed as specified above, backfill remainder of the trench according to the specific Township/Borough Requirements.

   d. Bituminous Driveways: After pipe bedding has been installed as specified above, backfill remainder of the trench with 100% PennDOT 2A Limestone backfill compacted in maximum six inch layers.

   e. Stone Driveways and Parking Areas: After pipe bedding has been installed as specified above, backfill remainder of the trench according with 100% PennDOT 2A Limestone backfill compacted in maximum six inch layers to a point six inches below the adjacent existing surface. Backfill the

remaining six inches with stone surface replacement pavement.

f. Sidewalks: 100% PennDOT 2A Limestone backfill placed and compacted in maximum six inch layers to a point eight inches below the adjacent exiting surface. Backfill the remaining eight inches with compacted 100% PennDOT 2A Limestone backfill and specified replacement pavement.

g. Unimproved Streets: 100% PennDOT 2A Limestone backfill placed and compacted in maximum six inch layers to a point six inches below the adjacent existing surface. Backfill the remaining six inches with compacted 100% PennDOT 2A Limestone backfill.

F. Final Zone

1. Unimproved Areas:

a. Clean earth backfill placed and compacted in maximum six inch layers to bottom of topsoil. Replace topsoil to approximate depth of existing topsoil as the final backfilling operation, and crown to such height as required by the Authority's Resident Project Representative in consultation with the Authority's Engineer.

2. Improved Areas:

a. Temporary: 16 inches of 100% PennDOT 2A Limestone backfill placed and compacted in maximum 4-inch lifts and covered by a 2-inch lift of bituminous cold patch. Repair all disturbed pavement prior to cessation of construction each working day. Maintain uniform surface of cold patch until permanent pavement is installed.

b. Permanent: Backfill final zone in accordance with Township/Borough/County/State standards. Paving conforming to the requirements of Section G, PAVING and specific State/Township/Borough Requirements.

G. Backfill Material and Manhole Excavation:

1. Backfill Material for Manhole Excavation: Where manholes are installed in paved streets, alleys, roads, berms, parking areas, or other improved surface areas, backfill the entire excavated area

around the manhole with AASHTO No. 57 Limestone Aggregate or 100% PennDOT 2A Limestone backfill from its base to the bottom of the improved surface area. Where manholes are installed in unimproved areas, backfill the entire excavated area around the manhole with AASHTO No. 57 Limestone Aggregate or 100% PennDOT 2A Limestone backfill from the base to a point twelve inches (12") above the top of the highest pipe entering the manhole and with clean earth material to the surface.

H. Settlement

1. If settlement occurs, additional backfill shall be deposited and mechanically compacted to the required elevation.

3.17 COMPACTION IN IMPROVED AREAS

A. In all improved areas the backfill shall be thoroughly compacted by use of vibratory tamping pads or, where these cannot be used, by mechanical or hand tamping. Backfilling shall be compacted to at least ninety-five (95%) percent of maximum density at optimum moisture content. A nuclear density test shall be performed to verify the compaction. In addition, in State Highways the more stringent requirements (Form 408 Specifications, Section 210) by PennDOT will govern the subgrade compaction. When necessary to secure proper compaction fill material shall be moistened.

B. The optimum moisture content and the maximum density of each type of material used for trench backfill shall be determined by "tests for Moisture-Density Relations of Soils, using 10 lb. Rammer and 18-inch Drop" (ASTM D1557 or AASHTO T-180).

C. The field moisture content of materials being compacted shall be determined by "Laboratory Determination of Moisture Content of Soil" (ASTM D2216). The field density of compacted material shall be determined by "Test for Density of Soil in Place by the Sand-Cone Method" (ASTM D1556).

D. A soils engineering and testing laboratory shall perform sufficient tests and inspection procedures both in the field and lab to insure that the provisions of this Specification are met. The testing and control firm shall be approved by the Authority's Engineer and paid by the Contractor.

E. After testing is completed and reports are provided, all subgrades below the paving will be examined by the Authority's Resident Project Representative in consultation with the Authority's Engineer before any paving is authorized.

F. It shall be the responsibility of the Soils Engineering and Testing Laboratory to promptly, faithfully and accurately report the results of its tests and inspections to the Authority's Engineer. The firm must, in addition, work in coordination with the Contractor making all test required by the Contract. The reports must state whether or not the results comply with Contract requirements. The testing and control firm shall promptly type and deliver all reports to the Authority's Engineer with a copy to the Contractor.

3.18 DISPOSAL OF MATERIAL

A. Excavated material shall be so placed as not to unreasonably interfere with travel. All bituminous material and other street surfacing, surface loam and sod, shall be kept separate from the remainder of the excavated material. Upon completion of the backfilling all surplus and/or unsuitable material removed, and the surface restored to the condition in which it was before ground was broken. All surplus excavation shall be removed from the site of the work by the Contractor and disposal shall comply with all Federal, State and local laws.

3.19 CARE AND RESTORATION OF PROPERTY

A. Excavating machinery and cranes shall be operated to prevent damage to existing structures and/or wires.

B. Do not to damage paving, curb, inlets, sidewalks, etc. Any damages to areas outside the limits shown shall be repaired/replaced in kind.

C. The restoration of existing property or structures shall be done as promptly as practicable and shall not be left until the end of the construction period.

D. Where work is performed in public rights-of-way and/or temporary construction right-of- way located on private property, all lawn areas and plants shall be restored if removed or damaged. If possible, plants may be replanted; otherwise, they must be replaced. Grass may be seeded or sodded and maintained until a good growth results. Water seeding is not acceptable for restoration work. In permanent rights-of-way, through private property, ONLY grass restoration will be required unless otherwise specified. Save all trees where possible. All trees over three inches (3") in diameter shall be adequately braced and protected; those under three inches (3") in diameter, shall be removed and replanted; otherwise, they must be replaced.

E. Unpaved shoulders shall be restored to a condition equal to or better than that in which they were found.

+ + END OF SECTION+ +

D. SANITARY SEWERS AND APPURTENANCES

D. SANITARY SEWERS AND APPURTENANCES

PART 1 GENERAL

1.1 SCOPE

A. Description of Work

1. Furnish and install all sanitary sewers and appurtenances as shown on the drawings and specified herein.

2. The work of this section consists of, but is not limited to, furnishing and installing pipe, materials for joint connections, house or building laterals to point indicated on drawings, specials, fittings and appurtenances thereto.

1.2 SUBMITTALS

A. Shop Drawings/Material Data Sheets

1. Submit six copies of shop drawings and/or catalog sheets of all materials to be used in the construction of the sewer lines.

2. Shop drawings show the principal dimensions, weight, structural features, etc., depending on the subject of the drawing.

3. When so specified or if considered by the Authority's Engineer to be acceptable, manufacturer's specifications, catalog data, descriptive matter, illustrations, etc. may be submitted for review in place of shop and working drawings. In such case the requirements shall be as specified for shop and working drawings, insofar as applicable.

B. Test Reports

1. Factory test pipe materials listed in the following table. Each pipe manufacturer must have facilities to perform listed tests. The Authority's Engineer reserves the right to require the manufacturer to perform such additional number of tests as the Authority's Engineer may deem necessary to establish the quality of the material offered for use.

Material	Test Method	Number of Tests
a. Ductile Iron Pipe	ANSI A 21.51	As specified in ANSI A 21.51.
b. Polyvinyl Chloride Pipe	ASTM D 3034 or	As specified in

	ASTM F 789 (ASTM F 679) (ASTM F 794) as applicable.	ASTM D 3034 or ASTM F 789 (ASTM F 679) (ASTM F 794) as applicable.

2. Certified copies of the tests made by the manufacturer, or by a reliable commercial laboratory acceptable to the Authority's Engineer, shall be submitted to the Authority's Engineer prior to the first shipment of pipe.

PART 2 PRODUCTS

2.1 DUCTILE-IRON PIPE WITH RUBBER GASKET JOINTS

A. General

1. Ductile-iron pipe shall be bell and spigot type, centrifugally cast and conforming to standard specifications of American National Standards Institute, ANSI A21.50 and A21.51, ductile-iron thickness class dependent upon size of pipe and depth of cover (minimum Class 52), with push-on joint of type that employs a single modified bulb shape grooved rubber gasket to effect the joint seal. Inside contour of bell shall provide a seat for the gasket, and an internal bead in the socket shall fit into the groove in the gasket. Plain end of the pipe shall be slightly tapered to ease its sliding fit with the gasket when joint is being made. Pipe and fitting for forcemains and gravity sewers installed in fill areas shall be push-on joint with Field-Lok gaskets. Mechanical Lok joints conforming to ANSI A21.11 may be used if approved by Authority.

2. Pipe shall have a minimum tensile strength of 60,000 pounds per square inch minimum, a minimum yield point of 42,000 pounds per square inch, and a minimum elongation of 10% in accordance with ANSI A21.51.

B. Fittings For Ductile-Iron Pipe

1. Fittings for ductile-iron pipe may be either gray or ductile iron conforming to latest issue of ANSI A21.10 for short body gray and ductile iron fittings, for 250 psi water pressure, plus water hammer, and shall be made with mechanical joint ends conforming to ANSI A21.11.

C. Lining and Coating

1. Line ductile iron piping for sanitary sewer service with an amine cured novalac epoxy containing at least 20% by volume of ceramic quartz pigment (ceramic epoxy).

2. Apply ceramic epoxy lining to the ductile iron pipe with 40 mils nominal dry film thickness.

3. Cover the interior surfaces of the pipe and fittings with ceramic epoxy lining from the interior of the spigot end to a point sufficiently forward in the bell socket such that the gasket, in the assembled joint, seals over the end of the lining.

4. Repair the cut end as per the manufacturer's written procedure where pipes are cut in the field.

5. Pipe Lining: For lines conveying sewage: Provide Protecto 401™ as manufactured by Induron® or an approved equal meeting the requirements of this specification.

6. Pipe and Fitting Lining: Manufacturer's ceramic epoxy lining single thickness.

7. Pipe and Fitting Exterior Coating: Manufacturer's standard asphaltic coating, approximately one mil thick in accordance with ANSI A21.51, applied to the outside of pipe and fittings only.

2.2 POLYVINYL CHLORIDE (PVC) PIPE

A. Pipe and Fittings

1. The polyvinyl chloride (PVC) pipe shall be manufactured in accordance with ASTM D3034 "Specifications for Type PSM Polyvinyl Chloride (PVC) Sewer Pipe and Fittings" having a minimum wall thickness equal to SDR-35 (Standard Diameter Ratio) as noted in Table 1 of the ASTM Specification.

2. The pipe shall be "bell and spigot" type wherein the bell is integral to the pipe. For pipe with belled ends, the thickness of the wall in the bell may be considered satisfactory if the bell was formed on pipe meeting the requirements of the applicable standards.

3. All bells, wye branches and fittings shall be commercially molded conforming to same applicable ASTM Specification requirements for pipe.

4. Pipe, at a maximum interval of 5-feet-0-inches, and fittings shall be marked as follows:

Manufacturer's Name or Trademark
Nominal Size
Material Designation "PVC"
ASTM Specification D3034

B. Joints

1. The pipe and fittings shall be joined by the elastomeric gasket system, conforming to ASTM D3212 "Specifications for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals," which shall produce a watertight seal.

2. Pipe Bell: Provide a gasket with a locked in a groove design so as to prevent displacement when pipes are joined.

3. The critical sealing dimensions of the bell, spigot and gasket shall be in accordance with the manufacturer's standard dimensions and tolerances.

4. The elastomeric gasket shall be rubber and shall comply with the physical requirements of ASTM F477 "Specification for Elastomeric Seals for Joining Plastic Pipe."

2.3 PVC PRESSURE PIPE

A. General

1. Polyvinyl chloride pipe (PVC) designed, manufactured, and tested in strict accordance with AWWA C900 (DR-14). Pressure rated at 200 psi minimum. Minimum standard dimension ratio (DR) of 14 for both barrel and bell dimensions with integral wall-thickened bell ends or separate couplings with elastomeric ring gasket. Pipe greater than 20 feet in length will not be accepted. Provide National Sanitation Foundation seal of approval. Comply with the requirements for Type 1, Grade 1 (PVC 1120), of ASTM D1784. Provide push-on type joint with a rubber O-ring gasket conforming to ASTM D1869.

2. Supply all pipe from one manufacturer.

3. Provide connections of PVC pressure pipe to ductile iron fitting using fully restrained retainer glands suitable for PVC pipe joints.

4. The use of PVC forcemains must be pre-approved by the Authority.

B. Testing and Inspection

1. The Contractor shall provide for the testing of all pipe and fittings, at the point of manufacture, by an independent laboratory employing ASTM testing methods; otherwise, certified tests furnished by the manufacturer shall be submitted to the Authority's Engineer.

2. During the process of unloading, all pipe and accessories shall be inspected by the Contractor for loss or damage during transit. No shipment of materials shall be accepted by the Contractor unless notation of any loss or damaged material has been made on the bill of lading by the agent of the carrier.

3. All pipe and accessories shall be laid, jointed, and tested for defects and leakage with pressure, in the manner herein later specified, in the presence of the Authority's Resident Project Representative and subject to his approval. The material found during the progress of the work to have cracks, flaws, or other defects will be rejected by the Authority's Resident Project Representative and the Contractor shall promptly remove from the site of the work such defective material.

C. Miscellaneous Requirements

1. Rubber gaskets for push-on joint pipe shall be elastomeric ring gasket manufactured in accordance with manufacturer's dimensions and standard practice.

D. Materials and Workmanship

1. All pipe shall be made of good quality PVC pressure pipe of such character as shall make the pipe strong and tough enough to admit satisfactory drilling and cutting. It shall be straight and shall be of true circle in section with its inner and outer surfaces concentric.

2.4 HIGH DENSITY POLYETHYLENE PIPE (HDPE):

A. General

1. HDPE to be used only for low pressure forcemains for residential grinder pumps or as otherwise approved by the Authority.

B. Pipe and Fittings

1. Provide high performance, high molecular weight, high density polyethylene pipe equal to Driscopipe 1000, as manufactured by Phillips Driscopipe, Inc., Dallas, Texas; or an approved equivalent. Provide pipe material of Type III, Class C, Category 5, P34 material as described in ASTM D1248. Provide minimum cell classification values of the pipe material to be 3 4 5 4 3 4 C as referenced in ASTM D3350-84. Provide density of 0.941 - 0.957 gms/cm3 when tested in accordance with ASTM D1505. Provide melt flow no greater than 0.15 gms/10 min. when tested in accordance with ASTM D1238 - Condition E. (Provide melt flow no greater than 4.0 gms/10 min. when tested in accordance with ASTM D1238 - Condition F.) Provide flexural modulus of 110,000 psi to less than 160,000 psi when tested in accordance with ASTM D790. Provide tensile strength at yield of 3,200 psi to less than 3,500 psi when tested in accordance with ASTM D638. Provide environmental stress crack resistance in excess of 5,000 hours with zero failures when tested in accordance with ASTM D1693 - Condition C. Provide hydrostatic design basis of 1,600 psi at 23ºC when tested in accordance with ASTM D2837. Provide Standard Diameter Ratio (SDR) 11.

2. Provide a manufacturer's certification stating that the pipe was manufactured from one specific resin in compliance with these Specifications. Provide certificate stating the specific resin used, its source, and list its compliance to these Specifications.

3. Provide standard HDPE fittings of standard commercial products manufactured by injection molding or by extrusion and machining, or fabricated from PE pipe conforming to these Specifications. Provide fittings of fully pressure rated by the manufacturer to provide a working pressure equal to the pipe for 50 years of service at 73.4ºF with an included 2:1 safety factor. Provide fittings manufactured from the same resin type, grade, and cell classification as the pipe itself. Produce fittings in accordance with good commercial practice to provide fittings homogeneous throughout and free from crack, holes, foreign inclusions, voids, or other injurious defects. Uniform fittings in color, opacity, density and other physical properties. Provide the minimum "quick-burst" strength of the fittings not be less than that of the pipe with which the fitting is to be used.

2.5 APPURTENANCES

A. Flexible Pipe Coupling

1. Provide flexible pipe couplings for connecting pipes of dissimilar materials. Provide clamped design with virgin PVC coupling and two type #305 stainless steel bands, such as manufactured by Fernco Joint Sealer Co. For lines 8-inch diameter and smaller use Fernco Proflex shielded specialty couplings. (Flexible Couplings, or approved equal distributed by The General Engineering Company, Frederick, Maryland).

B. Stoppers For Open Ends of Pipe

1. Stoppers shall be provided for the open end of each wye fitting, lateral, and manhole. The stopper shall be compatible to type of joint material being used.

2.6 VALVES

A. Sewage Combination Air Release/Air Vacuum Valves

1. The sewage combination air release and air vacuum valve shall be furnished and installed as shown and located on plans.

2. The sewage air release valve unit of the combination air valve shall be designed and constructed with a long body and float stem so that the operating mechanism will always be kept free from contact with sewage during the continuous purging of air, while the forcemain is under operating pressure. The mechanism shall also be designed to allow air to reenter the valve and forcemain whenever loss of pressure occurs in the main.

3. The mechanism, elongated stem and float shall be designed so that the discharge orifice of this valve will be fully closed tight when the float is raised about 1/2-inch by the sewage entering the inlet at the bottom of the valve body.

4. The discharge orifice seat, mechanism, and valve stem shall be constructed of stainless steel complying with ASTM Specifications. The orifice button shall be constructed of stainless steel complying with ASTM Specification A-240. The body and cover shall be constructed of cast iron complying with ASTM Specifications A-48, Class 35.

5. The valve inlet shall be of the size specified, and the discharge orifice shall be designed to have a venting capacity of at least 50 C.F.F.A.M.

6. Sewage release valves shall be provided with complete back-flushing and cleaning accessories and hose comprised of: 1 inch blow-off valve near bottom of valve body, quick disconnect couplings, 1/2-inch shut-off valve at top of valve body, and section of rubber hose with quick disconnect coupling. The sewage air release valve shall be as manufactured by the Val Matic Valve and Manufacturing Corp., Lyons, Illinois; APCO Valve and Primer Corp. of Schaumburg, Illinois; or equal.

7. The sewage air vacuum valve unit of each combination air valve shall be designed and constructed with a long body and float stem with a float at each end arranged so that the larger bottom float will seat the upper float and shut off the discharge of the valve when sewage enters only the lower section of the valve body. The operation of this valve shall be designed to allow large volumes of air to be discharged when the forcemain is being filled and permit large volumes of air to reenter the valve and prevent vacuum whenever pressure drops in the main. This valve shall remain closed after the initial purging of the forcemain, and the main remains under operating pressure.

8. The body and cover of these valves shall be constructed of cast iron; and the floats, stem, and trim shall be of stainless steel complying with the respective ASTM Specification noted for the sewage air release valves. The orifice seat shall be a Buna-N.

9. These sewage air vacuum valves shall have inlet and discharge orifice sizes having adequate venting capacities to properly allow the reentry of sufficient quantities of air at the proper rate to protect the forcemain upon drop or loss of pressure.

10. The valve unit shall have an inlet and discharge orifice of the sized specified and have a venting capacity of not less than 800 C.F.F.A.M. at an orifice differential pressure of five psig.

11. The air vacuum valve unit shall also be provided with backflushing accessories and hose as specified above for the sewage air release type valve with the same size fittings.

12. The combination air valve shall be completely assembled at the factory, each assembly tested at 300 psi hydrostatic pressure and each complete unit shipped fully assembled.

13. The combination sewage air release and air vacuum valves shall be as manufactured by the Val-Matic Valve & Manufacturing Corp., Lyons, Illinois; APCO Valve and Primer Corp., of Schaumburg, Illinois; or equal.

B. Sewage Air-Release Valves

1. These valves shall be designed and constructed with a long body and float stem so that the operating mechanism will always be kept free from contact with sewage during the continuous purging of air while the forcemain is under operating pressure.

2. The mechanism, elongated stem, and float shall be designed so that the discharge orifice of this valve will be fully closed when the float is raised about 1/2-inch by the sewage entering the inlet at the bottom of the valve body.

3. The discharge orifice seat, mechanism, and valve stem shall be constructed of stainless steel, complying with ASTM Specifications. The orifice needle shall be constructed of Buna-N. The mechanism lever pins and float shall be constructed of high strength, stainless steel, complying with ASTM Specification A240. The body and cover shall be constructed of cast iron, complying with ASTM Specification A48, Class 30.

4. The valve inlet shall be of the size specified and the discharge orifice shall be designed to have a venting capacity of at least 175 C.F.F.A.M., with forcemain pressure of 50 psig.

5. This sewage air valve shall also be provided with backflushing and cleaning accessories and hose including 1 inch blow-off valve near bottom of valve body; quick disconnect couplings and 1/2” shut-off valve at top of sewage valve, and section of rubber hose with quick disconnect coupling. Inlet valve shall be a gate valve of the size specified with accompanying companion flanges; the air release valve with bottom inlet shall be factory tested.

6. Contractor shall provide instructions on the operation of the valve to owner's operating personnel prior to owner’s acceptance of forcemain.

7. The sewage air release valves shall be as manufactured by the Val-Matic & Manufacturing Corp., Lyons, Illinois; APCO Valve and Primer Corp., Schaumburg, Illinois; or equal.

2.7 DETECTABLE IDENTIFICATION TAPE

A. All installations of nonmetallic pipeline shall include the furnishing and installation of detectable identification tape. This tape shall be constructed of nondegradable plastic at least two inches wide, shall be green in color, and imprinted in a contrasting color with the words, "CAUTION BURIED SEWER LINE BELOW!" The tape shall include metallic foil or wire designed to allow easy detection with an inductive-type pipe locator. The tape shall be installed in continuous conductive lengths in the pipeline trench above the initial stone backfill.

2.8 LATERALS

A. All lateral sewer pipe and fitting materials installed from the mainline wye connection to the lateral site tee are to match mainline sewer pipe material. All lateral material specifications to conform to material specifications provided herein for mainline sewer.

B. Lateral construction upstream of the site tee shall in accordance with the PCSA Building Sewer Specifications.

PART 3 EXECUTION

3.1 HANDLING OF DUCTILE IRON PIPE

A. Pipe and accessories shall be handled in such a manner as to insure delivery on the work in sound, undamaged condition. Particular care shall be taken not to injure the pipe coating. No other pipe or material of any kind shall be placed inside of any pipe or fitting at any time after the coating has been applied.

B. The pipe shall be removed from the truck one at a time. The pipe unloading shall be done with a forklift or forks attached to some equipment piece. Pipe shall not be rolled into buckets or directly on the ground.

3.2 HANDLING PVC PIPE

A. PVC sewer pipe and fittings may be stored either inside or outdoors. If it is stored outdoors for long periods, it shall be protected from direct exposure to sunlight.

B. PVC sewer pipe and fittings shall be stored in such a way so that the surfaces to be mated are protected from physical damage and are kept as clean as possible.

C. The pipe shall be stored by providing support at each end and intermediate support at 5-foot intervals along the length of the pipe. The pipe shall be stored in such a way as to prevent sagging or bending.

3.3 WYE BRANCHES

A. Lay wye branches of the same material and strength as the sewer main for the purpose of making building connections. The wye branches shall be laid at an angle as shown on the PCSA Building Sewer Specifications.

B. The spur of the wye branch shall be supported by Class "B" concrete or AASHTO No. 57 Limestone Aggregate in accordance with PCSA Standard Detail Drawings for the pipe used.

C. The branch of each wye connection or end of lateral installed shall be furnished and installed a watertight plug.

3.4 SADDLES (For use with Gravity Sewer)

A. Use of saddles must be preapproved by Authority, and only considered for connection to existing Vitrified Clay Pipe (VCP).

B. The saddle location shall be determined in the field. After selecting the location, the hole in the sewer main shall be cut with an approved type of tapping machine. No hand cutting or breaking of sewer will be allowed.

C. The saddle shall be property located over the hole and held in place with the straps provided with the saddle.

D. For PVC Pipe, repair couplings must be used in lieu of saddles.

3.5 BUILDING CONNECTIONS

A. Building connections from sewer to curb line, right-of-way line, or to other point as required by the Authority, shall be laid by the Developer/Contractor. Building laterals shall be laid in accordance with PCSA Building Sewer Specifications.

B. Building connections under concrete roads of the State Highway shall be made by boring where required. Backfill of boring shall be made with material to meet the requirements of the State Highway Department.

C. In general, specifications for materials, workmanship and watertight construction for building connections shall be the same as for mainline sewers.

3.6 DEEP CUT LATERALS

A. Deep cut laterals shall be constructed of 6-inch diameter pipe matching mainline material. All pipe and materials shall conform to all PCSA requirements and specifications. Lateral will not be permitted to enter the main directly from above (12 O'Clock Position). Care shall be taken to have all the joints perfectly made and the alignment correct. They shall be encased in PennDOT Class" AA" concrete to the required height. The concrete shall in all places cover the pipe for a depth of at least 5 inches.

3.7 STOPPERS

A. Stoppers shall be securely installed in the open end of each wye fitting, lateral and manhole stub. The stopper shall make a watertight closure of the pipe bell end of the pipe.

3.8 PROTECTING AND KEEPING PIPE CLEAN

A. During construction, the mouth of the completed pipe shall always be kept closed with a suitable plug to prevent the entrance therein of any water, earth, stones or other debris. The Contractor shall also take any and all measures to keep the pipe clean and free from deposits and protect the pipe from damage.

B. If the pipe is damaged from any cause or becomes either partly or completely filled with dirt, stones, sand or other debris, the Contractor shall make all necessary repairs and remove all such material.

3.9 PIPE LAYING

A. After the trench has been brought to the proper grade as heretofore specified, the pipe and specials shall be laid.

B. Care shall be taken to lay the pipe to true lines and grades. Every pipe laid shall be tested as to grade and alignment. Care must be taken to fit the joints together properly so that the centers of the pipes shall be in one and the same straight line, and so as to give an opening of even thickness, all around between spigot end of pipe and the socket end of specials and fittings. Each section of pipe shall rest upon the pipe bed for the full length of its barrel, with recesses excavated to accommodate bells and joints. The bottom of the trench shall be shaped to give substantially uniform circumferential support to the bottom quadrant of each pipe when earth bedding is used. Any pipe that has its grade or joints disturbed after laying shall be taken up and re-laid. The interior of all pipe shall be thoroughly cleaned of all foreign matter before being lowered into the trench, and shall be kept clean during laying operations by means of plugs or other approved methods. Under no

circumstances shall pipe be laid in water, and no pipe shall be laid when trench conditions, or the weather, is unsuitable for such work. In all cases, water shall be kept out of the trench until the concrete cradle, where used, has hardened. Every precaution necessary to obtain watertight construction for all joints must be taken. This same precaution must be taken for all connections with manholes.

3.10 ASSEMBLY OF DUCTILE IRON PIPE (DIP)

A. Cutting of pipe for closure pieces or for other reasons shall be done in a neat and workmanlike manner by a method which will not damage the pipe. All cutting of pipe shall be done by means of mechanical cutters of an approved type or types. Wheel cutters shall be used wherever practicable.

B. Before lowering and while suspended, the pipe shall be inspected for defects and rung with a light hammer to detect cracks. Any defective damage or unsound pipe will be rejected. The spigot shall be centered in the bell and the pipe pushed into position and brought into true and specified alignment. Except where necessary in making connections with other lines, pipe shall be laid with the bells facing in the direction of laying and for lines on an appreciable slope bells shall face up-grade.

C. Coupling DIP With Rubber Gasket Joints

1. The gasket seat in the socket and the gasket should be wiped with a cloth. The gasket should be placed in the socket with the large round end entering first. It can then be sprung into the gasket seat so that the groove fits over the bead in the seat. A thin film of lubricant should then be applied to the inside surface of the gasket that will come in contact with the entering pipe. Only non-toxic vegetable soap lubricant as recommended by pipe manufacturer shall be used. Mineral oil or petroleum base lubricant shall never be used.

2. The plain end of the pipe to be entered, should be wiped clean and placed in approximate alignment with the bell of the pipe to which it is to be joined. Apply a thin film of lubricant to the outside of the plain end for about one inch back from the end as required to facilitate installation. When subfreezing temperatures prevail, the joint should assemble easier if lubricant is applied only to the gasket. After lubrication, the plain end of the pipe should then be lifted and started into the socket so that it is in contact with the gasket. The joint should be made up with entering pipe deflected at an angle.

3. The joint should be made by exerting sufficient force on the entering pipe so that its plain end is moved past the gasket (which is thereby compressed) until it makes contact with the base of the socket. This

can be accomplished by one of the methods recommended by the pipe manufacturer, by crowbar, fork tool or jack type tool.

D. Rubber Gasket Joint Assembly With Field Cut Pipe

1. When pipe is cut in the field, the cut end shall be conditioned so that it may be used to make up the next joint. The outside of the cut end should be tapered back about 1/8 inch at an angle of about 30 degrees, with the center line of the pipe by using a coarse file or a portable grinder. The operation removes any sharp, rough edges which otherwise might injure the gasket.

E. When installing rubber gasket joint pipe in below freezing temperatures, keep lubricant and gaskets workable by leaving them in hot water bath when not actually in use, or in a heated storeroom.

F. The joint deflection angle should not exceed the pipe manufacturer's recommendations.

3.11 INSTALLING PVC PIPE

A. Joints

1. The joints shall be assembled in accordance with the manufacturer's recommended procedure.

2. Lubricants, if necessary for the assembly of the elastomeric gasket joint, shall not support bacterial growth nor have any deteriorating effect on pipe, fitting, or gasket materials and shall be the type recommended by the pipe manufacturer.

B. Pipe Installation

1. Installation shall be made in accordance with ASTM D-2321, "Underground Installation of Flexible Thermoplastic Sewer Pipe."

2. Any field cutting and fitting of the PVC plastic sewer main shall be done in accordance with procedures and techniques specified by the pipe manufacturer.

3. The pipe and fittings shall be installed in AASHTO No. 57 Limestone Aggregate bedding, all as specified in Section C - EARTHWORK FOR SANITARY SEWERS.

4. During the installation and backfill of the pipe, care must be taken to prevent movement of the pipe.

5. Pipe shall be joined by sliding the lubricated spigot end under the rubber ring and into the bell. A backup band shall be provided in the spigot to limit the movement of the "O" ring.

6. Make certain that the bell and rubber ring are wiped clean. Lubricate the spigot as recommended by the manufacturer. Brace the bell while the spigot end is pushed in so that completed joints will not be closed excessively and negate joint flexibility.

7. The pipe shall be bedded true to line and graded with uniform continuous support for both barrel and bells of the pipe.

3.12 TESTS

1. After sewer has been laid and the backfill placed to two (2) feet above the top of pipe, a light will be flashed between manholes; or if the manhole has not yet been constructed, between the locations of manholes, by means of a flashlight or mirrored light to determine whether the alignment of the main is true and whether any pipe has been displaced subsequent to laying. Each section of sewer between manholes shall show a full circle of light. If alignment is correct and no other defects are disclosed, backfilling may be resumed. All defects disclosed by this test shall be remedied immediately by the Contractor. All broken or cracked pipe shall be replaced, all deposits in the sewer are to be removed, and the sewer left true to line and grade and entirely clean.

    a. Prior to testing, the line shall be flushed out to be as clean as possible, and tests shall be made before road resurfacing and any restoration completed and the lines put into service.

2. After backfilling, Contractor shall make tests to ascertain that there are no broken pipes or leaking joints. Pipes failing these tests shall be replaced by the Contractor to the satisfaction of the Authority's Engineer.

3. The Contractor shall perform one or more required tests and shall furnish all apparatus and materials used for these tests.

4. The sewers and laterals shall be tested for leakage between manholes as the work progresses by a low-pressure air test.

5. The deflection test will be required a minimum of 30 days and a maximum of 12-months following final backfill for PVC pipe in addition to the low-pressure air test.

6. All tests shall be witnessed by the Authority's Resident Project Representative.

A. Air Method

1. Low pressure air test of sewers and laterals shall be as specified hereinafter. Each manhole run will be tested separately as the construction progresses, before trench surface restoration, and preferably with not more than four (4) manhole runs constructed ahead of testing.

2. Equipment used shall meet the following minimum requirements.

a. Pneumatic plugs shall have a sealing length equal to or greater than the diameter of the pipe to be tested.

b. Pneumatic plugs shall resist internal test pressures without requiring external bracing or blocking.

1) All pneumatic plugs shall be seal tested before being used in the actual test installation. One length of pipe shall be laid on the ground and sealed at both ends with the pneumatic plugs to be used. Air shall be introduced into the plugs. The sealed pipe shall be pressurized to 5 psig. The plugs must hold against this pressure without having to be braced.

c. All air used shall pass through a single control panel.

d. Three individual hoses shall be used for the following connections:

1) One hose from control panel to pneumatic plugs for inflation.

2) One hose from control panel to sealed line for introducing the low-pressure air.

3) One hose from sealed line to control panel for continually monitoring the air pressure rise in the sealed line.

3. Procedures

a. After a manhole reach of pipe including laterals has been backfilled in accordance with the specifications, the pipe cleaned, and the pneumatic plugs have been checked by the above procedure, the plugs shall be placed in the line at each manhole and inflated. Low pressure air shall be introduced into this sealed line until the internal air pressure reaches 5 psig. At least 2 minutes shall be allowed for the air pressure to stabilize.

b. After the stabilization period with 5 psig minimum pressure remaining in the pipe, the air hose from the control panel to the air supply shall be disconnected. The portion of the sanitary sewer (line) being tested shall be termed "Acceptable," if the time required in minutes or seconds is greater than the times indicated on Table A for the pressure to drop below 5 psig.

4. Safety

a. Pneumatic plugs to be installed and braced in such a way as to prevent blowouts.

b. All aspects of safety are the responsibility of the Contractor.

B. Deflection Test - PVC Only

1. General

a. Deflection testing shall be performed on all portions of the PVC sewer system. This test shall be performed in sections between manholes 30 days but not more than 12 months (unless otherwise approved by Authority) after final backfilling has been completed and the pipe tested for leakage.

b. Deflection testing shall be performed in accordance with the procedure outlined below.

2. Maximum Deflection

a. The maximum allowable deflection for all installed PVC sewer pipe shall not exceed 5% of the pipe's original internal diameter.

3. Testing Apparatus

a. Deflection testing shall be performed with a "go, no-go" mandrel which is sized to such dimensions that it will not “go” when encountering deflection greater than permissible.

4. Deflection Testing Procedure

a. Completely flush the line making sure the pipe is clean of any mud or debris that would hinder the passage of the mandrel.

b. During the final flushing of the line, attach a floating block or ball to the end of the mandrel pull rope and float the rope through the line.

c. After the rope is threaded through the line, connect the pull rope to the mandrel and place the mandrel in the entrance of the pipe.

d. Connect a retrieval rope to the back of the mandrel to pull it back if necessary.

e. Remove all the slack in the pull rope and place a tape marker on the rope at the ends of the pipe.

f. Draw mandrel through the sewer line. If any irregularities or obstructions are encountered in the line, corrective action shall be taken as required.

g. If a section with excessive deflection is found, it shall be located and excavated. The pipe shall be inspected for damage; if any damaged pipe is found, the pipe shal1 be replaced; if pipe is not damaged, replace and thoroughly tamp the haunching and initial backfill; replace remainder of backfill.

h. Retest this section for deflection.

C. Test Failures

1. If the installation fails to meet the stated test requirements, the Contractor shall determine the source of leakage, repair or replace all defective materials and/or workmanship failing to meet tests, and shall retest same until proven acceptable to the Authority’s Resident

Project Representative in consultation with the Authority's Engineer.

2. In the event the result(s) of the test(s) does not fall within the allowable range of acceptance, the Contractor shall take whatever corrective action is necessary, including replacement of the said pipe, etc., to bring the result(s) of the test(s) to within the allowable range of acceptance.

3.13 FIELD TESTING OF FORCEMAINS

A. After the pipe has been laid and the trench backfilled, the pipe shall be subjected to a hydrostatic pressure 150 percent of normal operating pressure.

B. Test shall be made only after completion or partial completion of backfill as specified and not until at least 36 hours have elapsed after the last joint has been made and/or, if applicable, after the last concrete thrust blocking has been cast.

C. Each section of pipeline shall be slowly filled with water and the specified test pressure, measured at the point of lowest elevation, shall be applied by means of a pump connected to the pipe in a manner satisfactory to the Authority's Engineer. The pump, pipe connection, gauges, water, and all other apparatus necessary to perform the test shall be furnished by the Contractor, including any assistance needed in conducting the test. The duration of the test shall be for a minimum of one hundred twenty (120) minutes.

D. Upon completion of the pressure test, the pipe shall be tested for leakage. The pressure during the leakage test shall be at the normal operating pressure. The duration of the leakage test shall be for a minimum of one hundred twenty (120) minutes. This test shall be conducted in the same manner as the pressure test, except that in this case the Contractor shall provide suitable equipment for measuring the amount of leakage.

E. No pipe installation will be accepted unless, or until, the leakage rate for the section of pipe being tested is less than the rate of leakage specified in the following table:

Pressure (psi)	**U.S. Gallons/hour**	**Forcemain Size**
100	0.30	3 or 4
100	0.45	6
100	0.60	8

F. Should the test of any section of pipeline disclose a leakage rate greater than that permitted, the Contractor shall, at his own expense, locate and repair the defective joint(s) and/or section(s) of pipe such that the leakage rate is within the allowance permitted.

PART 4 MISCELLANEOUS REQUIREMENTS

A. Each wye branch shall have its station recorded, by the Contractor, relative to the downstream manhole.

B. Contractor shall note that, as part of his work, he shall include the cutting and patching at manhole pipe entrances and the plugging of abandoned lines in the manhole and other connections to existing structure.

C. Requirements covering accidents, hazards to safety, and disruptions of important residential and business services will be strictly enforced. Contractor shall designate two responsible persons from his organization who may be contacted at any time in an emergency. Names of these two persons to be given in writing, to the Authority.

+ + END OF SECTION + +

SANITARY SEWERS AND APPURTENANCES

AIR TEST TABLES

MINIMUM HOLDING TIME IN SECONDS REQUIRED

TABLE "A"

Pipe Size (in.)	Time
4	2-1/2 minutes
6	4 minutes
8	5 minutes
10	6-1/2 minutes
12	7-1/2 minutes
15	9-1/2 minutes

E. MANHOLES

E. MANHOLES

PART 1 GENERAL

1.1 SCOPE

A. Description of Work

1. Furnish and install manholes as indicated on the Drawings, PCSA Standard Detail Drawings and as herein specified.

1.2 MANHOLES

A. Type of manholes used in the construction shall be precast concrete manholes.

1. Manholes shall be made up of precast concrete sections of which the top section shall be corbelled. Bottom section shall be precast concrete unless otherwise approved by Authority.

1.3 SUBMITTALS

A. Shop Drawings and Manufacturer's Literature

1. Submit shop drawings or manufacturer's "cuts" of all manhole items such as covers and frames, steps, type of connection for pipe to manhole wall and precast sections to Authority's Engineer for review and approval.

PART 2 PRODUCTS

2.1 MORTAR

A. Composition of mortar shall conform to "MORTAR FOR UNIT MASONRY," ASTM C270, Type N.

2.2 CONCRETE AND GROUT

A. Concrete shall conform to the requirements of SECTION F, CAST-IN-PLACE CONCRETE.

B. Grout shall be "Masterflow 713 Grout" manufactured by Master Builders, "Non-shrink 5 Star Grout" manufactured by U. S. Grout Corporation or equal. Grout shall meet test requirements of ASTM C827.

2.3 Pipe Zone Materials and Backfill

A. Pipe Zone Materials and Backfill shall be in accordance with the requirements specified in SECTION C, EARTHWORK FOR SANITARY SEWERS of the Specifications.

2.4 MANHOLE STEPS

A. Design to withstand load required of ASTM C478 and install as specified and in accordance with PCSA Standard Detail Drawings. Manhole steps shall be cast into the walls of risers and conical top sections at the factory, and shall be aligned vertically and spaced 12 inches on centers. Should field grouting of steps be approved, such grouting shall be performed utilizing premixed non-shrink grout material of the type herein before specified.

1. Reinforced Plastic Step: Composed of a 1/2-inch Grade 60, ASTM A615 deformed steel reinforcing bar completely encapsulated in Grade 49108, ASTM D5857 polypropylene copolymer compound, Type II, M. A. Industries, Inc., Type PS4, or equal.

2.5 MANHOLE FRAMES AND COVERS

A. Standard Manhole Frame and Cover

1. Casting Twenty-seven inch (27") diameter opening, gray iron castings conforming to ASTM A48, Class No. 30, designed for AASHTO Highway Loading Class HS-20. Frame base shall have four 7/8-inch diameter holes through it to receive the anchor bolts. Provide castings of uniform quality, free from blowholes, porosity, hard spots, shrinkage distortion or other defects. Frame and cover design and dimensions are as indicated on the PCSA Standard Detail Drawings.

a. Finish: Bearing surfaces machined to prevent rocking and rattling under traffic. Casting surfaces shot-blast cleaned and coated with asphalt paint, non-tacky drying.

b. Identification: A label reading "PCSA SEWER" shall be cast on the cover in letters one or two inches high, unless Authority orders in writing other such lettering.

c. Cover Gasket: A one piece O-ring gasket factory installed in a machined rectangular or dovetail groove in the bearing surface of the cover.

i. Gasket material of neoprene composition having good abrasion resistance, low compression set, Type D 40 durometer hardness determined in accordance with ASTM D-2240 and suited for use in sanitary sewer manholes.

ii. Gluing of gasket is not permitted.

B. Watertight Covers

1. Manholes at specific locations indicated on the drawings shall be equipped with watertight covers. Twenty-eight inch (28″) diameter opening, gray iron casting conforming to specified requirements for Manhole Frame and Cover with the addition of a cast iron inner lid. Inner lid to include neoprene gasket seal and steel locking bar with stainless steel hex head tightening screw. Manhole lid to include type F concealed water tight pick-hole.

C. Manhole Lid Insert

1. All Manholes (except where manholes with watertight frames and covers installed) shall be equipped with a Watertight Manhole Insert, The Man Pan Classic, as manufactured by The Man Pan, LLC, McMurray, Pennsylvania, or equivalent as approved by the Authority. Inserts are to be installed in standard manhole frame and cover.

D. Anchor Bolts

1. Frame Hold-Down Bolts: Anchor bolts for bolting manhole frame to the precast manholes shall be 3/4-inch diameter all-thread stainless steel rods, with a minimum 2-1/2 inch projection through the frame. Provide ASTM F593 304 Stainless Steel All-thread with double nuts at four locations as shown on the PCSA Standard Detail Drawings.

2. Factory cast in the top section with no fewer than four 3/4-inch threaded inserts or slotted inserts of three inches depth. Both insert types designed for an ultimate load in tension of 12,500 pounds. Inserts factory plugged for shipping. Coordinate insert locations in the top sections to match the bolt hole locations in the manhole cover frames.

2.5 PRECAST CONCRETE MANHOLES AND COMPONENTS

A. Sections

1. Sections shall be a minimum of 4 feet in diameter for pipe sizes up to and including 21 inches internal diameter. For pipe with an internal diameter greater than 21 inches or for manholes greater than 20 feet deep, the manhole shall be a minimum of 5 feet in diameter. Five feet diameter manholes also required where inside drop connections are proposed unless otherwise approved by the Authority.

2. Precast concrete sections shall be in accordance with ASTM Specifications for PRECAST REINFORCED CONCRETE MANHOLE SECTIONS ASTM C478. All joints shall be sealed with two layers of preformed plastic sealing compound.

3. All manholes shall be coated on the outside in accordance with paragraph 3.2.C.

4. All manholes shall incorporate chemical waterproofing admixture into concrete formula, Xypex Admixture C-500 as manufactured by Xypex Chemical Corp., Richmond, British Columbia, Canada or equal.

B. Risers and Top Sections

1. The top of base walls, the ends of reinforced concrete risers and the bottom ends of precast tops shall be so formed that when risers and tops are assembled with the base, they will make a continuous manhole. Joints shall be of such design as will permit effective joining and placement without irregularities in the interior wall surface of the manhole and result in a watertight manhole unit.

2. Manhole barrels shall consist of riser and top sections. The top section shall be an eccentric conical section with thickened upper walls with the smallest inside diameter equal to 29 inches, to receive the manhole frame and cover. No more than 2 lift holes shall be cast in each barrel or top section. Barrels shall be constructed to minimize number of joints/barrel sections in the structure with a maximum barrel height of 5 feet.

3. Manhole riser and top sections shall be designed, manufactured, tested, finished and marked in accordance with this specification and

"SPECIFICATIONS FOR PRECAST REINFORCED CONCRETE MANHOLE SECTIONS" (ASTM C478).

4. Precast manholes shall be constructed by the wet process method and shall have a slump of 3-1/2 inches to 4-1/2 inches. A letter of certification shall be submitted to the Authority's Engineer stating that these requirements have been attained.

5. The maximum manhole height for raising manholes to grade using riser/grade rings permitted shall be 12 inches.

C. Precast Manhole Bases

1. The bases shall be precast and shall consist of a manhole bottom and a wall which shall extend a minimum of 6 inches above the top of the highest inflowing sewer entering the base, except in instances of inside drop. Inside drops must be at a minimum 6 inches below or above the joint. The wall portion of the precast manhole base shall be 3 feet high at minimum, regardless of inflowing sewer elevation(s). 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 inverts of the lowest outflowing sewer and the lowest inflowing sewer to provide for the construction of a formed invert and benchwall within the manhole. Precast flow channels are permitted. No more than 2 lift holes shall be cast in the bases.

D. Joint Material

1. Preformed Plastic Sealing Compound: Fed. Spec. SS-S-210A, Type 1, Rope Form, of either bitumastic base compound or butyl rubber base compound, and shipped protected in a removable two-piece wrapper. Size cross-section of rope form to provide squeeze-out of material around entire interior and exterior circumference when joint is completed.

   a. Henry Company, LLC; RAM-NEK.
   b. Hamilton Kent Manufacturing Company; KENT-SEAL NO. 2.
   c. ConSeal; CS-102 Butyl Rubber Sealant.

E. Curing Pre-Cast Concrete Manhole Sections

1. When forms are stripped from a section, a cement slurry shall be brushed on to outside of section to fill in voids which appear on face of the section.

2. Within two hours after the section has been cast, it shall be enclosed within a suitable stream-curing chamber or enclosure that will protect the pipe from outside drafts. Enclosure shall allow full circulation of saturated vapor around the inside and outside of the section, and the curing shall keep all concrete surfaces continuously moist throughout the curing process. The ambient temperature rise about the pipe at any time shall not exceed 30°F per hour. The ambient temperature within the enclosure shall not be raised about 100°F by the use of steam within 2 hours after completion of concrete placement; thereafter, the temperature shall be maintained between 90°F and 150°F for the remainder of the steam-curing, except as provided for interruption of cure to remove the headers and pallets to prepare the section ends.

3. The curing cycle shall be maintained for a period of 12 hours.

4. The top and bottom rings used to form the tongue and groove ends shall remain on the section for the entire curing cycle.

5. Each manhole section shall be aged seven days before coating is applied in the field.

PART 3 EXECUTION

3.1 GENERAL

A. Schedule

Manholes shall be constructed promptly as the section of the sewer between them is completed: As soon as the manhole is completed, Contractor shall remove all loose dirt, debris and other foreign material from within.

B. Groundwater

All groundwater shall be kept away from newly installed concrete manholes until a watertight job is obtained. Manholes which admit groundwater after completion must be repaired to the satisfaction of the Authority's Engineers and at such time as he may direct. The Contractor shall use extra care during installation to obtain watertight joints.

C. Drop Connections

In all manholes, where the grade line of one sewer is two (2) feet higher than that of the other or where noted on the drawings, the connection shall be made by means of an "inside drop connection." Pipe and fittings used

shall conform to the piping specifications and/or as shown on the PCSA Standard Detail Drawings. All inside drop connections to utilize a drop bowl as manufactured by Reliner/Duran, Inc., Lyme, Connecticut or equal.

D. Manhole Pipe Connections

1. Precast Manhole Base and Riser Sections: All openings to be custom pre-formed during manufacturing in each precast base and riser section requiring a pipe opening. Pre-form the opening to accommodate the type of pipe and pipe opening seal required. Provide integrally-cast resilient flexible sleeve pipe to manhole connector with adjustable stainless steel straps, conforming to the requirements specified in ASTM C923 to provide a positive watertight seal for pipes entering precast structures.

    a. Provide Z-Lok Cast-In Boot Connector as manufactured by A-Lok Concrete Products, Inc. or approved equal for all piping up to 18 inches in diameter or as recommended by manufacturer.

    b. Provide Z-Lok STM Connector as manufactured by A-Lok Concrete Products, Inc. or approved equal for all piping greater than 18 inches in diameter or as recommended by manufacturer. Connections The sleeve connection shall then be concrete encased as shown on Construction Standard.

2. For Connections to Existing Manholes: Core drill required opening diameter per manufacturer recommendations by such methods as to prevent cracking and spalling concrete. Complete watertight connection as necessary to accommodate field conditions encountered using one of the following:

    a. Provide Kor-N-Seal Wedge Style Pipe-to-Manhole Connector (or equal) including stainless steel strap as manufactured by Trelleborg Pipe Seals.

    b. Provide a link seal collar using stainless steel hardware as manufactured by Garlock Pipeline Technologies, Inc. (GPT) (or equal).

3. For Grinder Pump/Low Pressure Forcemain Connections to Precast Manhole Base and Riser Sections: Connect to manhole as specified in D.1 and as shown on PCSA Standard Detail Drawings.

4. For Grinder Pump/Low Pressure Forcemain Connection to Existing Manholes: Connect to manhole as specified in D.2 and as shown on PCSA Standard Detail Drawings.

3.2 PRECAST MANHOLES

A. Handling

1. All precast manhole components shall be lifted and moved by use of suitable lifting slings and plugs that will not damage the precast manhole lip.

2. All damage to precast sections shall be thoroughly repaired in the presence of the Authority's Resident Project Representative. Repair and patching of minor breaks shall be done by chipping and scarifying the defective area before application of grout. A minimum of 72 hours shall be allowed for curing before the precast sections are put together.

B. Site Inspection of Precast Sections

1. Precast sections shall be subject to rejection on account of failure to conform to any of the specification requirements. In addition, individual sections of manhole sections may be rejected because of any of the following:

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 imperfect proportioning, mixing and molding.

c. Surface defects indicating honey-combed or open texture.

d. Damaged or cracked end, where such damage would prevent making a satisfactory joint.

e. Any continuous crack having a surface width of 0.01 in. (0.25 mm) or more and extending for a length of 12 in. (305 mm) or more, regardless of position in the section wall.

C. Manhole Coating

1. Prior to setting the precast sections in place, each section shall have the exterior concrete surface blown free of all dirt and debris and brushed clean and then coated with the following coating system.

a. Bitumastic Coating: Factory applied bitumastic coating to entire external surface of manhole. Conform to ASTM D-1227-95 and ASTM D-1227-97. Koppers Co., Inc. Bitumastic Super Service Black (or equal).

2. After manhole installation, damaged surfaces shall be recoated in accordance with the coating manufacturer's recommendation to give the required dry film thickness.

3. The Contractor shall provide a certification to the Authority's Engineer stating that he has installed the exterior manhole coating in accordance with the manufacturer's recommendations and that the minimum coating thickness has been achieved on all manholes. Additional coats are required if the specified coating thickness is not achieved.

4. Coating shall be applied in accordance with manufacturer's recommendations. Careful attention shall be given to proper recoat times depending on surface and ambient temperature. If time between coats exceeds manufacturer's recommended maximum period, the surface shall be brush blasted prior to applying additional coats. The manholes shall not be installed until the paint is thoroughly cured.

5. Color shall be black.

D. Placement of Precast Manhole Bases

1. The precast manhole bases shall be installed on AASHTO No. 57 Limestone Aggregate foundation. The subbase shall be leveled, then a minimum eight (8 inches of compacted AASHTO No. 57 Limestone Aggregate shall be installed before the base is set.

2. When using Prefabricated Pipe Opening Seals for connecting pipes into manholes, and such seals create an annular space on interior and exterior of manhole wall pipe openings after pipe connection is made, fill such annular spaces with or mortar.

a. Tightly parge mortar into annular spaces in a manner to completely fill the spaces and render the installation watertight.

b. Following mortar installation, trowel compound surface smooth and flush with interior face of manhole.

E. Placement of Manhole Sections

1. Manhole sections shall not be set by wedging or placing shims to secure proper level, and manholes shall not be backfilled without the permission of the Authority's Resident Project Representative in Consultation with the Authority Engineer.

F. Masonry Work

1. The top of all precast manholes may be brought to proper grade for receiving manhole frames by using concrete adjusting rings, or metal grade rings. Maximum adjustment permitted is 12". For adjusting manholes greater than 12", removal of the manhole cone and insertion of manhole barrel riser section is required.

2. Mortar used in manhole construction shall be prepared by thoroughly mixing: One volume of Type II Portland Cement with three volumes of sand and sufficient clean water to produce a rich mass of approved consistency. Mixing mortar on the ground or any improved surface shall not be permitted. Sand to be used in making mortar shall be clean, well graded and shall pass a standard No. 4 sieve.

3. All mortar to be used in filling lift holes in risers and in sealing pipe joints of manholes shall be an approved mixture of non-shrink grout.

4. Masonry shall not be constructed during cold weather (air temperature below 40°F) unless necessary precautions are observed as permitted by the Authority's Engineer.

G. Top Elevations

1. All manholes in undeveloped areas shall be installed such that the top elevation is a minimum of 1-foot above grade.

2. All manholes located in unimproved locations in developed areas shall be installed to a minimum elevation matching surrounding grade so as not to produce a cupping or pooling effect as compared to the surrounding terrain.

3. Confirm all final manhole top elevations with the Authority and adjust as required to suit field conditions and to the satisfaction of the Authority.

3.3 FLOW CHANNELS AND BENCH WALLS

A. In cast-in-place bases, the flow channels and bench walls shall be monolithically constructed with the base using forms to shape the invert that are specially made for this purpose.

1. Form inverts directly in concrete channel fill.

2. Accurately shape invert to a semi-circular bottom conforming to inside of connecting pipes, and steel trowel finish to a smooth dense surface.

3. Make changes in size and grade gradually.

4. Make changes in direction of entering sewer and branches to a true curve of as large a radius as manhole size will permit.

5. Make slopes gradual outside the invert channels.

6. Use PennDOT Class AAA (4,500 psi) concrete unless indicated otherwise on the Contract Drawings.

B. The minimum depth of flow channel shall be equal to 3/4 the diameter of the largest sewer in the manhole to which it connects. The channel shall be graded to give a smooth, uninterrupted flow through the manhole.

C. Bench walls shall be pitched a minimum of one (1) inch per foot from the inside periphery of the manhole to the edge of the flow channel.

D. Annular spaces between monolithically constructed flow channels and pipe penetrations installed in the filed shall be filled with non-shrink grout.

3.4 MANHOLE FRAMES AND COVERS

A. Manhole frames and covers shall be brought to proper grade as previously noted, set in one-half (1/2) inch bed of mastic and anchored in place with four (4) 3/4-inch diameter anchor bolts securely embedded in the top of the manhole.

3.5 TESTS

A. General

1. After the gravity sewers and manholes have been installed and backfilled, the manholes shall be tested for leakage.

B. Vacuum Test

1. All lines entering and leaving each manhole shall be plugged and plugs securely braced to prevent the vacuum from pulling the plug out of the pipe. Lift holes shall be plugged with a non-shrinking mortar. Provide all the necessary hardware to perform the vacuum test. With the vacuum testing equipment in place, proceed with the following:

a. Inflate the compression band to effect a seal between the vacuum base and the manhole. A vacuum tester base made to fit on frames also exists and can be used.

b. Connect the vacuum pump to the outlet port with the valve open.

c. Draw a vacuum of 10 inches of Hg.

d. Close the valve.

2. A manhole will be considered acceptable if it takes more than 60 seconds for a 48-inch or 75 seconds for a 60-inch diameter manhole for the vacuum to drop from 10-inches of Hg to 9-inches Hg, regardless of depth.

3.6 MISCELLANEOUS

A. Stubs, where indicated on the drawings, shall be set accurately to the required elevation and angle and shall consist of a suitable pipe opening and a minimum 5-foot length of pipe installed out of the manhole with the end capped watertight using a suitable stopper (glued or gasketed cap/stopper). Stubs shall be adequately braced to withstand the pressure of testing.

+ + END OF SECTION++

F. CAST-IN-PLACE CONCRETE

F. CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SCOPE

A. Description of Work

1. Furnish and install all concrete as indicated on the plans and as specified herein.

1.2 APPLICABLE SPECIFICATIONS

A. The Contractor shall follow the practices and standards of the following American Concrete Institute Specifications which are made part of this specification:

1. ACI-613, "Recommended Practice for Selecting Proportions for Concrete"

2. ACl-214, "Recommended Practice for Evaluation of Compression Test Results of Field Concrete"

3. ACI-304, "Recommended Practice for Measuring, Mixing and Placing Concrete"

B. ASTM Cl50, "Specification for Portland Cement"

C. ASTM C33, "Specification for Concrete Aggregates"

D. ASTM A615, "Specification for Deformed Billet Steel Bars for Concrete Reinforcement"

1.3 CLASS OF CONCRETE

A. All concrete work shall be PennDOT Class "A", for the following items:

1. Concrete Cradle

2. Concrete Encasement

3. Concrete for Miscellaneous Uses

4. Thrust Blocks

B. Concrete for sidewalks and driveways shall be Class "AA".

C. All concrete work located in State Highway rights-of-way shall be PennDOT Class A for the above items.

PART 2 PRODUCTS

2.1 MATERIALS

A. Cement shall be an acceptable brand of Portland Cement, ASTM C150, Type I. In the event field conditions require, and the Authority's Engineer finds it acceptable, a high-early strength Portland Cement, Type III may be used. Only one brand of cement shall be used in this work.

B. Water shall be clean, free from organic or vegetable matter, acid, alkali, or other injurious elements.

C. Fine Aggregate shall be clean hard natural sand or manufactured sand, or a combination of both and shall conform to ASTM C33.

D. Coarse Aggregate shall be hard, durable, uncoated limestone aggregate conforming to ASTM C33. Maximum size of coarse aggregate shall not be larger than one-fifth of the narrowest dimension between sides of forms, one-third of the depth of slabs, nor three-fourths of the minimum clear distance between reinforcing bars, whichever is least. In no case shall the maximum size exceed 1-1/2 inches.

E. All reinforcing bars shall conform to ASTM A615 Grade 60.

F. Wire for fabrication of the welded wire fabric shall conform to ASTM.

2.2 PROPORTIONING

A. Concrete mix shall have a consistency enabling it to be readily worked into all corners of the form and around all reinforcing by usual methods of placing and consolidating without permitting segregation or excessive free water.

B. All concrete on project shall be air-entrained, and the air content shall not exceed the requirements set forth in Table 3, ACI-613 for air-entrained concrete.

C. Concrete mix shall be proportioned by an acceptable independent testing and/or inspection laboratory. The design shall provide the following minimum 28 day compressive strengths:

1. PennDOT Class AAA concrete - 4500 psi

2. PennDOT Class AA Concrete - 3750 psi
3. PennDOT Class A Concrete - 3300 psi
4. PennDOT Class C Concrete - 2000 psi

Compressive Strength shall be in accordance with Section 704--Cement Concrete of PennDOT Form 408.

D. The slump of the concrete mix shall be in accordance with the requirements set forth in Table 1, ACI 613.

E. Concrete design mix shall be submitted to the Authority's Engineer for review before work commences. No concrete shall be placed until the Authority's Engineer has reviewed and accepted the design mix.

F. A Delivery Ticket indicating the mix (including maximum size of aggregate and amount of mix water), design strength of the concrete, design slump, and time of leaving the truck mixer shall be submitted with each batch at the time of delivery. Failure to render such ticket to the Contractor's Job Superintendent shall automatically be cause for rejection of the concrete. The Contractor's Job Superintendent shall write on the back of the delivery ticket: a) the time of arrival of the truck mixer on the site; b) the time of deposit of the concrete from the truck; and c) the place of deposit of the concrete. No concrete shall be deposited on the job when it has contained its mix water longer than sixty (60) minutes. Failure to deliver the completed ticket to the Authority's Engineer will be considered just cause for the Authority's Engineer to reject the deposited concrete at any time and to have it removed and replaced at the Contractor's expense.

PART 3 INSTALLATION

3.1 PLACING CONCRETE

A. Before placing concrete, all construction debris, water and ice shall be removed from the places to be occupied by the concrete.

B. Rock surfaces upon which concrete is to be placed shall be level, free from oil, water, mud, loose semi-detached or unsound rock fragments and rough enough to assure bond with concrete.

C. Where reinforcing bars are required, said bars shall be securely tied to prevent displacement during the pouring operation.

D. Concrete shall be deposited in approximately horizontal layers not to exceed 18 inches in thickness to avoid flowing.

E. Falling concrete shall be closely confined in a drop chute of the proper size to within two or three feet of the place of deposit in the forms and the final drop must be vertical to avoid segregation of aggregates. In no case shall concrete be deposited from a height that will cause separation of the aggregates.

F. Concrete shall be mixed in such quantities as required for immediate use and shall be placed while fresh before loss of slump occurs. Retempering by adding water to restore slump lost during excessive mixing or due to too long a lapse of time since initial mixing will not be permitted.

G. All slabs shall be placed for full thickness in one operation without any change in proportions.

H. All concrete shall be vibrated, using approved vibrators.

I. No concrete shall be placed without the Authority's Engineer's approval; his inspection of the soil and reinforcement prior to placement of concrete; and his presence during the placement of the concrete.

3.2 TEMPERATURE OF CONCRETE

A. Concrete, when deposited, shall have a temperature ranging between a minimum of fifty (50) degrees Fahrenheit and a maximum of ninety (90) degrees Fahrenheit.

B. When the temperature of the surrounding air is below forty (40) degrees or above ninety (90) degrees Fahrenheit, concreting shall be done in accordance with the recommendations noted in ACI-306 and ACI-605 respectively.

3.3 PROTECTION OF NEW WORK

A. All concrete, freshly placed, shall be suitably protected until such time as it is thoroughly set.

3.4 CURING

A. Curing shall start immediately upon completion of the finishing operation and shall continue uninterrupted for a minimum period of 14 days unless a longer period is specified. Rapid drying, upon completion of the curing period shall be prevented. At no time during the curing period shall the temperature of the concrete be permitted to drop below 40 degrees Fahrenheit.

B. Thirty (30) days after placement of the concrete, the Contractor shall apply two (2) coats of sealer to all surfaces subject to deicing chemicals and to concrete placed after September 1st. The sealer shall consist of 50% boiled linseed oil and 50% mineral spirits. Application shall be at a rate of .02 gallons per square yard of surface for each coat. In no case shall be application of the sealer be permitted when the air and concrete temperatures fall below 35 degrees Fahrenheit or rise above 90 degrees Fahrenheit. The first application shall be permitted to dry for at least 24 hours prior to the application of the second coat.

3.5 DEFECTIVE CONCRETE

A. Defective concrete shall be defined as concrete, in place, which does not conform to strength, shape, alignments, or elevations as specified on the drawings.

B. All defective concrete shall be removed and replaced in a manner acceptable to the Authority's Engineer.

+ + END OF SECTION + +

G. PAVING

G. PAVING

PART 1 GENERAL

1.1 SCOPE

A. Description of the Work

1. Furnish and place all paving in those areas disturbed or damaged by the construction work.

2. Work shall be in accordance with the Plans, as specified herein, with the requirements of the Municipality where the work is taking place, and/or the requirements of the Owner of the roadway.

3. The Contractor and Authority's Resident Project Representative shall, prior to construction, make a visual reconnaissance of all improved areas, determining the actual condition of the paving. Notes, photographs, etc., shall be made and kept on file at the Authority's Engineer's office for possible future reference.

4. If during the construction work the Contractor damages the existing paving outside the limits of paving, even though he previously determined that he would not damage the paving, it shall be his responsibility to replace the paving outside the paving limits to its original condition.

5. In all instances the requirements of the Owner of the roadway shall govern.

1.2 APPLICABLE SPECIFICATIONS

A. Perform work in accordance with Commonwealth of Pennsylvania Department of Transportation (PennDOT) Specification Publication 408 and Bulletins 15, 25 and 37.

1.3 QUALIFICATIONS

A. Contractor shall be experienced in paving operations and use of the proper equipment as required by the Pennsylvania Department of Transportation.

1.4 NOTIFICATIONS

A. The Contractor shall notify all companies and authorities that have existing utilities in the streets, that are to be overlaid in accordance with PA One

Call Requirements at a minimum. Longer advance notice is required where structures will be required to be raised.

B. Contractor shall notify, at least twenty-four (24) hours in advance, municipality, the local police and fire departments prior to beginning any paving operation.

PART 2 PRODUCTS

2.1 AGGREGATES

A. The crushed aggregate shall conform to the applicable provisions of Section 703, AGGREGATES, in Commonwealth of Pennsylvania, Department of Transportation Specifications, Publication 408.

2.2 BITUMINOUS MATERIALS

A. The bituminous materials shall conform to the applicable provisions of Bulletin No. 25 of the Commonwealth of Pennsylvania, Department of Transportation.

2.3 CONCRETE MATERIALS FOR STREETS

A. The concrete materials for streets shall conform to the applicable provisions of Section 704, CEMENT CONCRETE AND READY MIX CEMENT CONCRETE, in Commonwealth of Pennsylvania, Department of Transportation Specifications, Publication 408.

2.4 CONCRETE MATERIALS FOR WALKS AND DRIVEWAYS

A. The concrete materials for walks and driveways shall be PennDOT Class "AA" Concrete and shall conform to the specifications of Section F, CAST-IN-PLACE CONCRETE.

2.5 MANHOLE ADJUSTING RINGS

A. For raising manhole covers an acceptable manhole raising device shall be provided. The device shall be a solid adjusting ring or an adjustable manhole extension device as manufactured by Neenah Foundry Company of Cuddy, PA or equivalent approved by the Authority.

PART 3 EXECUTION

3.1 GENERAL

A. Permanent paving can only be performed during the specific times of year and weather conditions required by the owner of the roadway/facility.

3.2 RAISING MANHOLE COVERS AND VALVE BOXES

A. Install the adjusting rings in all sewer and storm manholes that require adjusting to meet the elevation of the paving.

B. Coordinate the raising of all valve boxes and/or manhole covers belonging to PCSA or other utilities. Comply with all individual utility company requirements.

C. Contractor shall be responsible to verify that all such items as mentioned above are adjusted to the new paving elevation in accordance with all applicable utility company requirements.

3.3 TEMPORARY PAVING

A. General

1. Temporary paving shall be installed in accordance with the requirements of the owner (Borough/Township, PennDOT, County, etc.) of the roadway after pipe and backfill have been installed in improved areas.

3.4 SURFACE PREPARATION

A. In preparation for permanent paving the temporary paving shall be removed.

B. Prior to the replacement of the base course the edges of the existing base and surface must be sawed 1-foot on each side of the trench, unless otherwise specified by municipal ordinance.

C. Remove all material within the trench and "cut back" area to subgrade ready for the base course.

D. The sub grade for all improved areas shall be thoroughly compacted to the proper distance below and parallel with the prescribed level of the base course. The sub grade shall be completely tamped in an approved manner prior to placing the base course. Compaction shall conform to the Density

Requirements in Section 210, SUBGRADE, in Commonwealth of Pennsylvania, Department of Highways Specifications, Publication 408.

E. When tamping down of temporary paving is permitted, the surface after being thoroughly tamped shall be cleaned of all foreign substances. A tack coat shall be applied in accordance with Section 460, BITUMINOUS TACK COAT, in Commonwealth of Pennsylvania, Department of Transportation Specifications, Publication 408.

3.5 TOWNSHIP/BOROUGH ROADS

A. Township/Borough Roads

1. Paving shall conform to the Township/Borough specifications.

2. Developer must receive any necessary permits from Township/Borough prior to construction.

3.6 DRIVES/PARKING AREAS

A. Stone and gravel drives and parking areas shall be covered to their existing surface with AASHTO No. 57 Limestone Aggregate; 4-inch minimum depth. 100% PennDOT 2A Limestone backfill shall be used to backfill any excavated areas in these parking areas or drives.

B. Improved drives/parking areas shall be repaired in kind to match existing surface.

1. Bituminous Paving - Replacement shall be with minimum one and one-half (1-1/2) inch compacted depth of Bituminous Wearing Course on minimum three (3) inches compacted depth of Bituminous Concrete Base. All bituminous paving materials shall comply with PennDOT Publication 408 requirements.

2. Concrete Paving - Replacement shall be with PennDOT Class AA Concrete, six (6) inches in depth reinforced with Number 4 welded wire mesh.

3.8 CONCRETE SIDEWALKS/CURB

A. Concrete Sidewalks - Replacement shall be with PennDOT Class AA Concrete, four (4) inches in depth placed on six (6) inch compacted 100% PennDOT 2A Limestone. Sidewalks shall have contraction joints spaced five (5) feet on centers and premolded expansion joint material at twenty-five (25) foot centers.

B. Concrete Curb - Curb shall be of the type and dimension specified on the drawings. PennDOT Class AA Concrete shall be placed in tight, smooth straight forms. Contraction joints shall be spaced no less than four (4) feet nor more than fifteen (15) feet on center. Joints shall be 3/16-inch wide and two (2) inches deep. Premolded expansion joint material 3/4-inch thick shall be placed at structures. Exposed surfaces of curb to be rubbed smooth and all voids filled with grout.

3.9 STATE HIGHWAYS

A. General

1. Repaving in State Highways shall be in accordance with "Occupancy of Highways by Utilities" 67 PA Code, Chapter 459, Highway Occupancy Permit Obtained for the work, or other applicable PennDOT Requirements.

B. Shoulder Restoration--State Highway

1. State highway shall be restored as shown on the construction standard.

2. Backfill shall be as specified in Section C - Earthwork for Sanitary Sewers.

C. Other Shoulders

1. Retained material which complies with Section 206.2, Publication 408 may be used for backfill, up to within 18-inches of final grade. The final 18-inches of backfill shall consist of 100% PennDOT 2A Limestone backfill thoroughly compacted.

3.10 THICKNESS

A. Thickness of all base courses, binder course, surface courses, and stone and gravel drives shall be as specified on the Drawings and/or municipal/state requirements.

3.11 DELIVERY TICKET (PAVING MATERIALS)

A. A delivery ticket indicating the quantities and types of paving material shall be submitted at the time of delivery. The complete delivery ticket shall be delivered to the Authority's Engineer. Failure to deliver such complete ticket to the Authority's Engineer will be cause for the Authority's Engineer to reject paving material.

+ + END OF SECTION++

H. RESIDENTIAL GRINDER PUMPS

H. RESIDENTIAL GRINDER PUMPS

PART 1 GENERAL

1.1 SCOPE

A. Use of residential grinder pumps must be approved by the Authority. All grinder pumps are to be privately Owned and Maintained. An individual Release is required to be executed and notarized by the property owner and submitted to PCSA prior to installation.

B. Install residential grinder pumps and appurtenances, where approved, for all buildings to be served by a low-pressure pump in accordance with manufacturer requirements, PCSA Standard Detail Drawings, and as herein specified.

C. Furnish complete factory-built and tested grinder pumps, each consisting of:

1. grinder pump(s) suitably mounted in a basin constructed of fiberglass or high-density polyethylene (HDPE),

2. electrical quick disconnect (NEMA 6),

3. pump removal system,

4. shut-off valve,

5. anti-siphon valve,

6. check valve assembled within the basin,

7. electrical alarm/disconnect/control panel,

8. all necessary internal wiring and controls, and

9. all necessary internal plumbing from pump to discharge connection.

D. Provide equipment that is a product of a company experienced in the design and manufacture of grinder pumps specific for use in low pressure sewage systems.

E. The installer/owner of the grinder pump unit is responsible to verify pump operating capabilities are suitable for the proposed installation.

1.2 SUBMITTALS

A. Provide complete catalog cut, fabrication, erection, electrical and mechanical drawings.

B. Shop Drawings: Submit shop drawings and product data for review.

C. Using pump manufacturers standards and recommendations, and the construction drawings, prepare and submit detailed hydraulic design calculations and written report for each proposed low-pressure system demonstrating that the system as a whole, and the individual pumps, will function as intended and that all pumps will operate within the manufacturer's requirements. Provide the review and seal of a registered professional engineer on the report.

PART 2 PRODUCTS

2.1 DESIGN INTENT, FUNCTIONALITY, AND PERFORMANCE REQUIREMENTS

A. The equipment included in this section is intended to pump unscreened, raw sewage waste fluids, solid and semi-solid materials including organics, plastics, hair, grease, stringy material, corrosive, explosive, flammable and viscous materials that are typically present is sanitary sewer systems. Pump operation is to be controlled by an automatic monitoring and control system designed and manufactured for the pump installation.

B. If the pumps proposed are designed to work in a community system. Pump design capacity including flow and head are critical components of the design intent that all pumps will work in conjunction with one another such that no individual unit is incapable of pumping sewage as a result of system head created by another pump.

2.2 MATERIALS

A. Component specific, as specified.

2.3 COMPONENTS

A. Grinder Pump Assembly: Provide NSF International approved residential grinder pump units that meet accepted plumbing equipment standards for use in or near residences; free from noise, odor, or health hazards, and tested by an independent laboratory to certify its capability to perform as specified in either individual or low-pressure sewer system applications. Provide a watertight, single unit cartridge type removable core assembly containing pump, motor, grinder, controls, check valve, anti-siphon valve, mechanical

and electrical quick disconnects and wiring. Factory test each core unit for watertight integrity at a minimum of 5 PSIG. Provide certificate of compliance.

1. Grinder Pumps:

   a. Provide grinder pumps capable of meeting the required design parameters for the specific installation. Provide grinder pump(s) capable of operating at negative total dynamic head without overloading the motor(s).

   b. Provide integral, vertical rotor, motor driven, solids handling pump(s) of the progressing cavity type with:

      1) A single mechanical seal

      2) Rotor: Highly polished, precipitation hardened stainless steel.

      3) Stator: Specifically compounded ethylene propylene synthetic elastomer suited for domestic waste water service that is high tear and abrasion resistant, grease resistant, water and detergent resistant, temperature stable and wear resistant.

      4) Pump Grinder: Direct-driven by a single, one-piece stainless steel motor shaft.

         i. Provide a rotating type grinder with a stationary, hardened and ground, stainless steel shredding ring. Securely fasten grinder impeller assembly to the pump motor shaft.

         ii. Provide two dynamically balanced hardened type 400 series stainless steel cutter bars. Design and manufacture to operate without objectionable noise or vibration over the entire range of recommended operating pressures.

         iii. Design and construct grinder pump assembly to eliminate clogging and jamming under all normal operating conditions including starting.

iv. Design and construct grinder pump to induce sufficient vortex action to scour tank free of deposits or sludge banks.

v. Design and construct the grinder pump to maintain average inlet velocity of 0.2 feet per second at maximum flow.

vi. Maximum impeller speed: 1800 rpm.

vii. Design grinder to reduce all components in normal domestic sewage, including "foreign objects", such as paper, wood, plastic, glass, rubber and the like, to finely-divided particles which will pass freely through the passages of the pump and the 1¼" diameter s/s discharge piping.

2. Motors:

a. 240 volt, 60 Hz, 1 Phase, capacitor start, ball bearing, squirrel cage induction type motor(s) having a starting current not to exceed 30 amperes and starting torque of 8.4 foot pounds.

b. Provide inherent protection against pump motor running overloads or locked rotor conditions by the use of an automatic-reset, integral thermal overload protector incorporated into the motor. Provide motor protector combination investigated and listed by Underwriters Laboratories, Inc., for the application.

3. Mechanical Seal:

a. Provide a mechanical shaft seal to prevent leakage between the motor and grinder pump.

b. Construct seal with a stationary ceramic seat and carbon rotating surface with faces precision lapped and held in position by a stainless steel spring.

4. Grinder Pump Assembly Compartment:

a. Provide a factory assembled, dual compartment, tank designed for direct bury applications complete with all electrical, mechanical, and structural appurtenances required

to comprise an operable unit. Provide all necessary electrical, mechanical, and structural penetrations and bulkheads molded in, factory sealed and warranted by the manufacturer to be watertight.

1) Tank:

   i. High density polyethylene, with a melt index of 2.0 grams/10 min.

   ii. Corrugated double wall construction with smooth internal wall.

   iii. External corrugations minimum amplitude of 1½".

   iv. Incidental sections of a single wall construction are to be a minimum .250 inch thick.

   v. Thermally welded and factory tested seams for leak tightness.

   vi. Design tank wall and bottom to withstand the pressure exerted by saturated soil loading and live load surcharge at maximum burial depth.

   vii. Minimum Nominal Tank capacity: 70 gallon

   viii. Provide EPDM grommet fitting for gravity sewer connection as required by site conditions.

2) Accessway:

   i. Integral extension of the wet well assembly.

   ii. Provide lockable cover assembly with low profile mounting and watertight capability.

   iii. Design and construct accessway to facilitate field adjustment of station height in increments of 4" or less without the use of adhesives or sealants requiring cure time.

3) Discharge Piping:

i. Construct of Type 304 Series Stainless Steel terminating outside the accessway bulkhead.

ii. Provide stainless steel, 1-1/4 inch female NPT fitting at exterior of bulkhead.

iii. Furnish one stainless steel ball valve rated for 200 psi

4) Electrical Disconnect: NEMA 6 electrical quick disconnect for all power and control functions.

5) Vent: 2 inch PVC.

5. Check Valves:

a. Equip stainless steel pump discharge piping with a factory installed, gravity operated, flapper-type integral check valve meeting the following:

1) Provide a full-ported passageway when open.

2) Friction loss of less than six inches (6") of water at maximum rated flow.

3) Working parts 300 series stainless steel and fabric reinforced synthetic elastomer to ensure corrosion resistance, dimensional stability, and fatigue strength.

4) Non-metallic hinge integral to the flapper assembly

5) Valve body; injection molded part made of glass filled PVC.

6) Provide each grinder pump assembly with a separate check valve for installation in the service lateral between the grinder pump assembly and the sewer main followed downstream next to the curb stop.

6. Pump Controls:

a. Locate all necessary controls in the top housing of the core unit. Attach top housing with stainless steel fasteners.

b. Provide Non-fouling waste water level detection for controlling grinder pump operation by monitoring the pressure changes in an integral air-bell level sensor connected to a pressure switch. Equip each switch with a breather assembly, complete with a suitable means to prevent accidental entry of water into the motor compartment.

c. Provide necessary length of 6 conductor 14 gauge, type SJOW cable, pre-wired and watertight to meeting UL requirements.

7. Alarm / Disconnect Panel:

a. Provide each grinder pump assembly with a NEMA 3R, thermoplastic UL listed Alarm/Disconnect Panel suitable for wall or pole mounting with.

1) Lockable hinged cover, secured dead front, component knockouts and lock.

2) Terminal blocks, integral power bus, push to run feature and complete alarm circuit.

3) Audio and visual alarm.

4) Push to run switch.

5) High level (redundant) grinder pump starting control.

b. For each grinder pump core, outfit the panel with:

1) One (1) 15 amp, double pole circuit breaker for the power circuit

2) One (1) 15 amp single pole circuit breaker for the alarm circuit.

c. Provide the following alarm sequence:

1) When liquid level in the sewage wet well rises above the alarm level, visual and audio alarms will be activated. The contacts on the alarm pressure switch will close.

2) The audio alarm may be silenced by means of the externally mounted, push-to-silence button.

3) Visual alarm remains illuminated until the sewage level in the wet well drops below the "off" setting of the alarm pressure switch.

4) Visual Alarm Lamp: Red fluted lens at least 2-5/8" in diameter and 1-11/16" in height mounted to the top of the enclosure in such a manner as to maintain NEMA 3R rating

5) Audio Alarm:

i. Printed circuit board.

ii. 86 dB buzzer with quick mounting terminal strip mounted in the interior of the enclosure.

iii. Weatherproof silicone boot push-type deactivation switch.

8. Operational Requirements:

a. Core Removal/Installation:

1) Provide two lifting hooks complete with nylon lift-out harness connected to the core top housing for core removal.

2) Provide accessible disconnect type mechanical and electrical connections.

3) Provide a push to run feature for field trouble shooting.

4) Mount all motor control components on a readily replaceable bracket for ease of field service.

5) Design unit such that all maintenance tasks for the grinder pump assembly are possible without entry of the grinder pump assembly.

6) Provide grinder pump unit free from electrical and fire hazards as required in a residential environment. As evidence of compliance with this requirement,

provide Underwriters Laboratory seal of approval in each unit.

7) During a high level alarm condition the appropriate light will illuminate to indicate which grinder pump core requires servicing.

2.4 PRODUCT DELIVERY

A. Transport, store and handle in accordance with manufacturer requirements. Inspect upon receipt. Inspect bill of lading, verify all parts are included. Store in weatherproof, locked enclosure on wood palette.

B. Deliver all grinder pump units 100% factory assembled, manufacturer tested and ready for installation. Grinder pump units will be individually mounted on wooden pallets.

C. Provide factory leak tests certifying the integrity of all joints, seams and penetrations. Include all necessary penetrations such as inlets, discharge fittings and cable connectors in the factory leak test along with their respective sealing means (grommets, gaskets, etc.).

2.5 LOW PRESSURE FORCEMAIN CONNECTION TO GRAVITY MAINLINE SEWER

A. Provide low pressure forcemain connection to manholes or gravity sewers in accordance with the PCSA Standard Detail Drawings or as required to suit field conditions.

PART 3 EXECUTION

3.1 CONSTRUCTION

A. Provide manufacturer's installation supervision services.

B. Field measure before installation. Assure accessibility and operating/ mounting height. Provide all required hardware and foundations.

C. Install complete with all required electrical, mechanical and structural connections as may be required to operate the unit.

D. Install pump and appurtenances in complete accordance with the PCSA Standard Detail Drawings and the manufacturer's recommendations. Provide all pipe, fittings, valves and adapters.

E. Test pumps and connecting piping. Repair all leaks.

F. Control groundwater to provide a firm, dry subgrade for the structure. Guard against flotation or other damage resulting from ground water or flooding.

G. Do not be drop, roll or lay pump assembly on its side for any reasons.

H. Accomplish installation so that 1" to 4" of accessway, below the bottom of the lid, extends above the finished grade line. The finished grade shall slope away from the unit. Construct excavation large enough to permit installation of concrete anchor.

I. Provide a six-inch (6") (minimum) layer of AASHTO No. 57 Limestone Aggregate as bedding material under each unit.

J. Install a cast-in-place concrete anti-flotation collar, as shown on the PCSA Standard Detail Drawings and recommended by the manufacturer.

K. Backfill grinder pump unit from the base to one foot (1') above the discharge pipe with AASHTO No. 57 Limestone Aggregate.

L. Furnish, install and wire the electrical enclosure. Coordinate with the individual property owner(s) to determine the optimum location for the "Alarm/Disconnect Panel".

M. Mount the alarm device as per national and local codes. Connect the alarm/disconnect panel to the grinder pump assembly by a 6 conductor 10 gauge UF type cable. Provide uncut, un-spliced, length of cable as required. Size cable for voltage drop tolerances of the pump and panel. Do not splice the cable between the grinder pump assembly and control panel.

3.2 FIELD QUALITY CONTROL

A. Provide manufacturers start-up and testing services.

B. Start-Up and Field Testing:

1. Retain the services of a qualified factory trained technician(s) to inspect the placement and wiring of each assembly, perform field tests as specified herein, and instruct the Owner's personnel in the operation and maintenance of the equipment before the assembly is accepted by the Owner. Provide all equipment and materials necessary to perform testing to include, as a minimum, a portable generator (if temporary power is required) and water in each basin.

2. Upon completion of the installation, under the supervision of the authorized factory technician(s) perform the following tests on each station:

   a. Turn ON the alarm power circuit.

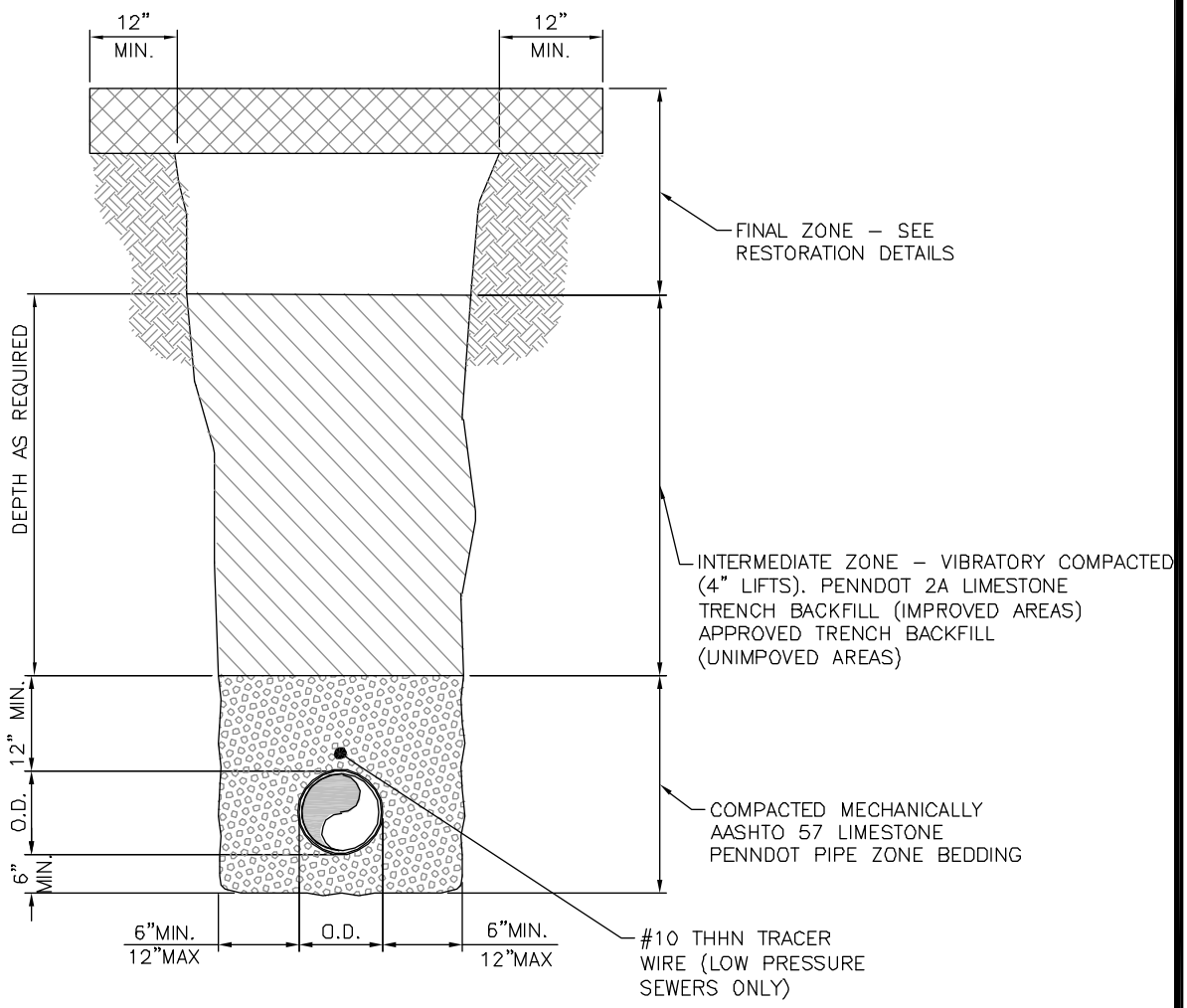
   b. Fill the wet well with water to a depth sufficient to verify the high level alarm is operating.

   c. Turn ON pumps power circuit. Initiate pump operation to verify automatic "on/off" controls are operative.

2. Upon completion of the start-up and testing the grinder pump Release must be submitted to the Authority.

+ + END OF SECTION++

I. PCSA STANDARD DETAIL DRAWINGS

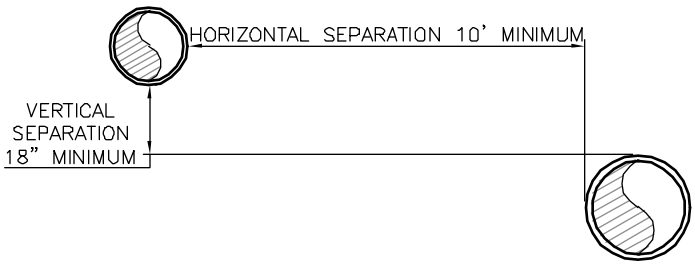


TYPICAL

TRENCH AND PIPE ZONES

N. T. S.

PETERS CREEK SANITARY AUTHORITY 3502 LINCOLN AVENUE FINLEYVILLE, PENNSYLVANIA 15332	DATE: 4-20-21 FILE NAME: SAN-01 SCALE: N.T.S.	Trench and Pipe Zones



NOTES:
1. WHEN THE HORIZONTAL SEPARATION OF OTHER UTILITIES AND SEWER LINE IS LESS THAN 10', THE VERTICAL SEPARATION BETWEEN THE TOP (CROWN) AND BOTTOM (INVERT) OF THE OTHER UTILITY AND THE SANITARY SEWER SHALL BE AT LEAST 18". ENCASE IN CONCRETE WHERE CROSSINGS OCCUR AND WHERE THE CONDITIONS PREVENT AN 18" VERTICAL SEPARATION.

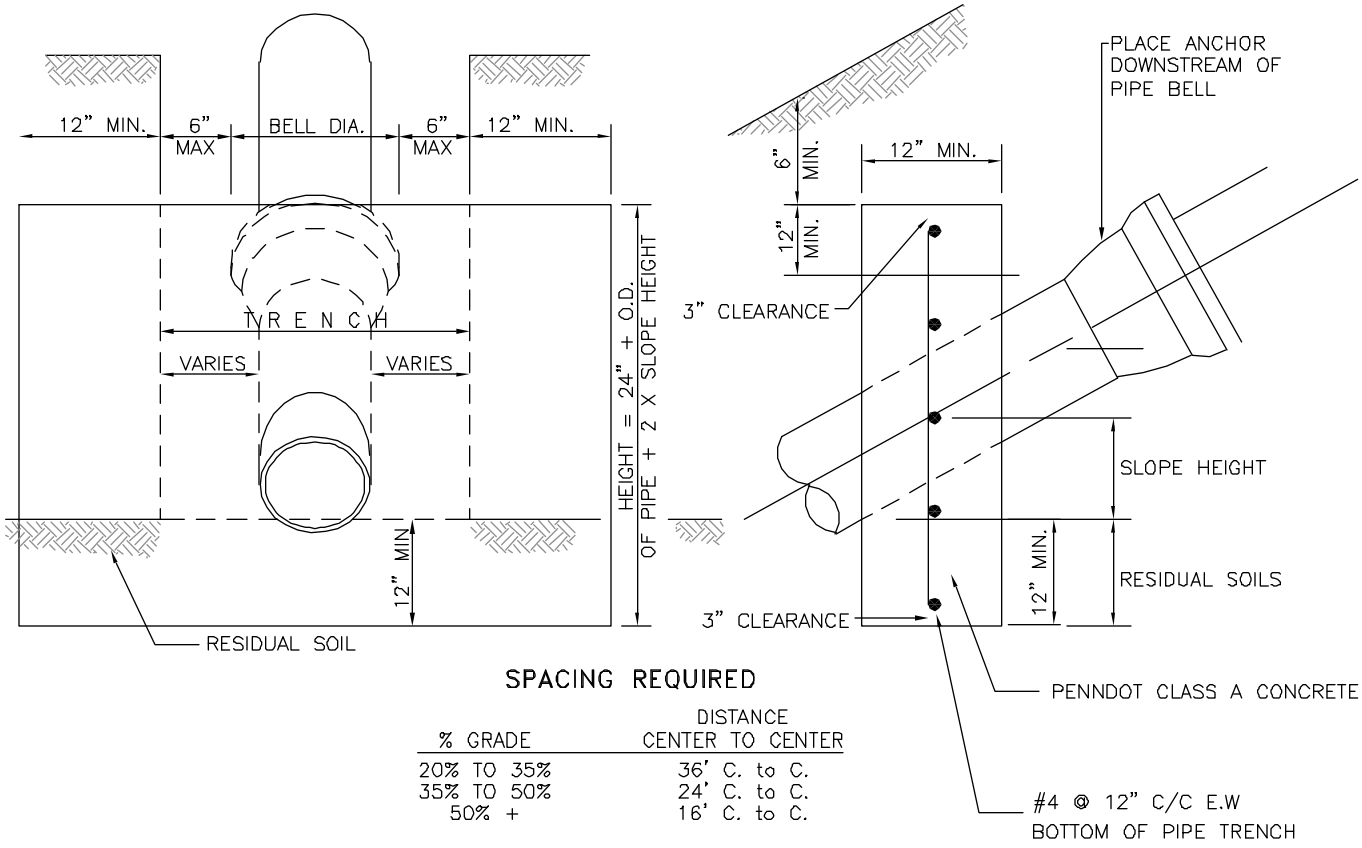
UTILITY SEPARATION

N. T. S.

PETERS CREEK SANITARY AUTHORITY
3502 LINCOLN AVENUE
FINLEYVILLE, PENNSYLVANIA 15332

DATE:	4-20-21
FILE NAME:	SAN-02
SCALE:	N.T.S.

Utility Separation



SPACING REQUIRED

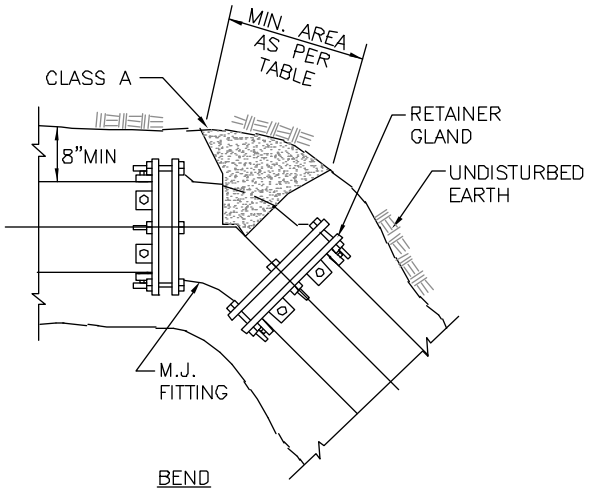
% GRADE	DISTANCE CENTER TO CENTER
20% TO 35%	36' C. to C.
35% TO 50%	24' C. to C.
50% +	16' C. to C.

DUCTILE IRON PIPE SHALL BE USED FOR ALL PIPING OVER 20% GRADE.

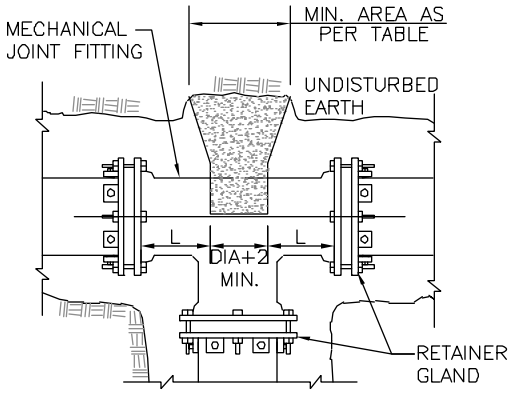
CONCRETE ANCHOR FOR SANITARY SEWERS

N. T. S.

PETERS CREEK SANITARY AUTHORITY 3502 LINCOLN AVENUE FINLEYVILLE, PENNSYLVANIA 15332	DATE: 4-20-21 FILE NAME: SAN-03 SCALE: N.T.S.	Concrete Anchor for Sanitary Sewers

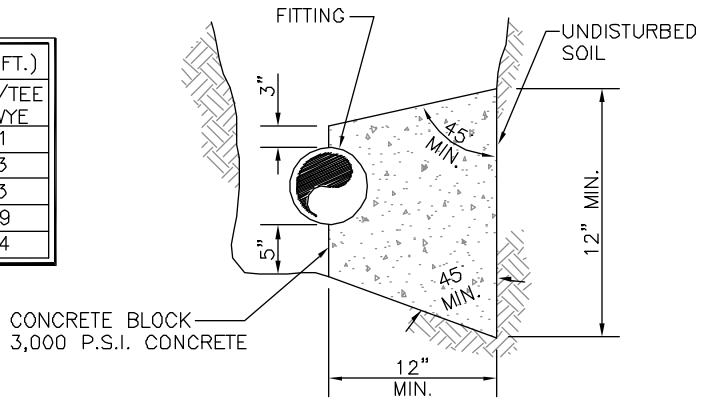


BEND



TEE, CAP, VALVE AND WYE

PIPE SIZE (in)	L (in.)	MINIMUM BEARING AREA OF BLOCK(SQ. FT.)				
		90° BENDS	45° BENDS	22.5° BENDS	11.25° BENDS	VALVE/TEE OR WYE
4	5	2.9	1.6	1.0	1.0	2.1
6	6	6.0	3.3	1.7	1.0	4.3
8	6.5	10.3	5.6	2.9	1.5	7.3
10	6.5	15.4	8.4	4.3	2.2	10.9
12	7	21.8	11.8	6.0	3.1	15.4



NOTES:

1. EARTH PRESSURE = 2,000 LBS./SQ.FT.
2. APPLIED PRESSURE = 150 P.S.I.+50% FOR WATER HAMMER OR SURGE
3. IF EARTH IN FIELD WILL NOT SUPPORT THE ABOVE EARTH PRESSURE, AREA OF BLOCK MUST BE INCREASED PROPORTIONATELY.
4. CONCRETE TO BE PENNDOT CLASS A, 3" SLUMP
5. ALL MECHANICAL JOINT FASTENERS (I.E. BOLTS, NUTS, ETC.) SHALL BE FREE OF CONCRETE. ALL FITTINGS SHALL BE MECHANICAL JOINT AND HAVE MEG-A-LUG RETAINER GLANDS (OR EQUAL) INSTALLED TO MANUFACTURERS SPECIFICATIONS.
6. CONCRETE WITH BEARING AREAS GREATER THAN 3 S.F. TO HAVE W4 x W4 WELDED WIRE FABRIC.
7. ALL FITTINGS TO BE DUCTILE IRON WITH EPOXY LINING.

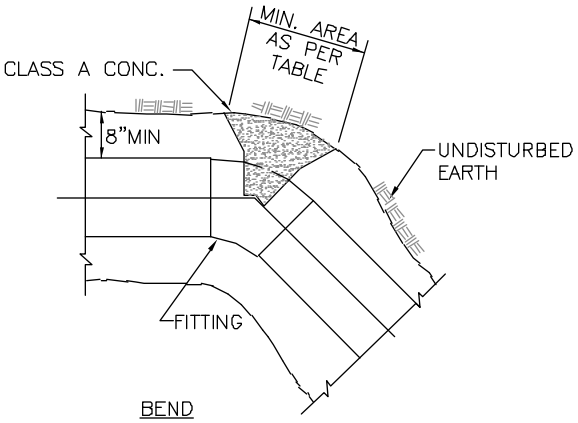
FORCEMAIN HORIZONTAL THRUST BLOCKING

N.T.S.

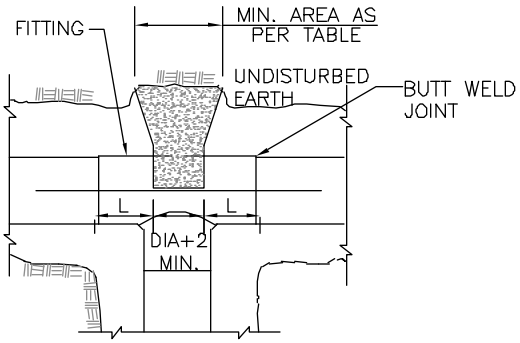
PETERS CREEK SANITARY AUTHORITY
3502 LINCOLN AVENUE
FINLEYVILLE, PENNSYLVANIA 15332

DATE: 4-20-21
FILE NAME: SAN-04
SCALE: N.T.S.

Sanitary Sewer Forcemain Thrust Blocking

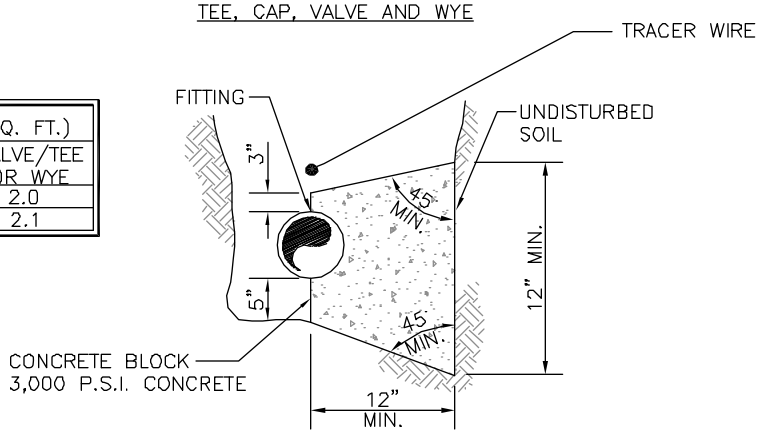


BEND



TEE, CAP, VALVE AND WYE

PIPE SIZE (in)	L (in.)	MIN. BEARING AREA OF BLOCK(SQ. FT.)				
		90° BENDS	45° BENDS	22.5° BENDS	11.25° BENDS	VALVE/TEE OR WYE
1 to 2	5	2	1.5	1.0	1.0	2.0
2 to 4	1.5	2.9	1.6	1.0	1.0	2.1



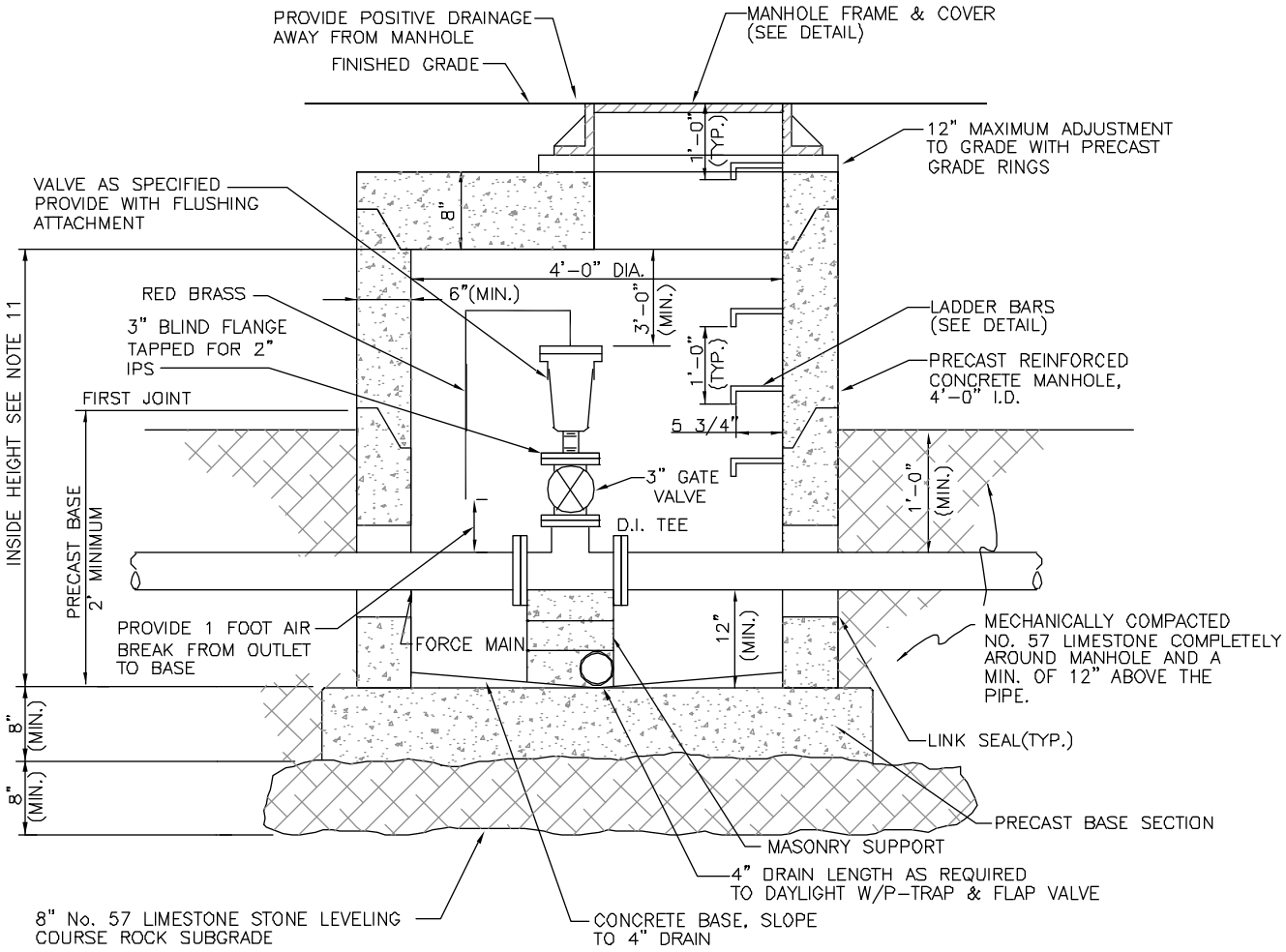
NOTES:

1. EARTH PRESSURE = 2,000 LBS./SQ.FT.
2. APPLIED PRESSURE = 150 P.S.I.+50% FOR WATER HAMMER OR SURGE.
3. IF EARTH IN FIELD WILL NOT SUPPORT THE ABOVE EARTH PRESSURE, AREA OF BLOCK MUST BE INCREASED PROPORTIONATELY.
4. CONCRETE TO BE PENNDOT CLASS 'A', 3" SLUMP.

TYPICAL
LOW PRESSURE (SEWER)
HORIZONTAL THRUST BLOCKING DETAIL

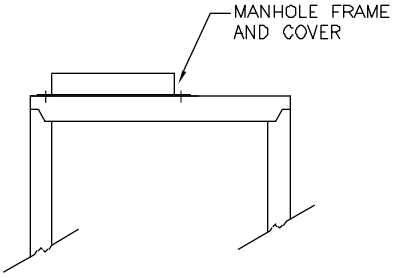
N. T. S.

PETERS CREEK SANITARY AUTHORITY 3502 LINCOLN AVENUE FINLEYVILLE, PENNSYLVANIA 15332	DATE: 4-20-21 FILE NAME: SAN-05 SCALE: N.T.S.	Sanitary Sewer Low Pressure Forcemain Thrust Blocksing



N O T E S :

1. ALL CONCRETE TO BE FIELD PLACED 4000 PSI, 5%± 1% AIR ENTRAINED.
2. MANHOLE BARREL JOINTS TO BE SEALED WITH 1"ø 2 FLEXIBLE BUTYL RUBBER JOINT SEALANT, USE 1/2"ø FOR FRAME AND COVER.
3. FRAME AND COVER TO BE ANCHORED WITH 4-3/4" DIA. S.S. ANCHOR BOLTS SET PERMANENTLY ANCHORED INTO CONCRETE.
4. LIFTING HOLES TO BE POINTED WITH NON-SHRINK GROUT, AND LEFT WATERTIGHT, NEAT AND SMOOTH.
5. MAXIMUM ADJUSTMENT TO FINISHED GRADE USING PRECAST GRADE RINGS SHALL NOT EXCEED TWELVE INCHES (12").
6. PRECAST SECTIONS SHALL CONFORM TO ASTM C-478 AS REVISED.
7. COAT EXTERIOR OF ALL MANHOLE BARREL SECTIONS WITH APPROVED BITUMINOUS COATING.
8. CAST LADDER BARS INTO BARREL SECTIONS AND CONFORM TO ASTM C-478, AS REVISED.
9. PROVIDE ALL RED BRASS AND DUCTILE IRON PIPING, UNLESS NOTED.
10. PROVIDE ALL NECESSARY PIPE, FITTINGS AND/OR ADAPTORS TO MAKE A COMPLETE WATER TIGHT CONNECTION.
11. INSIDE HEIGHT TO BE SET BASED ON VALVE INSTALLED. ADJUST PIPE DEPTH AS REQUIRED. MINIMUM HEIGHT IS 6'-6".



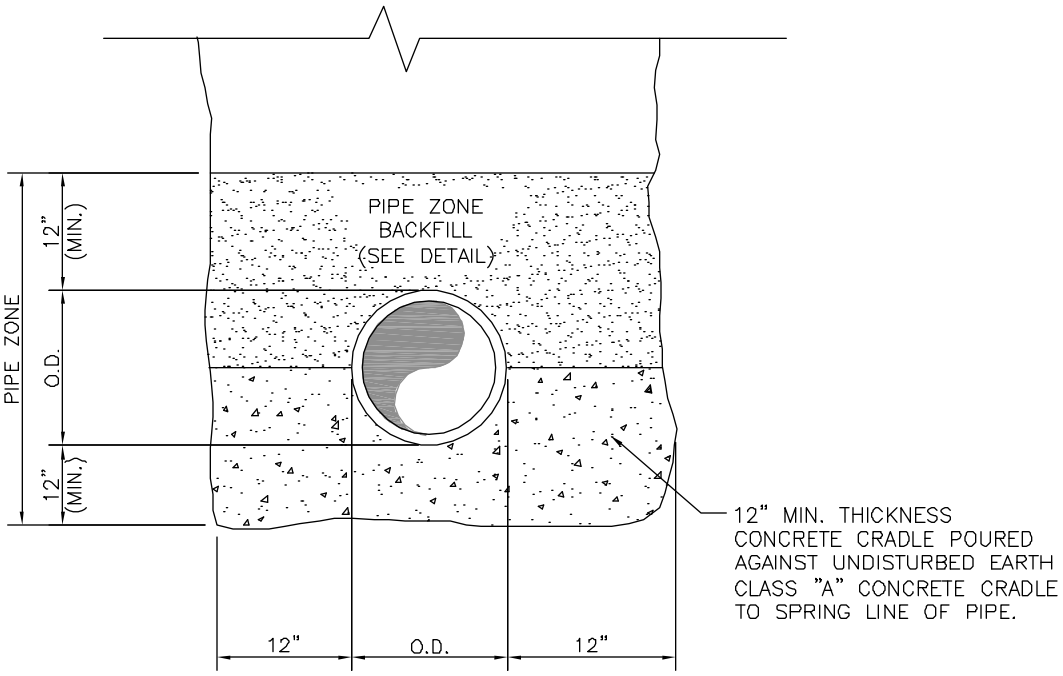
NOTE:
MANHOLE SLAB TOP SHALL MEET MINIMUM H-20 LOADING AND SHALL BE USED TO MEET GRADES AND/OR OTHER CONDITIONS AS MAY BE REQUIRED.

MANHOLE SLAB TOP

AIR/VACUUM RELEASE ASSEMBLY

N. T. S.

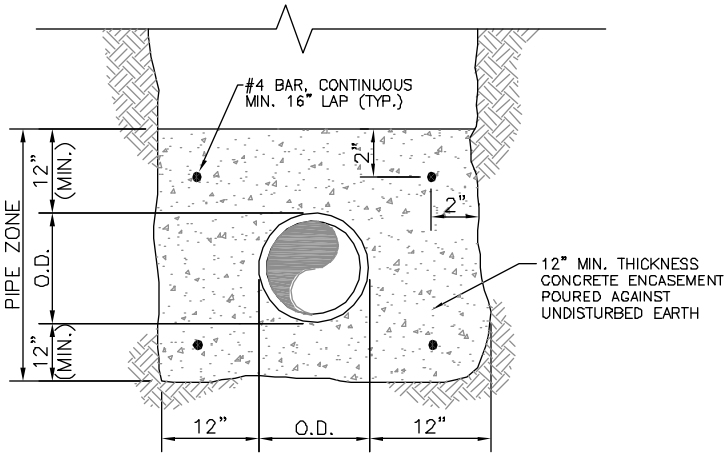
PETERS CREEK SANITARY AUTHORITY 3502 LINCOLN AVENUE FINLEYVILLE, PENNSYLVANIA 15332	DATE: 4-20-21 FILE NAME: SAN-06 SCALE: N.T.S.	Air Vacuum & Release Assembly



TYPICAL
CONCRETE CRADLE
N. T. S.

NOTE:
RESTRAIN PIPE AS REQUIRED TO PREVENT FROM FLOATING OR DISPLACEMENT.

PETERS CREEK SANITARY AUTHORITY 3502 LINCOLN AVENUE FINLEYVILLE, PENNSYLVANIA 15332	DATE: 4-20-21 FILE NAME: SAN-07 SCALE: N.T.S.	Concrete Cradle

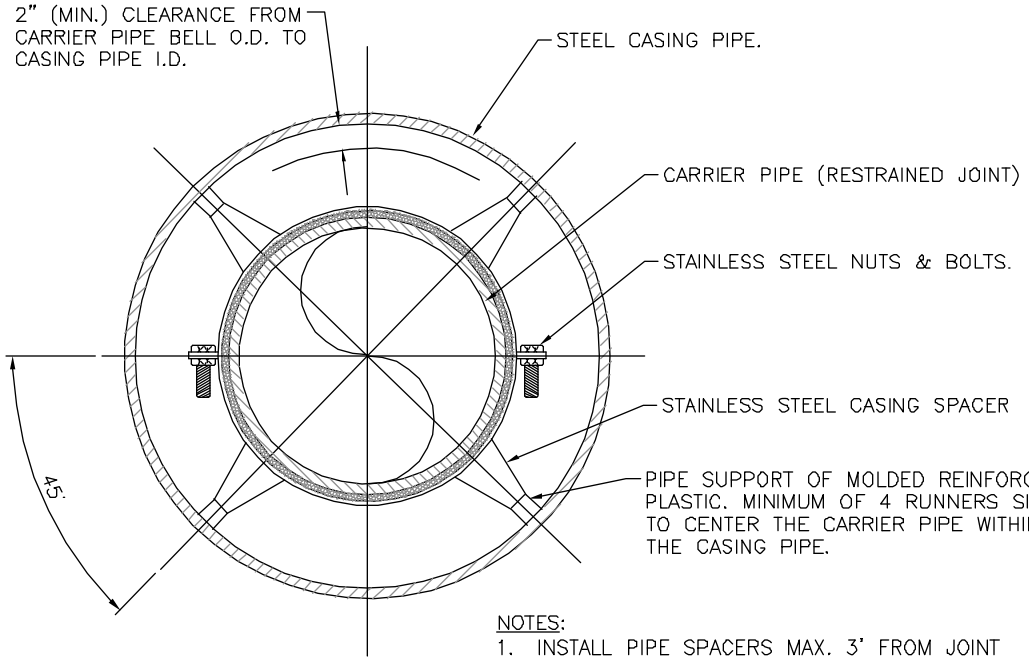


TYPICAL

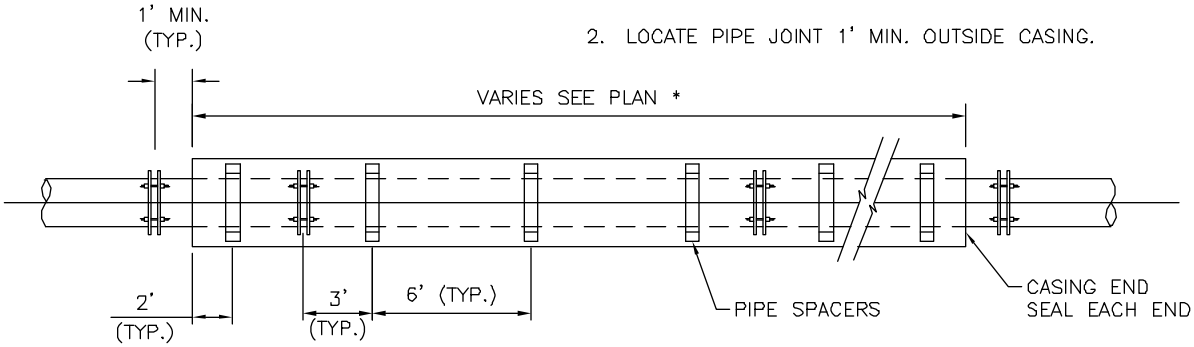
CONCRETE ENCASEMENT

N. T. S.

PETERS CREEK SANITARY AUTHORITY 3502 LINCOLN AVENUE FINLEYVILLE, PENNSYLVANIA 15332	DATE: 4-20-21 FILE NAME: SAN-08 SCALE: N.T.S.	Concrete Encasement



NOTES:
1. INSTALL PIPE SPACERS MAX. 3' FROM JOINT MAX. OF 6' BETWEEN SUPPORTS, AND A MAX. OF 2' FROM CASING END.
2. LOCATE PIPE JOINT 1' MIN. OUTSIDE CASING.

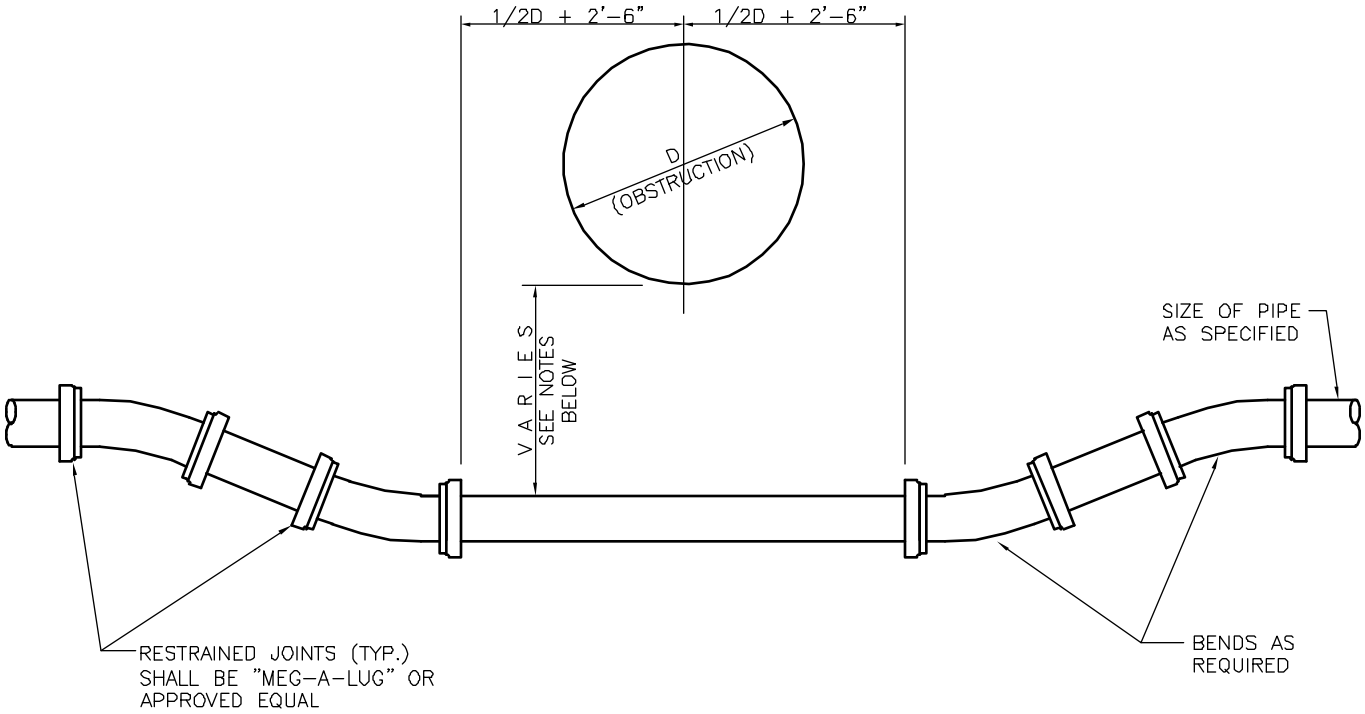


* EXACT LENGTH OF CASING PIPE TO BE DETERMINED IN THE FIELD.

CASING PIPE ASSEMBLY DETAIL

N. T. S.

PETERS CREEK SANITARY AUTHORITY 3502 LINCOLN AVENUE FINLEYVILLE, PENNSYLVANIA 15332	DATE: 4-20-21 FILE NAME: SAN-09 SCALE: N.T.S.	Casing Pipe Assembly



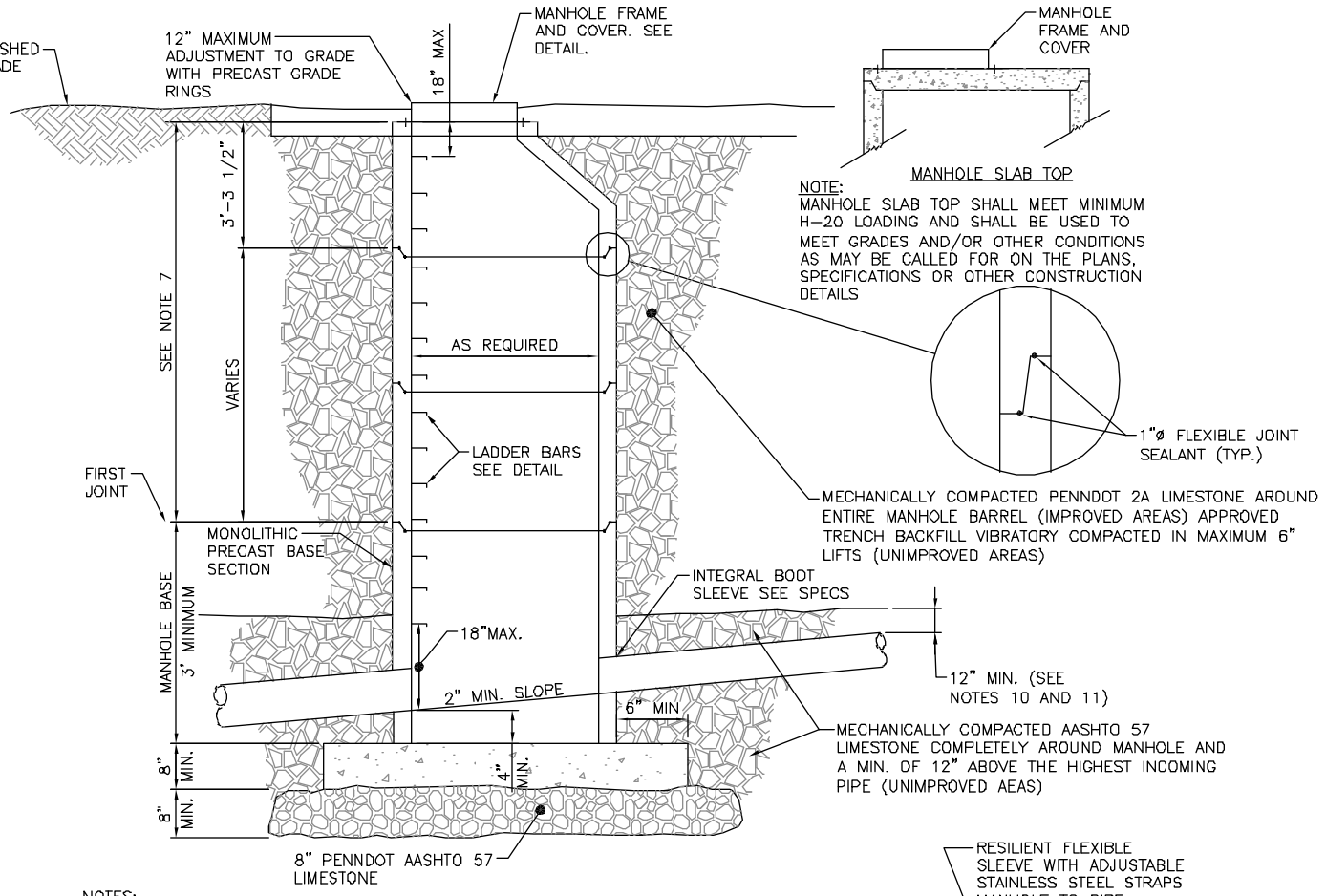
NOTES:

1. ALL PIPE SHALL BE DUCTILE IRON CLASS 52 SELF RESTRAINED JOINT FOR CREEK CROSSINGS WITH A MINIMUM OF 3'-0" COVER FROM THE STREAM BOTTOM TO THE TOP OF THE PIPE AND SHALL EXTEND A MINIMUM OF 10'-0" BEYOND THE TOP OF BANK ON EACH SIDE OF STREAM.
2. FOR CROSSING UNDER EXISTING PIPE OR OBSTRUCTIONS A MINIMUM OF 18" CLEARANCE SHALL BE MAINTAINED FROM THE BOTTOM OF THE EXISTING PIPE TO THE TOP OF THE PROPOSED FORCEMAIN.
3. FOR CROSSING UNDER EXISTING PIPE THE CONTRACTOR MAY ELIMINATE FITTINGS, IF DEPTH CAN BE OBTAINED BY DEFLECTING PIPE JOINTS WITHIN ALLOWABLE LIMITS AND IN ACCORDANCE WITH MANUFACTURES RECOMMENDATIONS.
4. SEE "FORCEMAIN VERTICLE BLOCKING" DETAIL.

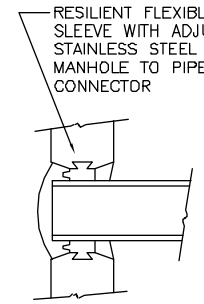
FORCEMAINS UNDER OBSTRUCTIONS

N. T. S.

PETERS CREEK SANITARY AUTHORITY 3502 LINCOLN AVENUE FINLEYVILLE, PENNSYLVANIA 15332	DATE: 4-20-21 FILE NAME: SAN-10 SCALE: N.T.S.	Forcemains Under Obstructions



NOTE:
MANHOLE SLAB TOP SHALL MEET MINIMUM H-20 LOADING AND SHALL BE USED TO MEET GRADES AND/OR OTHER CONDITIONS AS MAY BE CALLED FOR ON THE PLANS, SPECIFICATIONS OR OTHER CONSTRUCTION DETAILS



INTEGRAL BOOT SLEEVE

NOTES:

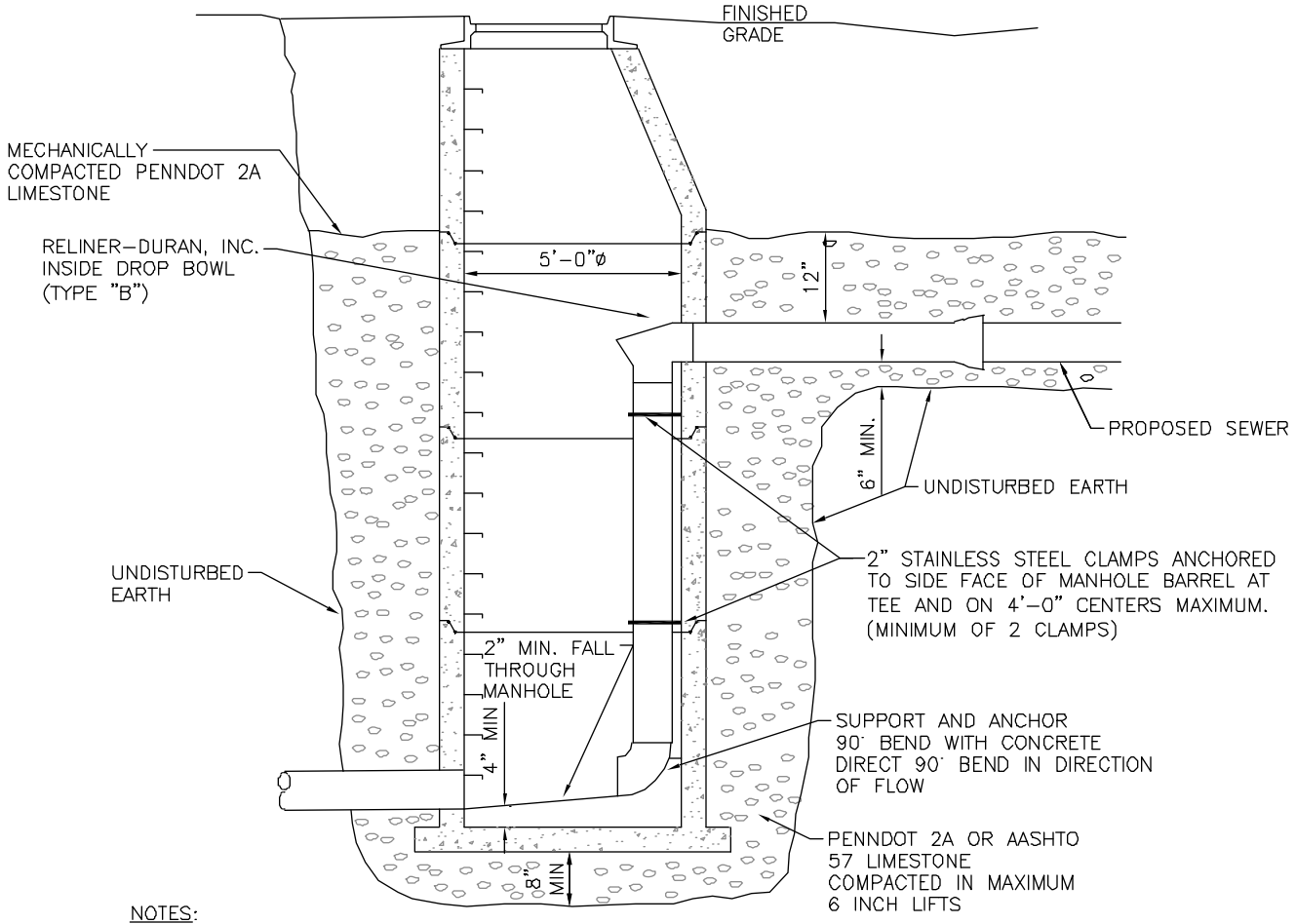
1. ALL CONCRETE STRUCTURE COMPONENTS TO BE PRECAST.
2. SEAL MANHOLE BARREL JOINTS WITH 2- 1"ø FLEXIBLE BUTYL RUBBER JOINT SEALANT, USE 1/2"ø FOR FRAME AND COVER.
3. ANCHOR FRAME AND COVER WITH (4) 3/4" DIA. S.S. ANCHOR BOLTS SET PERMANENTLY INTO CONCRETE. SEE FRAME AND COVER DETAIL.
4. POINT LIFTING HOLES WITH NON-SHRINK GROUT, WATERTIGHT, NEAT AND SMOOTH.
5. MAXIMUM ADJUSTMENT TO FINISHED GRADE USING PRECAST GRADE RINGS IS TWELVE INCHES (12").
6. CONFORM PRECAST SECTIONS TO ASTM C-478 AS REVISED.
7. IF THIS DIMENSION IS LESS THAN 3'-3" USE PRECAST SLAB TOP DESIGNED TO MEET LOAD CONDITIONS (H-20 MIN.)
8. COAT EXTERIOR OF ALL MANHOLE BARREL SECTIONS WITH APPROVED BITUMINOUS COATING.
9. CAST LADDER BARS INTO BARREL SECTIONS AND CONFORMING TO ASTM C-478, AS REVISED.
10. WHERE MANHOLES ARE INSTALLED IN IMPROVED AREAS, BACKFILL THE ENTIRE EXCAVATED AREA WITH MECHANICALLY COMPACTED PENNDOT 2A LIMESTONE.
11. WHERE MANHOLES ARE CONSTRUCTED IN UNIMPROVED AREAS, BACKFILL THE ENTIRE EXCAVATED AREA WITH MECHANICALLY COMPACTED AASHTO 57 LIMESTONE FROM THE BOTTOM OF THE EXCAVATED AREA TO 12 INCHES ABOVE THE HIGHEST PIPE ENTERING THE MANHOLE.

TYPICAL

PRECAST CONCRETE SANITARY MANHOLE AND SLAB TOP

N. T. S.

PETERS CREEK SANITARY AUTHORITY 3502 LINCOLN AVENUE FINLEYVILLE, PENNSYLVANIA 15332	DATE: 4-20-21 FILE NAME: SAN-12 SCALE: N.T.S.	Precast Concrete Sanitary Manhole and Slab Top



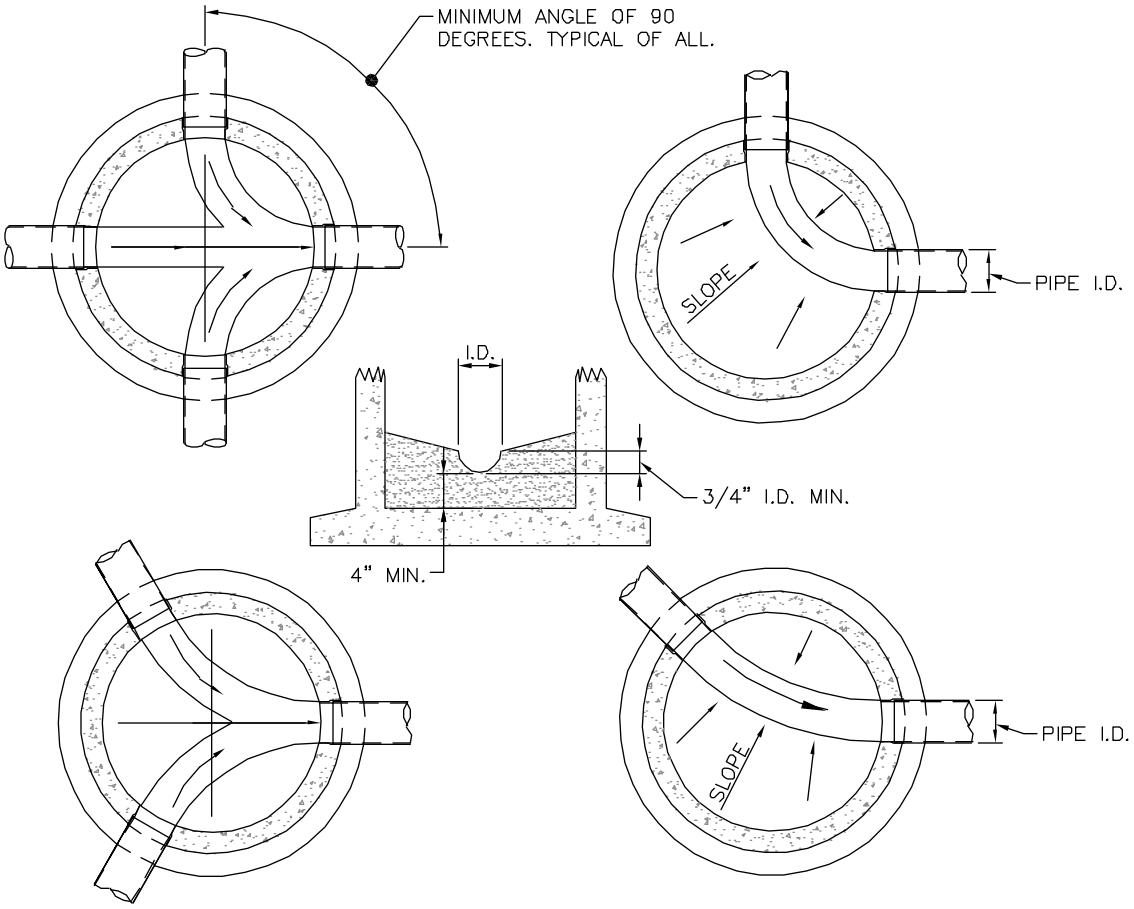
NOTES:

1. USE SAME PIPE MATERIAL USED TO CONSTRUCT THE MAIN FROM WHICH THE DROP CONNECTION IS MADE.
2. PVC DROP CONNECTION PIPE SHALL BE ASTM SDR 35.
3. DIAMETER OF THE DROP CONNECTION INLET PIPING SHALL EQUAL THE DIAMETER OF THE INLET PIPE.
4. MECHANICALLY COMPACTED AASHTO No. 57 LIMESTONE 8" MINIMUM LEVELING COURSE UNDER BOTTOM OF MANHOLE.
5. PROVIDE 5'–0" DIAMETER MANHOLES FOR MANHOLE DROP CONNECTIONS. SEE PRECAST CONCRET SANITARY MANHOLE DETAIL.
6. ALL MOUNTING HARDWARE TO BE STAINLESS STEEL.

TYPICAL INSIDE MANHOLE DROP CONNECTION 8", 10", 12" AND 15" DIAMETER SEWER PIPES

N. T. S.

PETERS CREEK SANITARY AUTHORITY 3502 LINCOLN AVENUE FINLEYVILLE, PENNSYLVANIA 15332	DATE: 4-20-21 FILE NAME: SAN-15 SCALE: N.T.S.	Inside Manhole Drop Connections



NOTES:

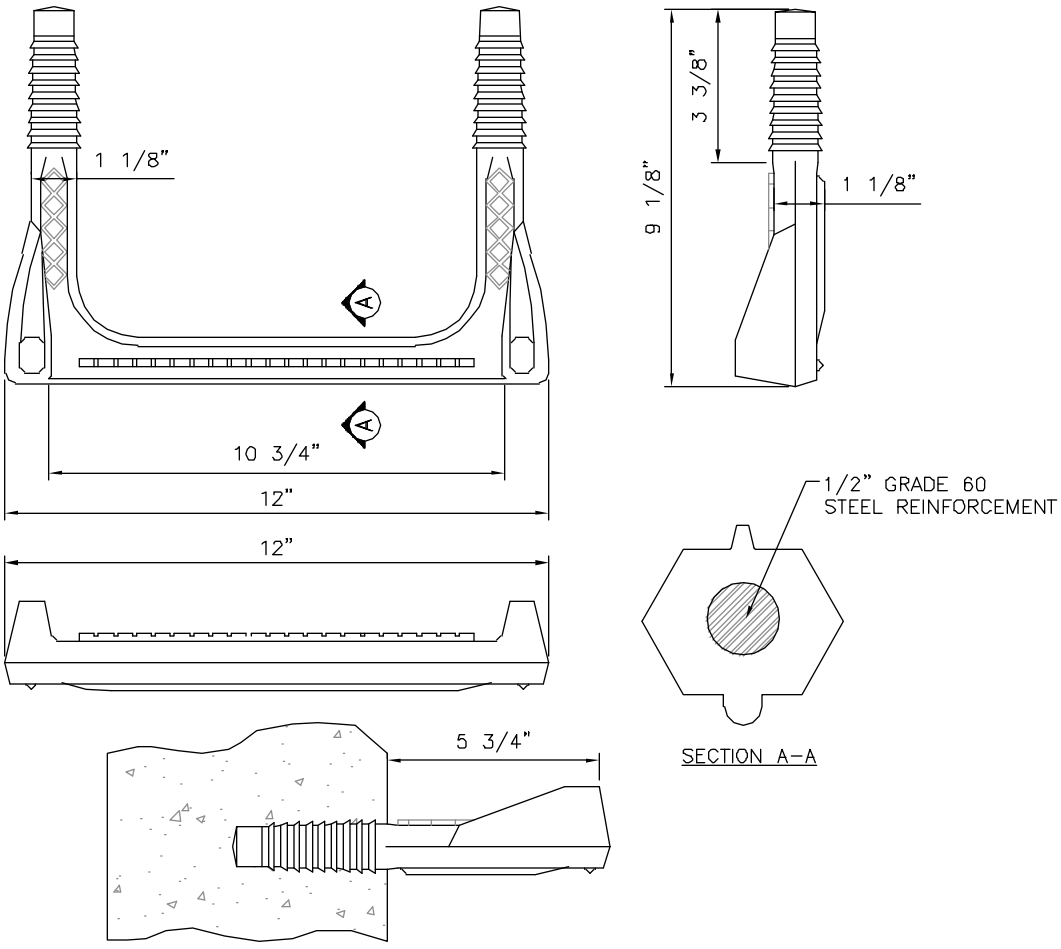
1. CHANNELS TYPICAL, NUMBER AND LOCATION TO MEET FIELD CONDITIONS.
2. CHANNELS TO BE SEMI-CIRCULAR IN SECTION.
3. SLOPE MANHOLE FLOOR TO CHANNEL FOR DRAINAGE.
4. PROVIDE SMOOTH FLOAT FINISH. PROVIDE UNIFORM RADIUS.
5. ALL INVERTS TO BE PRE-POURED.

TYPICAL
MANHOLE CHANNELS
N. T. S.

PETERS CREEK SANITARY AUTHORITY
3502 LINCOLN AVENUE
FINLEYVILLE, PENNSYLVANIA 15332

DATE:	4-20-21
FILE NAME:	SAN-16
SCALE:	N.T.S.

Manhole Channels



TYPICAL

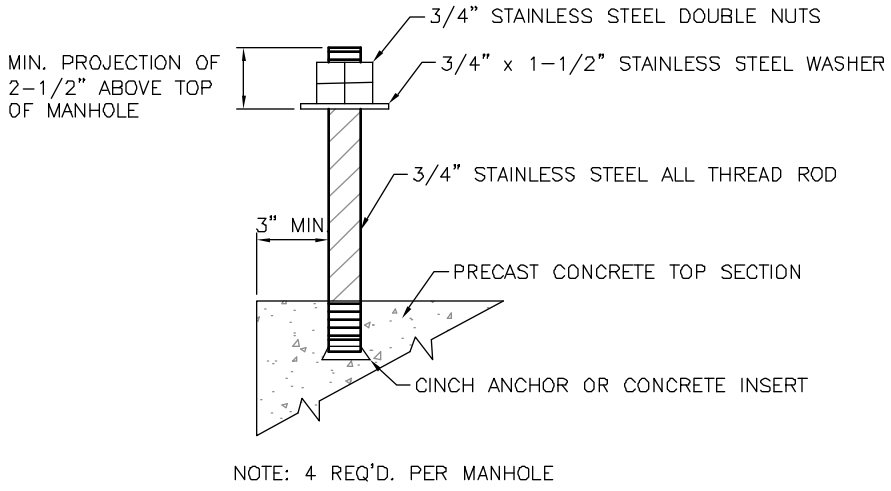
LADDER BARS FOR MANHOLE

N. T. S.

PETERS CREEK SANITARY AUTHORITY
3502 LINCOLN AVENUE
FINLEYVILLE, PENNSYLVANIA 15332

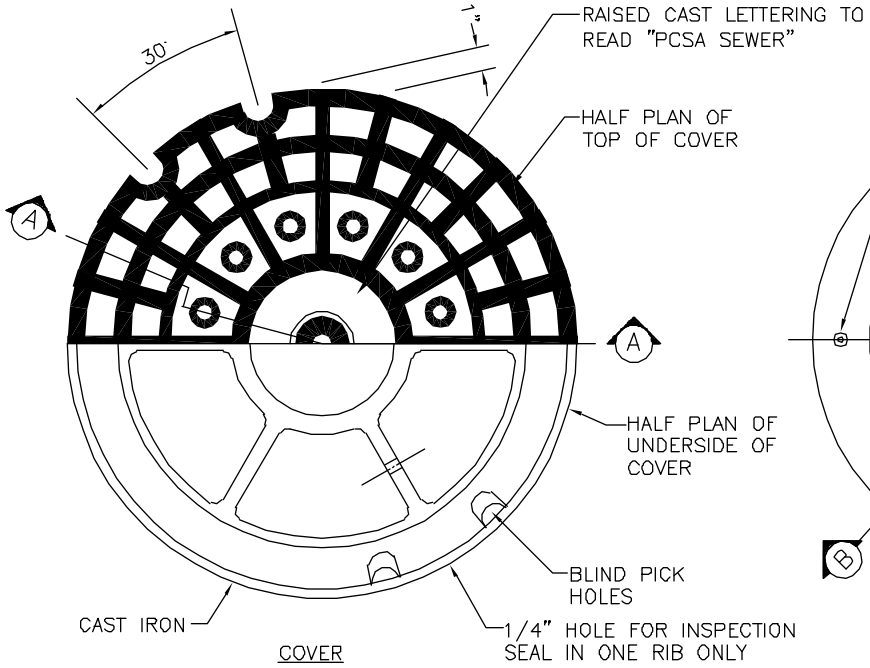
DATE:	4-20-21
FILE NAME:	SAN-17
SCALE:	N.T.S.

Ladder Bars for Manhole

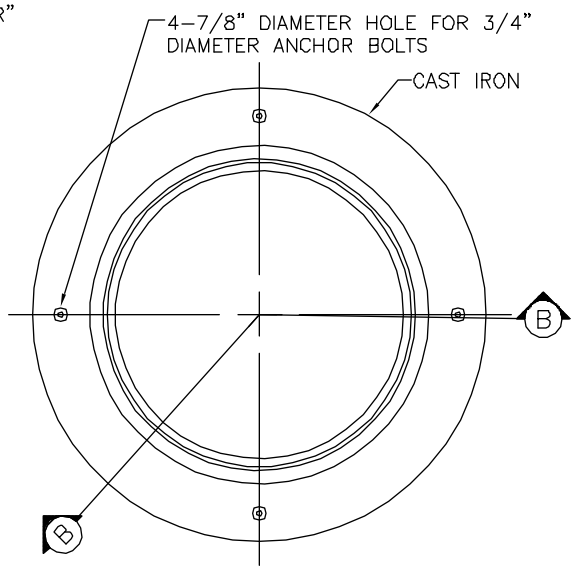


NOTE: 4 REQ'D. PER MANHOLE

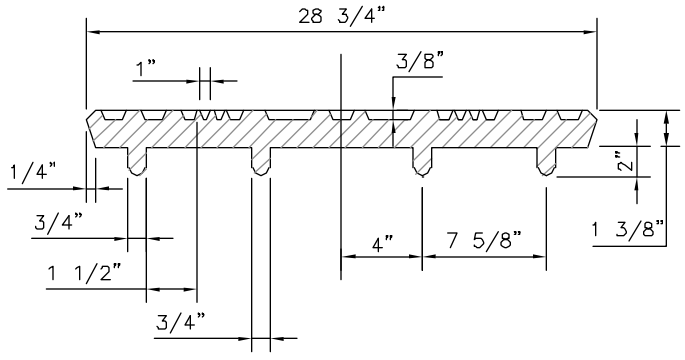
ANCHOR BOLT



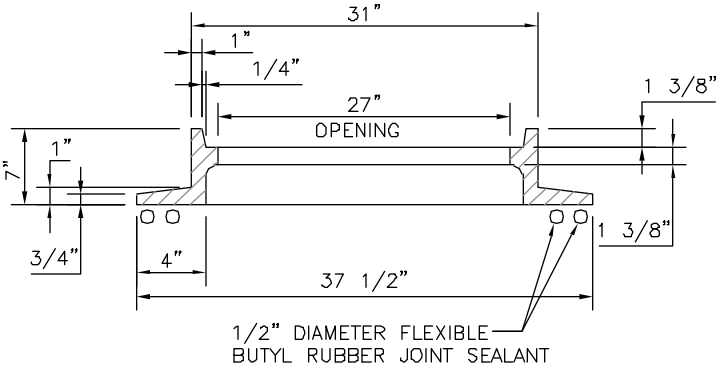
COVER



FRAME



SECTION A-A

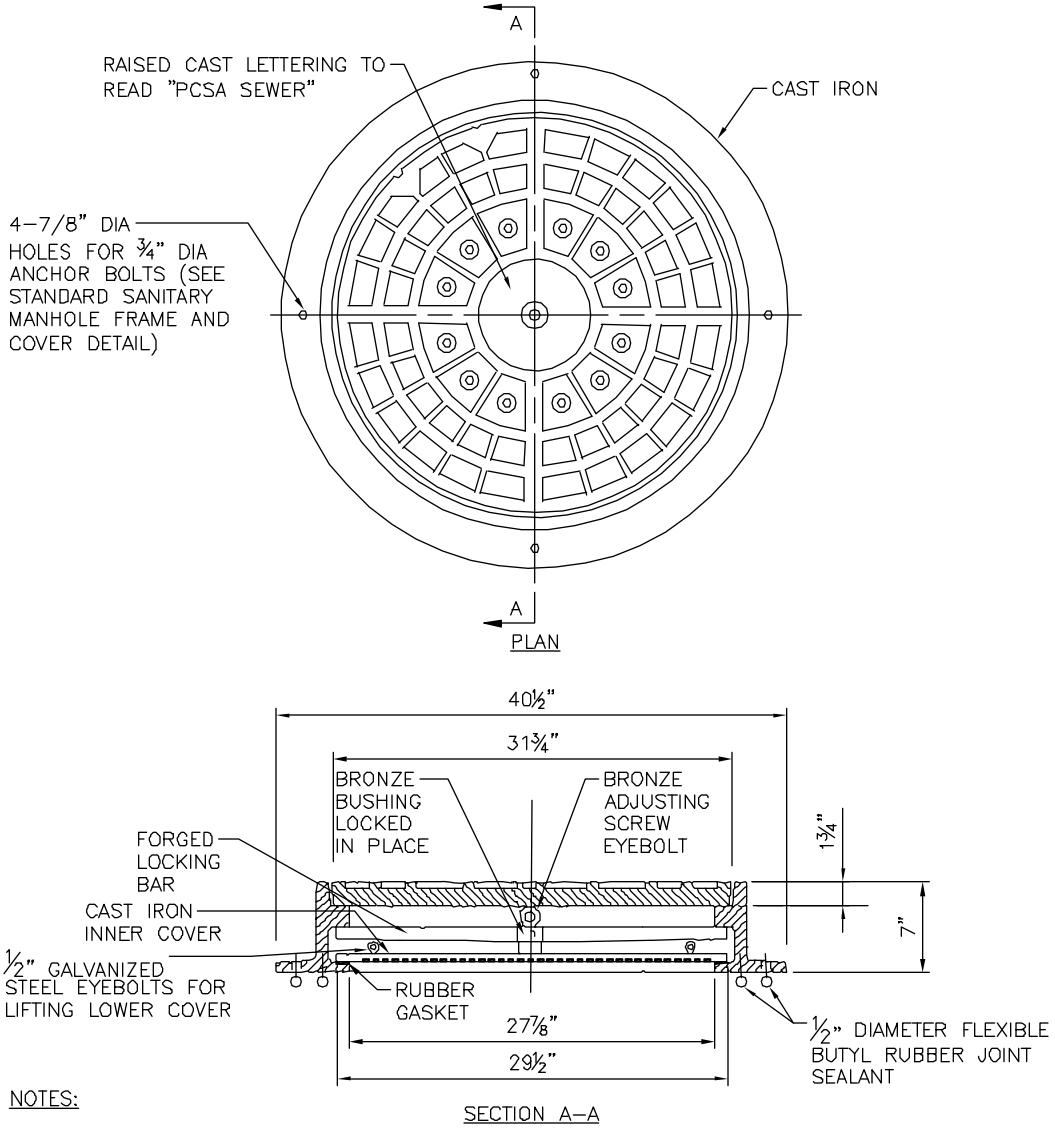


SECTION B-B

TYPICAL STANDARD SANITARY MANHOLE FRAME AND COVER

N. T. S.

PETERS CREEK SANITARY AUTHORITY 3502 LINCOLN AVENUE FINLEYVILLE, PENNSYLVANIA 15332	DATE: 4-20-21 FILE NAME: SAN-18 SCALE: N.T.S.	Standard Sanitary Manhole Frame and Cover



SECTION A–A

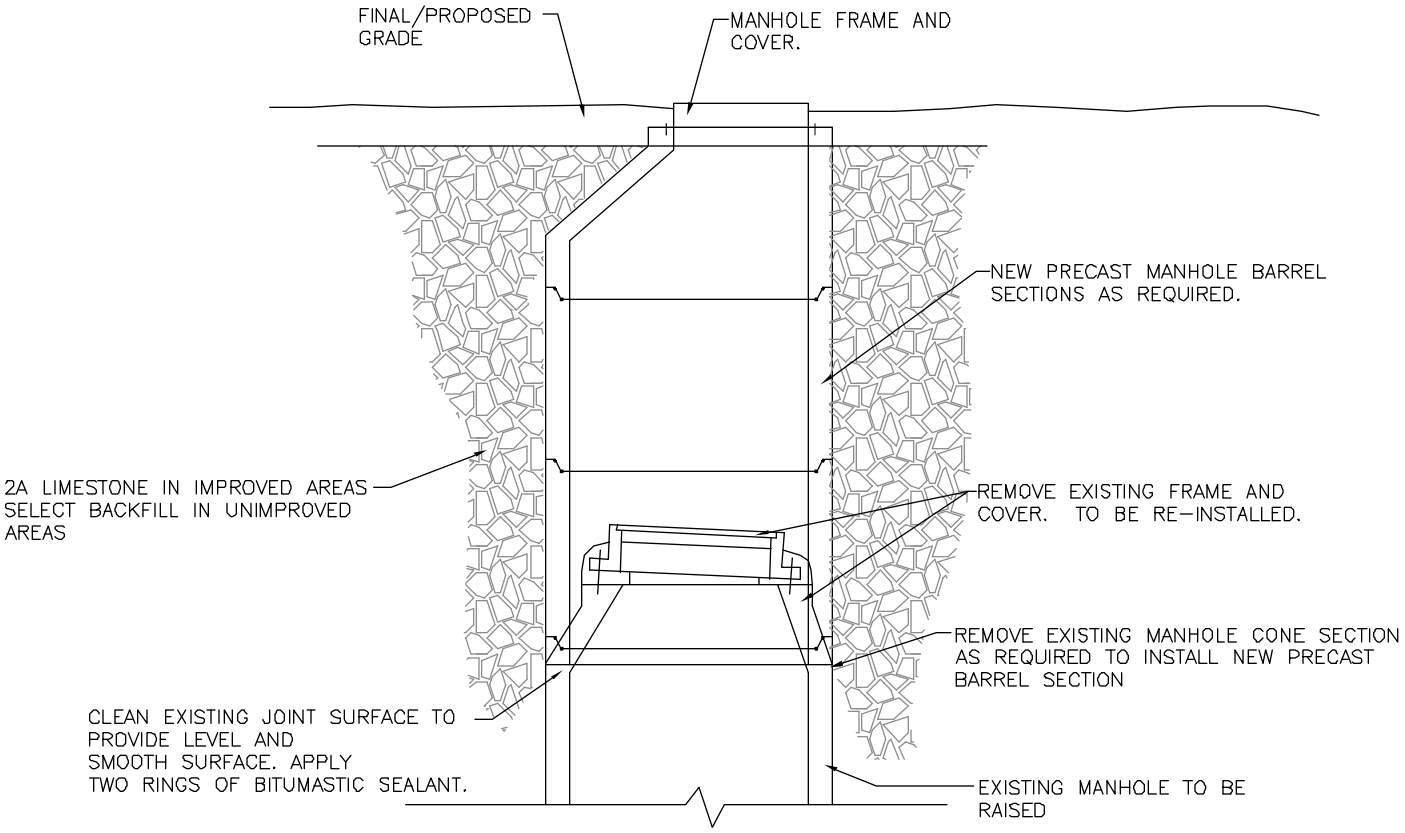
NOTES:

1. ALL CONTACT SURFACES MACHINED.
2. REFER TO STANDARD SANITARY MANHOLE FRAME AND COVER DETAIL FOR DETAIL ON COVER.

WATERTIGHT SANITARY MANHOLE FRAME AND COVER

N. T. S.

PETERS CREEK SANITARY AUTHORITY 3502 LINCOLN AVENUE FINLEYVILLE, PENNSYLVANIA 15332	DATE: 4-20-21 FILE NAME: SAN-19 SCALE: N.T.S.	Watertight Sanitary Manhole Frame and Cover



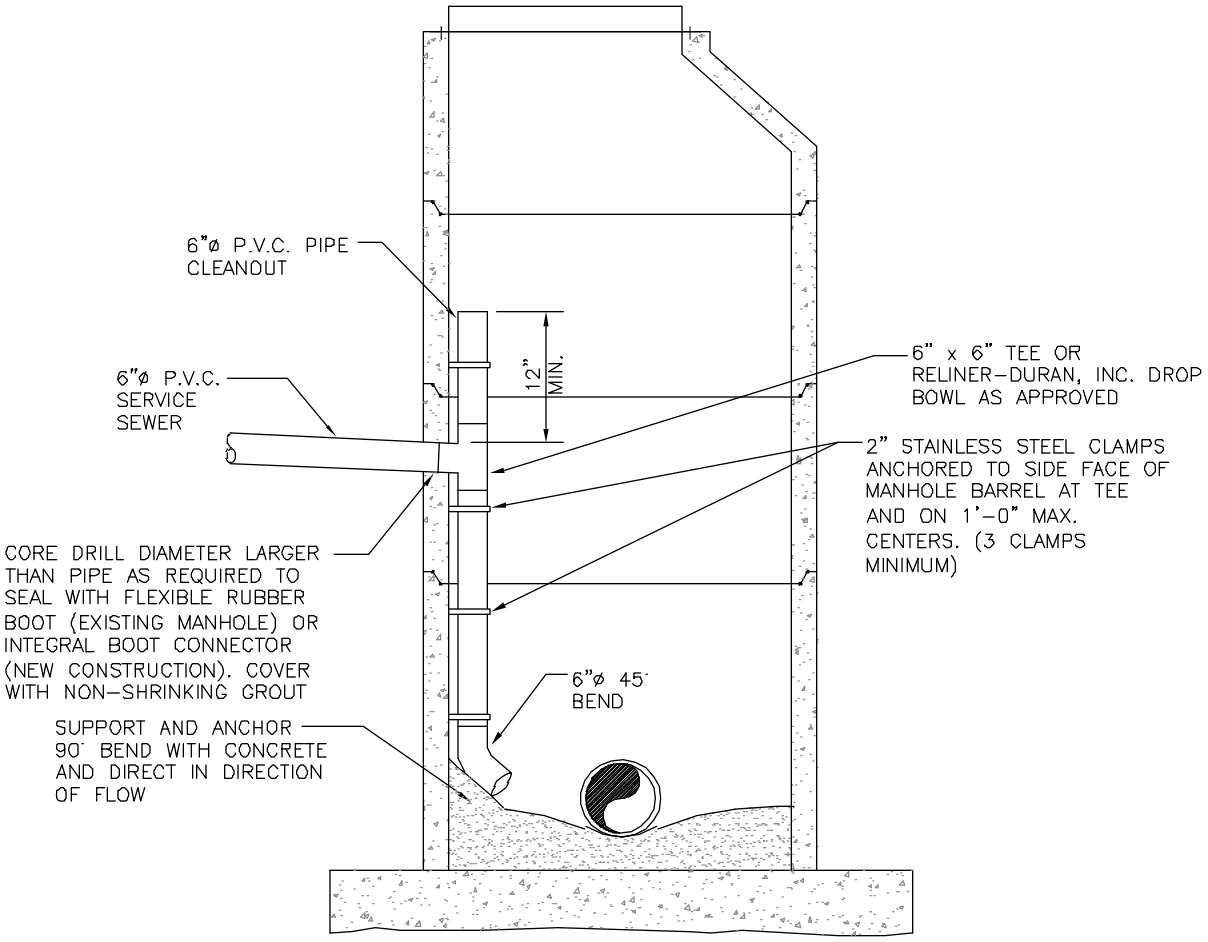
TYPICAL

RAISE MANHOLE TO GRADE DETAIL

N. T. S.

NOTE: THIS DETAIL PROVIDES GENERAL CONSTRUCTION REQUIREMENTS TO RAISE EXISTING MANHOLE. ALL MANHOLE COMPONENTS AND CONSTRUCTION NOT IDENTIFIED ON THIS DETAIL TO BE IN ACCORDANCE WITH APPLICABLE STANDARD DETAIL.

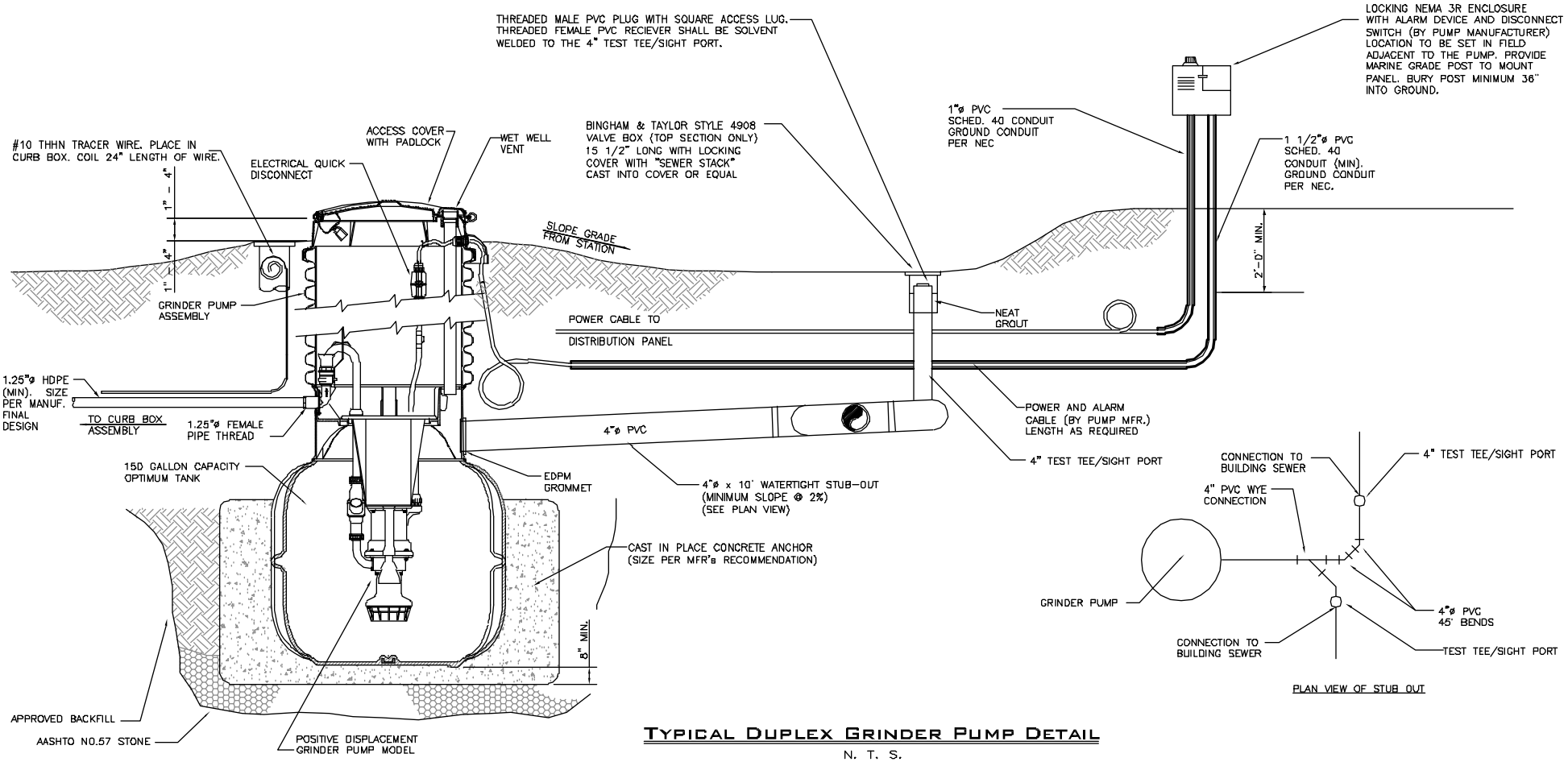
PETERS CREEK SANITARY AUTHORITY 3502 LINCOLN AVENUE FINLEYVILLE, PENNSYLVANIA 15332	DATE: 4-20-21 FILE NAME: SAN-22 SCALE: N.T.S.	Raise Manhole to Grade



NOTE:
DROP CONNECTION INLET PIPE SHALL BE 6"ø P.V.C. PIPE CONFORMING TO ASTM SDR35.

TYPICAL
SERVICE CONNECTION AT MANHOLE
N. T. S.

PETERS CREEK SANITARY AUTHORITY 3502 LINCOLN AVENUE FINLEYVILLE, PENNSYLVANIA 15332	DATE: 4-20-21 FILE NAME: SAN-29 SCALE: N.T.S.	Service Connection at Manhole

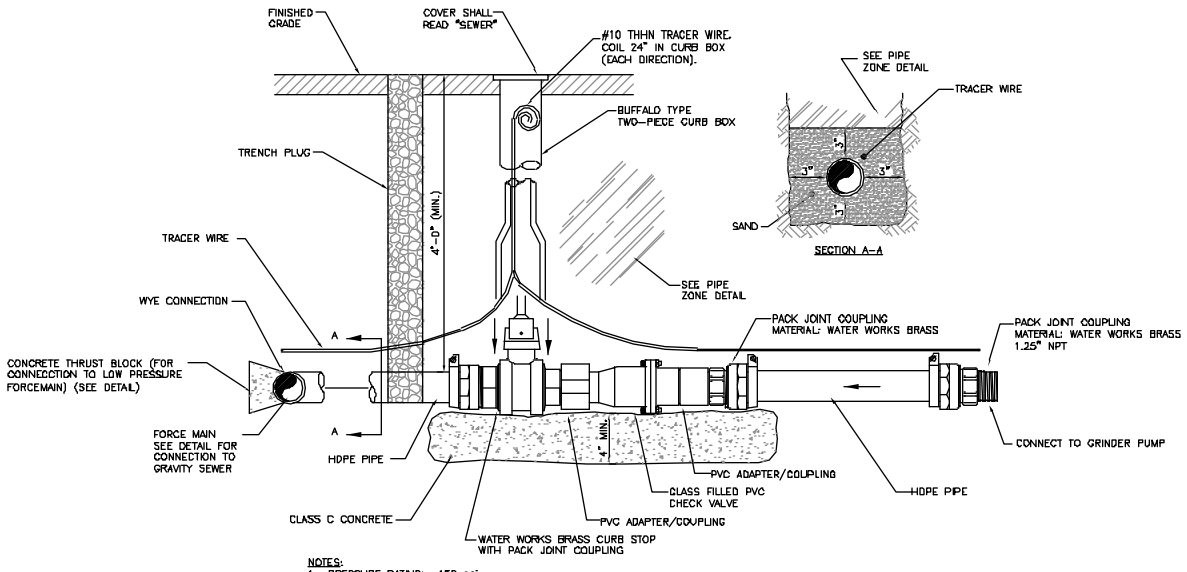


TYPICAL DUPLEX GRINDER PUMP DETAIL

N. T. S.

PETERS CREEK SANITARY AUTHORITY 3502 LINCOLN AVENUE FINLEYVILLE, PENNSYLVANIA 15332	DATE: 4-20-2 FILE NAME: SAN-30 SCALE: N.T.S.	Typical Simplex Grinder Pump

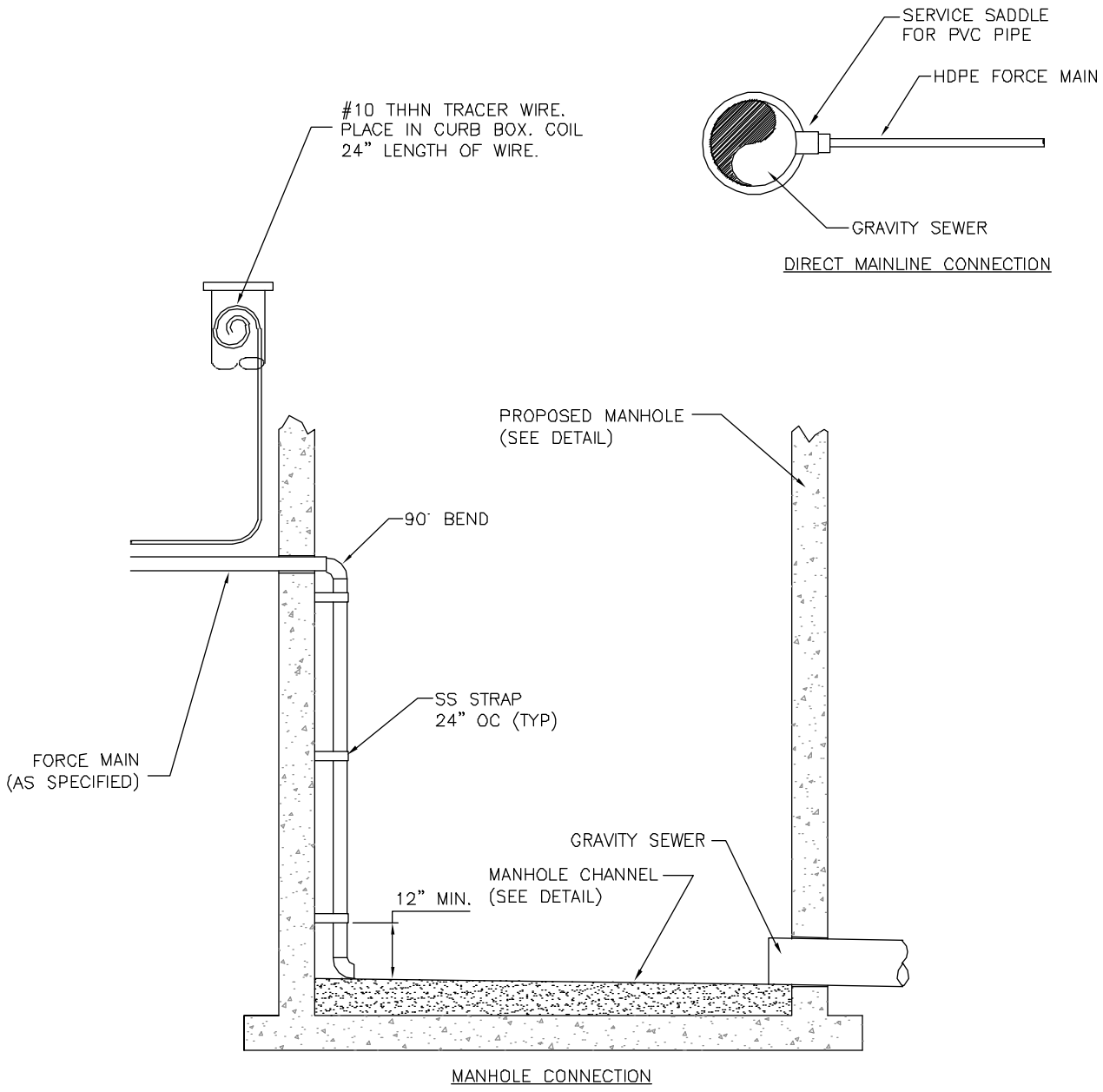
N:\CAD\Details\Clients\Peters Creek Sanitary Authority\ SAN-30 -Typical Simplex Grinder Pump.dwg layout = SAN-30 Typical Simplex Grinder Pump Username = nontestable Date = Apr 20, 2021 - 11:54am



NOTES:
1. PRESSURE RATING: 150 psi
2. ALL PACK JOINT COUPLINGS SUPPLIED WITH INSERT STIFFENERS
3. LOW PRESSURE FORCEMAIN TO BE HDPE PIPE (SEE SPECIFICATIONS). DIAMETER PER OWNER/MANUFACTURER'S DESIGN.
4. INSTALL TRENCH PLUGS

CURB BOX ASSEMBLY
N. T. S.

PETERS CREEK SANITARY AUTHORITY 3502 LINCOLN AVENUE FINLEYVILLE, PENNSYLVANIA 15332	DATE: 4-20-21 FILE NAME: SAN-31 SCALE: N.T.S.	# Curb Box Assembly



DIRECT MAINLINE CONNECTION

MANHOLE CONNECTION

LOW PRESSURE FORCE MAIN CONNECTION TO GRAVITY SEWER

N. T. S.

PETERS CREEK SANITARY AUTHORITY 3502 LINCOLN AVENUE FINLEYVILLE, PENNSYLVANIA 15332	DATE: 4-20-21 FILE NAME: SAN-36 SCALE: N.T.S.	Low Pressure (Sewer) Horizontal Thrust Blocking

APPENDIX B

Developer's Agreement for the Construction of the _____ Plan
Sanitary Sewer Facilities Extension
_____Township
Washington County, Pennsylvania

This Developer's Agreement entered into this ___ day of _____ 20__, by and between The Peters Creek Sanitary Authority, a municipal authority organized under the Pennsylvania Municipal Authorities Act, having its office at P.O. Box 3, 3502 Lincoln Avenue, Finleyville, PA 15332, hereinafter called "Authority",

_____, hereinafter called "Owners"

and_____, having a registered address of _____, hereinafter called "Developer".

Whereas, Developer is the agent for Owners of certain tracts of land situate in _____Township, Washington County, Pennsylvania, said tracts being the same as described in a deed from _____, dated _____ and of record in the Office of the Recorder of Deeds of Washington County, Pennsylvania, at Instrument No._____and more particularly described as Parcel ID _____hereinafter called "Property". Developer plans to develop the Property by the placement of buildings/additional buildings and facilities to be known as the _____, hereinafter called the "Development"; and

Whereas, in order to complete the Development as aforesaid, Developer is required to construct sanitary sewer lines and a sanitary sewer collector system to serve said Development, hereinafter called "Sanitary Sewer Facilities"; and

Whereas, it is to the mutual benefit of the Developer and Authority that certain

portions of the Sanitary Sewer Facilities, when completed, be owned, operated and maintained by the Authority; and

Whereas, the Authority has established rules and regulations with respect to the construction and acceptance of the Sanitary Sewer Facilities; and

Whereas, Developer agrees to comply with the requirements of the Authority and its rules and regulations.

Now, therefore, in consideration of the mutual promises and covenants hereinafter contained as well as in consideration of the fact that the parties intend to be legally bound hereby, it is hereby agreed as follows:

1. In the event the Development is proposed to be constructed in multiple Phases by the Developer, each proposed Phase shall require a separate Developer's Agreement and Construction Plans. All requirements as outlined in this Developer's Agreement are required to be met separately and independently for each Phase of the Development.

2. Developer shall deposit with the Authority, on or before the execution of this Developer's Agreement the sum of Two Thousand Five Hundred and no/l00ths Dollars ($2,500.00), which monies are to be used by the Authority for the payment of the Authority's engineering and legal fees, administrative expenses and in and for the payment of all application and recording fees with respect to the securing of the necessary permits from the various agencies of the Commonwealth of Pennsylvania. Interest will not accrue on any monies held in escrow for the Developer by the Authority.

The Authority will submit a monthly invoice to the Developer of all engineering, legal fees, administrative expenses and costs for the inspection of the construction of the Sanitary Sewer Facilities and Developer agrees to and shall make payment of the same

within thirty (30) days to the Authority. Any charges from the previous month's invoice which remain unpaid on the due date are subject to a one-time penalty of 5%. Any balance remaining on the account sixty (60) days after the date of the invoice is subject to a monthly interest charge of 1%. An itemized accounting of all invoices and monies paid shall be supplied to the Developer at the completion of the Sanitary Sewer Facilities by the Developer and the acceptance thereof by the Authority, if requested.

3. Developer, at its sole cost and expense, will prepare an application to the Pennsylvania Department of Environmental Protection (Pa DEP) for the execution by the Authority for a permit to construct the Sanitary Sewer Facilities referred to in this Developer's Agreement, if same is necessary, and will obtain any and all permits or licenses required by any governmental entity in the construction of the Sanitary Sewer Facilities contemplated herein.

4. Developer shall prepare construction plans and specifications particular to the Development, which shall require the approval and adoption of the Authority and the Authority's consulting engineer, hereinafter called "Construction Plans". The Construction Plans shall show both Plan and profile views of the Sanitary Sewer Facilities. The Construction Plan and Profile view(s) shall be at a minimum scale of l" = 50' and the vertical scale of 1" = 10' and shall show, in addition to the sanitary sewers and manholes, lateral locations, end of laterals and site tees, all roadways, property lines showing bearings and distances, easements, storm sewers, inlets and other utilities. Construction Plan profiles for the storm sewers shall also be provided. The Plan view shall show no fewer than one existing manhole on each side of the proposed connection point(s) to the Authority's sewer system. The exact location and distance from downstream manholes shall be shown for each

"wye" connection on the sewer line. Developer shall complete construction of the Sanitary Sewer Facilities strictly in accordance with the Construction Plans. At all times, the Authority and the Authority's consulting engineer retain the right to revise or modify the Construction Plans for the Development to better suit Development specific requirements or industry standards. The Construction Plans which may be amended or modified from time to time, with the approval of the Authority and the Authority's consulting engineer, are incorporated and made a part of this Developer's Agreement as if fully set forth herein. The Authority has prepared a manual entitled "Construction Specifications Manual and Sanitary Sewer Line Extension Procedures" detailing requirements that the Developer must follow and Developer is required to have said Authority manual on site at the Development at all times. Developer further agrees that, in the event it enters into any agreement with any other contractor for the construction of the Sanitary Sewer Facilities contemplated in this Developer's Agreement, it shall insert this Authority manual requirement in such agreement and furnish the Authority with a copy of the same upon execution. At all times, the Authority upon consultation with the Authority's consulting engineer retains the right to amend, revise or modify the manual entitled "Construction Specifications Manual and Sanitary Sewer Line Extension Procedures" to meet or exceed Development requirements or industry standards and the Developer will be provided with any updates.

New manholes, if any, shall be numbered in accordance with the Authority's manhole numbering system and constructed in accordance with Authority specifications. All manholes which will be constructed in the roadway pavement or at grade outside of the roadway shall be provided with a shallow profile plastic manhole insert as manufactured by The Man Pan or alternate as approved the Authority and the Authority's consulting engineer.

Construction Plans for each Phase of the Development are required to provide a listing of the Minimum Basement Elevations for each lot proposed under that Phase as well as a listing of which lots are required to have Backwater Valves installed on the sanitary sewer lateral to meet all requirements of and be in compliance with the Uniform Construction Code (UCC) for Plumbing. The Minimum Basement Elevations shall be followed and any deviation from the Minimum Basement Elevation on the approved Construction Plans must first be submitted by the Developer or the Developer's engineer in writing, including reason for the change, and then approved by the Authority and the Authority's consulting engineer. If approved, the Developer or the Developer's engineer must report the specific lot elevation change and include a revised listing of lots requiring a Backwater Valve on the final As-Built Plan submitted.

5. Developer shall deliver to the Authority, *prior* to the commencement of any work in connection with said Sanitary Sewer Facilities, the following:

a. An original certificate of insurance, identifying the name and phase of the Development and certifying that the Developer is insured with a reliable insurance company authorized to do business in the Commonwealth of Pennsylvania for General Liability in the minimum amount of $1,000,000.00, $500,000.00 for personal injury and $500,000.00 for property damage, for each occurrence as well as full coverage for Workers' Compensation and contractual liability coverage.

b. Submit an itemized estimate of the total cost of construction to be approved by the Authority's consulting engineer.

c. An original performance bond in the amount of One Hundred Ten Percent (110%) of the costs of construction executed by the Developer with a reliable insurance company authorized to do business in the Commonwealth of Pennsylvania, naming the Authority as obligee, certifying that the Developer will

perform in accordance with the terms of this Developer's Agreement and the rules and regulations of the Authority in connection with the construction of the Sanitary Sewer Facilities, provided, however, that said bond may be the bond of the contractor retained by Developer for the identical purpose naming the Developer and the Authority as obligee.

d. An original labor and materialmen's bond in the amount of One Hundred Ten Percent (110%) of the cost of construction executed by the Developer with a reliable insurance company, authorized to do business in the Commonwealth of Pennsylvania, guaranteeing the payment of all labor and materials performed or used in the construction of the Sanitary Sewer Facilities provided; however, that said bond may be the bond of the contractor retained by Developer for the identical purpose, naming the Developer and Authority as obligee.

The performance bond and labor and materialmen's bond referred to above shall specifically refer to the within Developer's Agreement by reference to the date herein and must identify the name and phase of the Development and must also contain as a condition of the obligation that the principal shall well and truly perform or cause to be performed all of the obligations under this Developer's Agreement, and that all labor and material must be paid in full, or otherwise the obligation of the bonds shall remain in full force and effect.

In lieu of the performance bond requirements as set forth in sub-paragraph (c) herein and the labor and materialmen's bond requirements as set forth in sub-paragraph (d) herein, the Developer may obtain irrevocable Letters of Credit, restrictive or escrow accounts of lending institutions of Federal or Commonwealth of Pennsylvania chartered lending institutions authorized to do business in the Commonwealth of Pennsylvania, for the same. Additionally, the bond requirements in sub-paragraphs (c) and (d) herein may be satisfied by

cash in the form of certified funds or cashier's check drawn to the order of the Authority. When these bond requirements are satisfied with cash, such cash shall be placed in a non-interest-bearing account with a bank of the Authority's own choosing.

Upon completion of the Development as approved by the Authority and the Authority's consulting engineer, the Developer shall submit after approval of all other submittal items as set forth herein, a certificate of completion letter to the Authority (reference is made on page 10 of the Developer's Agreement Item 11e) which date is provided and approved by the Authority of the construction contemplated by this Developer's Agreement. Other submittal items needing approval of the Authority and Authority's consulting engineer, include; but are not limited to, the notarized letter from the Developer certifying that all labor and materialmen have been paid in full, delivery to the Authority of a maintenance bond or cash in the form of certified funds or cashier's check for eighteen (18) months from the certified completion date drawn to the order of the Authority and approved for the construction contemplated by this Developer's Agreement and payment of all outstanding invoices owed to the Authority. After all required items in the Developer's Agreement have been submitted and approved by the Authority and the Authority's consulting engineer, the funds on deposit will be released less any bank charges. All forms of security for the maintenance bond must identify the name and phase of the Development and must be approved by the Authority and the Authority's consulting engineer. However, in the event Developer fails to perform the construction contemplated by this Developer's Agreement or fails to pay for all of the labor and materials performed or used in the construction contemplated by this Developer's Agreement then and in that event, the Authority will notify the Developer in writing of such deficiency and if such deficiency is not remedied within fifteen (15) days of the date of mailing of that notice, then such cash

posted for the performance bond and/or labor and materialmen's bond shall be forfeited to the extent necessary to cure such deficiency. Any funds remaining after curing such deficiency shall be retained by the Authority for a period of 18 months after the deficiency is cured, for purposes of maintenance of the line until Developer delivers a maintenance bond in accordance with this Developer's Agreement.

6. Developer shall be held solely responsible for any and all accidents occurring at the Property and to the fullest extent permitted by law, Developer shall indemnify, save, hold harmless and protect the Authority and its professional advisors, agents, servants, workmen and employees from and against all suits, claims, actions, damages, losses and expenses, of whatsoever nature brought by employees of the Developer and/or subcontractors of Developer and for all costs or liability to which Authority may be put for any injury or alleged injury to the person or property of another resulting from negligence or carelessness in the performance of the work or from any improper or inferior workmanship, or from inferior materials used in the work. Such obligation shall not be construed to negate, abridge, or otherwise reduce any other right or obligation of indemnity which would otherwise exist as to any party or person described in this paragraph.

7. Developer agrees that all work to be performed pursuant to this Developer's Agreement shall be subject to inspection and approval by the Authority (or its authorized agents including the Authority's consulting engineer) and that no work shall be covered unless and until inspected and approved by the Authority. In the event any work shall be covered prior to inspection and approval thereof, the Developer agrees that it will, at the request of the Authority, uncover or cause to be uncovered such work at its sole cost and expense. The determination of the Authority with respect to all work shall be final, and the Developer agrees to remove or cause to be removed and replaced at its sole cost and

expense any work disapproved or rejected by the Authority.

8. Developer agrees that the Authority shall have the right to enter upon Developer's Property at any time for the purpose of inspecting the work to be performed hereunder, and in the event any work shall be disapproved or rejected by the Authority and not corrected by the Developer within fifteen (15) days after notice to do so, the Authority shall have the right to remove and replace said work, and the expense of such removal and replacement shall be charged to Developer.

9. Developer agrees that there shall be no change(s) made in the construction of the Sanitary Sewer Facilities or any deviations from the Construction Plans as approved by the Authority, unless the Authority and the Authority's consulting engineer agree to such change(s). Changes are to be submitted in writing as directed by the Authority and the Authority's consulting engineer.

10. Developer agrees along with this Developer's Agreement, Developer will execute and deliver to the Authority a properly signed and notarized Easement Agreement dedicating the easements and Sanitary Sewer Facilities for this Development to the Authority. Upon completion, testing and acceptance of the Sanitary Sewer Facilities, the Authority will record the Easement Agreement. Delivery of the Easement Agreement to the Authority shall not be deemed to be an acceptance of the Sanitary Sewer Facilities which acceptance shall not occur until such Sanitary Sewer Facilities are completed, inspected and tested to the exclusive satisfaction of the Authority and the Authority's consulting engineer.

It is strictly understood and agreed that the obligation to prepare and furnish these documents of title, including but not limited to Easements and Right-of-Ways, in recordable form satisfactory to the Authority, shall be that of Developer. Said documents of title shall be submitted to the Authority for recording and Developer shall pay all recording fees associated therewith.

11. Developer agrees that it will, likewise, within forty-five (45) days of completion of construction of the Sanitary Sewer Facilities, submit to Authority the following:

a. An itemized list of actual total construction costs to be approved by the Authority's consulting engineer.

b. A notarized letter from the Developer certifying that all labor and materialmen have been paid in full.

c. A reproducible "As Built" Mylar Plan (24" x 36" sheets) and four paper copies of the same size for each Phase of the Development showing all Sanitary Sewer Facilities as actually constructed which references the Pennsylvania State Plane Coordinate System for all features shown on the map. As-Built Plans shall be produced based on field surveys of the sewer lines, manholes, lateral markers, and other Sanitary Sewer Facilities as constructed in the field. Surveys are to be performed by a Professional Land Surveyor licensed in the Commonwealth of Pennsylvania. The "As-Built" Plans shall show both Plan and profile views of the Sanitary Sewer Facilities. The Plan view(s) shall be at a minimum scale of l" = 50' and the vertical scale of 1" = 10' and shall show, in addition to the sanitary sewers and manholes, end of lateral locations as determined by field survey of lateral marker posts or site tees, all roadways, property lines showing bearings and distances, easements, storm sewers and inlets and other utilities. As-Built profiles for the storm sewers shall also be provided. The Plan view shall show no fewer than one existing manhole on each side of the proposed connection point(s) to the Authority's sewer system. The exact location and distance from downstream manholes shall be shown for each "wye" connection on the sewer line.

d. The information set forth in sub-paragraph (c) shall be supplied to the Authority in an electronic form AutoCAD DWG format containing the aforesaid

items.

e. A certification of completion letter, which date is provided and approved by the Authority. The Developer shall identify the date of the executed Developer's Agreement, the name and phase of the Development, stating that all of the work, testing and final walk through contemplated herein has been completed according to the Construction Plans and the specific date provided by the Authority of when it was completed.

12. By the execution and delivery of this Developer's Agreement, Developer agrees to guarantee and to maintain the stability of all work contemplated hereunder, as well as sanitary sewer pipe and other materials furnished and the functioning of the improvements/Sanitary Sewer Facilities, for a period of eighteen (18) months from the certification of completion date provided by the Authority and certified by the Developer. To further guarantee the stability of the Sanitary Sewer Facilities completed hereunder, twelve (12) months after the certification of completion date provided by the Authority and Authority's consulting engineer, the Developer shall perform, at Developer's sole cost and expense, Closed-Circuit Television (CCTV) inspection of the work performed in the presence of the Authority's authorized agent(s), using a contractor approved by the Authority. This inspection shall be completed within thirty (30) days after the twelve (12) month anniversary date of the date of completion as provided by the Authority and certified by the Developer. If this CCTV inspection is not completed and delivered to the Authority sixty (60) days after the twelve (12) month anniversary date provided by the Authority and certified by the Developer, the Authority will proceed to have the CCTV inspection performed and the Developer agrees to pay for the cost of such inspection plus a 10% administrative charge to the Authority. Defects of each and every kind appearing during the

guarantee period or discovered as a result of the CCTV inspection shall be corrected by Developer within thirty (30) days of discovery at Developer's sole costs and expense and to the exclusive satisfaction of the Authority.

To further secure and insure this covenant to maintain work, Developer shall furnish a maintenance bond in the amount of Fifteen Percent (15%) of the total cost of the work as approved by the Authority and the Authority's consulting engineer. The maintenance bond shall identify the name and phase of the Development, be issued by a reliable insurance company authorized to do business in the Commonwealth of Pennsylvania guaranteeing to maintain the stability of the work, as well as the sanitary sewer pipes or other materials furnished, for a period of eighteen (18) months from the certified completion date as provided by the Authority and certified by the Developer. The maintenance bond requirement may be satisfied by cash in the form of certified funds or cashier's check drawn to the order of Peters Creek Sanitary Authority. When this bond requirement is satisfied with cash, such cash shall be placed in a non-interest-bearing account with a bank of the Authority's own choosing. The funds on deposit will be maintained for a period of eighteen (18) months from the certified completion date as provided by the Authority and certified by the Developer. If during that eighteen (18) month period, any of the work as well as sanitary sewer pipes or other materials furnished is in need of stability or maintenance, the Developer will be notified in writing of the need of such stability or maintenance and that if such stability or maintenance is not cured by the Developer within fifteen (15) days of the date of the mailing of such notice, then such cash posted for the maintenance bond shall be forfeited to the extent necessary to remedy any instability of work or maintenance. At the end of the eighteen (18) month period from the certification of completion date provided by the Authority and certified by the Developer,

any funds remaining on deposit will be returned to the Developer less any bank charges and outstanding invoices owed to the Authority.

13. Developer agrees that prior to making any sanitary sewer connection to any premise, structure or structures erected or to be erected in the Development, it will submit or cause to be submitted a written application upon forms approved by the Authority requesting sanitary sewer service connection and shall for each such connection, pay with cash or certified check the amount that the Authority may from time to time adopt as its minimum initial sewer service connection fee.

14. The Authority agrees upon the delivery to it of all the required documents certifying completion of the construction of the Sanitary Sewer Facilities as set forth herein, and the necessary conveyances of title, Rights-of-Way and maintenance bond, that it will take the portion of said Sanitary Sewer Facilities in the Development designated on the approved Construction Plans as aforesaid and operate and maintain the same as part of its own sanitary sewer system.

If, for any reason, the Authority is of the opinion that the work is not satisfactorily completed, it shall forthwith set forth any objections thereto in detail and in writing to Developer.

15. It is distinctly understood and agreed that the execution and delivery of this Developer's Agreement is expressly contingent upon the Developer complying with all Ordinances of _____ Township, or Resolutions and the Rules and Regulations of this Authority with respect to the construction and installation of the Sanitary Sewers Facilities. It shall be the responsibility of the Developer to obtain copies of any such Ordinances, Resolutions and Rules and Regulations and to follow and comply with the same. In the event that anything in this Developer's Agreement is contrary to what is set forth in a

Resolution or the Rules and Regulations of the Authority, then the terms and provisions of this Developer's Agreement shall be controlling.

16. It is expressly understood and agreed that the execution and delivery of this Developer's Agreement is contingent upon Developer obtaining the requisite approval(s) from _____ Township with respect to the approval and development of the Development in regard to all matters other than sanitary sewers. In the event that for any reason whatsoever the approval of _____ Township should not be obtained and upon the parties hereto being so notified in writing, this Developer's Agreement shall be null and void and of no further effect.

17. It is distinctly understood and agreed that the obligations of the Authority hereunder are expressly contingent upon approval of the acceptance of additional sewage flow by the Pa DEP, the Environmental Protection Agency (EPA) of the United States of America and Clairton Municipal Authority (CMA). By execution of these presents, the Authority does not warrant nor does it represent that sufficient capacity exists in any public sanitary sewer facilities to which the sanitary sewers in the Development contemplated herein are to be connected. Furthermore, if in the opinion of the consulting engineers of the Authority, capacity exists in such public sanitary facilities at the time of execution of these presents, the Authority will not reserve the capacity required for the Development contemplated herein beyond one year of the date of execution of these presents. Capacity as used herein shall include capacity to accommodate present connections and connections to which the Authority has committed itself under other agreements.

18. Developer acknowledges that this Developer's Agreement and Developer's rights hereunder are specifically limited to the Sanitary Sewer Facilities shown on Construction Plans approved by the Authority and Authority's consulting engineer which are incorporated

herein by reference. In no event and under no circumstances shall Developer place additional facilities requiring connection to any Sanitary Sewer Facilities upon the Property without first having presented the Authority with flow data and preliminary plans and specifications and the issuance of a sanitary sewer connection permit from Authority. Any building permit issued by any municipal or other officer in contravention or violation of this covenant shall be deemed conclusively as void and of no effect.

19. Developer shall contact CMA to determine what documentation and fees are required by CMA for the Development. Developer shall provide the Authority with written proof that all such requirements of CMA have been satisfied prior to the Authority's takeover of the Sanitary Sewer Facilities.

20. The completion date for the construction contemplated herein shall be the date so certified by the Authority; such certification of completion shall in no event be issued until all testing of the Sanitary Sewer Facilities line is satisfactorily completed and a final walk through is done and any items noted on a punch list satisfactorily completed.

21. This Developer's Agreement shall be binding upon and inure to the benefit of the parties hereto, their successors and assigns. This Developer's Agreement is the complete agreement between the Authority and Developer and cannot be amended unless in writing signed by both parties.

22. The Developer has requested the Authority to enter into this Developer's Agreement. The Authority will enter into this Developer's Agreement subject to the following:

a) This Developer's Agreement is being entered into at the request of Developer;

b. This Developer's Agreement is being entered into for the purpose of making it

possible for Developer to submit a sanitary sewer Planning Module to the Pa DEP.

c. Developer understands that the Authority is under a Corrective Action Plan (CAP) directive issued by Pa DEP.

d. Developer understands that no sanitary sewer taps are available for Developer's Development, the Authority cannot issue any taps for Developer's Development and since taps cannot be issued, Developer cannot connect any part of its sanitary sewer lines into the Authority's system until taps are approved by Pa DEP and allocated to Developer by the Authority.

e. Developer understands that it is unknown when any sanitary sewer taps will be available for Developer's Development.

f. Developer understands that any capacity available for sanitary sewer taps must be approved not only by the Authority but by South Park Township, Jefferson Hills Borough, Clairton Municipal Authority and Pa DEP. This Developer's Agreement is expressly subject to such approvals.

g. Developer understands that if sanitary sewer taps are made available to the Authority those taps will be limited and will be allocated among Authority customers, residents and other developers. As a result, if and when taps are made available, the Authority does not and will not guarantee how many taps will be issued to Developer. Developer understands and agrees that Developer will not receive all requested sanitary sewer taps if and when they may become available and at all times shall remain subject to Authority procedures concerning tap allocation and any issuance of restrictive taps.

h. Developer understands and agrees that any Sanitary Sewer Facilities constructed by Developer are at Developer's sole risk. The Authority does not guarantee or represent that such Sanitary Sewer Facilities will be accepted into the Authority's sanitary sewer system, unless and until such Sanitary Sewer Facilities have

been permitted by Pa DEP, Developer has complied with all terms and conditions of this Developer's Agreement and taps have been allocated for the portion of the Sanitary Sewer Facilities to be accepted and any reference otherwise to such acceptance in this Developer's Agreement is null and void.

i. Developer understands and agrees that Developer is constructing a capped sanitary sewer and it is unknown if or when Developer will be permitted to connect any part of the Sanitary Sewer Facilities into Authority sanitary sewer lines. Unless and until such Sanitary Sewer Facilities, constructed by Developer, have been permitted by Pa DEP, Developer has complied with all terms and conditions of this Developer's Agreement as approved by the Authority and taps have been allocated for the portion of the Sanitary Sewer Facilities to be accepted, such lines will not be accepted into the Authority's system.

j. Developer understands and agrees that Developer has been notified that sufficient sanitary sewer taps will not be allocated to implement the total Development plan or any Phase of the Development. At this time the Authority does not know how many sanitary sewer taps, if any, can be allocated for this Development.

k. During implementation of the CAP the Pa DEP has agreed that the Authority may add limited volumes of new sanitary sewage flow in accordance with a schedule of connections contained in the Pa DEP approved CAP.

l. Pa DEP and the Authority have agreed that limited developmental activities in connection with the CAP may be commenced upon the issuance of a Water Quality Permit and the recording of the final plans.

m. Because of the limitations on the number of new connections to the Peters Creek Sanitary Sewer System during the implementation of the CAP, Developer acknowledges there is no guarantee that Developer will be allowed to connect their

dwelling units to the Peters Creek Sanitary Sewer System.

n. Due to the limitations on available new connections, Developer hereby incorporates into this Developer's Agreement as if fully set forth herein, a copy of the Note for Recorded Plan and/or Developer's Agreement attached hereto and made a part hereof as Exhibit 1.

[the remainder of this page is intentionally blank – signature page to follow]

IN WITNESS WHEREOF, the parties have hereunto set their hands and seals the day and year first above written.

THE PETERS CREEK SANITARY AUTHORITY

ATTEST:

_____ _____

Thomas Lumsden, Secretary Christopher M. Labee, Chairman

OWNERS

_____ _____

Witness

_____ _____

Witness

ATTEST: DEVELOPER

_____ _____

Witness

ACKNOWLEDGEMENT

COMMONWEALTH OF PENNSYLVANIA)
) SS:
COUNTY OF WASHINGTON)

On this, the_____ day of _____ 20____, before me, a Notary Public, the undersigned officer, personally appeared, _____, of _____ known to me (or satisfactorily proven) and the person whose name is subscribed to the within instrument and acknowledged that he/she has been authorized to execute the same for the purposes herein contained.

In Witness Whereof, I hereunto set my hand and official seal.

_____

Notary Public

My Commission Expires:

ACKNOWLEDGEMENT

COMMONWEALTH OF PENNSYLVANIA)
) SS:
COUNTY OF WASHINGTON)

On this, the_____day of _____, 20____, before me, a Notary Public, the undersigned officer, personally appeared Christopher M. Labee, Chairman, known to me (or satisfactorily proven) to be the Chairman of Peters Creek Sanitary Authority and the person whose name is subscribed to the within instrument and acknowledged that he executed the same for the purposes herein contained and has been authorized to sign the same.

In Witness Whereof, I hereunto set my hand and official seal.

_____
Notary Public

My Commission Expires:

ACKNOWLEDGEMENT

COMMONWEALTH OF PENNSYLVANIA)
) SS:
COUNTY OF WASHINGTON)

On this, the_____ day of _____ 20____, before me, a Notary Public, the undersigned officer, personally appeared,_____ of _____, known to me (or satisfactorily proven) and the person whose name is subscribed to the within instrument and acknowledged that they have been authorized to execute the same for the purposes herein contained.

In Witness Whereof, I hereunto set my hand and official seal.

_____

Notary Public

My Commission Expires:

EXHIBIT 1

NOTE FOR RECORDED PLAN AND/OR DEVELOPER'S AGREEMENT

Pursuant to the requirements of the Clean Streams Law, the Act of June 22, 1937, P.L., as amended, the Pennsylvania Sewage Facilities Act; the Act of January 24, 1958, P.L. 1535, as amended, and 25 Pa. Code Chapter 94.

The Peters Creek Sanitary Authority, has submitted to the Commonwealth of Pennsylvania, Department of Environmental Protection, a Plan and schedule of corrective actions in the Peters Creek Sanitary Sewer District's sewerage system. The Commonwealth has approved this Plan and schedule which in turn is now being implemented. During implementation, the Peters Creek Sanitary Authority has agreed pursuant to 25 Pa. Code Chapter 94, that Peters Creek Sanitary Authority may add only limited volume of new sewage flows to the sewerage system, and is responsible for authorizing and approving the discharge of sewage into this sewerage system in these limited volumes which shall be allocated based upon a schedule of connections approved by the Commonwealth and Peters Creek Sanitary Authority as part of the Corrective Action Plan. Accordingly, the Commonwealth agrees that developmental activities in connection with this Plan may be commenced without violation of 25 Pa. Code Chapter 94 but because of the limits on new connections to the sewerage system during Plan implementation, there is no guarantee that the Developer or purchasers of lots within this Development will be allowed to connect to the Peters Creek Sanitary Sewer sewerage system until after the Corrective Action Plan has been fully implemented, the sewerage system is no longer hydraulically overloaded and the system meets all of the requirements of both the permits therefore, and the applicable rules and regulations set forth in Title 25 of the Pennsylvania Code.

APPENDIX C