STANDARD CONSTRUCTION AND MATERIAL SPECIFICATIONS

FOR

WASTEWATER COLLECTION SYSTEM EXTENSIONS

MAY 2017

LOWER PAXTON TOWNSHIP AUTHORITY
LOWER PAXTON TOWNSHIP
DAUPHIN COUNTY, PENNSYLVANIA

8618490.3400

GHD
1240 NORTH MOUNTAIN ROAD
HARRISBURG, PA 17112
(717) 541-0622

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PREFACE

This document is provided by Lower Paxton Township Authority for use by developers and their contractors for design and construction of sanitary sewers and appurtenances within the Authority's service area. The standards in this document must be followed in design development and construction. Use of this document for any other purpose other than preparation of plans for submittal to Lower Paxton Township Authority or for construction of sanitary sewers in the Authority's service area is forbidden.

The specifications contained in this document meet or exceed the requirements of the Uniform Construction Code (UCC), the International Pluming Code (IPC) and the International Residential Code (IRC) for installation of service laterals and building sewers located on either public or private property. If a subject contained in either the IPC or IRC is not specifically addressed in the document, the requirements of the IPC or IRC are to be applied.

Please refer to the latest version of the "Codified Ordinances of Lower Paxton Township", for any items not covered under these specifications.

LOWER PAXTON TOWNSHIP AUTHORITY

STANDARD CONSTRUCTION AND MATERIALS SPECIFICATIONS FOR WASTEWATER COLLECTION SYSTEM EXTENSIONS

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Section 1

General Instructions

SECTION 1

GENERAL INSTRUCTIONS

1.01. DEFINITIONS: Wherever in these Specifications the following words, terms and expressions, or pronouns in place of them are used, the intent and meaning shall be interpreted as follows:

A. Agreement: The written agreement between the AUTHORITY and DEVELOPER covering the work to be performed.

B. AASHTO: American Association of State Highway and Transportation Officials.

C. ACI: American Concrete Institute.

D. AISC: American Institute of Steel Construction.

E. "Approved", etc: The words "approved", acceptable", "satisfactory", or words of like import, shall mean approved by, or acceptable, or satisfactory, to the ENGINEER, unless another meaning is plainly intended or otherwise specifically stated.

F. ANSI: American National Standards Institute.

G. ASTM: American Society of Testing Materials.

H. AUTHORITY: LOWER PAXTON TOWNSHIP AUTHORITY including any agent, officer or employee duly authorized to act for the said party in connection with the work of the DEVELOPER. Also referred to as OWNER.

I. Building Sewer: The Lateral pipe from a point near the Observation Tee or public right-of-way line to a point near the building foundation.

J. Completion Certificate: The certificate of the ENGINEER or AUTHORITY indicating the completion and acceptance of the work of the DEVELOPER.

K. Contract: The written agreement executed by and between the DEVELOPER and the DEVELOPER'S CONTRACTOR covering the performance of the work and the furnishing of labor, materials and service in the construction of sewer extensions to the AUTHORITY'S wastewater collection system.

L. Construction Observation: The observation of the work performed by the DEVELOPER to ascertain its conformity with the AUTHORITY'S Standard Construction and Material Specifications.

M. DEVELOPER: The person, firm or corporation ultimately responsible for construction of the sewers with whom the AUTHORITY has entered into the Agreement, as well as agents acting on behalf of the DEVELOPER, including the DEVELOPER'S CONTRACTOR.

N. DEVELOPER'S CONTRACTOR: The person, firm or corporation constructing the sewers on behalf of the DEVELOPER, if other than DEVELOPER.

O. DEVELOPER'S Drawings: The drawings which show the character and scope of the work to be performed and which have been prepared by the DEVELOPER and approved by the ENGINEER and are referred to in the Agreement.

P. ENGINEER: The independent consulting engineer that the AUTHORITY has contracted to review/assess the DEVELOPER'S design, installation, and completion of any sewer construction. The word "ENGINEER" shall include the officers, agents and employees of the ENGINEER. In cases where the AUTHORITY does not employ a consultant, the word "AUTHORITY" is substituted for "ENGINEER" throughout these Specifications.

Q. Fed. Spec: Federal Specifications, United States Government.

R. Fill: The deposit of earth material placed by artificial means.

S. Grade: The vertical elevation of the ground surface.

T. Grading: Any excavation or filling or combination thereof.

U. Lateral: The entire sanitary sewer system extending from the sewer main to a building, including both the service lateral and building sewer. This part of the system is owned, operated and maintained by the Property Owner.

V. Mass Grading: The grading that is completed on a large scale over a large area prior to preliminary grading.

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

X. Laws and Regulations: Laws, rules, regulations, ordinances, codes and/or orders of the AUTHORITY, Lower Paxton Township, Dauphin County, Commonwealth of Pennsylvania, and United States of America.

Y. Professional Services Contract: The Agreement between the AUTHORITY and the DEVELOPER where the DEVELOPER agrees to pay for all applicable charges from the AUTHORITY, the ENGINEER, and the Authority's Solicitor with respect to the Development's review approval and inspection.

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

AA. Project: The total construction of the sanitary sewer extension covered under the agreement or the total construction of the Lateral by the Property Owner.

BB. Project Representative: The authorized representative of the AUTHORITY or ENGINEER assigned to the site or any part thereof for observation of construction.

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

DD. Service Lateral: The Lateral pipe from the sewer main to the Observation Tee or a point near the public right-of-way line.

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

FF. Shop Drawings: All drawings, diagrams, illustrations, schedules, and other data which are specifically prepared by or for the DEVELOPER to illustrate some portion of the work and all illustrations, brochures, standard schedules, performance charts, instructions, diagrams, and

other information prepared by a supplier and submitted by the DEVELOPER to illustrate material or equipment for some portion of the work.

GG. Specifications: Those portions of these Standard Construction and Material Specifications consisting of written technical descriptions of materials, equipment, construction systems, standards and workmanship as applied to the work and certain administrative details applicable thereto and all supplements thereto.

HH. Street: A public road in a city or town, typically with houses and buildings on one or both sides. Street and road are used interchangeable within this document.

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

JJ. Supplier: A manufacturer, fabricator, supplier, distributor, or vendor of materials or equipment.

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

LL. Warranty Period: An 18 month time period beginning with the AUTHORITY'S final acceptance and issuance of completion certificate.

MM. Work: The entire completed construction of the sewer extension or the various identifiable parts thereof required to be furnished under these Specifications. Work is the result of performing services, furnishing labor and furnishing and incorporating materials and equipment into the construction, all as required by these Specifications.

1.02. DRAWINGS AND SPECIFICATIONS

A. The DEVELOPER'S Drawings and these Specifications are complementary, and the requirements of any one shall be considered as the requirements of all.

B. The Specifications in this document are written as if they were included in the Contract Documents executed by and between the DEVELOPER and the DEVELOPER'S CONTRACTOR. Whether they are so used is at the discretion of the DEVELOPER. All sanitary sewer extensions provided by the DEVELOPER, however, must conform to the requirements of these Standard Construction and Material Specifications.

C. All DEVELOPER'S Drawings pertaining to the Project are to be submitted by the DEVELOPER to the AUTHORITY for review. After review of the DEVELOPER'S Drawings by the AUTHORITY, the DEVELOPER shall make any corrections required, and submit corrected copies thereof to the AUTHORITY. The AUTHORITY'S approval of the DEVELOPER'S Drawings shall not relieve the DEVELOPER from responsibility for errors or discrepancies in such Drawings. All DEVELOPER'S Drawings shall be prepared and submitted in conformance with the requirements set forth in Section 01300 and with the agreement.

D. Deviations from the DEVELOPER'S Drawings or these Specifications required by the exigencies of construction will be determined by the ENGINEER only, and authorized in writing.

E. At all times the DEVELOPER shall keep on the Project, available to the AUTHORITY and ENGINEER and their representatives, one (1) copy of the DEVELOPER'S Drawings and these Specifications.

1.03. PRELIMINARY PROJECT SITE INSPECTION

A. Unless the requirement is waived by the ENGINEER prior to the start of actual construction operations, the DEVELOPER, or his authorized representative, shall go over the Project accompanied by the ENGINEER, or his designated representative, and shall observe for himself/herself, with the approved DEVELOPER'S Drawings before him/her, all pertinent conditions relative to the Project, including the status of rights-of-way and structures, obstructions, or other objects to be removed, altered and changed.

1.04. WORKING CONDITIONS

A. No night, weekend, or legal holiday work, requiring the presence of the ENGINEER or AUTHORITY or a representative of either, will be permitted, except in cases of emergency, and then only with the written consent of the ENGINEER or AUTHORITY and to such an extent as they may judge necessary.

B. Any request for AUTHORITY or ENGINEER project representatives for construction observation must be scheduled at the Sewer Operations Facility 72 hours in advance by calling 717-657-5623 between 6:30 a.m. and 2:30 p.m. The availability of a project representative is not guaranteed.

1. Normal working hours are considered to be between 6:30 am and 2:30 pm.

   Payment for construction observers shall be borne by the DEVELOPER, including any overtime.

1.05. MATERIALS

A. Before construction starts, the DEVELOPER shall furnish the ENGINEER with a complete statement of the origin, composition, and manufacture of all materials to be used in the construction of the Project, as called for in these Specifications. Only materials conforming to the requirements of these Specifications and approved by the ENGINEER shall be used in the work.

B. Representative preliminary samples of the materials, of the character and quality prescribed in these Specifications shall be submitted when indicated or directed, for advance examination or test. Written approval of the quality of such samples shall be received by the DEVELOPER prior to obtaining materials from the respective sources of supply.

C. Materials shall be stored so as to insure preservation of their specified quality and fitness for the work.

D. If any material intended for use in the construction of the Project has been inspected and rejected after such material has been delivered to the Site, the DEVELOPER shall immediately remove all such rejected material from the property.

1.06. PERMITS AND LICENSES

A. With the exception of the PennDOT Highway Occupancy Permit, if applicable, and the Water Quality Management Permit, if applicable, which will be obtained under the AUTHORITY'S signature, the DEVELOPER or Property Owner shall, unless otherwise specified, procure all necessary permits and licenses, pay all charges and fees, and shall give all notices necessary and incident to the proper and lawful prosecution of the work. The DEVELOPER shall prepare the applications and pay any fees and charges associated with any required Highway Occupancy and/or Water Quality Management Permit(s).

B. The PennDOT Highway Occupancy and Water Quality Management Permit applications shall be prepared by the DEVELOPER in the name of the AUTHORITY and submitted to the AUTHORITY along with the application fees. After review of the applications by the AUTHORITY, the DEVELOPER shall make any corrections, if required, and submit corrected copies to the AUTHORITY. The AUTHORITY will forward the applications and fees to the Pennsylvania Department of Transportation and the Department of Environmental Protection.

C. Payment for personnel from State Agencies, as required to be on hand during the construction of work on Highways under their jurisdiction, shall be borne by the DEVELOPER.

D. Where work is to be done by the DEVELOPER, in placing any pipe or other construction under railroad tracks, within the right-of-way of any railroad company, the DEVELOPER shall be governed by the requirements of the railroad company involved, and shall consult with the officials thereof relative to the installation. If the railroad company requires any of their personnel to be on hand during the construction of the work, payment for such personnel or any other costs associated with the railroad crossing shall be borne by the DEVELOPER.

E. When working within Township road or street right-of-ways, the Developer, individual Property Owner or Property Owner's representative is required to obtain a street and road occupancy permit.

F. The DEVELOPER AND CONTRACTOR shall observe all applicable Local, State, and Federal laws and regulations.

1.07. CARE OF PUBLIC AND PRIVATE PROPERTY.

A. The DEVELOPER shall comply with all provisions of the Pennsylvania Underground Utilities Act. The DEVELOPER shall protect all land monuments and property markers that will be affected by the construction until they have been correctly referenced. DEVELOPER shall satisfactorily reset monuments and markers that are disturbed by the DEVELOPER during the construction of the Project or otherwise.

1.08. SAFETY REQUIREMENTS

A. The DEVELOPER is responsible for all site safety, including, but not limited to, safety associated with all trenching, testing, and traffic control.

B. If the use of explosives is necessary for the prosecution of the work, the DEVELOPER shall store and use in strict conformity to all State and local laws and regulations. **No explosives shall be used without first securing appropriate State and/or local blasting permits.**

C. If work involves asbestos cement pipe (ACP), CONTRACTOR shall comply with a regulatory requirements, local state or federal, for the proper handling and disposal of ACP. DEP's Asbestos Abatement and Demolition/Renovation Notification form must be completed, signed

and submitted to DEP by the Contractor and proof of submission must be provided to the Authority.

D. Observance of, and compliance with, said regulations shall be solely and without qualification, the responsibility of the DEVELOPER, without any responsibility whatsoever on the part of the AUTHORITY or ENGINEER. The duty of enforcing such laws and regulations lies with the governing body, not with the AUTHORITY or ENGINEER.

1.09. REGULATIONS AND REQUIREMENTS OF THE DEPARTMENT OF ENVIRONMENTAL PROTECTION

A. The DEVELOPER is advised that he will be required to design and conduct his work in compliance with the rules, regulations and requirements of the Pennsylvania Department of Environmental Protection and all other applicable laws and regulations (Paragraph 1.010).

1.10. OBSERVANCE OF LAWS AND REGULATIONS

A. The DEVELOPER at all times shall observe and comply with all Federal and State laws and regulations, and local bylaws, ordinances and regulations in any manner affecting the conduct of the work or applying to employees on the Project, as well as all safety precautions and orders or decrees which have been promulgated or enacted, or which may be promulgated or enacted, by any legal bodies or tribunals having authority or jurisdiction over the work, materials, equipment, employees or the Contract between the DEVELOPER and the DEVELOPER'S CONTRACTOR; such observance and compliance shall be solely and without reliance on superintendence or direction by the AUTHORITY or ENGINEER.

1.11. ENGINEER'S DUTIES

A. The work shall at all times be subject to the observation of the ENGINEER, AUTHORITY or their authorized employees, who shall have free access to the work, and be furnished by the DEVELOPER with every reasonable facility for examination of the work, to the extent of uncovering, testing or removing finished portions thereof. The DEVELOPER shall provide all labor and equipment necessary for such observations. The ENGINEER may require the DEVELOPER to uncover for observation, or to remove any work done or placed in violation or disregard of instructions issued to the DEVELOPER by the ENGINEER, AUTHORITY or their representatives.

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

C. All observations and tests shall be performed without unnecessarily delaying the work. All material and workmanship, if not otherwise designated by these Specifications shall be subject to observation and test by the AUTHORITY and/or ENGINEER or their duly authorized representatives. The AUTHORITY and ENGINEER shall have the right to reject defective material or workmanship, or require its correction. Rejected workmanship shall be satisfactorily replaced with proper material and the DEVELOPER shall promptly segregate and remove rejected material from the premises. If these Specifications, the ENGINEER'S instructions, laws, ordinances, or any public authority require the work to be specially tested

or approved, the DEVELOPER shall give the ENGINEER timely notice of its readiness for inspection.

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

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

F. Any verbal opinion or suggestion that the ENGINEER may give the DEVELOPER shall in no way be construed as binding the AUTHORITY in any way.

1.12. DEFECTIVE WORK

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

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

C. The DEVELOPER shall promptly move from the premises all materials condemned by the ENGINEER or AUTHORITY as failing to conform to these Specifications, whether incorporated into the work or not, and the DEVELOPER shall promptly replace its own work.

1.13. NOTICE

A. The service of any notice, by the AUTHORITY or ENGINEER to the DEVELOPER, shall be considered accomplished upon completion of any one of the following procedures.

1. When delivered, in writing, to the person in charge of the office used by the addressee to conduct business;

2. When delivered, in writing, to the addressee or any of its authorized agents in person;

3. When delivered, in writing, to the addressee or any of its agents at the office used by the addressee to conduct the business of the DEVELOPER at or near the site of the work;

4. When deposited in the United States Mail, postpaid, and addressed to the party intended for such service at its office used for conducting business at the site of the work, or its last known place of business.

1.14. ENGINEERING STAKES

A. Setting and maintaining suitable stakes, grade boards, temporary structures, templates, and other materials for establishing and maintaining points, marks, and lines shall be the responsibility of the DEVELOPER.

B. The DEVELOPER is entirely responsible for maintaining all grades and elevations in the construction of the project in accordance with the approved plans.

1.15. ITEMS REQUIRED PRIOR TO BEGINNING CONSTRUCTION

A. Items Required from DEVELOPER'S:

1. Sewer Extension Agreement and related documents, including Construction Escrow.
2. County Conservation District approved Erosion Control Plan.
3. Blasting permit (if needed).
4. PennDOT Highway Occupancy Permit (if needed).
5. "Approved" Traffic Control Plan from Township (if applicable).
6. 72 hour notice indicating DEVELOPER intends to start work.
7. Pre-construction meeting.
8. Evidence that the final subdivision plan has been filed by the Municipality at the county courthouse, Recorder of Deeds office, if applicable.
9. Performance and Payment Bonds or other financial security to assure completion of the sewer construction.
10. Receipt of a letter from the DEVELOPER stating the name of the DEVELOPER'S CONTRACTOR who will be installing the sanitary sewers, when applicable.
11. Receipt from the AUTHORITY of a copy of the Water Quality Management (WQM) Permit issued by the DEP, when applicable; or the DEP Planning Module approval letter if a WQM permit is not required.
12. A list of suppliers for the materials to be used in the sanitary sewer construction.
13. Shop drawings of manhole sections, manhole frames and covers, pipe and other necessary construction materials approved by the AUTHORITY or ENGINEER.
14. Certification from the pipe manufacturer that the pipe meets or exceeds the requirements of the AUTHORITY.
15. Written approval by the AUTHORITY to proceed with construction.
16. Plats and legal descriptions of sewer easements to be dedicated to the AUTHORITY. The easements must be recorded at the Court House.
17. A set of ENGINEER "approved" construction drawings.

B. Items Required from Property Owners only installing a Lateral:

1. County Conservation District approved Erosion Control Plan (if needed).
2. Blasting permit (if needed).
3. Township Road Occupancy Permit and/or street-cut permit (if needed).
4. PennDOT Highway Occupancy Permit (if needed).
5. “Approved” Traffic Control Plan from Township (if applicable).
6. 24 hour notice indicating Property Owner intends to start work.
7. Shop drawings of construction materials approved by the AUTHORITY or ENGINEER.

END OF SECTION

Division 1

General Requirements

SECTION 01010

SUMMARY OF WORK

PART 1 GENERAL

1.01. SITE LOCATION

A. Project locations are in and adjacent to Lower Paxton Township, Dauphin County, Pennsylvania.

1.02. WORK COVERED BY THESE SPECIFICATIONS

A. The Work generally comprises construction of extensions to the existing wastewater collection system by developers in accordance with these Specifications, Detail Drawings bound herein, and the approved DEVELOPER'S Drawings.

B. The Detail Drawings represent the standards of construction of the AUTHORITY and are bound in the back of these Specifications. On the Detail Drawings, the words "Project Manual" are defined as these Specifications.

C. These Specifications cover the construction of sewers that are to be public and those sewers that are to remain private.

1.03. PRELIMINARY REQUIREMENTS

A. The AUTHORITY may assign its own employees as field Project Representative(s) to observe the work. In such cases, the authority given to the Engineer's Project Representative shall be assumed by the AUTHORITY's personnel.

B. Where sewers are to be installed within the right-of-way limits of existing streets, all removal and protection of street paving, backfilling of trenches, temporary and permanent replacement of street paving, restoration of shoulders and the maintenance and protection of traffic will be performed in strict conformance with the requirements of Lower Paxton Township, other governing municipality, or the Commonwealth of Pennsylvania Department of Transportation, as applicable. The cost of inspection by personnel of the Commonwealth of Pennsylvania Department of Transportation shall be paid by the DEVELOPER. Work within the right-of-way of State Highways shall be performed in accordance with the requirements of the latest edition of the Commonwealth of Pennsylvania, Pennsylvania Code, Title 67, Transportation, Department of Transportation, Chapter 459, Occupancy of Highways by Utilities. The Regulations are made a part of these Specifications.

C. When building sewer installations are required as work for this project, construct them from the cleanout/observation tee to the building using materials required by the latest version of the Building Sewer Specifications. Developer will need to obtain a Sewer Connection Permit prior to installation.

D. Where feasible, and to the maximum extent possible, locate new sewer main line in streets and paved areas to facilitate access for maintenance purposes.

E. Do not connect stormwater or groundwater drainage to any sewer extension of the AUTHORITY'S system. No rain water leaders, roof drainage, area or yard drainage, basement drainage, water from fire hydrants, ground water, or water from underground drainage fields shall be permitted to drain into or be admitted into the sanitary sewer system, nor shall any of these be admitted to the sanitary sewer system by the use of pumps of any

type. The sanitary sewer system and all extensions are intended to convey sanitary sewage only.

F. Proposed subsurface utilities shall be designed and installed maintaining a five (5) foot minimum horizontal separation and an eighteen (18) inch minimum vertical separation from all existing and proposed sanitary sewer facilities and appurtenances, except for water mains, which shall maintain a ten (10) foot minimum horizontal separation and an eighteen (18) inch minimum vertical separation, unless approved otherwise in writhing by the AUTHORITY. Nothing in this section shall be construed to prevent proposed subsurface utilities from crossing existing or proposed sanitary sewer facilities. However, when proposed subsurface utilities must cross sanitary sewer facilities, said crossing shall occur at a 90 degree angle, unless approved otherwise in writing by the AUTHORITY.

G. Interfacing Existing Construction:

1. Do not permit ground or surface water to enter the existing sanitary sewer facilities through the new sewer piping connection.

2. Do not flush, drain or deposit water or debris from the new sewer piping or related construction into the existing sanitary sewer facilities.

3. Install a watertight plug in new sewer piping entering a new manhole. Maintain the plug until all debris and accumulated water has been removed from the new sewer facilities and the new sewer facilities have passed all specified acceptance tests.

1.04. WORK HOURS

A. No night, weekend, or legal holiday work, requiring the presence of the Owner or Engineer, or a representative of either, is permitted, except in cases of emergency, and then only with the written consent of the Owner or Engineer and to such extent as Owner or Engineer may judge necessary.

Contractor must shut down operation when inspectors are not available.

1. Township holidays are as follows:

New Year's Day
Martin Luther King Day
Presidents' Day
Memorial Day
Fourth of July
Labor Day
Veterans Day
Thanksgiving and the Friday after Thanksgiving
Christmas Eve
Christmas Day

2. Additional days that Contractor may not be entitled to work because of anticipated reduced staffing:

Week following Thanksgiving (PA Deer Season)

All days between Christmas Day and New Year's Day

If staff is available, Contractor will be permitted to work.

3. Any request for inspectors during hours other than normal working hours must be made

in writing 72 hours prior to time needed. The availability of an inspector is not guaranteed.

4. NO PIPE LAYING OR INITIAL BACKFILL SHALL TAKE PLACE WITHOUT THE PRESENCE OF THE INSPECTOR – Normal work hours are 6:30am to 2:30pm. Construction of sanitary sewer must not start earlier than 7:00am and must stop at 2:00pm so that the inspector has a half hour to arrive at the site and to return to the AUTHORITY's garage. Contractor may establish a schedule of four (4) 10-hour days per week by providing written notification to OWNER prior to issuance of the Notice to Proceed. If accepted, the four (4) day, 10-hour day work week must start on a Monday and end on a Thursday. Friday may not be used as a make-up day due to a holiday during the week or inclement weather; however, DEVELOPER may request to work on a Friday by submitting a written request to the AUTHORITY 72 hours in advance when possible. The availability of an inspector is not guaranteed.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1 GENERAL

1.01. SUBMISSIONS REQUIRED FOR NEW SUBDIVISIONS

A. General: The descriptions under the SUBMITTALS Article in each Specification Section indicate the type of submission required. In addition, submit copies of DEVELOPER'S Drawings and a construction progress schedule:

1. Make all submissions to the office of the AUTHORITY unless otherwise directed by the AUTHORITY.

B. Definition: The term shop drawing, used throughout this Section, includes manufacturer's product data in the forms of descriptive literature, specifications and published detail drawings, and also DEVELOPER'S CONTRACTOR prepared drawings, certified test records or reports and such other certificates required by these Specifications.

1.02. GENERAL OUTLINE OF STEPS AND SUBMITTALS FOR DEVELOPER SEWER EXTENSIONS

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

B. Planning Phase:

1. Submit written request to AUTHORITY, inquiring as to the availability of capacity in the sanitary sewer system. The AUTHORITY will respond to request in writing. If a planning module is required, this will be indicated in the AUTHORITY'S written response.

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

a. The AUTHORITY'S ENGINEER will determine availability of capacity and advise the AUTHORITY.

b. The AUTHORITY will either approve or disapprove the DEVELOPER'S request.

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

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

4. DEVELOPER must obtain a copy of the AUTHORITY'S "Standard Construction and Material Specifications for Wastewater Collection System Extensions."

5. In some cases, it may be in the best interest of the DEVELOPER to meet with the

AUTHORITY and its ENGINEER prior to design submission of DEVELOPER'S Drawings. Such a meeting can prevent multiple requests of redesign of a sewer extension.

C. Design Phase:

1. The DEVELOPER shall submit Two (2) sets of DEVELOPER'S Drawings for each submission to the AUTHORITY for review and comment:

   a. When the DEVELOPER'S drawings are delivered to the AUTHORITY, a check for $1,000 shall be submitted to cover the initial costs to the AUTHORITY for Drawing review.

   b. Enter into a Professional Services Contract (PSC) with the AUTHORITY. A copy of the PSC will be forwarded to the DEVELOPER upon receipt of the DEVELOPER'S Drawings and an initial deposit of $1,000 to be placed in escrow.

   c. As the design review progresses and the AUTHORITY incurs costs greater than the $1,000 deposit, the AUTHORITY may, depending on the escrow deficiency, request additional escrow deposits from the DEVELOPER.

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

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

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

7. Upon approval of the DEVELOPER'S Drawings, the AUTHORITY will provide a listing of requirements prior to issuance of a Notice to Proceed.

8. The DEVELOPER shall submit five (5) sets of DEVELOPER'S Drawings to the AUTHORITY'S ENGINEER. These drawings will be stamped approved for construction. During the Pre-Construction Meeting, these drawings will be distributed to DEVELOPER, DEVELOPER'S CONTRACTOR, ENGINEER, and AUTHORITY'S Construction Observer/Field Project Representative.

D. Agreement Phase:

1. Upon approval of the DEVELOPER'S Drawings, a SEWER EXTENSION AGREEMENT (SEA) shall be entered into between the DEVELOPER and owner of the property being developed and the AUTHORITY. SEWER EXTENSION AGREEMENTS apply to both private and public sewer extensions:

a. Construction Cost Estimate for Financial Security When Constructing a Public Sewer Extension (Not Required for Private Extensions):

1) The DEVELOPER shall submit to the AUTHORITY a construction cost estimate for review by the AUTHORITY'S ENGINEER. The construction cost estimate will be used for financial security. The construction cost estimate will be multiplied by 1.10 for a ten percent contingency and this is the amount of required financial security.

2) The DEVELOPER shall then select the desired form of financial security. The most common forms are Performance Bonds, Letters of Credit and Escrow Accounts. The AUTHORITY has standard forms for each of these. The DEVELOPER is responsible for selecting and submitting the security to the AUTHORITY'S standards.

b. Upon receipt of the above information, the AUTHORITY will develop three (3) original copies of the SEWER EXTENSION AGREEMENT and attach the DEVELOPER'S financial security:

1) If additional escrow is required, the SEWER EXTENSION AGREEMENT will also indicate that additional money shall be deposited with the AUTHORITY for costs to be incurred by the AUTHORITY.

2) The AUTHORITY'S ENGINEER will determine the amount of escrow needed.

3) The ENGINEER will then forward the Sewer Extensions Agreements to the DEVELOPER for execution.

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

a. DEVELOPER shall submit one (1) copy of the DEVELOPER'S CONTRACTOR'S Insurance Certificate:

1) The LOWER PAXTON TOWNSHIP AUTHORITY shall be named as an additional insured.

2) The LOWER PAXTON TOWNSHIP shall be named as an additional insured.

3) The AUTHORITY'S ENGINEER shall be named as an additional insured.

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

c. DEVELOPER shall have executed SEWER EXTENSION AGREEMENT.

d. DEVELOPER to have established the escrow account to the dollar amount specified in the SEWER EXTENSION AGREEMENT:

1) If additional escrow money is needed during construction, the AUTHORITY will duly notify the DEVELOPER that an escrow deposit is required.

E. Construction Phase:

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

2. A Pre-Construction Meeting shall be held. Attendees at the Pre-Construction meeting shall include at a minimum the DEVELOPER'S CONTRACTOR, DEVELOPER, AUTHORITY, Project Representative, and AUTHORITY'S ENGINEER.

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

4. DEVELOPER shall install the sewers in accordance with AUTHORITY'S Standard Construction and Material Specifications:

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

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

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

5. The AUTHORITY'S Project Representative shall observe installation and testing of the sewer extension.

6. The AUTHORITY'S Project Representative shall prepare a list of punch list items.

7. The DEVELOPER shall complete all punch list items.

F. Post Construction:

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

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

3. Until Record Drawings and plats and legal descriptions required under Items 1 and 2 above are provided, the DEVELOPER shall place in escrow an amount sufficient to survey the development and provide record drawings, straight-line diagrams, deed of dedication, bill of sale and all other items listed in the Lower Paxton Township Authority Sewer Extension Agreement Amendment (sample amendment attached). In an effort to offset some of the escrow amount, the DEVELOPER'S land development engineer can submit, on a computer disk or flash drive in AUTOCAD, a copy of the land development plans and profiles of the sewer extension so that the field survey of as-built conditions would only need to be verified.

4. DEVELOPER shall submit to the AUTHORITY a Guarantee Phase Financial Security (Maintenance Security):

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

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

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

5. Upon completion of construction and receipt and approval of the above Post Construction Submissions and Financial Security, the AUTHORITY will then permit issuance of individual connection permits in accordance with the SEWER EXTENSION AGREEMENT.

1.03. DEVELOPER'S DRAWINGS SUBMISSION

A. General:

1. Submit two copies of DEVELOPER'S Drawings for review. After review of these drawings, make any corrections required and resubmit two corrected copies.

2. If a WQM or Part II permit is required from DEP, submit one copy.

3. Sheet Size: 24 x 36 inches.

4. Base all elevations on USGS datum and refer to AUTHORITY record drawing elevations of the existing sewers and indicate the difference between USGS and AUTHORITY datum.

5. Include the following note on each drawing, "All materials used and construction methods employed shall be in accordance with the latest standards of the LOWER PAXTON TOWNSHIP AUTHORITY STANDARD CONSTRUCTION AND MATERIALS SPECIFICATIONS."

6. Drawings shall include all details (e.g. manholes, manhole connections, bedding, encasement, etc.) necessary for construction of the project. (For reference, all detail drawings are contained in this document "Standard Construction and Materials Specification".) Include the following note on each drawing, "For sewer detail drawings the contractor shall reference the latest Standard Construction and Material Specifications and the Specifications for Building Sewer Installation of Lower Paxton Township Authority."

7. Include the following note on each drawing, "DEVELOPER/DEVELOPERS CONTRACTOR shall test pit all existing utility crossings prior to installing any sanitary sewer pipe to verify existing horizontal and vertical elevations to assure no conflict with new sewer."

8. Include the following note on each drawing if the sanitary sewers are to be dedicated to the AUTHORITY, "The DEVELOPER offers the sanitary sewers to the Lower Paxton Township Authority."

9. Include the following note on each drawing, "When sewers are installed through Authority's right-of-way including planter 'islands', no house, structure, trees, shrubs,

gardens, or obstruction on or over, or that will interfere with vehicular access for the construction, maintenance or operation of any sewer, shall be installed within limits of the easement, and no changes in the grade or contour over the sewer shall be permitted in accordance with the AUTHORITY's standard Deed of Dedication."

10. Bind drawings in sets and number them consecutively.

11. A design checklist is attached. At a minimum, the DEVELOPER shall comply with items on the checklist.

B. Required general information to be shown on the Design Drawings:

1. Name of the Design Engineer/Surveyor.

2. Seal of the Design Engineer/Surveyor (on Final Approved Drawings).

3. Signature of the Design Engineer/Surveyor (on Final Approved Drawings).

4. Name of the development and the owners.

5. Original Date and all subsequent revision dates.

6. Indicate by note on the Index Map(s) or Plan and Profile sheet(s), the Water Quality Management Permit Number, or DEP File Code No. if no WQM permit was required, of the existing facility that the proposed sewers are connecting into.

7. Act 287 list of utilities, PA One Call Design Serial Number and Logo (and all subsequent amendments thereto).

C. Required drawings:

1. Location Plan: Showing approximate area of the municipality in which the project is located. No particular scale is required.

2. Index Map(s): Drawn to a scale of 1" = 400' and having the following items included thereon:

a. Scale.

b. Sewer sizes and type if other than 8" sewers.

c. Names of all streets.

d. Orientation and point(s) of connection(s) of proposed sewer extension with the existing sewer system.

e. Number designation of each manhole shall begin at the existing main, and progress upward with highest number being the most upstream manhole. The AUTHORITY will specify new manhole numbers.

3. Plan and Profile Drawings: Plan View drawn to a scale of 1" = 50' and Profile View drawn to a horizontal scale of 1" = 50' and a vertical scale of 1" = 10' and having the following items included thereon:

a. Location of each existing or proposed building with elevation of the existing or proposed basement (Plan View). If proposed basement elevations are not

known, the drawings must include a note stating which lots are not intended to be provided with gravity basement drainage.

b. Sewer ties to existing permanent and semi-permanent features (Plan View).

c. Top elevations of manholes (Profile View).

d. Invert elevations of manholes (Profile View).

e. Manhole numbers corresponding to those on Index Map (Plan View and Profile View).

f. Distance between manholes (Profile View); maximum 400 lineal feet.

g. Grade of proposed sewer (Profile View); minimum 0.50 percent on 8-inch main and 1.0 percent for terminal manhole runs.

h. All sewers installed in fill areas shall be ductile iron pipe lined with Protecto 401 Ceramic Epoxy Lining. Laterals and building sewers installed in fill shall be either PVC SDR 26 (with bedding extended to virgin ground) or ductile iron pipe lined with Protecto 401 Ceramic Epoxy Lining.

i. All sewers installed in wetlands shall be ductile iron pipe lined with Protecto 401 Ceramic Epoxy Lining unless otherwise approved by the Authority Engineer.

j. Size of proposed sewer (Profile View); 8-inch main with 6-inch Service laterals.

k. Location, size and elevation of all existing and proposed underground utilities (Plan View and Profile View); minimum 18-inch vertical separation and ten feet horizontal clearance to water mains and five feet to all other utilities.

l. Service Connection Ties:

1) The measurement to locate tee branch is the horizontal distance measured along the centerline of the main sewer from the centerline of downstream manhole to the centerline of tee branch.

2) The ties and measurements necessary to locate the upper free end of the service connections are:

a) The horizontal distance measured to the closest tenth of a foot from the downstream and upstream property markers, house corners, to the end of the service connection.

b) The horizontal distance from the centerline of the main sewer to the end of the service connection.

c) Laterals shall be installed at right angles to the main.

m. Show proposed access right-of-way to existing or proposed off-street sewers and note that “access shall be perpetual for maintenance vehicles and that nothing shall be erected or planted during construction of sewers, streets, utilities, buildings, or landscaping, or thereafter, that would hinder or prevent vehicular access”. Provide access right-of-way around any existing or

relocated streams, swamps, wetlands or steep slopes and provide curb cuts at access point from street. Access shall not be across a private paved driveway, nor shall it be hindered by construction, retaining walls or other utilities and appurtenances such as boxes or fire hydrants.

D. Submit the following information as a supplement to the construction drawings:

1. Number of persons to be served initially.

2. Number of persons to be served in the future.

3. Number of acres to be served initially.

4. Number of acres to be served in the future.

5. Initial and future sanitary sewer flows, if the development is other than residential.

E. Final Acceptance Submissions:

1. Record Drawings:

a. Before the work will be accepted by the AUTHORITY, submit PDF and AUTOCAD format digital file (after final approval), reproducible mylars (after final approval) and two (2) copies of all working Drawings, modified as necessary to show the facilities as constructed. Submit a certificate with the record reproducibles attesting to the correctness of all information shown on the Drawings.

b. The AUTHORITY intends to use prints of the reproducibles to provide information to designers and contractors as required by the Commonwealth of Pennsylvania Underground Utilities Act 287 and its amendments thereto.

c. A checklist for record drawings is attached. At a minimum, the DEVELOPER shall comply with items on the checklist. The AUTHORITY reserves the right during the review process to request changes or modifications to the drawings that make the plan clear and legible.

d. Record drawings shall indicate:

1) Sheet size 24” x 36”.

2) Index Map at 400’ scale as identified in Section 01300.1.04.C.2- Index Map.

3) Lot lines and lot number adjacent to sewer easement or roadway.

4) All information as identified in Section 01300.1.04.C.3- Plan and Profile Drawings.

5) Name of Design Engineer/Surveyor including seal and signature.

6) Name of DEVELOPER including address.

7) All manhole numbers as provided by the AUTHORITY.

2. Straight Line Diagrams: DEVELOPER shall prepare and submit one copy of the lateral locations to the AUTHORITY. See sample form immediately following this Section. Forms are available from the AUTHORITY. Sewers including manhole numbers shall be indicated.

3. Final Acceptance Tests, as specified under the various Sections, completed and successful.

4. Final Acceptance Affidavits: An affidavit and such other satisfactory evidence as is required that all labor, material, rentals, contractors and subcontractors, and indebtedness arising out of performance of the sewer contract work have been paid; and that all other claims against the DEVELOPER, DEVELOPER'S CONTACTOR, or Subcontractors arising out of performance of the sewer contract work either have been paid or that the DEVELOPER, DEVELOPER'S CONTRACTOR or Subcontractor has and will maintain in force such Public Liability and Property Damage Insurance as will fully protect them and the AUTHORITY from any such claims as may be pending or that may thereafter arise, to include any work performed during or at the end of the DEVELOPER'S Guarantee period of 18 months. Such guarantee work as may be required as a result of the AUTHORITY'S Guarantee Re-Inspection, which will take place at the end of the 18-month Guarantee time period.

5. Submit a copy of the existing deed indicating that the DEVELOPER owns the land to be conveyed to the AUTHORITY.

6. Submit deed of dedication/Bill of Sale of all sewer mains and manholes to the AUTHORITY. All laterals, grinder pumps, private pressure pipe systems and off-street sewers not covered by a right-of-way shall remain with the property owner, DEVELOPER or by a homeowners association where required by Township regulations.

7. Submit GPS locations of center of manholes, each straight tee and each observation tee.

1.04. RIGHT-OF-WAY DRAWINGS

A. Provide two (2) copies of all required plats and descriptions for rights-of-way during the design phase. Generic form for Deed of Easement to be used is attached at the end of this Section. Attention is directed to the prohibitions for changes in grade or construction within the easement. Rights-of-way shall be recorded in the courthouse by the AUTHORITY.

B. Provide a deed of conveyance/Bill of Sale transferring ownership of the sanitary sewer extension to the AUTHORITY.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

Design Checklist for
Sanitary Sewer Extensions

Job Number: _____

Developer: _____

Development: _____

Date: _____

Submittal No.: _____

Item Number	Item	Acceptable	Unacceptable
1	Base Datum on existing sewers.		
2	Note on each Drawing "All materials used and construction methods employed are to be in accordance with the latest standards of the Lower Paxton Township Authority Standard Construction and Materials Specifications."		
3	Note on Drawings "For sewer detail drawings reference Standard Construction and Material Specifications, Lower Paxton Township Authority."		
4	Note on Drawings "Contractor shall test pit all existing utility crossings prior to installing any sanitary sewer pipe to verify existing horizontal and vertical elevations to assure no conflict with new sewer."		
5	Note on Drawings "When sewers are installed through Authority's right-of-way, including planter 'islands', no house, structure, trees, shrubs, gardens, or obstruction on or over, or that will interfere with vehicular access for the construction, maintenance or operation of any sewer, shall be installed within limits of the easement, and no changes in the grade or contour over the sewer shall be permitted in accordance with the AUTHORITY's standard Deed of Dedication."		
6	Note on Drawings "Laterals to be placed outside of driveway and sidewalk areas, five (5) feet from any water service and five (5) feet from any street tree."		
7	Name of Engineer/Surveyor		
8	Seal of Engineer/Surveyor		
9	Signature of Engineer/Surveyor		
10	Name of Development and Owner		
11	Sheet Size 24 × 36		
12	Revision Dates Shown		
13	Indicate by note on the Index Map(s) or Plan and Profile sheet(s), the Water Quality Management Permit Number, or DEP File Code No. if no WQM permit was required, of the existing facility that the proposed sewers are connecting into.		
14	Is planning module approval shown on drawings?		
15	Act 287 Utility Lists and Design Serial Number		
16	Show location of buildings and lots		

Item Number	Item	Acceptable	Unacceptable
17	Index Map (1"=400') indicating: Sewer sizes other than 8-inch		
	Names of Streets		
	Manhole Numbering		
	Existing MH Labels		
18	Check that Prefix and number system is consistent with overall system numbering.		
19	Elevation of Basements shown on Plan or if no basement service then show first floor elevation and add "Note: Basement service not provided for these lots."		
20	Indicate all utilities on the plans and profiles.		
21	Plan view 1"=50' Profile 1"=10'		
22	Phasing of sanitary sewer should indicate the last sewer section installed to extend 1 manhole run beyond current phase being constructed.		
23	Maximum run length of 400 feet.		
24	Minimum cover of 5 feet		
25	Minimum manhole height with standard 4-feet diameter manhole and 8-inch pipe is 5.1 feet. If flat top manhole is necessary, verify necessary minimum height.		
26	Check for clearance with water main (10 feet horizontal and 18-inches vertical).		
27	Check for clearance with storm sewer and other utilities (5 feet horizontal and 18-inches vertical). Any crossings shall occur at 90 degree angles unless otherwise approved.		
28	Check for 5' horizontal separation between water services and laterals.		
29	Are steep slope sewers in Right-of-Way constructed using DIP?		
30	Any constructability issues?		
31	Placement of manholes in street. Manholes should be 7 feet from the curb and the frames must be located outside of the wheel path.		
32	Placement of manholes in parking lots. Manhole shall be located outside of parking spaces.		
33	Indicate those manholes that require watertight covers.		
34	Manholes located in undeveloped areas shall be set at two feet above finale grade.		
35	Invert Ins, Invert Outs, Rim Inverts provided?		
36	Correct slopes and lengths?		
37	Minimum Slope of 0.5% for 8-inch pipe provided?		
38	Terminal Run Minimum Slope is 1.0%.		
39	Minimum slope across manhole is 0.1 feet for 8-inch pipe.		
40	If slopes are between 4% to 9%, the inverts across manholes shall be 4-inches for constructability.		
41	If steep slopes (9% to 20%), the inverts across manholes shall be 6-inches for constructability.		

Item Number	Item	Acceptable	Unacceptable
42	If steep slopes (greater than 20%), the inverts across manholes shall be 12-inches for constructability. Slopes shall not exceed 25%.		
43	Lateral stationing from downstream manhole shown?		
44	Size of Laterals shown? Should be 6-inch.		
45	Lateral Length provided?		
46	Location of observation tee between the grass strip between the curb and sidewalk or within the right of way line.		
47	Laterals shown a minimum of 5 feet from outside walls of manholes?		
48	Only straight tees shall be used to tie laterals into the main unless the lateral is constructed on a cul-de-sac, then wyes are permitted.		
49	Verify depth of sewer doesn't exceed Authority requirements. If sewer is greater than 20 feet, Authority must give prior approval.		
50	If sewer is deep, greater than 18 feet, DIP should be used.		
51	If manhole is greater than 20 feet deep an intermediate platform shall be installed and the manhole shall be 5 feet in diameter.		
52	If invert in and invert out elevation difference is greater than 24 inches, an inside drop connection shall be installed and the manhole shall be 5 feet in diameter.		
53	If invert in and invert out elevation difference is less than 24 inches, a smooth flow transition (channel) shall be installed to eliminate splash conditions.		
54	All sewers installed in existing streets shall be backfilled with stone as noted in detail. See details for backfill requirements of future private streets and streets to be dedicated to the Township.		
55	Where there is fill beneath the proposed sewer, the pipe shall be DIP. SDR 26 may be approved if stone bedding is extended to virgin ground and the fill is compacted to 95% of the maximum dry density in unpaved areas and 100% of the maximum dry density in paved and gravel areas; however, prior approval from Authority is required to use SDR 26		
56	All sewers installed in wetlands shall be DIP.		
57	Do stream crossings meet County standards for use of ductile iron pipe (DIP)?		
58	Is all DIP shown lined with Protecto 401?		
59	Right-of-Way of 30 feet (min) shall be provided.		
60	Do the plans indicate Electric or Other Utilities to be installed in the sewer easement? Minimum distance is 5 feet. All utility junction boxes shall be located outside of sanitary sewer easements.		
61	Excavation shall not interfere with normal 45 degree bearing splay of foundations.		

Item Number	Item	Acceptable	Unacceptable
62	Curb cuts and access roads must be provided when sewer extends off of streets so that there is right-of-way access for vehicles. Add note that "Access shall be perpetual for maintenance vehicles and that nothing shall be erected or planted during construction of sewers, streets, utilities, buildings, or landscaping, or thereafter, that would hinder or prevent vehicular access."		
63	When tying into existing manholes a note should be added to the plan indicating that the existing manhole must pass a vacuum teste or be replaced to ensure water tightness.		
64	Is a right-of-way gate needed?		
65	If on-lot grinder pumps are needed, does the design comply with the Specifications?		
66	Are the next 3 to 4 manholes downstream of a pumping station's force main connection and the next 1 to 2 manholes downstream of grinder pump connections shown as lined or to be lined if existing?		
67	If private sewer extension, indicate “Private Sewer” on covers.		
68	Existing sewers to be abandoned within streets shall be filled with flowable fill per abandonment detail. Existing sewers to be abandoned within right-of-ways per abandonment manhole detail.		
69	Is a grease interceptor or trap or oil separator required? Show size and show sampling MH.		

Record Drawings
Technical Review Checklist

Job Number: _____

Developer: _____

Development: _____

Date: _____

Submittal No.: _____

Item Number	Item	Acceptable	Unacceptable
1	Drawings Titled “Record Drawings” (“As-Builts” are not acceptable).		
2	Base Datum on existing sewers.		
3	Name of Engineer/Surveyor.		
4	Seal of Engineer/Surveyor.		
5	Signature of Engineer/Surveyor.		
6	Name of Development and Owner.		
7	Index Map (1”=400’)		
8	Sewer Other than 8-inch		
9	Names of Streets		
10	Manhole Numbering		
11	Location of building(s), lot lines and lot numbers.		
12	Plan view 1 inch = 50 feet; Profile 1 inch = 10 feet		
13	Check MH Prefix and number system.		
14	Right-of-way – 30 feet add note about perpetual access for maintenance.		
15	Invert Ins, Invert Outs, Rim Inverts shown on Drawings.		
16	Lateral Stationing from downstream manhole.		
17	Size of Laterals Shown.		
18	Lateral Length - from Main to end of pipe.		
19	Lateral Depth at end of service lateral.		
20	Sheet Size 24-inch × 36-inch.		
21	Correct Slopes.		
22	Type of mainline pipe indicated on profile.		
23	GPS location of center of manholes, each straight tee and each observation tee provided.		
24	PDF and AUTOCAD format drawings (features shall be contained in separate layers)		

Date: _____

Mini-Basin: _____

LOWER PAXTON TOWNSHIP AUTHORITY
AS-BUILT SANITARY SEWVER LATERAL LOCATIONS

Project _____ Length _____ LF

Street _____ Pipe Size _____ Type _____

Contractor _____ Grade _____ % Max Depth _____ FT

Engineer _____ Air Test _____ Lbs _____ Secs.

Submited _____ Internal _____ Final _____

House/Lot No.	Depth at End	Lateral Length	Station of "T"	MH	INVERT	Station of "T"	Lateral Length	Depth at End	House/Lot No.
				STA 0+00					
				MH	INVERT				

DEED OF DEDICATION
SANITARY SEWER RIGHTS OF WAY FOR _____

THIS INDENTURE, made the _____ day of _____, in the year two thousand and _____

BETWEEN

_____, Grantor

AND

LOWER PAXTON TOWNSHIP AUTHORITY, Dauphin County, Pennsylvania Grantee

WITNESSETH That the said Grantor, for and in consideration of the sum of _____, has granted, bargained, released and confirmed and by those presents does grant, bargain, release and confirm unto the said Grantee, its successors and assigns those certain rights-of-way, including the sewer main lines and manholes located within the said rights-of-way and dedicated simultaneously herewith, to the Lower Paxton Township Authority, County of Dauphin, Pennsylvania, as more particularly described on the attached legal description marked as Exhibit "A" and the attached plat(s) marked as Exhibit "B".

SAID rights-of-way being part of the same premises which _____, by a deed dated _____ and recorded in the Office of the Recorder of Deeds in and for Dauphin County, Pennsylvania in Deed Book _____ Page _____, granted and conveyed unto _____, Grantor herein.

TO HAVE AND TO HOLD the said rights-of-way located within the above described tract, unto the said Grantee as more particularly described on attached Exhibits "A" and "B" to the said Grantee to and for the only proper use and behoof of the said Grantee, its successors and assigns forever as a part of the public sewer system, to operate, maintain, replace and remove such sewer system as the Grantee may from time to time require, consisting of underground pipes, conduits, manholes and drains, upon, over and under a strip of land as more particularly described in Exhibits "A" and "B" hereto attached and made a part hereof; together with the right of ingress and egress over and across the lands of the Grantor to and from said strip for the purpose of exercising the rights herein granted; to place surface markers beyond said strip, to clear and keep cleared all trees, roots, brush and other obstructions to allow vehicular access from the surface and sub-surface of said strip, and to install gates and stiles in any fences crossing said strip.

The Grantor is to have full use and enjoyment of said premises except for the purposes granted said Grantee, and provided that Grantor shall not construct or permit to be constructed any house, structure, trees, shrubs, gardens, or obstruction on or over, or that will interfere with vehicular access for the construction, maintenance or operation of any sewer line or appurtenances constructed hereunder, and will not change the grade or contour over said sewer line without written approval of Grantee.

The rights-of-way hereby granted shall be subject, however, to the rights of the Grantor herein in the future development of the real estate adjacent to the rights-of-way to lay out and dedicate a street on, upon and over said rights-of-way.

AND, the parties hereto, for themselves, their heirs, executors, successors and assigns, hereby covenant and agree that no structure or obstruction shall be constructed or permitted on said right-of-way.

AND, the said Grantor, for itself, its successors and assigns, by these presents, covenants, promises and agrees to and with the said Grantee, its successors and assigns, that neither the said Grantor, nor its successors and assigns will at any time hereafter ask, demand or recover or receive of or from the said Grantee, its successors and assigns, any sum or sums of money as and for damages for and by reason of the conveyances of the aforesaid tracts of land for public sanitary sewer purposes, and by reason of the physical grading, improving and maintaining said sanitary sewer rights-of-way.

AND, the said Grantor, for itself, its successors and assigns, does covenant, promise and agree, to and with the said Grantee, its successors, by these presents, that it, the said Grantor and its successors and assigns, by these presents, that the Grantor has not done or committed any act, matter or thing whatsoever whereby the premises hereby granted, or any part thereof, is, are, shall or may be impeached, charged of encumbered in title, or otherwise howsoever.

IN WITNESS WHEREOF, the Grantor, has caused this indenture to be signed the day and year first above written.

ATTEST:

_____
Grantor

_____

By: _____
Title

Certificate of Residence

I hereby certify that the mailing address of the Grantee is:

425 Prince Street
Harrisburg, PA 17109

_____
Agent/Attorney for Grantee

ACKNOWLEDGEMENT

COMMONWEALTH OF PENNSYLVANIA :
: ss:
COUNTY OF DAUPHIN :

On this, the _____ day of _____, 20__, before me, a Notary Public, the undersigned, personally appeared _____, known or proven to be the President of _____, the Grantor in the foregoing instrument and that he executed the foregoing instrument on behalf of Grantor for the purposes therein contained.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

_____
Notary Public

My Commission Expires:

LOWER PAXTON TOWNSHIP AUTHORITY
SEWER EXTENSION AGREEMENT

PROJECT:_____

TAX PARCEL ID:_____

THIS AGREEMENT made and executed on this ___ day of _____, between the LOWER PAXTON TOWNSHIP AUTHORITY, a body corporate and politic existing by virtue of the laws of the Commonwealth of Pennsylvania, with its principal office at 425 Prince Street, Suite 139, Harrisburg, Pennsylvania 17109 (hereinafter referred to as AUTHORITY),

and

_____

(Name, whether corporation, partnership or individual,

_____

and address of DEVELOPER)

_____

Phone Number Contact Person

(hereinafter referred to as DEVELOPER)

WITNESSETH:

WHEREAS, the DEVELOPER intends and is about to develop for residential or other purposes a certain tract of land situated within the sewer areas of the AUTHORITY, which tract, the location and dimensions of the streets and the existing structures and those intended to be erected thereon, together with the planned number of E.D.U.'s are generally designated and described on the Final Subdivision Plan, dated _____ and approved by the Supervisors on _____is hereby incorporated by reference.

WHEREAS, the DEVELOPER has made application to the AUTHORITY for permission to construct, at its own cost and expense and by its own contractors, a sanitary sewer system extension within the above designated and described tract and to connect same when completed into the existing sanitary sewer collection system of the AUTHORITY.

NOW, THEREFORE, in consideration of the payments and promises hereinafter made in accordance with the Municipality Authorities Act of 1945, Act of May 2, 1945, P.L. §382, as amended, 53 P.S. 301, et seq, both parties intending to be legally bound, do mutually agree as follows:

1. (a) A document of the AUTHORITY entitled "Standard Construction and Material Specifications for Wastewater Collection System Extensions dated **May 2017**, hereinafter referred to as "Specifications", together with any reference as though fully set forth herein. Should any provisions of this Agreement be inconsistent with the provisions of the aforesaid "Specifications", the provisions of the latter, according to their latest amendments, shall prevail.

(b) The DEVELOPER, at its own cost and expense, shall cause to be prepared, by a Professional Engineer licensed in the Commonwealth of Pennsylvania, all detailed plans, permit applications and planning modules, hereinafter collectively referred to as "permit documents", for the proposed extension to the sanitary sewer collection system of the AUTHORITY.

(c) Such plans shall be prepared in compliance with the above described "Specifications".

(d) All such "permit documents" shall be supplied to the AUTHORITY as detailed in the aforesaid "Specifications".

(e) Upon receipt of such "permit documents" and fees, as periodically adopted by the AUTHORITY, the AUTHORITY shall cause same to be reviewed. Such "permit documents" shall be revised or amended, if necessary, by the DEVELOPER until they are approved by the AUTHORITY.

(f) The approved "permit documents", where applicable, shall be submitted by the AUTHORITY, as detailed in the "Specifications" to the Department of Environmental Protection of the Commonwealth of Pennsylvania (hereinafter referred to as the DEP). Upon receipt of all required approvals of such regulatory agencies as are required by law and upon compliance by the DEVELOPER with all applicable local ordinances, regulations, resolutions and specifications, the AUTHORITY shall issue the DEVELOPER a written Notice to Proceed with sewer construction.

2. The DEVELOPER shall hire, employ and pay its contractor, contractors or subcontractors to construct the extension according to the aforesaid approved plans, and the AUTHORITY shall have no responsibility or liability for payment of any part of the costs and expenses arising out or relating to said construction or the labor, material, and equipment used therein or thereon.

3. During the time of construction of the sanitary sewer extension, and until the sewer extension is dedicated to the AUTHORITY, the DEVELOPER shall indemnify and

save harmless the AUTHORITY and all of its officers, agents and employees, from all claims, liabilities, suits, judgments, verdicts, actions or proceedings at law or equity of any kind whatsoever arising out of, connected with or caused by any operation or matter in, of or related to the sewer extension which is the subject of this Agreement, including among other things, injury to property, and injury to and sickness and death of each and every person or persons whatsoever, including without limitation, members of the public and officers, agents and employees of the DEVELOPER, the DEVELOPER'S contractors, contractors, or sub-contractors, and the DEVELOPER shall, if required by the AUTHORITY produce evidence of settlement of any such claims, suits, liabilities, judgments, verdicts, actions or proceedings. The DEVELOPER shall defend or cause to be defended all such above described claims, liabilities, judgments, verdicts, suits, actions or proceedings, groundless or not, which may be commenced against the AUTHORITY and the DEVELOPER shall pay or cause to be paid any and all judgments which may be secured in any such actions, claims, liabilities, judgments, verdicts, proceedings or suits, and the DEVELOPER shall defray or cause to be defrayed any and all expenses, including costs and attorney's fees, which may be incurred in or by reason of such actions, claims, liabilities, judgments, verdicts, proceedings or suits. Such defense and indemnification shall be provided by including the AUTHORITY and all of its officers, agents and employees as additional insureds under the policies of the DEVELOPER. The DEVELOPER and its contractors shall be solely responsible for construction site safety, safety practices, supervision, direction of personnel, use of equipment and the means, methods and manner of construction.

4. The DEVELOPER agrees to give the AUTHORITY ten (10) days written notice of DEVELOPER'S intention to begin construction of the sewer system so that its construction may be properly inspected by the AUTHORITY, and seventy-two (72) hours written or verbal notice before actual construction work shall begin. The AUTHORITY reserves the right to withhold approval with respect to any work which has begun before the expiration of the ten (10) day notice period without the consent of the AUTHORITY. Furthermore, the AUTHORITY shall not approve any improperly constructed work, the existence of which the AUTHORITY has notified the DEVELOPER of after the inspection has disclosed such improper construction. At all times, the sewer contractor shall keep on the construction site, "permit documents" and the AUTHORITY's current "Specifications".

During the course of construction, all materials, workmanship and compliance with the approved plans shall be subject to the inspection of the AUTHORITY or its designee.

The AUTHORITY shall not perform or be responsible for any hiring, firing, supervision, superintendence, direction of personnel, use of equipment, construction site safety, safety programs or the direction of the manner or method of construction employed by the contractors, sub-contractors, agents, servants or employees; nor shall the AUTHORITY be liable for any matters or claims arising therefrom. The AUTHORITY shall be under no obligation or liability arising from the work of or injuries to the contractors, their subcontractors, agents, servants or employees on said Project.

In the event the materials and/or workmanship are found by the AUTHORITY to be in non-compliance with the previously described "Specifications", the AUTHORITY or its designee shall issue a written Notice to Stop Work. The DEVELOPER hereby agrees to immediately cease construction operations and replace and/or correct the non-compliant materials and/or workmanship. The approval to proceed with construction shall be reissued only upon receipt of written procedures from the DEVELOPER to prevent future non-compliant occurrences and inspection by the AUTHORITY or its designee of the corrected non-compliant materials and/or workmanship. The DEVELOPER shall also be responsible for compliance with inspection requirements of applicable governmental agencies and utility companies in connection with construction of the sewer extension.

5. Promptly upon completion of the extension, but no longer than sixty (60) days after completion and prior to issuance of a sewer connection permit thereto the DEVELOPER shall cause to be prepared and furnished to the AUTHORITY, at the expense of DEVELOPER, the following:

(a) Final Acceptance Submissions as detailed in the "Specifications", which include the following:

(1) Record Drawings.

(2) Red-lined Working Drawings

(3) Straight Line Diagrams.

(4) Final Acceptance Affidavits.

(5) Legal Description for Deed of Dedication for Centerline of Sanitary Sewer.

(6) Plat and Legal Description for Sanitary Sewer Easements (when applicable).

(7) Existing Property Deed.

(b) Maintenance Security, as described in the Financial Securities Agreement referenced in Paragraph #6 hereof.

(c) Executed Deed of Dedication Document.

(d) Executed Deed of Easement Document (when applicable).

The DEVELOPER shall prepare the Plat and Legal Description for the sewers to be dedicated to the AUTHORITY. The Deed of Dedication shall be prepared and recorded by the AUTHORITY at the cost of the DEVELOPER. The AUTHORITY shall not release the financial security or accept the sanitary sewers until the AUTHORITY is

in receipt of items (a) through (d) listed above. Upon Final Inspection and approval, the AUTHORITY shall issue a written Final Acceptance Certificate.

6. Prior to the AUTHORITY issuing Notice to Proceed with sewer construction to the DEVELOPER, as referred to in paragraph #1 (f) hereof, the DEVELOPER shall:

(a) Execute with the AUTHORITY a Financial Security Agreement in a form to be provided by the AUTHORITY in accordance with the Municipality Authorities Act of 1945, Act of May 2, 1945, P.L. 382, as amended, 53 P.S. 301, et seq.

(b) Deposit with the AUTHORITY, the receipt whereof is hereby acknowledged, the sum of _____which shall be held by the AUTHORITY, with interest, for application by the AUTHORITY to or toward the following costs chargeable to it in the performance of this agreement:

(1) All reasonable and necessary charges of its Consulting Engineers for examination and approval of the plans and specifications as referred to in Paragraph #1 (b) hereof and the submission thereof to the DEP under Paragraph #1 (f) hereof; and

(2) All reasonable and necessary fees and charges, if any, paid by the AUTHORITY to the DEP as referred to in Paragraph #1 (e), hereof; and

(3) All reasonable and necessary expenses and charges of inspection as referred to in Paragraph #4 hereof and as further defined by Resolution as periodically adopted by the AUTHORITY; and

(4) All reasonable and necessary Attorney's fees and expenses.

The Authority shall provide monthly statements to the DEVELOPER indicating the status of said funds.

Should the fund above deposited exceed the actual cost to the AUTHORITY of said specified charges and fees, the balance remaining upon completion of the project shall be refunded in full to the DEVELOPER; but should said deposit be insufficient in the above respect, the DEVELOPER shall pay the deficiency to the AUTHORITY upon demand.

7. Upon receipt and recording of the Deed of Dedication by the AUTHORITY, the sewer extension project and all parts and appurtenances thereof shall be, become, and remain the sole, absolute, and permanent property of the AUTHORITY or its assigns free and clear of any lien, obligation, other liability in favor of the DEVELOPER, its successors or assigns, its contractor or contractors, its and their laborers and materialmen and any of their creditors, or in favor of any other person or corporation, to the same end and effect as if the AUTHORITY had constructed the extension project with its own labor and at its own expense; and thereafter the AUTHORITY shall maintain, repair,

rebuild and otherwise act toward said extension as its own property and at its own cost and expense and the DEVELOPER shall have no further obligation or responsibility thereto except as hereinafter provided. Nothing herein shall be construed to discharge or dilute the contractual obligations of the contractor, contractors, or sub-contractors of the DEVELOPER to guarantee their workmanship and to maintain the construction site for such periods of time following completion as may have been agreed upon by contractors and the DEVELOPER. The DEVELOPER shall and does hereby, for a period of eighteen (18) months following the delivery of said Deed of Dedication and Final Acceptance by the AUTHORITY, guarantee the said sewer system as to workmanship and materials as outlined in the Financial Security Agreement required in Paragraph 6(a) hereof.

8. This Agreement is executed in and shall be construed in accordance with the laws of the Commonwealth of Pennsylvania and shall be binding upon and inure to the benefits of the parties hereto, and their heirs, representatives, successors, and assigns.

9. Neither this Agreement nor the obligations of the parties set forth herein shall be modified or changed except by written agreement executed by all parties hereto.

10. Each person whose signature appears below represents that he or she has been duly authorized in accordance with law to execute this Agreement with legally binding effect, in conformity with the Uniform Written Obligation Act of 1927, upon the party represented.

IN WITNESS WHEREOF, the parties hereto have set their hands and seals on the day and date first above written.

ATTEST:

LOWER PAXTON TOWNSHIP,
AS AGENT FOR THE AUTHORITY

_____
Secretary

By:_____
Chairman

(SEAL)

_____
DEVELOPER

WITNESS:

By:_____
Signature and Title

_____

(SEAL)

Lower Paxton Township Authority
Sewer Extension Agreement Amendment

Development
(Gravity Sewer Installation)

WHEREAS, Item #5 of the Sewer Extension Agreement between Developer, "Developer" and Lower Paxton Township Authority "Authority" requires that prior to individual connections to the sanitary sewer system, the Developer shall furnish to the Authority record drawings, straight line diagrams, final acceptance affidavits, plat and legal description for deed of dedication, right-of-way drawings, and maintenance security.

WHEREAS, the Developer has requested individual connections to the sanitary sewer for the properties located in Development.

WHEREAS, the Developer has deposited with the Authority monies toward costs related to the Sewer Extension Agreement. These funds have been deposited in an escrow account, bearing interest, with monthly statements provided to the Developer.

WHEREAS, the Developer has agreed to provide the Authority permission to utilize these funds to prepare Item #5, sub-paragraph a, b, c and d of the Sewer Extension Agreement.

NOW, THEREFORE, in consideration of the payments and promises hereinafter made in accordance with the Municipality Authorities Act of 1945, Act of May 2, 1945, P.L. 382, as amended, 53 P.S. 301, et seq, both parties intending to be legally bound, do mutually agree as follows:

1. If the final acceptance submissions under Item #5, sub-paragraph a, b, c and d of the Sewer Extension Agreement are not provided by Date, the Authority at the cost and expense of the Developer, shall use escrow funds established under the Sewer Extension Agreement to prepare said documents. The documents shall be prepared

by a Professional Engineer licensed in the Commonwealth of PA all details and documents required.

2. The Authority agrees to provide a statement indicating all funds paid to the engineer for this service.

3. Before the Authority issues connection permits for the properties the Developer shall deposit with the Authority a check in the amount of $ Amount to cover additional fees that may be incurred under this agreement.

4. In accordance with the Agreement, the Authority agrees to return the balance remaining in the escrow account upon completion of the project.

IN WITNESS WHEREOF, the parties hereto have set their hands and seals on this _____ day of _____, _____.

ATTEST:

Lower Paxton Township
As Agent for the Authority

_____
Secretary

_____
Chairman

Developer
Developer

_____
Signature and Title

Address

Phone: Phone
Fax: Fax

_____
WITNESS:

(Seal)

SECTION 01500

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01. REQUIREMENTS INCLUDED

A. Provide and maintain methods, equipment, and temporary construction, as necessary to provide controls over environmental conditions at the construction site and related areas under DEVELOPER'S control. Remove controls and temporary facilities at the completion of work.

1.02. RELATED REQUIREMENTS

A. Approved Erosion and Sedimentation Control Plan.

B. Stream Crossing and Wetlands Encroachment Permits.

C. Traffic Control Plan(s).

D. Other Local and State Regulatory Requirements as Applicable.

1.03. DUST CONTROL

A. Provide positive methods and apply dust control materials to minimize raising dust from construction operations, and provide positive means to prevent air-borne dust from dispersing into the atmosphere.

1.04. DIVERSION AND CARE OF WATER DURING STREAM CROSSINGS

A. Where required, DEVELOPER will obtain the necessary permits for wetlands and stream crossings from the Pennsylvania Department of Environmental Protection and the Pennsylvania Fish Commission. DEVELOPER shall not perform any work in a stream channel, unless the required permit has been issued, and whether or not the permit is subject to stipulations or special conditions. DEVELOPER shall take sufficient precautions to prevent pollution of wetlands or streams with fuels, oils, bitumens, or other harmful materials. DEVELOPER shall conduct operations in such a way that will minimize damage to the stream channel and stream banks, prevent erosion of stream banks and deposits of excess sediment in streams, or otherwise harm streams or the properties along streams.

B. Diversion and care of water during swamp area or stream crossing and canal embankment excavation work shall consist of diverting and maintaining the flow during the construction period, and dewatering work areas. All permanent construction work shall be performed in areas free from water unless otherwise specifically authorized by ENGINEER. The finished structures and portions thereof shall be protected from damage by flowing water until completion of work.

C. The DEVELOPER shall provide suitable dry trench conditions for laying the pipe by diverting streams and/or dewatering the swamp areas. In diverting streams, extreme care must be used to prevent property damage.

D. Removal of Temporary Work: Unless otherwise authorized, all temporary protective structures and other works shall be removed upon completion of work. All banking and filling which is not part of the permanent work shall be removed to the original ground surfaces existing prior to beginning of work and all diversion channels, ditches, and other cavities shall be backfilled with embankment material, placed and compacted in accordance with Section 02221. Materials used in temporary construction shall be disposed of to the satisfaction of the ENGINEER.

1.05. WATER CONTROL

A. Provide methods to control surface water to prevent damage to the Project, the site, or adjoining properties.

1. Control fill, grading and ditching to direct surface drainage away from excavations, pits, tunnels and other construction areas, and to direct drainage to proper runoff.

B. Maintain excavations and trenches free of water, provide and operate pumping equipment of a capacity to control water flow.

C. Dispose of drainage water in a manner to prevent flooding, erosion, or other damage to any portion of the site or to adjoining areas, comply with applicable codes and regulations, and Article 1.07 of this Section.

1.06. DEBRIS CONTROL

A. Maintain all areas under DEVELOPER'S control free of extraneous debris.

B. Initiate and maintain a specific program to prevent accumulation of debris.

1. Provide containers for deposit of debris.

2. Prohibit overloading of trucks to prevent spillages.

a. Provide periodic inspection to enforce requirements.

C. Schedule periodic collection and disposal of debris.

1. Provide additional collections and disposal of debris whenever the periodic schedule is inadequate.

1.07. SOIL EROSION AND SEDIMENTATION CONTROLS

A. Plan and execute construction to control surface drainage to prevent erosion and sedimentation.

B. Comply with Erosion and Sedimentation Control Handbook, Dauphin County Conservation District and with DEVELOPER'S approved plan.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.01. REMOVAL

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

END OF SECTION

SECTION 01561

PROTECTION OF PROPERTY FROM WASTEWATER BACKUPS, SPILLS AND DISCHARGES

PART 1 GENERAL

1.01. RELATED DOCUMENTS

A. Division 2 Specifications, as applicable, including proprietary specifications of individual system and product manufacturers.

1.02. CONTRACTOR'S RESPONSIBILITIES

A. Precautions shall be taken to insure that the DEVELOPER'S CONTRACTOR'S operations do not cause backups, spills, and discharges of wastewater on private property or into the waters of the Commonwealth of Pennsylvania during construction, including while bypass pumping as referenced in Section 02715.

B. In the event of a wastewater backup, spill, or discharge, the CONTRACTOR shall provide immediate notification to the OWNER, property owner, and the Pennsylvania Department of Environmental Protection, if applicable.

C. Any wastewater backups, spills, and discharges shall be immediately cleaned-up by the CONTRACTOR.

D. The CONTRACTOR shall pay clean-up costs and all claims for property damage resulting from wastewater backups, spills, and discharges caused by the CONTRACTOR'S operations.

1.03. LIST OF EMERGENCY CONTACTS

A. Prior to commencement of the CONTRACTOR'S operations, the CONTRACTOR shall provide the OWNER with a list of the CONTRACTOR'S emergency contacts, including CONTRACTOR personnel and at least two qualified/experienced wastewater clean-up subcontractors.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

SECTION 01570

TRAFFIC REGULATION

PART 1 GENERAL

1.01. DESCRIPTION

A. Purpose: The purpose of this Section is to provide the DEVELOPER with general guidelines for the control of traffic while the work of the Project within street right-of-way is being performed. The goal is to promote safe and efficient traffic movement through work areas and safety for the DEVELOPER'S work force. The DEVELOPER, however, is responsible for all safety on the job site. The traffic control plan should be submitted to the Lower Paxton Township Police Department and TOWNSHIP ENGINEER for review.

1.02. QUALITY ASSURANCE

A. Requirements of Regulatory Agencies:

1. Furnish, erect and maintain at closures, intersections, and throughout the Project, the necessary approved barricades, suitable and sufficient lights, approved reflectors, danger signals, warning, detour and closure signs. Provide a sufficient number of watchmen and take the necessary and legal precautions for protection of work and safety of the public. Barricades, danger signals, signs and obstructions shall be illuminated from sunset until sunrise. Materials and safety devices (i.e., barricades, flashing warning lights, torches, reflectors and signs) shall conform to the Pennsylvania Department of Transportation Specifications.

2. Traffic regulation on Township streets shall conform in all respects to the requirements for traffic control on State Highways except enforcement will be by Township police. A traffic control plan should be submitted and approved by the Lower Paxton Township Police and TOWNSHIP ENGINEER.

3. State Highways:

a. The DEVELOPER is advised that he is required to provide traffic control in complete compliance with the rules and regulations of the Pennsylvania Department of Transportation, including but not necessarily limited to the following:

1) PENNDOT Publication 213 – Temporary Traffic Control Guidelines.

2) PennDOT Publication 234 – Flagging Handbook.

3) PA Code Title 67, Transportation: Chapter 212 – Official Traffic Control Devices (publication 212).

4) PennDOT publication 35 approved construction materials (bulletin 15).

5) PennDOT publication 408/2016, specifications and current interims, specifically Section 901-Maintenance and Protection of Traffic During Construction.

6) Federal Highway Administration, Manual on Uniform Traffic Control Devises.

7) PennDOT publication 236, Handbook of Approved Signs.

8) PA Code Title 67, Transportation: Chapter 441 – Access to and Occupancy of Highways by Driveways and Local Roads.

9) PA Code Title 67, Transportation: Chapter 459 – Occupancy of Highways by Utilities.

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

1.03. SUBMITTALS

A. Submit Traffic Control Plans (TCPs) to the TOWNSHIP ENGINEER for review and approval prior to start of construction. Each road closure setup must have its own TCP reviewed and approved by the OWNER. Each TCP shall have a narrative describing what work is being performed and the order of that work, and shall be legible in every detail. All work within roadways must be covered by the proposed TCP. No work may commence without an approved TCP. Paving operations must also have an approved TCP.

Each TCP shall conform to the following, and must list the following notes:

1. Control traffic in accordance with the current edition of PennDOT publication 408, section 901.

2. Furnish, erect, place and maintain traffic control signs and devises and maintain traffic during course of construction and at all other times in accordance with the methods indicated on these drawings and:

a. The special provisions of the contract.

b. PA code, title 67, Chapter 212, Official Traffic Control Devises (publication 212).

c. PennDOT publication 213, Temporary Traffic Control Guidelines.

d. PennDOT publication 35 approved construction materials (bulletin 15).

e. PennDOT publication 408/2016, specifications and current interims.

f. Federal Highway Administration, Manual on Uniform Traffic Control Devices.

g. PennDOT publication 236, Handbook of Approved Signs.

3. Remove the devices immediately upon completion of the work. Unless otherwise specified, they remain the property of the contractor.

4. The OWNER or representative will inspect all traffic control devices prior to the start of work.

5. Cover or remove all signs not in use or conflicting to the operation being performed. When covering the existing signing do not put tape on the face of the sign or attach any other material directly to the face of the sign.

6. Maintain all official existing roadway signs.

7. This traffic control plan does not relieve the contractor of his responsibility as specified in section 901.3 (a) of publication 408/2116.

8. Protect all drop-off conditions in accordance with PennDOT publication 408/2016.

9. All traffic control devices shall be new or in like new condition and maintained as such.

10. All warning signs for the project are to be of type III fluorescent or type VII florescent sheeting.

11. Locations of all signs are to meet current standards for offset, mounting height and be properly ballasted per PennDOT Publication 111M, TC-8700 Series.

12. Remove conflicting pavement markings in accordance with PennDOT publication 408/2016 section 963.

13. Reinstall or replace signs removed or damaged during construction operations immediately as indicated or instructed.

14. Inventory and document all existing signs and pavement marking patterns prior to the beginning of construction with the Township engineer.

15. Material and equipment shall not be stored in travel lanes. On street storage shall be properly coned off.

16. Maintain one lane of traffic while installing cross pipes and pavement patching undercuts. Only excavate what can be backfilled before the end of a work day, including milling for trench pavement restoration.

17. All post mounted signs must be mounted on breakaway steel posts as specified in section 1103.08 of publication 408/2016.

18. Install long term traffic control in accordance with the PennDOT publication 213, PARA 39b and 24.

19. Flagging in accordance with publication 213 will be required as necessary to perform short term construction operations, as applicable.

20. Sign each individual flagging operation with an advance W20-7A sign.

21. Flaggers are to be equipped with walkie-talkie and properly trained, and shall produce their card certifying they have successfully completed said training upon demand by OWNER.

22. Prior to implementing traffic pattern changes contact: Lower Paxton Township, emergency services (police, fire, medical, etc.), local business, county maintenance, school district, posted and bonded roads coordinator.

23. Maintain all access to all side roads, private driveways, and businesses at all times, when practical. All accesses must be immediately opened after construction is complete.

24. Signs utilized at night shall meet reflective standards.

25. Road closed signs must be Type 3 stand mounted for road closures.

26. See drawings for sign locations.

27. A copy of this plan will be on site at all times.

PART 2 PRODUCTS

2.01. MATERIALS

A. Materials and safety devices such as barricades, flashing warning lights, reflectors and signs, provided for the purpose of protecting the work and the safety of the public, and for maintaining and protecting traffic, must conform to the requirements specified in Section 901 of the current edition of the Pennsylvania Department of Transportation Specifications Publication 408/2016 (as supplemented) and to requirements specified in the current edition of PENNDOT Publication 213 – Temporary Traffic Control Guidelines which complements Section 901.

B. All signs and cones shall be new or like new condition and all signs shall be placed on appropriate stands. All warning signs must be Type 3 stand mounted a minimum of 12" above ground.

C. All warning signs for the project are to be of type III fluorescent or type VII florescent sheeting.

PART 3 EXECUTION

3.01. FLAGGING

A. Flagging must be done in accordance with Publication 213 and Flaggers are to be equipped with walkie-talkie and properly trained, and shall produce their card certifying they are properly trained upon demand of Owner.

B. Sign each individual flagging operation with an advance W20-7A sign.

END OF SECTION

Division 2

Site Work

SECTION 02010

SUBSURFACE EXPLORATION

PART 1 GENERAL

1.01. DESCRIPTION

A. Digging Test Pits:

1. In locations where new sewers are to be connected to existing sewers, the DEVELOPER'S CONTRACTOR will not be permitted to proceed with new construction until he has dug test pits and determined the exact location and elevation of the existing sewers. Dig such test pits only at the locations agreed to by the ENGINEER.

2. All appropriate approvals (i.e. street cut permits) must be obtained by the DEVELOPER'S CONTRACTOR from the governing municipality prior to any subsurface exploration.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

SECTION 02211

ROCK REMOVAL

PART 1 GENERAL

1.01. WORK INCLUDED

A. Rock Removal - Mechanical Method.

B. Rock Removal - Explosive Method.

1.02. RELATED WORK

A. Section 02221 - Trenching. Comply with Paragraph 1.05 – Protection, as applicable.

1.03. QUALITY ASSURANCE

A. DEVELOPER'S CONTRACTOR: DEVELOPER'S CONTRACTOR shall have five years documented experience with the use of explosives for disintegration of subsurface rock.

1. Blaster shall be licensed in accordance with all applicable Federal, State and/or local laws ordinances and regulations.

1.04. REGULATORY REQUIREMENTS

A. Conform to applicable Federal, State and/or local laws, ordinances and regulations for explosive disintegration of rock.

B. Obtain and display permits on site from the Township, DEP and any other authorities and state agencies having jurisdiction before explosives are brought to site or drilling is started.

C. DEVELOPER to obtain blasting permit from Township.

1.05. REFERENCES

A. NFPA-495-Code for the Manufacturer, Transportation, Storage, and Use of Explosive Materials.

B. Department of Environmental Protection, Chapter 210-Blasters Licenses and 211 – Storage, Handling and Use of Explosives.

PART 2 PRODUCTS

2.01. MATERIALS

A. Explosives: Type recommended by explosives firm and required by authorities having jurisdiction.

B. Delay Devices: Type recommended by explosives firm.

C. Blasting Mat Materials: Type recommended by explosives firm.

PART 3 EXECUTION

3.01. INSPECTION

A. Verify site conditions and note irregularities affecting work of this Section.

B. Beginning work of this Section means acceptance of existing condition.

3.02. ROCK REMOVAL - MECHANICAL METHOD

A. Excavate for and remove rock by the mechanical method.

B. Cut away rock at excavation bottom to form level bearing.

C. Remove shaled layers to provide sound and unshattered base for footings, slabs and embankments.

D. Excavate to 8 inches below invert elevation of pipe and 24 inches wider than pipe diameter.

E. Remove excess or unsuitable materials from site.

F. Correct unauthorized rock removal in accordance with backfilling and compaction requirements of Section 02221.

3.03. ROCK REMOVAL - EXPLOSIVES METHODS

A. If rock is uncovered requiring the explosives method for rock disintegration, notify the ENGINEER and execute as follows:

1. Apply for and obtain DEP Blasting Activity Permit and any other permits that may be required. Comply with all guidelines, conditions and requirements of permits.

a. Make determination if blasting activity qualifies for “Permit-by-Rule”.

b. Submit to the ENGINEER blasting permit or permit-by-rule notification prior to blasting.

2. Advise owners of adjacent buildings or structures in writing and conduct pre-blast survey of wells and structures on adjacent properties, as applicable.

3. Provide Seismographic monitoring during progress of blasting operations and comply with regulations of the Pennsylvania Department of Environmental Protection.

4. Disintegrate rock and remove from excavation.

a. Conduct blasting operations to avoid injury to persons and property.

b. Use explosive quantity and strength required to break rock approximately to intended lines and grades and yet leave rock in unshattered condition.

c. Cover rock with logs or mats, or both where required.

d. Issue sufficient warning to all persons prior to detonating a charge.

e. Store caps and exploders separately from explosives.

f. Remove all explosives from site at completion of blasting operations.

5. Provide the ENGINEER with copies of daily blasting Records as prescribed in Chapter 211 *"Storage, Handling and Use of Explosives"*, Section 211.46 of the Pennsylvania Department of Environmental Protection regulations.

6. Repair any damage to structures, walls, pavement, etc. resulting from blasting activities to the satisfaction of property owner(s).

7. Remove and repair any damage that may have occurred to adjacent roadways areas in accordance with all applicable regulations.

B. The AUTHORITY reserves the right to prohibit blasting and the right to require that rock be removed by drilling and/or drilling and wedging.

C. DEVELOPER'S CONTRACTOR is fully responsible for all rock removal methods and materials. AUTHORITY and ENGINEER assume no responsibility for rock removal methods and materials selected and utilized by the DEVELOPER'S CONTRACTOR.

3.04. FIELD QUALITY CONTROL

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

END OF SECTION

SECTION 02221

TRENCHING

PART 1 GENERAL

1.01. WORK INCLUDED

A. Excavated trenches for piping shown on Drawings.

B. Compacted bed and compacted fill over piping to subgrade elevations.

1.02. RELATED WORK

A. Section 02211 - Rock Removal.

1.03. REFERENCES

A. Pennsylvania Department of Transportation (PennDOT) Publication 408.

1.04. PERMITS

A. Township Road Occupancy Permit and/or street-cut permit.

B. State highway occupancy permit in AUTHORITY'S name.

C. Blasting permits (Township or other).

D. Stream crossing permit.

E. Wetland encroachment permit.

1.05. PROTECTION

A. Notify all utilities prior to work so that they may locate all affected facilities.

B. Protect excavations by shoring, bracing, sheet piling, underpinning, or other methods required to prevent cave-in or loose soil from falling into excavation.

C. Underpin adjacent structures which may be damaged by excavation work, including service utilities and pipe chases.

D. Notify ENGINEER of unexpected subsurface conditions and discontinue work in affected area until notification to resume work.

E. Protect bottom of excavations and soil adjacent to and beneath foundation from frost.

F. Use rubber tired or treated equipment on pavement unless otherwise authorized in writing by agency having jurisdiction.

G. Grade excavation top perimeter to prevent surface water run-off into excavation.

H. DEVELOPER, at all times, shall keep the gutters open so that storm or other waters shall not have their flow obstructed. If, in any case, the material excavated from the trenches must temporarily extend over the gutters, it shall be duty of the DEVELOPER to plank or bridge over the gutters without extra compensation so that the flow of water is not prevented.

I. Temporary Protective Construction:

1. Temporary Fence Barricade: Erect and maintain substantial temporary fences surrounding excavation to prevent unauthorized persons entering such areas.

2. Temporary Fence: Where necessary, to keep one side of streets or roadway free from obstruction or to keep material piled along side of the trench from falling on private property outside the right-of-way, erect and maintain a safe and substantial fence.

3. Barricades: Furnish and erect substantial barricades at crossings of trenches, or along trenches, to protect the traveling public.

4. Excavation Covers: Cover open excavation when work therein is suspended or left unattended, such as at the end of a work day. For such covers, use materials of sufficient strength and weight to prevent their removal by unauthorized persons.

5. Remove temporary protective construction at the completion of work on the Project.

J. Blasting shall be in accordance with DEP regulations and requirements of Section 02211.

K. Assume the risks attending the presence or proximity of overhead or underground public or private utility lines, pipes, conduits and their attending support work, existing structures and property of whatever nature. Responsibility for damages and expenses arising out of the work, for direct or indirect injury to such structures or to any person or property by reason of them, or by reason of injury to them, whether such structures are or are not shown on the Drawings, rests solely with the DEVELOPER.

1. Support of Existing Utility Lines: Adequately support underground utilities not requiring removal and exposed as a result of excavation. Provide adequate support along their entire exposed length. Support system shall be acceptable to the affected utility company. Install these supports in such a manner that backfilling may be performed without dislodging such utilities.

a. Place and carefully compact aggregate backfill around the supports, and leave such supports in place as a guard against breakage due to backfill settlement.

2. Utility pole guy line supports: Restore to satisfaction of utility company.

1.06. WORK IN PRIVATE RIGHT OF WAY

A. Protect all property including land, ornamental shrubs and trees, fences, patios, landscaping and other existing improvements and replace in kind all those damaged at no cost to the AUTHORITY.

B. Pay all valid and substantiated claims for property damage, including trespass occupation for damage outside the right-of-way.

C. It shall be the DEVELOPER'S responsibility to obtain all rights-of-way for access to the construction site. Written authorization from all affected property owners shall be provided to ENGINEER before beginning work in the affected area.

1.07. QUALITY ASSURANCE

A. Testing and Inspection Service: DEVELOPER is responsible for paying for a qualified independent geotechnical testing and inspection laboratory to perform soil testing during trench backfilling operations where required by PennDOT. AUTHORITY has the right to employ and pay for additional soil testing and inspection services if determined to be necessary by the ENGINEER.

PART 2 PRODUCTS

2.01. SELECT MATERIALS IN ACCORDANCE PENNDOT'S PUBLICATION 408

A. Coarse Aggregate AASHTO No. 8 (PennDOT 1B Stone).

B. Coarse Aggregate AASHTO No. 57 (PennDOT 2B Stone).

C. Coarse Aggregate PA No. 2A.

D. Coarse Aggregate PA No. 2RC.

E. Coarse Aggregate PA No. R-3.

2.02. COMMON FILL MATERIALS AND SUITABLE BACKFILL MATERIAL (FOR RIGHTS-OF-WAYS AND FUTURE PRIVATE STREETS AND FUTURE STREETS TO BE DEDICATED TO THE TOWNSHIP WHERE MASS GRADING IS INVOLVED, SEE DETAILS)

A. Suitable Earth Fill: Reused or imported; graded free of stones and rocks greater than 3 x 6 inches, clay lumps, brush roots, weeds, clearing and grubbing waste, or other organic or unsuitable materials. Earthen fill must be made up of less than 20% stones.

B. On a case by case basis, with the Engineer's approval, native material with rock fragments larger than six (6) inches may be used to backfill the trench in rights-of-ways provided that the bedding depth is increased to eighteen (18) inches over the pipe and no rock fragments larger than six (6) inches in diameter are present in the first eighteen (18) inches of backfill over the bedding. Large rocks shall be kept to the side of the trench.

C. If the above noted conditions cannot be met, acceptable fill materials shall be brought on site. All imported fill and backfill material must comply with the Pennsylvania DEP regulations pertaining to "Clean Fill".

PART 3 EXECUTION

3.01. INSPECTION

A. Verify stockpiled fill to be reused is approved.

B. Verify backfill and areas to be backfilled are free of debris, snow, ice, or water, and surfaces are not frozen.

3.02. PREPARATION

A. Identify required lines, levels, contours, and datum.

B. When necessary, compact subgrade surfaces to density requirements for backfill material.

3.03. EXCAVATION

A. All excavation shall be unclassified; remove as required for piping installation shown on the Drawings. Excavate subsoil required for piping as shown on the Drawings.

B. Cut trenches as required by OSHA:

1. Roads, streets, highway shoulders, residential driveways, residential lawns; sides of excavation are to be kept vertical or laid back. Provide temporary shoring or sheeting as required by all applicable laws, codes, and regulations.

2. Underdeveloped areas and open country; excavation may be sloped back from 12 inches above top of pipe. Keep excavation within rights-of-way. Slope angle shall be as required to maintain excavation stability and as required by applicable laws, codes, and regulations.

C. Removal of Pavement and Storage of Materials:

1. Grub and clean surface of all materials of whatever nature over the line of trench.

2. Classify material removed and preserve such material as may be required for use in backfilling.

3. Store material removed and preserve such material as may be required for use in backfilling. Remove material not required for backfilling or which cannot be stored on streets or rights-of-way.

4. Saw cut paving to neat lines equidistant from the centerline of the trench. Shall be 1' wider on either side of trench width (i.e. 5' trench = 7'cut).

5. Remove all undermined pavement with additional saw cutting.

6. In business streets, important thoroughfares, narrow streets, or other limited areas, proceed as follows:

a. Remove from streets, the first 100 feet or additional length as may be necessary when directed by the ENGINEER.

b. Material subsequently excavated shall be used to backfill the trench where allowed by the Detail Drawings.

c. Material not required for backfilling or which cannot be stored on streets or right-of-ways shall be removed. DEVELOPER shall at his own expense bring back as much of the required material removed as may be required to properly backfill the trench or if so required furnish other material as may be necessary.

D. Hand trim excavation and leave free of loose matter. Hand trim for bell and spigot pipe joints.

E. Remove lumped subsoil, boulders, and rock up to 1/3 cu yd, measured by volume. Remove larger material under Section 02211.

F. Excavation shall not interfere with normal 45 degree bearing splay of foundations.

G. Correct unauthorized excavation.

H. Fill over-excavated areas under pipe bearing surfaces in accordance with direction by ENGINEER.

I. Stockpile excavated material in area designated on site and remove excess subsoil not being reused from site.

J. Excavate trenches at least 30 feet in advance of pipe laying except in muck or quicksand where pipe laying must follow as closely as the best interests of the WORK will require.

K. Excavated material shall be placed so as to minimize the inconvenience to occupants traveling in streets and driveways of adjoining properties.

L. Excavated material shall not be deposited on private property without written consent of the property owner filed with the AUTHORITY.

M. In case more material is excavated from an excavation or trench than can be backfilled over the completed work, or can be stored within the limits of the right-of-way, or in the event working space is limited or space cannot be provided for traffic and drainage, the excess material shall be removed to some convenient place provided by the DEVELOPER. The DEVELOPER shall bring back as much material so removed as may be required to backfill the work, if of the proper kind, or if so required furnish other material as may be necessary.

N. At the end of each work day trenches shall be completely backfilled and/or steel plates, with Township approval, shall be placed over the excavation to accommodate traffic. All trenches on state roads must be backfilled at of day; steel plates are not permitted unless authorized by PA DOT

O. Remove all rubber-tired equipment from the streets at the conclusion of each workday. No equipment will be permitted to be parked on the streets with the exception of any tracked equipment, which must be moved to the side of the roadway and visibly marked with flashers and otherwise in compliance with all safety requirements of local authorities.

3.04. BACKFILLING – EXISTING STREETS

A. Support pipe during placement and compaction of bedding fill. The bedding shall be graded by hand to provide a uniform and continuous bearing support for its entire length - bell holes shall be provided at ends of pipe lengths, but size of holes shall be kept to a minimum. The bell holes shall be backfilled with bedding material which shall be compacted and brought up to the height of the adjacent material. After pipe is placed bedding material shall be hand placed and carefully compacted to the dimension shown on the Drawings. Bedding material to be placed to spring line of pipe and chalked by hand the length of pipe, before initial cover is placed.

B. Backfill trenches to contours and elevations. Backfill systematically, as early as possible, to allow maximum time for natural settlement. Do not backfill over porous, wet, or spongy subgrade surfaces.

C. Stone backfill material must be uniform in depth extending to both trench walls.

D. Machine compact all backfill material as shown on detailed Drawings or as directed by Engineer. Compaction shall be at least 100 percent of the maximum dry density in paved and gravel areas. The maximum dry density shall be determined by ASTM D698 or as directed by Engineer. The Township may engage a qualified independent testing agency to perform field density testing at a frequency determined by the Township Engineer. The use of a qualified independent testing agency in no way relieves the Contractor of its responsibility to furnish materials and construction

in full compliance with the plans and specifications.

E. Maintain optimum moisture content of backfill materials to attain required compaction density.

F. Remove surplus backfill material from site.

G. Backfill in accordance with the detailed Drawings. Backfill compacted using a trench roller or a wacker shall be installed in one (1) foot lifts. Backfill compacted using a hydraulic tamper or boom mounted tamper shall be installed to a minimum depth of four (4) feet above the top of the pipe and then compacted in accordance with the written instructions of the tamper manufacturer.

H. 2A Modified Stone backfill must be used for the entire trench for all pipe that is located within existing streets per the Detail Drawing.

I. At the end of each work day the excavated area shall be completely backfilled and/or steel plates, with Township approval, shall be placed over the excavation to accommodate traffic. All trenches on state roads must be backfilled at of day; steel plates are not permitted unless authorized by PA DOT.

J. At the end of the work day all stone must be removed from the street and the streets must be swept with water.

3.05. BACKFILLING – FUTURE PRIVATE STREETS OR FUTURE STREETS TO BE DEDICATED TO THE TOWNSHIP

A. When the future street has already been rough graded to the final elevation and a trench is dug to install the sanitary sewer, the backfill must be PA No. 2A coarse aggregate trench backfill, properly compacted, from the top of the pipe bedding to the bottom of the proposed paving per Detail Drawing TR-1B. Trench shall be constructed as noted above in Paragraph 3.04

B. Backfilling for future private streets or future streets to be dedicated to the Township, only when the pipe is installed at the same time as the mass grading, shall be constructed as noted above in Paragraph 3.04, except as follows:

1. Backfill may be suitable earth fill (defined above) if suitable material is available and if constructed per Detail Drawing TR-1C.

3.06. BACKFILLING –RIGHT-OF-WAYS

A. Support pipe during placement and compaction of bedding fill. The bedding shall be graded by hand to provide a uniform and continuous bearing support for its entire length - bell holes shall be provided at ends of pipe lengths, but size of holes shall be kept to a minimum. The bell holes shall be backfilled with bedding material which shall be compacted and brought up to the height of the adjacent material. After pipe is placed bedding material shall be hand placed and carefully compacted to the dimension shown on the Drawings. Bedding material to be placed to spring line of pipe and chalked by hand the length of pipe, before initial cover is placed.

B. Backfill trenches to contours and elevations. Backfill systematically, as early as possible, to allow maximum time for natural settlement. Do not backfill over porous, wet, or spongy subgrade surfaces.

C. Backfill material must be uniform in depth extending to both trench walls.

D. Machine compact <u>all backfill material</u> as shown on detailed Drawings or as directed by Engineer.

Compaction shall be at least 95 percent of the maximum dry density in unpaved areas. The maximum dry density shall be determined by ASTM D698 or as directed by Engineer. The Township may engage a qualified independent testing agency to perform field density testing at a frequency determined by the Township Engineer. The use of a qualified independent testing agency in no way relieves the Contractor of its responsibility to furnish materials and construction in full compliance with the plans and specifications.

E. Maintain optimum moisture content of backfill materials to attain required compaction density.

F. Remove surplus backfill material from site.

G. Backfill in accordance with the detailed Drawings. Backfill compacted using a trench roller or a wacker shall be installed in one (1) foot lifts. Backfill compacted using a hydraulic tamper or boom mounted tamper shall be installed to a minimum depth of four (4) feet above the top of the pipe and then compacted in accordance with the written instructions of the tamper manufacturer.

H. Suitable earthen backfill may be used above the pipe bedding for the entire trench for all pipe that is located within rights-of-ways per the Detail Drawing. Suitable earthen backfill shall be free of topsoil, vegetation, clearing and grubbing waste, lumber, metal, refuse; and free of rock or similar hard objects larger than 3 x 6- inches.

3.07. UNSUITABLE MATERIAL

A. Remove and dispose of unsuitable material encountered during trench excavation work. Replace with R-3 Coarse Aggregate material as specified herein or Class A concrete bedding when directed by the ENGINEER.

3.08. TOLERANCES

A. Top Surfaces of Backfilling: As required to meet existing grade and/or ground elevations.

B. Whenever the trenches have not been properly filled, or if settlement occurs, they shall be re-excavated, refilled, re- compacted, smoothed off, and finally made to conform to the surface of the ground.

END OF SECTION

SECTION 02270

EROSION AND SEDIMENT POLLUTION CONTROL

PART 1 GENERAL

1.01. REQUIREMENTS OF REGULATORY AGENCIES

A. Erosion and Sediment and Pollution Control Plan:

1. Conduct soil erosion and sediment pollution control work in accordance with rules, regulations and requirements adopted by the Pennsylvania Department of Environmental Protection and as contained in the Developer's approved Land Development Plan.

2. Detail requirements for the control plan are described in an Erosion and Sediment Pollution Control Program Manual that may be obtained from the Bureau of Soil and Water Conservation, Division of Soil Resources and Erosion Control, Harrisburg, Pennsylvania.

B. Fines and related costs resulting from failure to provide adequate protection against soil erosion and sediment pollution control are the obligation of the DEVELOPER.

C. Erosion and sediment pollution control measures employed will be subject to approval and inspection by the Pennsylvania Department of Environmental Protection and/or County Conservation District.

D. The Contractor shall keep on the Project Site one copy of the approved Erosion and Sediment Pollution Control Plan.

1.02. REFERENCES

A. The administrative code of the Commonwealth of Pennsylvania, Title 25, Chapter 102, Erosion Control.

B. Commonwealth of Pennsylvania – DEP Erosion and Sediment Pollution Control Program Manual.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

SECTION 02300

TUNNELING, BORING AND JACKING

PART 1 GENERAL

1.01. RELATED WORK

A. Rock Removal: Section 02211.

B. Trenching: Section 02221.

C. Piped Utilities-Sanitary Sewers: Section 02700.

1.02. QUALITY ASSURANCE

A. Workmen Qualifications:

1. Employ in the work only personnel thoroughly trained and experienced in the skills required.

2. Have welds made only by welders, tackers and welding operators who have been previously qualified by tests as prescribed in the Structural Welding Code AWS D1.1 of the American Welding Society to perform the type of work required.

B. Design Criteria:

1. Provide encasing conduit under highways of sufficient strength to support all superimposed loads, including an American Association of State Highway and Transportation Officials H-20 Loading with 50 percent added for impact.

C. Requirements of Regulatory Agencies:

1. Work of this Section within State Highway right-of-way will be subject to inspection by representatives of the Commonwealth of Pennsylvania Department of Transportation (PennDOT), and the work must be performed in accordance with the requirements of the latest edition of the Commonwealth of Pennsylvania, Pennsylvania Code, Title 67, Transportation, Department of Transportation, Chapter 459, Occupancy of Highways by Utilities.

2. Inspection, insurance or other charges demanded by PennDOT, or other authority having jurisdiction shall be paid for by the Developer.

D. Source Quality Control:

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

MATERIAL	TEST METHOD	NUMBER OF TESTS
Steel Pipe	ASTM A 139 or ASTM A 53	As specified in ASTM A 139 or STM A 53 as applicable

2. Laboratory Tests: The ENGINEER reserves the right to require that laboratory tests also be conducted on materials that are shop tested. Furnish labor, materials, and equipment necessary for collecting, packaging, and identifying representative samples of materials to be tested and the shipping of such samples to the Testing Laboratory.

1.03. REFERENCES

A. American Association of State Highway and Transportation Officials (H-20): (AASHTO) Loading for Conduits Installed Under Streets, Road, or Highways.

B. American Society for Testing and Materials:

1. ASTM A 53, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.

2. ASTM A 123, Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

3. ASTM A 139, Specification for Electric-Fusion (Arc)-Welded Steel Pipe (NPS 4 in. and Over).

4. ASTM A 307, Specification for Carbon Steel Externally Threaded Standard Fasteners.

5. ASTM A 569, Specification for Steel, Carbon (0.15 Maximum Percent, Hot-Rolled Sheet and Strip, Commercial Quality.

6. ASTM A 615, Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.

7. ASTM C 32, Specification for Sewer and Manhole Brick (Made from Clay or Shale).

8. ASTM C 33, Specification for Concrete Aggregates.

9. ASTM C 150, Specification for Portland Cement.

10. ASTM C 270, Specification for Mortar for Unit Masonry.

C. American Welding Society: AWS D1.1 Structural Welding Code.

D. PennDOT Specifications Publication 408, as supplemented.

1. PennDOT Section 703.2 Coarse Aggregate.

1.04. SUBMITTALS

A. Shop Drawings and Products Data: Furnish completely dimensioned shop drawings, cuts or other data as required to provide a complete description of products to be installed.

B. Certificates: Certified records or reports of results of shop tests, such records or reports to contain a sworn statement that shop tests have been made as specified.

C. Furnish PennDOT for approval, detail drawings, accompanied by design calculations, for the tunneling shield, tunneling pits, including sheeting and bracing therefore, tunnel liner plate and tunneling procedure and grouting method and all such drawings and computations shall bear the seal of a Registered Professional Engineer.

D. Furnish PennDOT for approval, detail drawings, accompanied by design calculations, for boring or jacking pits including sheeting and bracing therefore, steel pipe and boring or jacking procedure and grouting method and all such drawings and computations shall bear the seal of a Registered Professional Engineer.

1.05. PRODUCT DELIVERY, STORAGE AND HANDLING

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

1.06. SITE CONDITIONS

A. Scheduling:

1. Perform tunneling, boring or jacking operations continuously on a 24-hour basis if required by PennDOT or railroad company.

B. Protection: As specified in Section 02221 and such added requirements included herein:

1. Adequately support and protect utilities and facilities that are encountered in, or may be affected by, the work.

2. Accommodation of Traffic: As specified in Section 01570.

3. Explosives and Blasting: Not permitted in performance of work of this Section.

4. Excavation Conditions: As specified in Section 02221.

5. Excess Materials: As specified in Section 02221.

6. Borrow Material: As specified in Section 02221.

PART 2 PRODUCTS

2.01. ENCASING CONDUIT

A. Steel Tunnel Liner Plate: Cold formed, steel, four flanged liner plates:

1. Minimum Inside Neutral Axis Diameter: As shown on the DEVELOPER'S Drawings and/or the Detail Drawings, or as indicated by the ENGINEER.

2. Minimum Thickness: U.S. Standard Gauge 8, marked on each liner plate by manufacturer.

3. Steel: Structural quality hot rolled carbon steel; ASTM A 569.

4. Provide tapped grout holes and plugs (minimum 1 ½ inch diameter) in every third plate.

5. Hot Dipped Galvanized: ASTM A 123.

6. Nuts and Bolts: Minimum ½ inch diameter, coarse thread, conforming to ASTM A 307, Grade A.

7. Coating: Factory coat inside and outside with asphaltic material to a minimum thickness of 0.05 inch.

B. Steel Pipe: ASTM A-252 Grade 2 or ASTM A-139 Grade B. Minimum yield strength of 35000 PSI:

1. Minimum Diameter: As shown on the DEVELOPER'S Drawings and/or Detail Drawings.

2. Minimum Wall Thickness: .344", or as required by design criteria.

2.02. SEWER PIPE AND FITTINGS

A. Ductile Iron Pipe (DIP): As specified in Section 02700.

B PVC Pipe: As specified in Section 02700.

2.03. MISCELLANEOUS MATERIAL

A. Casing Spacers:

1. Spacers shall be made of Stainless Steel with glass reinforce plastic runners or polymer plastic runners.

2. Shall be supplied by Advance Products & Systems, Inc., PO Box 53096, Lafayette, LA 70505-3096. 1-318-233-6116.

B. End Seals:

1. 1/8" thick synthetic rubber with S.S. Brands.

2. Model AC Pull on End Seal by Advance Products & Systems, Inc.

C. Aggregate Backfill:

1. ¼" Limestone Chips or material as directed by Owner.

D. Sand: ASTM C 33, fine aggregate.

2.04. DEVELOPER OPTIONS IN PRODUCTS

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

PART 3 EXECUTION

3.01. INSPECTION

A. Inspect materials and products before installing in conformance with the inspection requirements of the appropriate referenced standard.

B. Remove rejected materials and products from the Project.

3.02. PREPARATION

A. As specified in Sections 02221 and 02211.

3.03. PERFORMANCE

A. Excavation: As specified in Section 02221 and 02211 and such added requirements included herein:

1. Should the DEVELOPER in constructing any tunneling, boring or jacking pit excavate below the subgrade for the pipe sewer, he will be required to backfill the area excavated below the subgrade with aggregate backfill or with concrete as required by the ENGINEER.

B. Tunneling:

1. Tunneling shall conform to the applicable requirements of Section 02221 and all applicable requirements of PennDOT:

a. Install the tunnel liner plate to the limits indicated on the DEVELOPER'S Drawings and/or Detail Drawings or required by the ENGINEER or PennDOT.

b. Tunneling pits shall be as shown on the Sewer Detail Drawing entitled "Tunnel Work Pit and Tunnel Liner Plate".

c. Exercise care in trimming the surface of the excavated section in order that the steel liner plates fit snugly against undisturbed material.

d. Do not advance excavation ahead of the previous installed liner plates any more than is necessary for the installation of the succeeding liner plate.

e. Support vertical face of the excavation as necessary to prevent sloughing. Completely bulkhead the heading at any interruption of the tunneling operation.

f. Paint field bolt heads and nuts.

2. Grouting:

a. Place a uniform mixture of grout under pressure behind the liner plate and the undisturbed material.

b. Provide grout holes tapped for no smaller than 1 ½ inch pipe, spaced at approximately 3 feet around the circumference of the tunnel liner plates in every third ring.

c. Start grouting at the lowest hole in each grout panel and proceed upwards simultaneously on both sides of the tunnel.

d. Install threaded plug in each grout hole as the grouting is completed at that hole.

e. Proceed with grouting as required by the ENGINEER, but in no event shall more than six linear feet of tunnel be progressed beyond the grouting.

C. Boring:

1. Boring shall conform to the applicable requirements of the regulatory agency and additional requirements specified herein:

a. Install the encasing conduit by the boring method to the limits indicated on the DEVELOPER'S Drawings and/or Detail Drawings or such additional limits required by the ENGINEER or regulatory agency.

b. Excavate and sheet boring pit.

c. Provide devices at the front of the pipe to prevent auger and cutting heads from leading the encasing conduit. Unsupported excavation ahead of pipe is prohibited.

d. Over-cut by cutting head not to exceed the outside diameter of the encasing conduit by more than one-half inch.

e. The use of water or other liquids to facilitate casing placement and spoil removal is prohibited.

f. If voids develop or if bored hole diameter is more than 1 inch greater than the outside diameter of the encasing conduit, place Grout to fill voids.

g. Check conduit alignment in a manner and at times required by ENGINEER. Check alignment and grade at least once per shift as the work progresses.

h. Completely bulkhead heading at interruptions in boring operation.

i. Completely weld joints around the circumference between sections of steel pipe encasing.

D. Jacking:

1. Jacking shall conform to all applicable requirements of the regulatory agencies and additional requirements specified herein. This operation shall be conducted without hand mining ahead of the pipe and without the use of any type of boring, auguring, or drilling equipment:

a. Install the encasing conduit by the jacking method to the limits indicated on the DEVELOPER'S Drawings and/or Detail Drawings or such additional limits required by the ENGINEER or the regulatory agencies.

b. Preliminary work shall consist of excavating and sheeting an acceptable shaft on the downstream side of the crossing and the installation of a backstop and guide timbers.

c. Design: Bracing and backstops shall be so designed and jacks of sufficient rating used so that the jacking can be progressed without stoppage except for adding lengths of pipe.

d. Accurately place guide timbers on line and grade.

e. Support: The vertical face of the excavation shall be supported as necessary to prevent sloughing

f. Use poling boards and bulkheads as required if subgrade conditions in the heading are unstable.

g. Jacking and excavation within the pipe shall proceed simultaneously with the ground being cut no more than 2 inches outside the pipe at the tope and sides and not less than 2 inches above subgrade at the bottom.

h. The use of water or other liquids to facilitate casing placement and spoil removal is prohibited.

i. If voids develop or if jacked hole diameter is more than 1 inch greater than the outside diameter of the encasing conduit place grout to fill voids in manner approved by the regulatory agencies.

j. Check conduit alignment in a manner and at times required by ENGINEER. Check alignment and grade at least once per shift as the work progresses.

k. Completely bulkhead heading at interruptions in jacking operation.

l. Completely weld joints around the circumference between sections of steel pipe encasing.

E. Laying and Testing Pipe: Lay and test pipe in encasing conduit as specified in Section 02700 and such added requirements included herein:

1. Support and maintain the alignment and grade of sewer piping until the concrete cradle is installed and concrete has cured.

2. Provide concrete cradle as indicated on Detail Drawings.

3. Paint exposed portion of hold down rod if used.

F. Encasing Conduit Filling and Closing: After the sewer has been installed in the encasing conduit and has been tested, fill the encasing conduit with sand or AASHTO No. 8 stone. Concrete is not considered acceptable fill material:

1. Close one end of encasing conduit with rubber boot before filling encasing conduit. Close other end of encasing conduit with rubber boot after filling encasing conduit or as operation dictates.

G. Cleanup: As specified in Section 02221.

3.04. FIELD QUALITY CONTROL

A. Testing: After laying pipe in encasing conduit and before filling conduit conduct line acceptance testing as specified in Section 02700.

END OF SECTION

SECTION 02605

MANHOLES

PART 1 GENERAL

1.01. RELATED DOCUMENTS

A. DEVELOPER'S Drawings and Detail Drawings.

B. Division 1 Specifications.

C. Division 2 Specifications, as applicable, including proprietary specifications of individual system and product manufacturers.

1.02. WORK INCLUDED

A. Fabrication of pre-cast concrete manholes.

B. Installation of manholes and appurtenances.

1.03. QUALITY ASSURANCE

A. Manhole Acceptance Tests:

1. General:

a. After the manhole has been completely constructed, the frame bolted thereon, and the trench backfilled, a vacuum test may be performed. A manhole acceptance vacuum test shall be conducted after backfilling and bituminous concrete base course or binder course has been completed unless otherwise directed by the ENGINEER or AUTHORITY.

b. Any damage caused to properties due to sewage handling and/or sewage backup while vacuum testing shall be the responsibility of the DEVELOPER.

c. Existing manholes to remain must be tested before and after new connections are made to them.

2. Vacuum Testing Equipment:

a. Furnish testing equipment as specified in the manufacturer's written instructions. Only manhole testing equipment is acceptable. Pressure gauge for this procedure MUST read in inches of mercury, not in PSI and gauge must read in 1/10 increments.

b. Gauges must be oil filled.

3. Vacuum Test Procedures:

a. Perform vacuum testing in accordance with the testing equipment manufacturer's written instructions.

b. Draw a vacuum of ten (10) inches of mercury and close the valves.

c. Allow vacuum to stabilize for 30 seconds then test according to manhole diameter listed below. No drop in vacuum is acceptable:

1) Four foot diameter - 60 seconds.

2) Five foot diameter - 75 seconds.

3) Six foot diameter - 90 seconds.

d. Repair or replace defective manholes as directed by the Engineer and retest.

1.04. SUBMITTALS

A. Submit shop drawings or catalogue cuts, as appropriate, for materials listed under Paragraph 2.1 of this Section. Submit only those materials that are actually to be used in the work. These will usually be as follows:

1. Precast Concrete Manholes.

2. Manhole Steps.

3. Manhole Castings.

4. Gaskets, Adapters, and Other Appurtenances.

5. Design Mixtures: For each precast concrete mixture. Include compressive strength and water-absorption tests. Provide design of concrete manhole products with minimum compressive strength of 4000 psi at 28 days unless otherwise noted.

B. Six-inch anti-flotation collars shall be installed on all manholes located in sewer easements. Manholes located within streets shall have anti-flotation collars for the following conditions; 4’ diameter manholes greater than 11 feet deep and 5’ diameter manholes greater than 10 feet deep. Anti-flotation design shall be the ultimate responsibility of the manufacture.

C. Submit manufacture’s Certification of Compliance in accordance with Section 01300.

D. Make submittals prior to start of construction. Make submittals to AUTHORITY.

E. Manholes installed within PennDOT rights-of-way shall be inspected by PennDOT during manufacturing and shall be PennDOT certified.

1.05. DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and handle manholes, manhole frames and covers and appurtenances in accordance with the manufacturer's recommendations, and in such manner as to protect the materials from damage.

B. Manholes and related materials shall be loaded and unloaded by lifting with hoists with a properly sized spreader bar so as to ensure lifting chains do not damage the concrete surface of the manhole. Under no circumstances shall such material be dropped or skidded against material already on the ground.

C. Manholes and related materials shall at all times be handled with care to avoid damage. The interior shall be kept free from dirt and foreign matter. All manholes, manhole frames and covers and appurtenances shall be carefully lowered or raised into place with suitable equipment in a manner that will prevent damage to the material. Under no circumstances shall manholes or accessories be dropped or dumped.

D. Manholes, and all related materials, shall be thoroughly inspected for defects prior to their being installed. Any defective, damaged, or unsound material, shall be repaired or replaced as directed.

PART 2 PRODUCTS

2.01. MATERIALS

A. Manholes:

1. Precast Concrete Manhole Base, Top and Riser Sections:

a. Precast Concrete manholes shall be of the design and dimensions shown on the sewer Detail Drawings:

1) Manholes shall be 48” diameter unless noted otherwise.

b. Precast concrete bases shall be manufactured in accordance with the requirements of ASTM C478:

1) Cast-in-place concrete bases are not permitted.

c. All manholes shall be eccentric cone top sections unless noted otherwise.

d. Openings in precast concrete manholes to accommodate the connection of piping shall be custom preformed for each manhole at the time of manufacture. Openings for connection of the piping shall be of the size and shape required for the particular type of pipe seal provided.

e. All precast concrete manholes shall be designed in accordance with ASTM C890 to accommodate AASHTO highway load class HS20-44.

f. The tops of the precast concrete bases shall be accurately formed to receive the tongue of the bottom precast concrete manhole section of the wall.

g. The bases shall be monolithically cast and shall consist of a manhole bottom and a wall which shall extend a minimum of 10 inches above the top of the highest influent sewer. The top of the base section shall be carefully formed to receive the tongue of the barrel section. There shall be a minimum distance of 3 inches between the invert of the lowest effluent sewer and floor of the precast base to provide for the construction of a formed invert and bench wall within the manhole.

h. Precast top sections shall have hold down bolt inserts factory cast in the top section. Each top shall have four (4) three quarter (3/4) inch threaded inserts or slotted inserts to accommodate manhole frame hold down bolts. Insert types designed for an ultimate load in tension of 12,500 pounds. Coordinate insert locations in the top section to match the bolt hole locations on the manhole frame. All inserts shall be factory plugged before shipping.

2. Portland Cement: Composition and compressive strength conforming to ASTM C478 as follows:

    a. ASTM C150, Type I or Type III cement with a crystalline capillary waterproofing admixture for sulphate resistance, as follow:

        1) Xypex Concentrate Admix C-2000.

        2) Rheomac 300D by BASF.

        3) Pennetron.

        4) Ipanex.

    b. ASTM C 150 Type II cement.

    c. Type I cement with granulated ground blast-furnace slag or fly ash not exceeding 25% by weight.

3. Monolithic Poured-In-Place Concrete Manhole Bases:

    a. Cast-in-place manhole bases are not permitted.

4. Cast-in-place concrete used for channels inside precast manhole bases shall be of a 4,000 psi Mix Design with a 3/8" diameter maximum allowable aggregate size and a 0.45 maximum water/cementitious ratio:

    a. Consistency: The mixed concrete shall be of uniform consistency. The maximum allowable slump shall be 1-inch.

    b. Portland Cement: Composition and compressive strength conforming to ASTM C478 and matching the criteria above for manhole fabrication.

    c. On-site mixing of concrete for channel construction is not permitted.

5. Precast Reinforced Concrete Manhole Riser and Top Sections:

    a. As previously specified.

6. Steel Reinforcement:

    a. Steel reinforcement used in the manufacture of precast concrete manhole bases and precast concrete riser and top sections shall conform to the requirements specified in Section 4 of ASTM C478 and to the detailing and fabrication requirements of Section 6 of ASTM C478.

7. Gasket for Sealing Precast Concrete Manhole Joints:

    a. Manhole section joint gasket materials specified herein shall be used in accordance with the Detail Drawings. Only one method of joint sealing and gasketing will be permitted for all manholes:

        1) Preformed Plastic Gaskets for Manhole Joints:

a) Flexible plastic gasket-type sealant for manhole joints shall be butyl rubber (plastic) sealant, shall meet the requirements of Federal Specification SS-S-210A (3.4 Adhesion & Hydrostatic Pressure) and shall conform with the applicable requirements specified in Section 5.7 of ASTM C361.

b) The sealing compound shall not leak at the joints (while being tested at 10 psi) for a period of 24 hours. Requirements for sag and flow resistance (vertical and overhead 1"-wide joints) shall be such that no sagging is detected (while being tested at 135 degrees F) for a period of 5 days. Requirements for chemical resistance shall be such that no visible deterioration of the sealing compound occurs (when immersed separately in a solution of acid, alkalies and saturated hydrogen sulfide) for a period of 30 days.

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

8. Pipe Openings and Seals:

a. Openings shall be performed during manufacturing in each base and riser section requiring a pipe opening. Each opening shall accommodate the type of pipe and pipe seal required.

b. Pipe opening seals shall meet the requirements specified in ASTM C923.

c. Pipe opening seals integrally cast with holes for pipe in precast concrete manhole walls shall be all-rubber composition, flexible, pliable, and provide up to 15 degrees lateral, diagonal or vertical pipe deflection. Gaskets shall be leak-proof tested to 20 psi, and shall meet or exceed rubber quality standards of ASTM C-443.

d. Manhole adapters shall be provided for all PVC pipe in cut-in pipe openings and shall be recommended by the pipe manufacturer.

9. Frame Hold Down Bolts:

a. Bolts, nuts and washers shall be stainless steel in accordance with ASTM A307 and ASTM A276.

b. Anti-seize compound shall be used on all threaded surfaces of bolts and frames.

10. Manhole Steps:

a. Reinforced Plastic Step: Composed of a 1/2-inch Grade 60 ASTM A615 deformed steel reinforcing bar completely encapsulated in Grade 49108, ASTM D4104 polypropylene copolymer compound Type II:

1) MA Industries, Inc.: Type PS4.

2) Or approved equal.

b. Field installation of manhole steps shall not be permitted. Steps shall be aligned vertically and spaced so as to be on equal centers in the assembled manhole, a maximum distance of 12 inches apart. Steps shall be located the minimum distance from the ends of riser and top sections as shown on the Detail Drawing. Each step shall be embedded in the riser section at least three and one-half (3 1/2) inches but not more than four (4) inches.

11. Manhole Castings:

a. Castings for manhole frames and covers shall be heavy duty cast iron.

b. Ferrous castings shall be of uniform quality, free of blow holes, shrinkage distortion, or other defects.

c. Metal shall conform to ASTM A-48 Class 30 for gray iron and shall be designed for AASHTO highway loading class HS-20.

d. All castings shall be manufactured true to pattern; component parts shall fit together in a satisfactory manner. Frames and covers shall have continuously machined bearing surfaces to prevent rocking.

e. As-cast dimensions may vary one half the maximum shrinkage characteristic of the metal or $\pm$ 1/16 inch.

f. Manhole Casting Schedule:

1) Finish: Cover bearing surfaces machined to prevent rocking and rattling under traffic.

2) Identification: Cast the word “SEWER” integrally on cover in 2-inch size raised letters.

3) Cover Gasket: One piece O-ring gasket or T-Seal gasket factory installed in a machined rectangular or dovetail groove in the cover bearing surface. No flat gaskets shall be permitted:

a) Gasket material of neoprene composition having good abrasion resistance, low compression set, 40 durometer hardness and suited for use in sanitary sewer manholes.

b) Gluing of gasket in cover is required.

4) Tensile Test Bar: Size B, cast separately, but poured from same iron as castings they represent.

g. Watertight Manhole Frame and Cover: Gray iron castings conforming to previously specified requirements for manhole frame and cover with the addition of cover hold-down bolts:

1) Cover Hold-Down Bolts: Type 316 stainless steel, ASTM A 276, bolts and washers.

2) Threaded Sleeves: Manhole frame factory fitted with stainless steel threaded sleeve to accept cover bolts. Anti-seize compound shall be used on all threaded surfaces of bolts and frames.

h. Manhole frames and covers shall be as shown on the Detail Drawings.

i. Manufacturer:

1) Neenah Foundry Company, Model 1642 381-1 (standard: o-ring gasket) or Model 1642 345 B (standard: T-seal gasket), Model 1916F (watertight), and Model 16422018 (low profile) Neenah, WI.

2) No substitutions will be accepted.

12. Grade Rings:

a. General:

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

2) Precast Concrete Grade Rings will not be accepted, unless directed by the Owner. Grade adjustments must be made using poured concrete adjustment risers as shown on the Detail Drawings.

3) On-site mixing of concrete for poured grade adjustments is not permitted.

b. If Owner allows precast grade rings, they shall meet the following:

1) Precast concrete grade rings for leveling units shall be manufactured in compliance with the requirements of the Specifications for Precast Reinforced Concrete Manhole Sections, ASTM Designation C478; and shall meet the requirements shown on the drawings. Split grade rings are unacceptable. Broken or cracked concrete grade rings will not be acceptable. Grade adjustment for a manhole shall not exceed two (2) inches.

13. Cement Grout:

a. Cement grout shall be non-shrink non-metallic.

b. Use Type I cement where grout is not in contact with sewage.

c. Use Type II (Sulfate Resistant) where grout is in contact with sewage.

14. Waterproofing Mortar:

a. Material composition meeting the requirements of ASTM C270, Type M with waterproofing admixture included.

b. Apply in accordance with manufacturer's instructions.

c. Acceptable Manufacturers:

1) Medusa Waterproofing Paste or Powder; Medusa Cement Company.

2) Hydralite, Grace Construction Material.

3) Hydrolox, Chem Master Corporation.

15. Intermediate Platforms:

a. In manholes 20’ or deeper, intermediate platforms made of stainless steel or precast concrete shall be installed.

b. The platform shall be as indicated on the Detail Drawings and ultimately be approved by ENGINEER.

c. Manholes with intermediate platforms shall be 5’ in diameter.

16. Drop Manholes: Construct in accordance with Type indicated in Details on the Drawings, or bound in Project Manual. Drop connections are required for manholes with invert in and invert out elevation differences greater than 24-inches:

a. Outside Drop Connections: Use DIP and fittings in drop connection. Outside drop connections must have prior Authority approval.

b. Inside Drop Connections preferred method:

1) PVC bowl with S.S. expansion anchors.

2) S.S. adjustable clamping brackets (304 S.S.).

3) PVC hood for bowl assembly required.

4) Discharge from drop connection piping must be directed into a preformed concrete flow channel.

5) Acceptable manufacturers:

Reliner – Duran, Inc.,
53 Mt. Archer Road,
Lyme, CT 06371
(800) 434-0277

2.02. MANHOLE LINING SYSTEM

A. Manholes designated for lining will be lined against H2S corrosion. Lining system will be from invert to manhole frame including all donuts and manhole base. Dry finish thickness shall be a minimum of 250 mils for existing manholes and 150 mils for new manholes. Lining system will be Sprayroq (No Substitutes Allowed).

PART 3 EXECUTION

3.01. MANHOLE CONSTRUCTION

A. General:

1. Manholes shall consist of poured concrete adjustment risers and eccentric or flat slab top sections on concrete base, complete with cast iron frames and covers and reinforced plastic steps.

2. DEVELOPER shall provide precast reinforced concrete bases for manholes.

3. Manholes shall conform to the design and dimensions shown on the Detail Drawings and to the requirements specified herein.

4. Manhole tops installed within streets and ground surfaces of residential areas shall be set to match existing grade and slope, unless otherwise noted by Authority.

5. Manhole frame and covers to be set to match the final grade, longitudinal slope and cross slope, considering any scratch course and overlay without the use of paving rings. In areas where final wearing is not placed due to winter months, frame and cover shall be winterized to assure snow plows do not damage the frame and cover and traffic makes a smooth transition when traveling.

6. Manholes installed within streets should be 7’ away from curbs and located outside of wheel paths.

7. Where the DEVELOPER’S Drawings show manhole tops to be above existing ground in undeveloped areas and in open country, manhole shall be set at the top elevations called for on the plans or two (2) feet above final grade, unless otherwise directed by ENGINEER.

8. Cast-in-place concrete bases are not permitted.

9. Connections to existing manholes shall include vacuum testing of manhole prior to and after connection to assure water-tightness of new connection.

10. Where new manholes are constructed on existing sewers, a pre-cast base shall be installed. Cast-in-place bases are unacceptable. Installation of new base shall include cutting and removal of mainline, installation of new pre-cast base, sewer pipe and connectors to existing pipe. Vacuum acceptance testing of new manhole is required. Testing of reconnection of existing pipe is required.

11. On-site mixing of concrete for channel construction or poured adjustment risers is not permitted.

12. Any manhole components damaged shall be replaced. Grouting to repair damage is unacceptable.

13. DEVELOPER is responsible for maintaining sewage flow during construction and acceptance testing.

14. Preformed plastic gasket material shall be artificially warmed in cold weather.

15. Minimum drop of 0.10 feet in manhole between invert in and invert out for 8 inch pipe

to be verified by Contractor prior to installation.

16. New pipe connections to existing manholes must be core bored. Core boring is not permitted to be done under steps of manhole or at joints in existing manholes.

17. Cured in place pipeliner or Sprayroq shall be installed in manholes with force main discharges and in 3 to 4 manholes downstream of pumping station connections and 1 to 2 manholes downstream of grinder pump connections.

18. All manholes and frames and covers shall be installed so that the manhole covers are outside the tire path.

19. Manholes shall be installed meeting the following conditions:

    a. The sides or “barrel” of the manhole shall be plumb and straight.

    b. The manhole channel shall have a minimum of 0.10 feet of fall across the channel.

    c. The pipe invert shall match the invert of the channel.

20. Center of manhole covers must be shot and GPS locations provided to the Authority.

B. Manhole Bases (Precast Concrete):

1. All manhole bases shall be installed on a 6-inch layer of coarse aggregate as indicated on the Detail Drawings.

C. Concrete Channels:

1. Channel configurations shall be as indicated on the Detail Drawings.

2. In manholes with more than one influent line, the channels shall be properly formed as to direct the flow into the main channel and downstream.

3. Manholes having less than 24 inches of fall shall have smooth flow trasitions (channel) from influent to effluent pipes to eliminate splash conditions.

4. All channels shall be molded in the concrete base and shall be of proper size, cross section, and to required grade; all bends in channels shall be built with the maximum possible radius. Channels shall be finished smooth in a neat and workmanlike manner with steel trowels. The channels must be the same width and shape as the pipe to ensure that plugs and internal inspection equipment shall pass without restricton into all pipes.

5. Precast channels are allowed. However, they must be formed to above specifications and are subject to rejection if they do not meet specifications or are deemed to be unsatisfactory.

D. Precast Concrete Riser and Top Sections:

1. All precast reinforced concrete risers and top sections necessary to build a completed manhole shall be furnished, and the different sections shall fit together readily to permit effective jointing. Jointing shall be in accordance with the Detail Drawings.

2. A double application of preformed plastic sealing compound joints between adjacent sections shall be carefully made in accordance with the written instructions of the manufacturer. After the joints have been made, the preformed plastic sealing compound shall be cut or trowelled smooth across the joint on the inside of the manhole wall. Where required on the Detail Drawings, joints shall also be sealed with non-shrink grout.

3. Through wall lift holes are not acceptable.

4. Adjoining riser and conical top sections shall be fitted together to assure true vertical alignment of manhole steps.

5. Repair of manhole sections using grout is not permitted. If any damage occurs, the entire manhole section shall be replaced.

6. Flat top manhole slabs shall only be used for shallow manholes when approved by ENGINEER. All other manholes (4, 5 and 6-foot diameter) shall be installed with top cone sections.

7. Five and six foot diameter manholes may be installed with a reducing barrel to accommodate four foot diameter cone section. A detail of the reducing barrel section must be approved by the ENGINEER prior to installation. Reducing slabs will not be accepted.

E. Manhole Steps:

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

2. The top manhole step shall be a maximum of 4 1/2 inches from the top of the manhole cone section. The bottom manhole step shall be a maximum of 12 inches from the top of the manhole channel.

3. Any loose steps shall constitute replacement of entire manhole section.

F. Manhole Frames and Covers:

1. Where required, final adjustment of frame to elevation shall be made using poured concrete adjustment risers as shown on the Detail Drawings. Poured grade elevation adjustments shall not be permitted to exceed six (6) inches.

2. The joint between the bottom of the frame and the top of the poured concrete grade adjustment riser, or the top manhole section as applicable, shall be made with preformed plastic sealing compound and shall be sealed on the outside surface using non-shrink grout.

3. Frames for all manholes shall be bolted to the manhole. Covers for all manholes off street (R/W) manholes shall be water tight as shown on the Detail Drawings. Studs, nuts, and washers shall be of stainless steel. Bolts shall have a sufficient number of proper sized threads for proper connection.

4. Bolt frames through grade rings or poured concrete adjustment risers so bolts are securely fastened to top manhole section.

5. Secure covers to frame as shown on the Detail Drawings.

6. All manhole frames, regardless of location, are to be bolted to cone section.

3.02. MANHOLE REHABILITATION (IF NECESSARY AT TIE IN LOCATIONS)

A. DEVELOPER to remove all brick and existing concrete and steel riser rings and replace with new poured concrete adjustment risers. If total depth of riser exceeds six-inches the cone section is to be removed and a larger cone section and/or intermediate barrel section(s) shall be installed. Grade adjustments shall be performed in accordance with the specifications.

B. If the condition of the existing frame and cover does not meet existing specifications, a new frame and cover shall be installed.

C. DEVELOPER to verify shiplap for manhole prior to ordering any new manhole sections.

D. All manhole frame and covers are to be set to existing ground/street elevation. If the street section is to be paved, the manholes shall be set to finish elevation of new paving.

E. All existing manholes to remain, that the new sanitary sewer is tying into, shall be vacuum tested prior to any grade adjustments and/or coring. Testing shall be performed from above frame to bottom of manhole. If existing manhole does not pass a vacuum test, it shall be replaced unless the failure is located between the top of the cone and above the frame and can be repaired. If manhole remains, it must also pass a post rehabilitation test.

F. The inside of the manholes shall be cleaned out of any debris (stones, concrete, grout, etc.) that may accumulate during grade adjustments.

END OF SECTION

SECTION 02700

PIPED UTILITIES-SANITARY SEWERS

PART 1 GENERAL

1.01. RELATED DOCUMENTS

A. DEVELOPER'S Drawings and Detail Drawings.

B. Division 1 Specifications.

C. Division 2 Specifications, as applicable, including proprietary specifications of individual system and product manufacturers.

1.02. WORK INCLUDED

A. Installation of sanitary sewers, force mains and specials.

1.03. QUALITY ASSURANCE

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

B. Repair or replace defective piping or specials.

C. Sewer Line Acceptance Tests:

1. General:

a. All sewers, sanitary sewer reconnects, and plugged laterals shall be air tested. Sewer lines will be tested for leakage between manholes as the work progresses. The air testing shall apply to each reach of sewer line, manhole-to-manhole. All reconnection points to existing pipes not replaced must also pass an air test.

b. All types of sewer pipe installed, except for DIP, shall be tested for deflection.

c. All sewer runs shall be lamped.

d. All sewers, including manholes, shall be inspected prior to air testing/vacuum testing, and all visible or detectable leaks shall be repaired, or at OWNER's direction, replaced before testing begins. The line acceptance tests shall be made after backfilling has been completed.

e. The DEVELOPER shall repair all visible or detectable leaks or defects of any nature.

f. Any damage caused to properties due to sewage handling and/or sewage backup while air testing shall be the responsibility of the DEVELOPER.

g. No acceptance testing will be performed until sewer main has been flushed.

h. No acceptance testing will be permitted if there is any remaining sewer pipe installation necessary for manhole sections upstream of desired pipe to be tested.

i. All sewers, including manholes, shall be tested prior to final trench restoration.

2. Testing equipment:

a. Air Testing:

1) Air testing shall be performed utilizing testing equipment consisting of an air-compressor and storage tank of adequate capacity; an air control panel equipped with all necessary piping, valves and pressure gages to control the rate at which the air flows to the test section and to monitor the air pressure inside the test section; and all required plugs. In order to prevent overloading the test section with the full pressure of the compressor, the test equipment must be provided with an approved pressure relief device set to blow out at 10 psi. An extra pressure gage of known accuracy shall also be provided so that the gages of the test equipment can be frequently checked. All gages shall be oil filled and shall read to the 1/10 psi increment.

b. Deflection Testing:

1) Deflection testing shall be performed using a rigid *"Go-No Go"* device. A hydro-cleaner or blower/parachute device, complete with string lines, shall be provided for attaching pull lines.

2) All sewer lines, except DIP, shall be tested. Testing shall be performed after the line as been backfilled for a minimum of thirty (30) days unless otherwise waived by Engineer.

c. Lamping:

1) Lamping shall be performed by AUTHORITY staff, with assistance from DEVELOPER.

2) If a “full moon” does not exist, or a deformation is detected, the sewer run shall be re-excavated. If Inspector/ENGINEER determines pipe deformation is eliminated then pipe can be re-bedded and re-backfilled, otherwise, pipe shall be replaced.

3) Pipe shall have no vertical or horizontal deflection.

3. Cleaning Prior to Tests:

a. It shall be the responsibility of DEVELOPER to have the pipe cleaned prior to air testing and deflection testing.

b. Clean piping including sewers, branches and service connections, until free of dirt, silt and/or other construction debris:

1) Provide a means to trap and collect the debris produced during the sewer and manhole cleaning prior to testing.

2) Manholes are to be pumped down during the flushing process.

3) A sediment screen with a hole size less than or equal to 3/8 of an inch shall be installed in all the sewer mains exiting the manhole directly down stream of where the flushing is taking place to catch any debris that is in the line, any time flushing is being performed. Once the line is flushed the manhole will be cleaned of all sediment and debris and the sediment screen will be moved to the next manhole downstream.

4) Flushing will be performed starting at the furthest upstream manhole for the entire project proceeding downstream until all lines are flushed.

5) All debris removed during the flushing process is to be disposed of at an approved dump site.

4. Air Testing Procedure:

a. All tees or end of side sewer stubs placed for future connections shall be plugged with flexible-joint caps, or acceptable alternate, securely fastened to withstand the internal test pressure. Plugs or caps shall be readily removable.

b. Testing of any sewer will not be conducted until backfill and compaction are completed. Each pipe section shall be tested with low pressure air at a minimum pressure of 5 psig. Where ground water is present, the test pressure shall be determined as follows:

Test pressure = H/2.31 + 5 psig, where H is the depth of groundwater over pipe.

c. At least two minutes shall be allowed for temperature stabilization, adding only the amount of air required to maintain pressure.

d. The pipe shall hold the required test pressure for the duration prescribed in the air test table (Table 1) attached to this Section. The times listed in the table are additive when testing pipes of different sizes.

e. Any pressure drop is considered a failure of test.

f. Repair or replace, at direction of OWNER, and retest sections of sewer not meeting test requirements.

g. Maximum test pressure is 10 psig when testing PVC pipe.

5. Deflection Testing Procedure:

a. Use "*Go-No-Go*" device in accordance with pipe manufacturer's requirements.

b. Unless specified otherwise by ENGINEER, long term pipe deflection (reduction in vertical inside diameter) shall not exceed 5 percent as specified in DEP Sewage Manual, Section 25.85 Deflection Test and as shown below for PVC SDR 35 pipe. Use pipe manufacturer's requirements if pipe type is other than PVC SDR 35.

Nominal Size (in)	Average Inside Diameter (in)	5% Deflection Mandrel (in)
8	7.891	7.28
10	9.864	9.05
12	11.737	10.79
15	14.374	13.20

c. Repair or replace at direction of OWNER and retest sections of sewer not meeting test requirements. (Repair: Remove and replace section that does not meet test requirements.)

d. Deflection testing will be done at least 30 days after pipe installation, unless otherwise waived by Engineer.

e. CONTRACTOR may be required to use OWNER's mandrel if it is in the AUTHORITY's opinion that the CONTRACTOR'S mandrel does not appear to meet specifications.

D. Minimum Testing Requirements:

1. Securely fasten and brace all line plugs in the pipe section being tested so that none of the plugs is suddenly released when the compressed air is applied to the pipe section. Limit the internal pressure in the sewer line to 5 psi greater than the average back pressure of any ground water that may submerge the pipe.

2. All gages, air piping manifolds and valves of the air testing equipment shall be located above ground at the top of the trench.

3. No one shall be allowed in the manhole during testing.

4. Special care shall be exercised during removal of plugs; and the pressure in the piping of the test section shall be completely relieved before any plug shall be removed.

E. Pressure Testing of Force Mains (Hydrostatic Test):

1. All completed pipe shall be tested for leakage between valves and bulkheads to encompass the entire length of the force main.

2. Piping shall hold the test pressure for 2 hours without pumping. Piping system shall experience no pressure drop during testing. Repair any visible leaks.

3. Hydrostatic pressure tests shall not be made until at least seven (7) days after concrete thrust blocks are installed. The CONTRACTOR, at his option and expense, may use high early strength concrete for thrust blocks in which case hydrostatic pressure tests shall not be made until at least three (3) days have elapsed.

4. The section of force main being tested shall be filled with water a minimum of 24 hours before the main is tested. The CONTRACTOR shall insure that air is expelled from the pipeline in accordance with AWWA C-600, Section 4.1.3. Testing method must be preapproved by ENGINEER.

5. After the pipeline has been filled with water for 24 hours, the CONTRACTOR shall conduct a hydrostatic test. Each section of force main shall be tested at 1½ times the maximum pump shut off head for two (2) hours. The CONTRACTOR shall not employ a test pressure, which exceeds the allowable pressure of any installed pipe, valve or appurtenance.

F. The AUTHORITY will make a final inspection of the installed sewer system upon completion of the street construction, including paving. This inspection will be made to verify final grade of manhole frames and covers and that the interior manholes are clean free from leaks.

G. Before 18 months following the AUTHORITY'S final inspection and approval of sewer extension/replacement, a re-inspection may be performed to verify that the manholes and sewer mains continue to be free of leaks and defects. Defects found shall be repaired as if under the terms of the original contract.

1.04. SUBMITTALS

A. Submit shop drawings or catalogue cuts, as appropriate, for materials listed under Paragraph 2.1 of this Section. Submit only those materials that are actually to be used in the work. These will usually be as follows:

1. Pipe, Fittings, Sweeping Tees and End Plugs.

2. Gaskets, Adapters, and Other Appurtenances.

3. Detection Tape.

4. Stone Certifications.

5. Valves and valve boxes.

B. Submit manufacturer's Pipe Certification Certificate.

C. Make submittals prior to start of construction. Make submittals to AUTHORITY.

1.05. DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and handle the piping and appurtenances in accordance with the manufacturer's recommendations, and in such manner as to protect the materials from damage. Upon delivery, all PVC pipe and appurtenances shall remain suitably covered to block UV rays.

B. Pipe and related materials shall be loaded and unloaded by lifting with hoists or skidding so as to avoid shock or damage. Under no circumstances shall such material be dropped or skidded against pipe already on the ground.

C. Pipe and related materials shall at all times be handled with care to avoid damage. The interior shall be kept free from dirt and foreign matter. All pipe and appurtenances shall be carefully lowered or raised into place with suitable equipment in a manner that will prevent damage to the material. Under no circumstances shall pipe or accessories be dropped or dumped.

D. Pipe, and all related materials, shall be thoroughly inspected for defects prior to their being installed. Any defective, damaged, or unsound material, shall be repaired or replaced as directed.

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

F. Pipe, whose manufacture date is more than 6 months old, shall not be installed on the project.

PART 2 PRODUCTS

2.01. MATERIALS

A. PVC Pipe: Gravity Sewers:

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

a. Unplasticized polyvinyl chloride (PVC) gravity sewer pipe and fittings with integral wall bell and spigot joints meeting ASTM D-3034 specification for Type PSM Poly Vinyl Chloride (PVC) Sewer Pipe and Fittings, Standard Dimension Ratio (SDR) 35 or SDR 26.

b. The pipe shall be joined with an integral bell, bell-and-spigot type rubber gasketed joint. Rubber gasket shall conform to ASTM F 477. The rubber gasket shall be compressed radially on the pipe spigot to form a watertight seal in accordance with ASTM D 3212.

c. Fittings shall be made of PVC having a cell classification of 12454B or 12454C or as defined in ASTM D 1784. Fabricated fittings with solvent cemented components shall be made in accordance with ASTM D 2855 and taking cognizance of ASTM F 402.

d. Pipe stiffness at 5% deflection shall be 46 PSI for all pipe diameters when tested in accordance with ASTM D 2412.

e. Air testing and deflection testing to be performed in accordance with the requirements of this Section.

2. 18” - 27” Diameter:

a. Unplasticized polyvinyl chloride (PVC) gravity sewer pipe and fittings with integral wall bell and spigot joints meeting ASTM F679 specification for “Poly Vinyl Chloride (PVC) Large Diameter Plastic Gravity Sewer Pipe and Fittings”, or ASTM 794 specification for Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings based on controlled inside diameter or ASTM F1803 specifications for Poly (Vinyl Chloride)(PVC) Closed Profile Gravity Pipe and Fittings Based on Controlled Inside Diameter.

b. The pipe shall be joined with an integral bell, bell-and-spigot type rubber gasketed joint. Rubber gasket shall conform to ASTM F477. The rubber gasket shall be compressed radially on the pipe spigot to form a watertight seal in accordance with ASTM D 3212.

c. Fittings shall be made of PVC having a cell classification of 12454B or 12454C (only) as defined in ASTM D 1784. Fabricated fittings with solvent cemented components shall be made in accordance with ASTM D 2855 and taking cognizance of ASTM F402.

d. Pipe stiffness at 5% deflection shall be 46 PSI for all pipe diameters when tested in accordance with ASTM D 2412.

e. Air testing and deflection testing to be performed in accordance with the requirements of this section.

B. Ductile Iron (DIP):

1. Pipe:

a. Ductile iron pipe shall be centrifugally cast, annealed ductile iron manufactured in accordance with ANSI A21.50 and A21.51.

b. Pipe joints shall be push-on or mechanical joint with retainer glands and shall conform to ANSI specification A21.11. Furnish joints with all required accessories. Number of joints to be restrained shall be determined by the pipe manufacturer for the conditions encountered (minimum of four (4) joints on each side of the fitting and/or bend shall be restrained). Restrained joint pipe shall be as manufactured by U. S. Pipe, Clow, American or approved equal. The use of mechanical joint pipe with retainer glands may also be used.

c. Mega lugs shall also be provided at each fitting and/or bend.

d. Furnish Class 52 pipe, with protected 401 ceramic epoxy lining.

e. Gaskets for restrained joints shall be Field Lok 350 gaskets as manufactured by U.S. Pipe, Snap-Lok as manufactured by Griffin Pipe or approved equal.

f. Ductile iron pipe used for main line gravity sewer construction shall be push-on joint.

2. Fittings:

a. Furnish fittings in accordance with ANSI 21.10 250 psi rating.

b. Joints shall be push-on or mechanical joint with retainer glands in accordance with ANSI A21.11. Furnish joints with required accessories.

c. If restrained joint pipe is furnished, furnish fittings of the same type and manufacturer as pipe furnished.

d. Compact fillings may be used.

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

4. Manufacture's standard asphalic coating, approximately one mil thick in accordance with AWWA C151, applied to the outside of pipe and fittings.

5. The interior of all ductile iron pipe and fittings is to be lined with Protecto 401 Ceramic Epoxy Lining, in accordance with the manufacturer's specifications.

C. High Density Polyethylene Pipe (HDPE) Force Mains (For force mains less than 4" in diameter):

1. High Density Polyethylene (HDPE) pressure pipe, tubing and fittings for force main piping shall be SDR 11. Manufacturers shall verify the suitability of pipe for the intended applications.

2. Materials used for the manufacturer of polyethylene pipe and fittings shall be high density, black PE 3408 meeting the following physical property requirements:

Property	Test Method (1)	Nominal Value
Material Designation	PPI/ASTM	PE 3408
Material Classification	D3350	345444C
Density	D1505	0.957
Flow Rate	D1238 (190/21.6)	8.5
Flexural Modulus	D790	136,000
Tensile strength @ yield	D638	3,500
ESCR	D1693	F_0>10,000
ESCR, compressed ring	F1248	F_0>10,000
UV stabilizer (C)	D1603	2.5
Elastic modulus	D638	125,000
Brittleness temperature	D746	<-180
Melting Point	D789	261
Vicat softening temperature	D1525	255
Hardness	D2240	64
Thermal expansion	D696	1.1×10^{-4}
Volume resistivity	D991	2.6×10^{16}
HDB @ 73.4ºF	D2837	1600
HDB @ 140ºF	D2837	800
Molecular weight category	Extra high	
Molecular weight	GPC	330,000

(1) Test procedures are ASTM unless otherwise specified. (PPI = Plastics Pipe Institute, and GPC = Gel Permeation Chromatography.)

3. Pipe and fittings shall be manufactured from identical material meeting the requirements listed and shall be designed for a 100 psi working pressure. The manufacturer shall certify that samples of the manufacturer's production pipe have been tested in-house, in accordance with ASTM D-2837, and validated in accordance with the latest revisions of PPI TR-3. Under these procedures, the minimum hydrostatic design basis shall be certified by the manufacturer to the 1600 psi at 73.4ºF and 800 psi at 140ºF. The pipe and fitting manufacturer shall have an independent PPI Material Listing in accordance with PPI TR-3 and TR-4.

4. Pipe and fittings shall be produced by the same manufacturer.

5. Pipe shall be manufactured in accordance with ASTM F-714. Dimensions and tolerances for pipe outside diameter and minimum wall thickness shall be in accordance with ASTM F-714.

6. Fittings shall be manufactured to the requirements of ASTM D-3261 and as follows:

    a. Fabricated fittings shall be manufactured from pipe of at least one SDR heavier pipe than the system piping, and shall be pressure rated to match the system piping.

    b. The butt fusion outlets of fabricated fittings shall be machined to the same SDR as the system piping to which they are to be fused.

    c. The manufacturer shall subject samples from each molded fittings production lot to x-ray inspection for voids. Voids shall not be permitted, and if found in the samples, the entire production lot shall be x-ray inspected. If additional voids are found, the production lot shall be rejected.

7. Air Release Valve fittings will be Electorfusion Corp Saddles. Outlets shall be 2-inch NPT. Saddles will be as manufactured by Central Plastics Company.

D. PVC Pipe (Force Mains when excessive H2S determined to be an issue):

1. Pipe:

    a. PVC pipe will conform to the AWWA C900 specifications, with gaskets meeting ASTM F 477 and joints in compliance with ASTM D3139. Pipe will be DR 14 (200psi) and green in color.

    b. Joints shall be restrained with a Uni-Flange as manufactured by Ford or approved equal. Joint restraints are required for four (4) joints on either side of any fitting or bend (not including the fitting or bend).

2. Fittings:

    a. Same as noted above. Furnish joints with required accessories including Mega-Lugs for PVC. Mega-Lugs shall be as manufactured by EBBA Iron Works.

    b. Joints shall be mechanical joint in accordance with ANSI A21.11. Furnish joints with required accessories including Mega-Lugs for PVC. Mega-Lugs shall be as manufactured by EBBA Iron Work.

3. The interior of all ductile iron fittings is to be lined with Protecto 401 Ceramic Epoxy Lining, in accordance with the manufacture's specifications.

4. Manufacturer's standard asphaltic coating, approximately one mil thick in accordance with AWWA C151, applied to the outside of fittings.

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

E. Bolted Steel Coupling:

1. Sleeve complying with ASTM A-53.

2. Followers: Ductile Iron ASTM A 536 or AISI C1020 steel.

3. Stainless Steel Bolts and Nuts: semi-finished hexagon nuts to ASTM A325-80 and ASTM A563-80, respectively.

4. Coating is to be AWWA C-213 Fusion Bonded Epoxy or approved equal. Including Holiday test.

5. Gaskets: Grade 30.

6. Approved manufacturers:

   a. Dresser, Bradford, PA.

   b. Krausz.

   c. Smith-Blair.

   d. Romac.

F. Flexible Pipe Coupling with Anti-Shear Stainless Steel Collar (Only for pipes 6-inches in diameter and under):

1. Provide flexible pipe couplings with anti-shear stainless steel collar designed for differing pipe material connections and for transition/reducing conditions of differing pipe material connections.

2. Coupling will be PVC material which meets the performance requirements of Commercial Standard Specification CS 226-59. Couplings designed for pipe outside diameter coupling shall incorporate recesses to contain the stainless steel bands. Couplings provided with pre-assembled type 305 stainless steel bands.

3. Use flexible pipe couplings only where directed by the Engineer.

4. Approved manufacturers:

   a. FERNCO Inc., Distributed by the General Engineering Company

   b. Or Equal.

G. Mechanical Pipe Coupling (For pipes 8-inches in diameter and greater):

1. All couplings and adapters for pipes 8-inches in diameter (other than PVC) and greater shall be solid sleeve/mechanical couplers, no flexible couplers will be allowed.

2. Constructed of materials which will pass the strength and chemical requirements of ASTM C954.

3. Couplings must be lined with a fusion bond coating that meets AWWA C213 standards.

4. All nuts and bolts must be stainless steel.

5. Approved manufacturers:

   a. Romac, Bothel, WA.

   b. Mission, Corona, CA.

c. Krausz, Ocala, FL.

d. Calder, Gardner, CA.

e. Dresser, Bradford, PA.

H. Transition Gaskets:

1. For DIP to SDR 35 PVC pipe transition use a ROMAC Industries transition coupling style XR501 or approved equal. Coupling must be lined with a fusion bond coating that meets AWWA C213 standards.

I. Location Tape:

1. Location tape shall be a metal detectable reinforced underground utility marking tape with a solid aluminum foil core with permanent printing under a mylar layer.

2. The location tape shall consist of a minimum 5.0 mil (0.0005") overall thickness, coated and colored cross-woven polyethylene, with no less than 4,400 psi of tensile strength and color coded suitable for direct burial.

3. Location tape shall be 2-inch width minimum.

4. Detection cable shall be 12 gage multi-strand stainless steel cable. Detection cable shall be required for all HDPE & PVC force mains. Valve boxes shall be placed every 450 feet.

2.02. VALVES AND SPECIALS

A. Gates Valves 4-12 inches in diameter:

1. Gate valves shall be resilient seated meeting of exceeding AWWA C509. Gate valves shall have mechanical joint ends and be equipped with a 2-inch operating nut and be suitable for buried applications. Valves shall open when turned to the left. Valve shall have fusion-bond epoxy coating on the inside and outside of the valve. Valve will have an extension stem which extends to a minimum of two (2) feet below the ground. The valve shall be as manufactured by American Darling.

B. Air and Vacuum Release Valve:

1. Air and vacuum release valve shall be designed to operate (open) while pressurized, allowing entrained air to escape through the air release orifice. Valve shall operate from 0 through 250 psi, close watertight when liquid enters even when fluid is rising without pressure, allow air to enter in the event of a vacuum.

2. Valve body shall be stainless steel (316Ti).

3. Valve shall be equipped with a stainless steel isolation device or an inline ball valve shall be installed.

4. Float to be derlin and spindle shall be stainless steel (316Ti).

5. Valve shall be supplied with a flushing attachment consisting of a bronze or stainless steel shut-off valve, quick connect couplings and rubber hose for backwashing with clear water.

6. Valve for the raw wastewater pump station discharge piping shall be a 2" H-TEC (986 w/ Isolation Device).

C. Mechanical Couplings:

1. General: Steel mechanical couplings of the gasketed, sleeve type shall be furnished and installed as required. The coupling shall be of the proper diameter to make a tight joint. The coupling shall not have stops. All couplings shall be for 150 psi working pressure.

2. Material: Each coupling shall consist of one middle ring of a thickness and length suitable for the proposed application and test pressures; two followers; two rubber compounded wedge section gaskets and sufficient trackhead bolts to properly compress the gaskets.

3. Manufacturer:

a. American Darling.

b. Mueller.

D. Valves Boxes:

1. All valves buried in the ground where applicable shall be provided with cast iron extension type valve boxes of the roadway type.

2. The valve boxes shall be of three-piece construction, and shall be of the screw type.

3. The valve boxes shall have a 5 1/4-inch shaft, and shall be furnished with covers. Cover will be marked "SEWER".

4. The valve boxes shall be hot coated inside and out with a tar or asphalt compound.

5. Acceptable Manufacturers:

a. Bingham and Taylor, Culpeper, VA.

b. BIBBY-STE-CROIX Foundries, Inc., PA.

E. Miscellaneous Valves and Piping (Inside Air Release Chamber and Flushing Manhole):

1. Lever operated ball valve will be bronze suitable for 225 pounds of service. Valve shall be one piece body design, blowout proof stem, reinforced Teflon seats and seals, threaded ends and lever operated. Valve will be manufactured by Stockham, NIBCO or Crane.

2. All piping, couplings and unions shall be stainless steel.

PART 3 EXECUTION

3.01. LAYING PIPE

A. General:

1. Maximum sewer run length is 400 ft.

2. Minimum cover over sewer pipe is five (5) feet except when crossing streams, in which case the amount of cover shall be in accordance with the DEP Design Manual.

3. Minimum grade of mainline sewer shall be twenty-five (25) percent greater than the minimum grade required by the DEP, except as approved by the AUTHORITY (example minimum grade of 8-inch sewer is 0.5 percent compared to DEP minimum of 0.4 percent).

4. Sewer depth shall not exceed 20 feet unless specifically approved by the AUTHORITY.

5. Slopes shall not exceed 25% without prior authorization by Engineer.

6. Sewers at depths greater than 18 feet (above top of pipe) shall be Class 52 D.I.P. SDR 26 and C900 pipe may be used for sewers deeper than 18 feet with prior approval from ENGINEER.

7. A change in pipe type when constructing a run is only acceptable if specifically approved by the AUTHORITY.

8. Following trench excavation, pipe laying shall proceed upgrade with pipe laid carefully, hubs upgrade, spigot ends fully centered into adjacent hubs, and true to lines and grades given.

9 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. Each pipe shall be firmly held in position so that the invert forms a continuous grade with the invert of the pipe previously placed.

   a. Utilize portable laser to establish grades of sewers. Laser shall be used in accordance with manufacturer's written instructions:

      1) Grade shown on DEVELOPER'S Drawings is that of sewer invert. Tolerance $\pm$ ¼- inch.

10. Under no conditions shall pipe be laid in water, on subgrade containing frost, and/or when trench conditions are unsuitable for such work. In all cases, water shall be kept out of the trench until concrete cradles, supports, encasement, or saddles, where used, and materials in the joints have hardened.

11. Ductile iron pipe shall be required for crossing of streams or other wet areas. The bottom of the trench shall be stable in order to maintain the proper grade of the pipe. If the material in swamp areas or stream bottoms is soft, the unsuitable material shall be removed to a depth at which stabile, undisturbed earth or rock is encountered, not to exceed a depth below pipe invert of three (3) feet, or to the limits designated by the ENGINEER. Trench sub-bedding shall be backfilled with No. 3 coarse aggregate in accordance with the Detail Drawings. If wetlands or stream bottom is rock, normal pipe bedding is required.

12. Any pipe that has its grade or joint disturbed after laying shall be taken up and relaid. Any section of pipe already laid and found to be defective shall be taken up and replaced with new pipe.

13. Walking or working on top of the completed pipeline, except as may be necessary in

backfilling or tamping, shall not be permitted until the trench has been backfilled to a height of at least 2 feet over the top of the pipeline.

14. Maintain pipelines free and clear of debris during the progress of the work.

15. At times when pipelaying is not in progress, the open ends of the pipe shall be closed by watertight plug.

16. Diversion of Sewage During Construction:

    a. Sewage flowing in existing sewer shall be temporarily plugged or diverted around or through the construction be means of by-pass pumping, fluming, or any other means acceptable to ENGINEER:

        1) If by-pass pumping is required, provide stand-by pump equivalent to the largest by-pass pump in service.

    b. At completion of each work day, connect new sewer pipe to existing sewer. Reconnection shall be covered so there is no visible sewage.

    c. Prior to beginning work, DEVELOPER shall have on hand all required materials necessary to accomplish the work.

    d. DEVELOPER shall be responsible for any property damage caused by sewage handling.

17. DEVELOPER shall maintain a log of service connection locations and lateral pipe lengths and sizes. The locations shall be based upon sewer line stationing and shall indicate if the lateral is in service or plugged.

18. Connections to existing manholes shall require vacuum testing prior to connection and after connection to assure water tightness of manhole.

19. Install straight tees a minimum of 5 feet from outside walls of manholes.

B. PVC and HDPE Pipe:

1. Inspect pipe and fittings for defects or damage prior to lowering into the trench.

2. Install pipe and fittings in accordance with manufacturer's written instructions.

3. Do not kick or throw PVC pipe and fittings into the trench.

4. Use of hydrohammer for compaction will not be permitted within four (4) feet of the top of the pipe.

3.02. CONCRETE FOUNDATIONS

A. Where required by ENGINEER, or where shown on the DEVELOPER'S Drawings and/or Detail Drawings, pipe shall be placed on a formed concrete cradle, or unformed concrete shall be placed around pipes for bedding and encasement.

B. Concrete cradles shall consist of structures requiring forms and be composed of concrete, built-in trenches to support pipes, and to the dimensions shown on the Detail Drawings.

C. Concrete bedding and encasement shall be composed of concrete placed in trenches, without forms as pipe bedding, or encased around pipes, to the dimensions and in the locations indicated on the Detail Drawings.

3.03. The AUTHORITY reserves the right to retest, at the DEVELOPER'S expense, any piping throughout the duration of the Construction Period:

A. Make repairs to piping found defective by such AUTHORITY conducted tests.

3.04. The AUTHORITY will make a final inspection of the installed sewer system upon completion of the street construction, including paving. This inspection will be made to verify final grade of manhole frames and covers and that the interior manholes are clean and free from leaks:

A. The warranty period shall begin with all conditions being satisfactory to the AUTHORITY in its final inspection.

3.05. Before 18 months following the AUTHORITY'S final inspection and approval of developer installed sewer extensions, a re-inspection may be performed to verify that the manholes and sewer mains continue to be free of leaks and defects. Defects found shall be repaired as if under the terms of the original contract.

3.06. Locations of each tee or wye and observation tee must be shot and the GPS locations shall be provided to the AUTHORITY.

END OF SECTION

SPECIFICATION TIME REQUIRED
FOR SIZE AND LENGTH OF PIPE INDICATED

Pipe Diameter (in.)	Minimum Time (min:sec)	Length for Minimum Time (ft.)	Time for Longer Length (sec x Length, ft.)	Specification Time for Length (l) Shown (min:sec)							
				100 ft.	150 ft.	200 ft.	250 ft.	300 ft.	350 ft.	400 ft.	450 ft.
4	1:53	597	0.190 x Length	1:53	1:53	1:53	1:53	1:53	1:53	1:53	1:53
6	2:50	398	0.427 x Length	2:50	2:50	2:50	2:50	2:50	2:50	2:51	3:12
8	3:47	298	0.760 x Length	3:47	3:47	3:47	3:47	3:48	4:26	5:04	5:42
10	4:43	239	1.187 x Length	4:43	4:43	4:43	4:57	5:56	6:55	7:54	8:54
12	5:40	199	1.709 x Length	5:40	5:40	5:42	7:08	8:33	9:58	11:24	12:50
15	7:05	159	2.671 x Length	7:05	7:05	8:54	11:08	13:21	15:35	17:48	20:02
18	8:30	133	3.846 x Length	8:30	9:37	12:49	16:01	19:14	22:26	25:38	28:51
21	9:55	114	5.235 x Length	9:55	13:05	17:27	21:49	26:11	30:32	34:54	39:16
24	11:20	99	6.837 x Length	11:24	17:57	22:48	28:30	34:11	39:53	45:35	51:17
27	12:45	88	8.653 x Length	14:25	21:38	28:51	36:04	43:16	50:30	57:42	64:54
30	14:10	80	10.683 x Length	17:48	26:43	35:37	44:31	53:25	62:19	71:13	80:07
33	15:35	72	12.926 x Length	21:33	32:19	43:56	53:52	64:38	75:24	86:10	96:57
36	17:00	66	15.384 x Length	25:39	38:28	51:17	64:06	76:55	89:44	102:34	115:23
42	19:54	57	20.942 x Length	34:54	52:21	69:49	87:15	104:42	122:10	139:37	157:04
48	22:47	50	27.352 x Length	45:35	68:23	91:11	113:58	136:46	159:33	182:21	205:09
54	25:31	44	34.618 x Length	57:42	86:33	115:24	144:15	173:05	201:56	230:47	259:38
60	28:20	40	42.738 x Length	71:14	106:51	142:28	178:05	213:41	249:18	284:55	320:32

SECTION 02715

SANITARY SEWER FLOW CONTROL

PART 1 GENERAL

1.01. RELATED DOCUMENTS

A. Specifications, as applicable, including proprietary specifications of individual system and product manufacturers.

1.02. WORK REQUIRED

A. The DEVELOPER shall furnish all materials, labor, equipment, power, and maintenance to implement a temporary system for conveying the existing wastewater flow past the work area for the time required to complete the sanitary sewer system maintenance/rehabilitation operations.

1.03. SUBMITTALS

A. Flow Control System Plan – The DEVELOPER shall submit a flow control system plan to the AUTHORITY/ENGINEER for review and discussion purposes prior to initiating work on the project.

1.04. QUALITY ASSURANCE

A. The design, installation, and operation of the temporary flow control system shall be the DEVELOPER'S responsibility. The flow control system shall meet the requirements of all codes and regulatory agencies having jurisdiction.

B. In developing the temporary flow control system plan, the DEVELOPER shall take into account pump performance data/curves; quantity, capacity, and location of all equipment; size, type and routing of all suction and discharge pipes; and means of connecting the system.

C. When bypass pumping is required, the DEVELOPER shall include one standby pump equivalent in size to the single largest pump in service. The standby pump shall be fully connected and ready for operation so that, upon starting the motor, the standby pump will convey the flow.

1.05. WORK ON PRIVATE PROPERTY OR IN RIGHTS-OF-WAY

A. Permission to work on private property or obtaining rights-of-way, if required, shall be secured by the AUTHORITY.

B. If, for the DEVELOPER'S convenience (e.g. material storage areas, staging areas, additional site access, etc.), DEVELOPER desires permission to work on private property (other than properties where permission to work and/or rights-of-ways have been secured by the AUTHORITY), DEVELOPER shall secure permission and provide AUTHORITY with appropriate documentation.

C. The DEVELOPER shall protect from damage all property, including land, trees, shrubs, fences, and other existing improvements and replace in kind all those damaged as a result of the DEVELOPER'S operations.

D. The DEVELOPER shall pay all claims for property damage and trespass/occupation for damage outside the immediate work area or rights-of-way, as designated by the AUTHORITY/ENGINEER.

1.06. SPECIAL PRECAUTIONS

A. The DEVELOPER shall give notice of sewer system interruption to the AUTHORITY and affected property owners.

B. When flow in a sewer is plugged, blocked, or bypassed, sufficient precautions shall be taken to protect the sewer from damage that could potentially result from sewer surcharging. As a guide, the DEVELOPER shall endeavor to limit the level of surcharging to 5 psi (11.6 feet), a standard test pressure for new sewers. Further, precautions shall be taken to insure that temporary flow control measures do not cause flooding or damage to public or private property served by the sewers.

C. The bypass pumping hoses must be watertight and in new or like new condition.

D. The DEVELOPER shall take care to prevent spills and discharges of raw wastewater to the ground, trenches, and State waters. Any spills and discharges shall be properly cleaned up and reported immediately to the AUTHORITY.

E. If any spills of raw wastewater occur, due to failure of the DEVELOPER to maintain the temporary flow control system, the DEVELOPER shall be responsible for the cost of spill clean-up and any fines levied on the AUTHORITY by the state, federal, or any other applicable agency.

F. DEVELOPER shall provide subcontractor(s) or personnel experienced in the cleanup of sewage spills satisfactory to AUTHORITY.

PART 2 PRODUCTS

2.01. PLUGS

A. Plugs shall be inflatable, designed for sanitary sewer applications.

B. All plugs shall be equipped with a steel cable for firm attachment to a stationary object at ground level to prevent loss of the plug in the sewer.

2.02. PUMPS

A. Pumps shall be capable of pumping wastewater, grit, and other debris normally present in sanitary sewers. Pumping equipment shall be of adequate capacity to maintain sewer flows within the limits set forth in Part 3 of this section.

B. Pumps shall be complete with suction and discharge piping and fittings and all other appurtenances for a complete installation.

2.03. ROAD RAMPS

A. If bypass pumping hose(s) need to cross a busy roadway, an approved bypass pumping “road ramp” shall be utilized.

B. Road ramps must meet federal bridge loadings of 20,000 lbs. per single axel rating and must have safety reflectors.

PART 3 EXECUTION

3.01. GENERAL

A. Flow control shall be performed as required to comply with these specifications. No discharge of sewage onto the ground or into the trench will be allowed.

B. When sewer depth of flow at the upstream manhole of the sewer section being worked on is above the maximum allowable for television inspection/videotaping or air testing, the flow shall be reduced by plugging, blocking, or bypass pumping.

C. The DEVELOPER shall cease temporary flow control measures and re-establish gravity flow conditions at the end of each workday.

3.02. PLUGGING OR BLOCKING

A. When plugging or blocking is required, a sewer plug shall be inserted into the sewer upstream of the section being worked on. The plug shall be designed so that all or any portion of the wastewater can be released. Flow shall be reduced to the limits specified above.

B. Plugs shall be firmly attached to a stationary object at ground level to prevent loss of the plug in the sewer.

3.03. BYPASS PUMPING

A. When bypass pumping is required, the DEVELOPER shall set up and operate pumps, suction and discharge piping, plugs, and other equipment to divert the wastewater flow around the work area.

B. The DEVELOPER shall include one standby pump equivalent in size to the single largest pump in service. The standby pump shall be fully connected and ready for operation so that, upon starting motor, the standby pump will convey the flow.

C. The DEVELOPER shall furnish oil, fuel, grease, lubricants, tools and spare parts that may be required to maintain the operation of the pumps throughout the work period, as recommended by the manufacturer. The DEVELOPER shall be solely responsible for maintaining the temporary bypass pumps and appurtenances.

D. The DEVELOPER shall maintain adequate hoisting equipment for the pumps and ancillary equipment at the site.

E. The DEVELOPER shall insure that a responsible operator is on hand at all times when pumps are operating.

F. At the end of the work period, the DEVELOPER shall remove the pumps and appurtenances and restore the site to the satisfaction of the AUTHORITY.

END OF SECTION

SECTION 02720

BUILDING SEWERS AND SERVICE LATERALS

PART 1 GENERAL

1.01. SITE CONDITIONS

A. Pipe Line Ownership: The Lower Paxton Township Authority (AUTHORITY) is not the owner of the Building Sewer or Service Lateral being installed under this specification section. The property owner is the ultimate owner of the pipeline. Access to the property is by permission of the property owner to be secured by AUTHORITY:

1. The construction of the Building Sewer and Service Lateral pipeline shall conform to the requirements of this specification section.

2. Each individual lot shall have its own private Building Sewer and Service Lateral. No shared laterals will be permitted between separate lots/Property Owners.

B. Environmental Requirements: Do not perform pipe installation when weather conditions are such that work cannot be performed satisfactorily:

1. Keep trenches dewatered until pipe joints have been made and inspections and tests have been performed.

2. Under no circumstances lay pipe in water or on bedding containing frost.

PART 2 PRODUCTS

2.01. BUILDING SEWER MATERIALS

A. Elastomeric Materials: Elastomeric materials used in pipelines shall be suitable for continuous contact with domestic sewage.

B. The use of Schedule 40 PVC is prohibited.

C. PVC Pipe (4 or 6-inch diameter):

1. Pipe and Fittings:

a. Unplasticized polyvinyl chloride (PVC) gravity sewer pipe and fittings with integral wall bell and spigot joints meeting ASTM D3034 specification for Type PSM PVC sewer pipe and fittings, Standard Dimension Ratio (SDR) 35, SDR 26, or ASTM F789. (For gasket joints only.)

b. The pipe shall be joined with an integral bell, bell-and-spigot type rubber gasketed joint. Rubber gasket shall conform to ASTM F 477. The rubber gasket shall be compressed radially on the pipe spigot to form a watertight seal in accordance with ASTM D3212.

c. Fittings shall be made of PVC having a cell classification of 12454B as defined in ASTM D1784.

d. Pipe stiffness at 5 percent deflection shall be 46 psi for all pipe diameters when tested in accordance with ASTM D2412.

e. Double Sweeping Tee: Fabricated from SDR 26 PVC material and as manufactured by GPK.

f. Schedule 40 to SDR 35 adapter for connection to interior plumbing: SDR 26 PVC fitting “long neck” as manufactured by Multi Fittings or GPK.

D. Ductile Iron Pipe (DIP): Provide pipe conforming to ANSI A21.50 and ANSI A 21.51 requirements and having a Class 52 wall thickness:

1. Use DIP only where required by special site conditions or as directed by the AUTHORITY. Where DIP is used for pipe sewer mains, use DIP pipe for service connection piping. Building sewer can transition to PVC if it is less than 18 feet. SDR 26 PVC pipe may be used in place of DIP with prior approval from the ENGINEER.

2. Fittings: Gray iron or ductile iron conforming to ANSI A21.10 requirements.

3. Joints: Provide push-on or mechanical style rubber-gasket joints conforming to ANSI A 21.11 requirements.

4. The interior of all DIP and fittings is to be lined with Protector 401 Ceramic Epoxy Lining (or approved equal), in accordance with the manufacturer’s specifications.

5. Pipe and Fitting Coating: Manufacturer’s standard asphaltic coating, approximately one mil thick in accordance with AWWA C151, applied to the outside of pipe and fittings.

E. Flexible Pipe Couplings with Anti-Shear Stainless Steel Collar (only for pipes 6-inches and smaller):

1. Provide flexible pipe couplings with anti-shear stainless steel collar designed for differing pipe material connection; and for transition/reducing conditions of differing pipe material connections. (Flexible-couplings are not permitted for connecting pipe of like materials.)

2. Coupling Construction: Virgin PVC material which meets the performance requirements of Commercial Standard Specification CS 226-59. Couplings designed for pipe outside diameter coupling shall incorporate recesses to contain the stainless steel bands. Couplings provided with pre-assembled type 305 stainless steel bands and screws.

3. Acceptable Manufacturers:

a. FERNCO Inc., Distributed by the General Engineering Company.

b. Or Equal.

F. Ductile Iron Pipe (DIP) or Cast Iron Pipe to SDR 35 Polyvinyl Chloride (PVC) Pipe Transition Gaskets:

1. Gasket Construction: Virgin SBR in accordance with ASTM D 2000 MBA 710, compounded for sewer service. Designed for use in cast iron mechanical joint fittings for adapting PVC sewer pipe.

2. Acceptable Manufacturers:

a. Romac Industries, Inc.

b. Or Equal.

G. Cleanout Caps and Plugs: Designed for permanent installation but removable at a future time. Pipe caps and plugs shall be able to withstand the pressures of the line acceptance test as outlined hereinafter:

1. Cleanout Cap Construction: In non-traffic areas, provide Panella-type push-on clean out cover with cast iron body and brass cap with countersunk lug, as shown on the Detail Drawings.

H. Cap Protection Casting: Gray iron casting conforming to ASTM A 48, Class No. 35, designed for AASHTO Highway Loading Class HS-20. Casting shall be a product of the U.S.A.:

1. Finish: Cover bearing surface machined to prevent movement under traffic. Casting surfaces factory cleaned and coated with manufacturers standard asphalt paint; non-tacky drying.

2. Acceptable Manufacturers: East Jordan Iron Works, Inc., Model No. 1565, or Neenah Foundry Company Model NF-1975 479.

3. Use Cap Protection Casting with all observation tees and any cleanouts located in areas of vehicular traffic.

2.02. SERVICE LATERAL MATERIALS

A. General Requirements: Where a new Service Lateral is to be constructed along with the Building Sewer (for connection into the main sewer), the DEVELOPER shall make the connection to the main sewer using the fittings as specified in the following paragraphs. Use the same material and fitting type as the type of main sewer pipe being connected into, unless otherwise directed by the AUTHORITY.

B. Pipe and Fitting Materials, Flexible Pipe Couplings with Anti-Shear Collar, Cleanout Plugs, and Cap Protection Casting: Use same as specified under 2.01. Building Sewer Materials.

C. Straight tees: use straight tees to connect to the sanitary sewer main. Wyes are only permitted when laterals are connected on a cul-de-sac.

D. Saddles: No saddle connections are allowed on main line.

PART 3 EXECUTION

3.01. PREPARATION

A. Inspection: Inspect each section of pipe and each pipe fitting before laying in conformance with the inspection requirements of the appropriate referenced standard:

1. Mark with large, painted X and remove rejected pipe from the Project.

B. Pipe Cleaning: Clean piping interior prior to laying pipe and following pipe laying. Keep open ends of piping and pipe attachment openings capped or plugged until actual connection or actual pipe testing.

3.02. CONSTRUCTION METHODS

A. General Requirements:

1. Use proper and suitable tools and appliances for the proper and safe handling, lowering into trench and laying of pipes.

2. Lay pipe proceeding upgrade true to line and grade, at a 90 degree angle to curb line. Lay bell and spigot pipe with bell end upgrade.

3. Exercise care to ensure that each length abuts against the next in such manner that no shoulder or unevenness of any kind occurs along inside bottom half of pipeline.

4. Before joints are made, bed each section of pipe full length of barrel with recesses excavated so pipe invert forms continuous grade with invert of pipe previously laid. Do not bring succeeding pipe into position until the preceding length is embedded and securely in place with Initial Backfill.

5. Dig bell holes sufficiently large to permit proper joint making and to insure pipe is firmly bedded full length of its barrel. All pipe should be properly bedded.

6. All pipe should be properly bedded to haunch line with applicable aggregate stone to prevent deflection and/or egg shaping before backfill is placed above the pipe.

7. Walking or working on completed pipeline, except as necessary in tamping and backfilling, is not permitted until trench is backfilled one-foot deep over top of pipes.

8. Take up and relay pipe that is out of alignment of grade, or pipe having disturbed joints after laying.

9. Take up and replace with new piping, such newly installed pipe sections found to be defective after installation.

10. In the case of repairs, perform pipe reconnections in accordance with the Pipe Reconnection Detail Drawing. Place 40 lb. bags of concrete beneath repair couplings.

11. Minimum slope of 4-inch building sewer is ¼-inch per foot.

12. Minimum cover of 3 feet is required.

13. Install tees on mainline sewer a minimum of 5 feet from outside walls of manholes.

14. In general, where depth of sewer invert is 12-feet or more, or elsewhere as designated by the ENGINEER, install service connections to enter the sewer as shown on Sewer Detail Drawings for “Service Connection-Deep Sewer”. Use same material used for service connections.

15. Install pipe and fittings in accordance with manufacturer’s written instructions.

16. Do not kick or throw PVC pipe and fittings into the trench.

B. Pipe Laying and Joining: Perform pipe laying and joining in strict accordance with pipe manufacturer’s installation instructions and such additional requirements as specified herein:

1. Make joints absolutely watertight and immediately repair detected leaks and defects

in newly installed pipe. Methods of repair subject to approval of the AUTHORITY:

a. Laying Specified Types of Plastic Pipe: Installation and joint assembly according to ASTM D 2321 for Class I bedding material.

b. Laying Ductile Iron Pipe: Installation and joint assembly according to AWWA C 600. Where necessary to field cut pipe use approved pipe cutter, milling cutter or abrasive wheel saw.

C. Service Lateral-to-Existing Main Sewer Connection:

1. PVC Fitting in Mainline:

a. Connection of the Service Lateral to the sewer main shall be made by removing a section of the sewer main and replacing it with an SDR 35 PVC straight tee connection and then reconnecting this to the sewer main with rigid PVC gasketed couplings. If existing lateral and main are not PVC, match existing material.

b. Pipe to pipe connections shall be made in accordance with Pipe Reconnection Detail.

c. Observation tees shall be installed at the connection between the Building Sewer and the Service Lateral or within the right-of-way line (easement).

d. All sewer laterals, including the reconnection at mainline, tee and all pipe, shall pass an air test before AUTHORITY acceptance.

D. Service Lateral-to- Manhole Connection: Cut the required pipe opening in the manhole by core drilling methods only. Make the pipe opening no more than 2-inches above the bench of the manhole base or into the base. Make the opening of sufficient size to accommodate the pipe with a pipe opening seal:

1. Pipe Opening Seal: Provide KOR-n-SEAL pipe opening seal as manufactured by NPC Systems, Inc. and as distributed by Monarch Products Co., Inc., York Haven, PA; substitutes not allowed by AUTHORITY.

2. DEVELOPER must vacuum test manhole prior to core bore and after core bore if required by AUTHORITY.

3. Drop connections are not allowed unless specifically approved by AUTHORITY on a case-by-case basis.

4. Form a new channel in the existing manhole bench for the new connection. Form the channel to a depth and width of one-half the pipe diameter of the new pipe entering the existing manhole. Channels may not be formed by using brick, block or any other preformed material. Channel must have a smooth finished surface.

5. Core boring for new lateral connections are not permitted to be cut under existing steps or over an existing lateral connection.

3.03. PIPELINE CONSTRUCTION

A. General Requirements: Construct Building Sewers, and laterals where required, to such points as directed by the AUTHORITY, and in accordance with the Detail Drawings included in these Specifications. Lay and join piping in every respect as specified previously and the

following additional requirements:

1. Cleanouts and Observation Tees: Install a 6 x 6 x 6-inch double sweeping tee for OWNER's use in inspection and testing of building sewer lines connection. Cleanout/observation tee riser to be of same material as service lateral line. When final grading is accomplished, install cleanout protective casting at finished grade in accordance with the Standard Details. Close the outlet of double sweeping tee on the building sewer side with a plug. Type of plugs used and method of installation subject to ENGINEER'S approval. Installed plug shall successfully pass Line Acceptance Test. Sizes of tees as indicated on the Detail Drawings:

    a. Install a cleanout riser with cap on the vertical outlet of the tee. Cleanout riser of same material as observation tee. Sizes of cleanout risers as indicated on the Detail Drawings. Riser pipe must be one continuous section of pipe unless deeper than 13.75 feet.

    b. All observation tees shall be located within the public easement.

    c. Install a protective casting on all Observation Tees Risers.

    d. Observation tees shall not be located in any sidewalk area, unless otherwise directed by Owner.

    e. Observation tee riser casting must be placed during the installation of the sewer main and lateral stubs. Certificate of occupancy will not be issued if the casting is not in place and flush to the ground.

2. Building Sewers shall not exceed a maximum distance of 100 feet without having a cleanout installed. Cleanout shall include a riser of the same material and size as the Building Sewer and Service Lateral where required:

    a. All cleanout risers shall have cap protection casting to prevent damage to riser and cap. The casting shall be able to withstand any imposed traffic loads. Cleanouts shall not be located in any sidewalk area, unless otherwise directed by OWNER.

    b. Cleanout risers shall be at grade, but remain visible for future inspections.

    c. Cleanout risers located in all areas and at the building are to be capped with a Panella-type, push-on clean out cover, with cast iron body and brass cap with countersunk lug, as shown on the Detail Drawings.

    d. All Cleanouts shall be constructed on horizontal grade and riser shall have no bends; must be vertical and shall be a solid piece of pipe unless deeper than 13.75 feet.

    e. If Cleanout riser is in an area of vehicular traffic, a metal riser protective casting must be used.

3. Pipe Line Bends: Construct Building Sewers and Service Laterals using not greater than 45 degree bends except where indicated otherwise on the Detail Drawings in these Specifications. Provide at least 1-foot spool piece between 45 degree bends, unless bends are less than 45 degrees. Any 90 degree bends required by the Authority shall be with two 45 degree bends separated by a minimum of 1 foot, to be used only with Authority approval.

3.04. INSPECTION AND TESTING

A. Inspections: During the progress of the Building Sewer construction, and Service Lateral construction where required, the AUTHORITY will make periodic inspections of the work. The inspections to be performed by the AUTHORITY may include the following:

1. Inspection of pipe bedding procedures.

2. Inspection of air testing procedures.

3. Inspection of backfilling procedures.

4. Inspection of cleanout riser and casting.

B. General Requirements for Testing: Conduct test specified herein so that each pipe line installed in the Project is tested to the satisfaction of the AUTHORITY. Tests shall be conducted in the presence of the AUTHORITY:

1. Provide tools, materials, apparatus and instruments necessary for pipeline testing.

2. Give the AUTHORITY a minimum of 72 hours advance notification of the time when the testing is to be performed. Schedule all inspections as stated in Section 1 of General Instructions.

3. Building sewers and laterals/main need to be tested separately. Contractor CANNOT test the entire mainline, lateral and building sewer all at once.

4. For new building sewer connections the 6” observation tee needs to be tested if the plumber is hooking into it.

5. If the observation tee was not previously tested the lateral testing procedure will need to include the observation tee and stack pipe.

6. If the new lateral is tying into an existing main, the tee and pipe reconnections to the main must be tested, except if connecting into a line that is VCP. Air testing requirements are identified in Section 02700 and Detail Drawings.

C. Testing Equipment: Control valve and test gauge apparatus shall be located above grade during the testing to allow for observation by the AUTHORITY:

1. Use testing apparatus equipped with necessary piping, control valves and gauges to control pressure within piping test section and to monitor pressures throughout the test.

2. To prevent accidental overloading of piping test section, provide testing apparatus with an approved pressure relief device set to relieve at 10 psi. An extra pressure gage of known accuracy shall also be provided so that the gages of the test equipment can be frequently checked. All gages shall be oil filled and shall read to the 1/10 psi increment

3. The test gauge shall be in satisfactory operating condition and recently calibrated. Gauge shall read in one-tenth increments and be liquid filled.

D. Line Acceptance Test: After the pipe line is constructed, observed by AUTHORITY representative and then <u>partially backfilled to at least 2 feet above the pipe</u>, perform a low pressure air line acceptance test in accordance with the Standards listed herein and the

following:

1. Test the seal plugs before actual use by testing plugs outside the trench in a short length of pipe pressurized to maximum anticipated testing pressure. Plugs shall hold and be properly braced, and show no movement. All Building Sewers to be tested from 6-inch clean out riser previously installed by pipe excavation contractor. A 4-inch clean out after 6-inch stub for the purpose of testing of Building Sewer acceptance test will not be allowed. The installation of clean out for testing will be grounds for rejection of Building Sewer.

2. Introduce low-pressure air slowly into sealed pipeline until internal air pressure meets the following requirements. Introduce air until the pressure stabilizes (2 minutes) after which the test period shall begin. Test pressure shall be 5 psig.

   (Or, if groundwater conditions are known, the test pressure shall be determined as follows:

   $$\text{Test Pressure} = 5 \text{ psig} + \frac{H}{2.31}$$

   where H = depth of groundwater above the pipe in feet.)

   a. A successful test is when no drop in pressure (no loss of air at all) is observed with the trench partially backfilled; and when pressure is maintained throughout the backfilling operations, as may be required by the AUTHORITY according to the next paragraph.

   b. DEVELOPER may be required to hold the pipe line under air test pressure while performing the remainder of the backfilling operations. This requirement is necessary in order to determine leakage, if any, produced by backfilling operations under certain adverse conditions and shall be at the discretion of the AUTHORITY.

3. Building Sewer:

   a. Insert 6” solid ball in downstream side of observation tee making sure that it is all the way past the T into the 6” pipe.

   b. Insert 6” test ball into the top of the 6” observation tee.

   c. Insert 4” solid ball into the upstream side of the Building cleanout making sure that it is all the way past the T into the 4” pipe as close to the reconnection point as possible.

   d. Insert 4” solid ball into the top of the 4” Building cleanout.

   e. Insert 4” solid balls into the top of any remaining intermediate cleanouts.

   f. Inflate line to proper pressure. Make sure air source (i.e. air compressor, air tank etc.) is disconnected from the test ball once proper pressure is achieved.

   g. Wait for allotted time making sure that there is 0 PSI drop.

   h. Deflate line. Make sure liquid filled pressure gauge returns to 0 PSI.

4. Lateral:

a. Insert solid balls into 6” observation tees on the downstream side.

b. Install solid ball into the upstream side of the mainline.

c. Install a test ball into the downstream side of the mainline.

d. Inflate line from the downstream MH. To proper pressure. Make sure air source (i.e. air compressor, air tank etc.) is disconnected from the test ball once proper pressure is achieved.

e. Wait for allotted time making sure that there is 0 PSI drop.

f. Deflate line. Make sure liquid filled pressure gauge returns to 0 PSI.

5. New Building Sewer Installation:

a. Insert 6” solid ball in downstream side of observation tee making sure that it is all the way past the T into the 6” pipe.

b. Insert 6” test ball into the top of the 6” observation tee.

c. Insert 4” solid ball into the upstream side of the Building cleanout making sure that it is all the way past the tee into the 4” pipe as close to the reconnection point as possible.

d. Insert 4” solid ball into the top of the 4” Building cleanout.

e. Insert 4” solid balls into the top of any remaining intermediate cleanouts.

f. Tape or secure all stack pipes.

g. Inflate line to proper pressure. Make sure air source (i.e. air compressor, air tank etc.) is disconnected from the test ball once proper pressure is achieved.

h. Wait for allotted time making sure that there is 0 PSI drop.

i. Deflate line. Make sure liquid filled pressure gauge returns to 0 PSI.

E. Repair and Retest: When the pipeline fails to meet test requirements specified previously, comply with the following procedures:

1. Determine source or sources of leakage.

2. Repair or replace defective material, and if a result of improper workmanship, make corrections in the presence of the AUTHORITY.

3. Conduct additional test required to demonstrate that pipeline meets specified tests requirements.

F. The AUTHORITY will make a final inspection of the installed pipeline upon completion of the street restoration (if any), including paving.

END OF SECTION

SECTION 02721

GREASE INTERCEPTORS/ OIL SEPARATORS AND SAMPLING MANHOLE

PART 1 GENERAL

1.01. WORK INCLUDED

A. Installation of grease interceptor or oil separator and sampling manhole.

1.02. RELATED WORK

A. Section 02221 – Trenching.

B. Section 02605 – Manholes.

C. Section 02720 – Building Sewers and Service Laterals.

1.03. QUALITY ASSURANCE

A. Grease Interceptors/oil separators/sampling manholes specified herein shall be essentially the standard products of manufacturers who have been regularly engaged in the successful production of high quality materials of this type for at least ten years, have supplied such materials for at least five years of the ten year period, and have at least five installations in successful operation for at least five years.

B. Repair or replace defective interceptor/separator components/sampling manholes and piping.

1.04. SUBMITTALS

A. Submit shop drawings or catalogue cuts, as appropriate, for materials listed. Submit only those materials that are actually to be used in the work. These will usually be as follows:

1. Manufacturer shop drawing of interceptor/separator.

2. Gaskets, couplings, adapters, and other appurtenances.

3. Manhole components and covers and frames.

4. Stone certification.

B. Sketch of proposed/existing interior and exterior plumbing and how it relates to the grease interceptors/oil separators.

C. Make submittals prior to start of construction. Make submittals to ENGINEER.

1.05. DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and handle the interceptor/separator/sampling manholes and appurtenances in accordance with the manufacturer's recommendations, and in such manner as to protect the materials from damage.

B. The grease interceptors/oil separators/sampling manholes shall be loaded and unloaded by

lifting with hoists or skidding so as to avoid shock or damage. Under no circumstances shall the interceptor/separators/sampling manholes be dropped or skidded against materials already on the ground.

C. The grease interceptors/oil separators/sampling manholes shall at all times be handled with care to avoid damage. The interior shall be kept free from dirt and foreign matter. The interceptor/separator/sampling manholes shall be carefully lowered or raised into place with suitable equipment in a manner that will prevent damage to the material. Under no circumstances shall the interceptor be dropped or dumped.

D. The interceptor/separator/sampling manholes and appurtenances shall be thoroughly inspected for defects prior to being installed. Any defective, damaged, or unsound material shall be repaired or replaced.

PART 2 PRODUCTS

2.01. MATERIALS

A. Grease Interceptors- grease interceptors are required at all food service establishments and any other grease generating facilities.

1. Grease interceptors shall be constructed of reinforced concrete in accordance with ASTM C478.

2. Manhole entry shall have cast iron frame and cover with reinforced concrete base and risers as specified in Section 02605.

3. Sizing of grease interceptors shall be based on wastewater flows and grease retention capacity. The minimum size of a grease interceptor is 1,000 gallons.

4. Inlet and outlet of grease interceptors shall be properly baffled.

5. Inlet and outlet of grease interceptors shall be designed to prohibit access by insects and vermin.

6. The detail drawing for the standard minimum size commercial grease interceptor is provided at the end of these Standard Specifications.

7. Acceptable manufacturers:

a. Monarch Products Company, Inc.

b. Or Equal.

B. Oil Separators- oil separators are required at repair garages, car-washing facilities, factories, and similar facilities in which servicing, repairing or washing is being performed:

1. Oil separators shall be constructed of reinforced concrete or steel.

2. Sizing of oil interceptors shall be based on wastewater flows and oil retention capacity, minimum size shall be 350 gallon. The minimum capacity of an oil interceptor is 6 cubic feet for the first 100 square feet of area to be drained plus 1 cubic foot for each additional 100 square feet of area to be drained into the separator.

3. Acceptable manufacturers:

a. Highland Tank, Inc.

b. Monarch.

c. Or approved equal.

C. Sampling Manholes – shall be constructed in accordance with Section 02605 Manholes and the Detail Drawings.

PART 3 EXECUTION

3.01. GREASE INTERCEPTOR/OIL SEPARATOR/SAMPLING MANHOLE INSTALLATION

A. Grease interceptors shall be located within 20 to 30 feet from the plumbing fixtures to be served.

B. Grease interceptors /oil separators/sampling manholes shall be located outside the rear of the building, in an area where all components are readily accessible for cleaning, maintenance and visual inspection, and in non-traffic areas. Where an interceptor/ separator/sampling manholes must be located in a traffic area, the covers shall be designed for heavy traffic loading.

C. Grease interceptors /oil separators shall be buried so as to intercept the Service Lateral. Service Lateral for sanitary facilities should connect downstream of interceptors/ separators. The lateral may connect into the sampling manhole as a separate line from the interceptor's discharge pipes and shall not combine with any other flow.

D. The manhole entry of the grease interceptor/oil separator/sampling manholes shall be finished to grade.

E. For grease interceptor, the inlet, outlet and baffle fittings shall be of a tee design with a vertical extension of 12 inches from the tank floor and reaching well above the water line.

F. The sampling manhole shall be placed after the grease interceptors/oil separators discharge but before any public or private wastewater is combined with the proposed establishment's wastewater. The sampling manhole will be used to sample the discharge of the wastewater leaving the proposed establishment to determine if the grease or oil concentration is in excess of the limits set forth by the Sewer Use Ordinance. For sampling manhole requirements, refer to the Detail Drawings attached and Section 02605, Part 2.01.

G. The grease interceptor/oil separator/sampling manholes shall be accessible at all times to the Township Plumbing Inspector and AUTHORITY personnel.

H. The grease interceptor/oil separator/sampling manholes shall be pressure tested at 3-5 psig.

END OF SECTION

SECTION 02725

PIPED UTILITIES - FORCE MAINS AND PRESSURE SEWERS

PART 1 GENERAL

1.01. RELATED DOCUMENTS

A. DEVELOPER'S Drawings and Detail Drawings.

B. Division 1 Specifications.

C. Division 2 specifications, as applicable, including proprietary specifications of individual system and product manufacturers.

1.02. WORK INCLUDED

A. Installation of force mains and pressure sewers.

1.03. REQUIREMENTS FOR USE OF FORCE MAINS OR PRESSURE SEWERS

A. Extensions to the AUTHORITY'S sewer system are to be conventional gravity sewage collection systems unless the DEVELOPER demonstrates to the satisfaction of the Authority that it is not feasible to serve the proposed development without pumping of wastewater.

B. If the AUTHORITY approves use of pumping station(s), the design capacity of the station(s) and force main(s), and location of force main connection to the existing system must be approved by the AUTHORITY prior to design of the proposed pumping and force main facilities.

C. Upon determination of force main size and anticipated head conditions, specifications for the force main materials and construction will be provided. Refer to Section 02700 for material requirements:

1. Force Main - 1.5 inches through 4 inches:

a. ASTM D2241 Type 1, Grade 1 PVC Pressure Pipe SDR 21 or SDR 26 200 psi.

b. AWWA C-900, DR 14, 200 PSI PVC.

c. HDPE.

d. Ductile Iron Pipe conforming to ANSI 21.50 and 21.51, Class 52 minimum.

2. Force Main - 6 inches:

a. Ductile Iron Pipe conforming to ANSI 21.50 and 21.51, Class 52 minimum.

b. AWWA C-900, DR 14, 200 PSI PVC.

3. Force Main 8 inches and larger:

a. Ductile Iron Pipe conforming to ANSI 21.50 and 21.51, Class 52 minimum.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

SECTION 02831

RIGHT-OF-WAY GATE

PART 1 GENERAL

1.01. RELATED DOCUMENTS

A. DEVELOPER'S Drawings and Detail Drawings.

B. Division 1 Specifications.

C. Division 2 Specifications, as applicable, including proprietary specifications of individual system and product manufacturers.

1.02. WORK REQUIRED

A. General Requirements: Install a gate system of the type specified herein on off-street rights-of-ways to prevent unauthorized entry. The exact location for the gate system shall be selected by the AUTHORITY.

B. Gate System Design: Provide a stock gate with hinges and locking assembly, as well as pedestrian access post, in accordance with the design indicated on the DEVELOPER'S Drawings and Detail Drawings.

PART 2 PRODUCTS

2.01. GATE MATERIALS

A. Gate Frame Work: Ferrous metal elements of the gate frame and accessories shall receive zinc (Grade E) coating by the hot dip process after fabrication. Metal coated to 1.8 oz. of zinc coating per square foot of surface, in a smooth finish, free from dross, uncoated spots and foreign materials, in accordance with ASTM A 123.

1. Provide framework of roll-formed or tubular members fabricated from 50,000 psi minimum yield strength steel. Member sizes shall be adequate section and weight for the gate leaf width indicated.

B. Hinge, Locking and Pedestrian Access Posts: Provide galvanized steel posts of the nominal dimensions indicated.

PART 3 EXECUTION

3.01. INSTALLATION

A. Set hinge and locking posts and pedestrian access post by the post hole method. Powered augers may be used so long as the holes are made true and not over excavated. Open cut excavations for setting of posts is not acceptable.

1. Post holes shall be large enough to accept the posts with enough annular space to allow complete backfilling with concrete to eliminate post movement.

2. Mount the stock gate using gate hardware designed specifically for mounting in galvanized steel. Set hasp and keeper latch to allow for easy opening and closing operation. Hasp lock provided by the AUTHORITY.

END OF SECTION

SECTION 02900

LANDSCAPING

PART 1 GENERAL

1.01. RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections.

B. Division 2 Specifications, as applicable, including proprietary specifications of individual system and product manufacturers.

1.02. SUMMARY

A. This Section includes the following:

1. Lawn and right-of-way restoration. For clarification, an improved ROW is considered a stretch of area of open grass that is being mowed and being maintained by the property owner as a lawn.

2. Placement, Fine grading, and raking of topsoil.

3. Seed and soil supplements on the prepared seed bed.

4. Mulches and blankets.

1.03. SUBMITTALS

A. General: Submit each item in this paragraph according to the general provisions of the Contract, including General and Supplementary Conditions, and Division 1 Specification Sections.

B. Product certificates signed by manufacturers certifying that their products comply with specified requirements.

1. Manufacturer's certified analysis for standard products.

2. Analysis for other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.

3. Label data substantiating that plants, trees, shrubs, and planting materials comply with specified requirements.

C. Topsoil Analysis: The Owner shall furnish soil analysis by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; deleterious material; pH; and mineral and plant-nutrient content of topsoil.

1. Report suitability of topsoil for lawn growth. State recommended quantities of nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory topsoil for turf growth.

2. A minimum of one set of soil tests shall be conducted for each type of topsoil used for restoration including sources of imported topsoil.

D. Certification of grass seed from seed vendor for each grass-seed mixture stating the botanical and common name and percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.

E. Planting schedule indicating anticipated dates and locations for each type of planting, in conformance with part 1.07. Coordination and Scheduling of this Section.

F. Maintenance instructions recommending procedures to be established by property owner for maintenance of landscaping during an entire year. Submit before expiration of required maintenance periods.

1.04. QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer who has completed landscaping work similar in material, design, and extent to that indicated for this Project and with a record of successful landscape establishment.

1. Installer's Field Supervision: Require installer to maintain an experienced full-time supervisor on the Project site during times that landscaping is in progress.

B. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section *"Project Meetings."*

1.05. DELIVERY, STORAGE, AND HANDLING

A. Packaged Materials: Deliver packaged materials in containers showing weight, analysis, and name of manufacturer. Protect materials from deterioration during delivery and while stored at site.

B. Seed: Deliver seed in original sealed, labeled, and undamaged containers.

C. Grass-seed that has a date of production from the manufacturer that is more than 18 months old shall not be used on the project.

1.06. PROJECT CONDITIONS

A. Utilities: Determine location of above grade and underground utilities and perform work in a manner which will avoid damage. Hand excavate, as required. Prune and remove roots that interfere with proper grading and raking of topsoil.

B. Excavation: When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, or obstructions, notify Owner before planting.

1.07. COORDINATION AND SCHEDULING

A. Coordinate installation of planting materials during normal planting seasons for each type of plant material required.

B. Additional Requirements for Seeding lawns and Rights-of-ways.

1. The Contractor shall prep and fully restore disturbed areas as soon as possible, but not more than 20 days after the area is backfilled. If seeding occurs outside of the planting

season as shown below, and satisfactory grass cover is not established, then the area shall be re-prepped and re-seeded in the first 30 days of the next planting season. All landscaping must be completed for all disturbed areas by the end of the planting season as shown below.

	Planting Season (PennDOT Publication 408)
Lawns and Rights of Way	March 15 to June 1 August 1 to October 15

2. Areas disturbed outside the planting season must be temporarily seeded and mulch cover must be installed. Contractor must complete permanent restoration within 30 days of the start of the subsequent planting season for areas disturbed outside of the planting season.

1.08. WARRANTY

A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Remove and replace dead planting materials immediately unless required to plant in the succeeding planting season.

C. Replace planting materials that are more than 25 percent dead or in an unhealthy condition at end of warranty period.

D. A limit of one replacement of each plant material will be required, except for losses or replacements due to failure to comply with requirements.

E. Subsequent topsoil placement, re-prep and re-seeding required due to settlement or washout shall be incidental to the contractor.

PART 2 PRODUCTS

2.01. GRASS SEED

A. Grass seed shall be fresh, clean, dry new-crop seed complying with the following table:

MINIMUM SEED SPECIFICATIONS					
SPECIES	MIN PERCENT BY WEIGHT	MIN PERCENT PURITY	MIN PERCENT GERMINATION	MAX PERCENT WEED SEED	SEEDING RATE LBS/ACRE
Annual Ryegrass	25	98	90	0.15	200
Kentucky Bluegrass	40	85	80	0.20	
Perennial Ryegrass	35	90	90	0.15	

B. Use S75BN North American Green double sided straw blanket (biodegradable), or approved equal, in private yards at equal to or less than slopes of 3:1, where directed by Owner, to protect grass seed. For slopes greater than 3:1, use S150BN North American Green, or approved equal, for slopes less than or equal to 2:1 or use SC150BN North American Green, or approved equal, for slopes less than or equal to 1:1.

2.02. TOPSOIL

A. Screened Topsoil: Comply with Sections 801 and 802 of PADOT Publication 408, as applicable, except the minimum organic material shall be 7.5%, and maximum stone or foreign matter dimension shall be ¾". Sieve analysis shall be ¾" – 100% passing, 3/8" – 90% passing, #4 – 80% passing, #10 – 70% passing and #200 – 45% passing.

1. Topsoil Source: Reuse surface soil stockpiled on the site, or import suitable topsoil. Verify suitability of surface soil to produce topsoil meeting requirements through soil testing in accordance with these specificiations, and amend with sand and/or organic material suitable to owner (not horse manure, uncomposted cow manure, or woody material.) Supplement with tested and approved imported topsoil when quantities are insufficient. Screen topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful to plant growth.

2. Contractor shall keep an operable topsoil screening machine on site. All topsoil shall be screened prior to placement.

B. Unscreened Topsoil: Comply with Section 801 and 802 of PADOT Publication 408, as applicable, except the minimum organic material shall be 7.5%, and maximum stone or foreign matter dimension shall be < 2" when imported. Once unscreened topsoil is imported it needs to be placed and prepped according to Part 3 section 3.03. below.

2.03. SOIL AMENDMENTS

A. Lime: Comply with the material described in the Erosion and Sedimentation Control Plan.

B. Herbicides: EPA registered and approved, of type recommended by manufacturer.

C. Water: Potable

2.04. FERTILIZER

A. Commercial fertilizers: Provide commercial-grade complete fertilizer as described in the Erosion and Sedimentation Control Plan, or as specified by owner. Owner reserves the right to have top soil tested and fertilizer mixes recommended.

B. Chemical analysis shall be guaranteed and clearly shown on each bag. Fertilizer for use in hydraulic seeders shall be in pellet or granular form, highly soluble in water, and shall, in addition, contain 1% magnesium oxide and 5 lbs. of borate per ton. The derivation of fertilizer elements shall be as follows:

1. Nitrogen: Ammonium sulfate, ammonium nitrate, or ammonium phosphate.

2. Phosphorus: Phosphoric acid, calcium phosphate, ammonium phosphate.

3. Potassium: Muriate of potash.

2.05. MULCHES

A. Mulching materials shall be native or agricultural grasses, such as air-dry wheat or oat straw, cured to less than 20% moisture content by weight. Mulch shall be mildew free. Mulch shall be free from mature seed bearing stalks, roots, prohibited or noxious weeds, and sticks larger than 1/4 inch in diameter.

2.06. EROSION-CONTROL MATERIALS

A. Blankets: Provide erosion control blanket as described in the Erosion and Sedimentation Control Plan or as directed by Owner.

B. Provide Erosion Control Blankets on all disturbed areas where slopes 4:1 or steeper, for all areas within 50 feet of a surface water regardless of slope, on all areas of concentrated flow, such as roadside swales and rain leader outlets and all other disturbed areas as described in the Erosion and Sedimentation Control Plan. Also provide Erosion Control Blankets along roadways without curb (approximately 3' wide).

PART 3 EXECUTION

3.01. EXAMINATION

A. Examine areas to receive landscaping for compliance with requirements and for conditions affecting performance of work of this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02. PLANTING PREPARATION OF IMPROVED RIGHT OF WAY AND LAWNS

A. Limit subgrade preparation to areas that will be planted in the immediate future.

B. Six inches of screened topsoil shall be placed in improved right-of-ways and lawns/private property.

C. Loosen subgrade to a minimum depth of 4 inches (100 mm). Remove stones larger than ¾ of an inch in any dimension and sticks, roots, rubbish, and other extraneous materials.

1. Place approximately ½ the thickness of planting soil mixture required. Work into top of loosened subgrade to create a transition layer and then place remainder of planting soil mixture.

D. Apply pulverized limestone as follows:

1. Spread and work into a 4 to 6 inch soil depth enough ground limestone to fully meet the requirement shown by the soil test.

2. Where lime requirement exceeds 200 lbs. per 1,000 sq. ft., apply half of the total requirement, till, and apply the remaining half.

3. PH range once completed must be 6.00 to 7.00.

E. Apply basic fertilizer prior to application of starter fertilizer.

F. Spread and work into a 4 to 6 inch soil depth enough recommended fertilizer to fully meet the requirements shown by the soil test.

G. After the areas required to be seeded have been brought to approved final grade, they shall be thoroughly loosened by a method acceptable to the Township, until the tillage is acceptable. Tillage will not be required on areas which have been left in the satisfactory state of tillage.

H. Irregularities in the surface, resulting from tillage or from other operations, shall be smoothed before seeding operations are begun to prevent the formation of water-collecting pockets. Unsuitable material larger than ¾ of an inch in any dimension shall be removed and disposed of during this operation.

I. The application of lime and basic fertilizer shall be performed during the tillage operation.

J. Grade lawn and grass areas to a smooth, even surface with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit fine grading to areas that can be planted in the immediate future. Remove trash, debris, stones larger than ¾ of an inch in any dimension, and other objects that may interfere with planting or maintenance operations.

K. Moisten prepared lawn areas before planting when soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

L. Restore prepared areas if eroded or otherwise disturbed after fine grading and before planting.

M. Finish grades shall be of smooth, uniform flow without depressions or rises, with gradual and uniform transition at slopes and embankments. Maximum allowable tolerance in finish grades shall be not more than 1 inch in 10 ft. 0 inches, or 3 inch in 100 ft. 0 inches. Finish grading shall not create depressions or puddles.

3.03. PLANTING PREPARATION OF UNIMPROVED RIGHT OF WAY

A. Limit subgrade preparation to areas that will be planted in the immediate future.

B. Place previously stripped and preserved topsoil.

1. Remove and dispose of existing grass, vegetation, and turf. Do not turn over into soil being prepared for seeding.

2. Till surface soil to a depth of at least 6 inches (150 mm). Apply required soil amendments and initial fertilizers and mix thoroughly into top 4 inches (100 mm) of soil. Trim high areas and fill in depressions. Till soil to a homogenous mixture of fine texture.

3. Mechanically screen surface soil by use of a “rock hound”, or equivalent equipment, of roots, plants, sods, stones, and other extraneous materials greater than ¾ of an inch harmful to plant growth.

4. Remove waste material, including stones, roots, grass, vegetation, turf and other extraneous material and legally dispose of it off of the owner's property.

C. Loosen subgrade to a minimum depth of 4 inches (100 mm). Remove stones larger than ¾ of an inch in any dimension and sticks, roots, rubbish, and other extraneous materials.

1. Place approximately ½ the thickness of planting soil mixture required. Work into top of loosened subgrade to create a transition layer and then place remainder of planting soil mixture.

D. Grade areas to a smooth, even surface with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit fine grading to areas that can be planted in the immediate future. Remove trash, debris, stones larger than ¾ of an inch in any dimension, and other objects that may interfere with planting or maintenance operations.

E. After the areas required to be seeded have been brought to approved final grade, they shall be thoroughly loosened by a method acceptable to the Township, until the tillage is acceptable. Tillage will not be required on areas which have been left in the satisfactory state of tillage.

F. Irregularities in the surface, resulting from tillage or from other operations, shall be smoothed before seeding operations are begun to prevent the formation of water-collecting pockets. Unsuitable material larger than ¾ of an inch in any dimension shall be removed and disposed of.

G. Apply pulverized limestone as follows:

1. Spread and work into a 4 to 6 inch soil depth enough ground limestone to fully meet the requirement shown by the soil test.

2. Where lime requirement exceeds 200 lbs. per 1,000 sq. ft., apply half of the total requirement, till, and apply the remaining half.

3. PH range once completed must be 6.00 to 7.00.

H. Apply basic fertilizer prior to application of starter fertilizer.

I. Spread and work into a 4 to 6 inch soil depth enough recommended fertilizer to fully meet the requirements shown by the soil test.

J. The application of lime and basic fertilizer shall be performed during the tillage operation.

K. Restore prepared areas if eroded or otherwise disturbed after fine grading and before planting.

L. Finish grades shall be of smooth, uniform flow without depressions or rises, with gradual and uniform transition at slopes and embankments. Maximum allowable tolerance in finish grades shall be not more than 1 inch in 10 ft. 0 inches, or 3 inches in 100 ft. 0 inches. Finish grading shall not create depressions or puddles.

3.04. PREPARATION OF SUBSEQUENT PERMANENT SEEDING: Where areas are to be re-planted by the contractor as directed by the owner due to insufficient growth.

A. Remove and dispose of existing grass, vegetation, and turf. Do not turn over into soil being prepared for lawn seeding.

B. Till surface soil to a depth of at least 6 inches (150 mm). Apply required soil amendments and initial fertilizers as directed by the Owner and mix thoroughly into the top 4 inches (100 mm) of soil. Till soil to a homogenous mixture of fine texture.

C. If in an unimproved right of way, mechanically screen surface soil by use of a “rock hound”, or equivalent equipment, of roots, plants, sods, stones, and other extraneous materials harmful to plant growth greater than ¾ of an inch. If in an improved right of way place additional screened topsoil needed to raise the area back to original grade and fill any depressions or irregularities.

D. Grade areas to a smooth, even surface with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit fine grading to areas that can be planted in the immediate future. Remove trash, debris, stones larger than ¾ of an inch in any dimension, and other objects that may interfere with planting or maintenance operations.

E. After the areas required to be seeded have been brought to approved final grade, they shall be thoroughly loosened by a method acceptable to the Township, until the tillage is

acceptable. Tillage will not be required on areas which have been left in the satisfactory state of tillage.

F. Irregularities in the surface, resulting from tillage or from other operations, shall be smoothed before seeding operations are begun to prevent the formation of water-collecting pockets.

G. Remove waste material, including grass, vegetation, stones and turf, and legally dispose of it off the owner's property.

3.05. SEEDING LAWNS AND RIGHT OF WAY

A. Sow seed with a spreader or a seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph (8 km/h). Evenly distribute seed by sowing equal quantities in 2 directions at right angles to each other.

1. Do not use wet seed or seed that is moldy or otherwise damaged in transit or storage.

B. Sow seed at the following rates:

1. Seeding Rate: Comply with the approved Erosion and Sedimentation Control Plan.

C. Rake seed lightly into top 1/4 inch of topsoil, roll lightly, and water with fine spray.

D. Place double sided straw blankets, where directed by owner.

3.06. HYDROSEEDING LAWNS AND RIGHT OF WAY

A. Hydroseeding: Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogenous slurry suitable for hydraulic application:

1. Apply slurry uniformly to all areas to be seeded. Rate of application as required to obtain specified seed-sowing rate.

3.07. MULCHING

A. Lawn Areas: Place mulch within 48 hours after seeding. Apply at an average minimum depth of 2 in. loose measurement. Take care when placing mulch not to disturb the seeded surfaces. Secure mulch by one or several of the following methods, depending on the size of the area, steepness of slope and availability of equipment:

1. Non-Asphaltic Emulsion may be utilized to secure mulch. Emulsion shall be nontoxic, conforming to AASHTO M-140, Type SS-1, and to requirements specified for Class E-1 or E-6 in Penn DOT Bulletin No. 25. It shall contain no solvents or other diluting agents toxic to plant life, and not more than 0.75% of saponificable acids. Apply uniformly at the rate of 28 gal. per 1,000 sq. yds.

2. Terra Tack II, produced by Grass Growers of Plainfield, NJ, may be used to secure mulch. Apply by hydroseeder as an overspray to straw mulch. Mix in accordance with manufacturer's instructions and apply at the rate of 45 lbs. of Terra Tack II (Part A and B), 750 gal. of water and 150 lbs. of wood cellulose fiber per acre. Terra Tack II, in the previous mix, is an overspray to straw only and is not meant as a mulch in itself.

3. Mulch nettings may be utilized to secure mulch. Staple lightweight jute, cotton, or plastic nettings to soil surface according to manufacturer's recommendations.

3.08. CLEANUP AND PROTECTION

A. Protect landscaping from damage due to landscape operations, operations by other contractors and trades, and trespassers. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged landscape work as directed.

3.09. DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris, and legally dispose of it off the owner's property.

END OF SECTION

Division 11

Equipment

SECTION 11300

PUMPING STATIONS

PART 1 GENERAL

1.01. RELATED DOCUMENTS

A. DEVELOPER'S Drawings and Detail Drawings.

B. Division 1 Specifications.

C. Division 2 Specifications, as applicable, including proprietary specifications of individual system and product manufacturers.

1.02. WORK INCLUDED

A. Construction of pumping stations, including installation and testing of pumps and controls, electrical and HVAC equipment.

1.03. REQUIREMENTS FOR USE OF PUMPING STATIONS

A. Extensions to the Authority's sewer system are to be conventional gravity sewage collection systems unless the DEVELOPER demonstrates to the satisfaction of the Authority that it is not feasible to serve the proposed development without pumping of wastewater.

B. If the AUTHORITY approves use of pumping station(s), the design capacity of the station(s) and force main(s), and location of force main connection to the existing system must be approved by the AUTHORITY prior to design of the proposed pumping and force main facilities.

C. Upon determination of required station capacity and anticipated head conditions, specifications for the specific pumping station application, including, but not necessarily limited to, wet well, enclosures, pumps and controls, piping, electrical and HVAC equipment, will be determined by the ENGINEER and AUTHORITY and provided to the DEVELOPER for the design of the facilities.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

SECTION 11304

SUBMERSIBLE GRINDER PUMP STATIONS

PART 1 GENERAL

1.01. SUMMARY

A. Section Includes: The work specified in this Section consists of providing grinder pump unit(s) with the tank, internal piping, and operating controls in accordance with the AUTHORITY'S resolution for grinder pump use. This application is for grinder units provided for individual buildings that cannot be served by gravity, but that will pump into the gravity system. Low pressure sewer systems will not be accepted unless demonstrated to the satisfaction of the AUTHORITY that it is not feasible to serve the development by conventional measures. Requirements for a low pressure sewer system serving multiple grinder units shall be obtained from the AUTHORITY on a case-by-case basis.

B. Related Sections:

1. Trenching: Section 02221.

2. Force Mains and Pressure Sewers: Section 02725.

1.02. REQUIREMENTS FOR SUBMERSIBLE GRINDER PUMP STATIONS

A. Submersible grinder pump stations shall meet the following requirements:

1. Receive Grinder Pump Station approval from AUTHORITY'S ENGINEER.

B. Grinder Pump Station Applications:

1. For each project where the use of grinder pumps has been proposed, the DEVELOPER shall submit for approval by the ENGINEER an application containing the following information:

a. Name and address of developer.

b. Project location.

c. Name of manufacturer and model number of equipment to be used, product information and pump curve.

d. Site plan and elevation drawings showing the location of building(s) using grinder pump stations, location and elevations of gravity sewers to the grinder pump stations, elevations of the top and the base of each grinder pump station, and location and elevations of the pressure sewers.

e. Calculations justifying pump horsepower and impeller diameter selection.

C. Operation and Maintenance Manuals: Within four weeks following the receipt of approved shop drawings, submit to the ENGINEER for review and approval, an electronic copy of manuals prepared by the manufacturer/supplier, or the DEVELOPER'S CONTRACTOR. Incomplete or inadequate manuals will be returned to the DEVELOPER for correction and resubmission:

1. Include the following elements in each manual:

   a. Erection or installation instructions.

   b. Start-up procedures.

   c. Recommended and alternative procedures.

   d. Schedule of preventive maintenance requirements.

   e. Detailed maintenance procedures.

   f. Schedule of lubrication requirements.

   g. Data sheet listing pertinent equipment or system information, as well as the addresses and telephone numbers of the nearest sales and service representatives.

   h. Provide a list of the manufacturer recommended spare parts.

1.03. QUALITY ASSURANCE

A. Tank Design Criteria: Provide a completely watertight tank, designed to withstand the minimum depth of bury earth load at the proposed tank location:

   1. The tank manufacturer shall calculate the anti-flotation anchor and provide an appropriate design for the anchor.

B. Requirements of Regulatory Agencies: Comply with construction code requirements of State, County, and such other political subdivision specifications as may exceed the requirements of the codes, standards and approving bodies referenced throughout these Specifications:

   1. Provide electrical control panels and grinder pump units constructed in accordance with the requirements of the Underwriters Laboratory, or other nationally recognized certification agency, and labeled accordingly.

   2. Units shall comply with the applicable requirements of the Pennsylvania Department of Environmental Protection and the National Sanitation Foundation.

C. Source Quality Control:

   1. Shop Tests: In accordance with Paragraph 1.05. of the General Instructions, factory test each unit. The manufacturer shall have facilities to perform listed tests. The ENGINEER reserves the right to require the manufacturer to perform such additional number of tests, as the ENGINEER may deem necessary to establish the quality of the material offered for use:

      a. Test to assure water tightness of the unit for the proposed installation depth.

      b. Test pump output in gallons per minute at 15 psi and 35 psi.

      c. Test amperage and wattage of electrical consumption.

2. Laboratory Tests: The ENGINEER reserves the right to require that laboratory tests also be conducted on units that have been shop tested. When the ENGINEER so orders, furnish without compensation, labor, materials, and equipment necessary packaging, and shipping the grinder pump unit to the Test Laboratory.

3. Single Source Responsibility: To ensure single source responsibility and part supply, provide the pump components, tank, internal piping system and electrical controls from one grinder pump manufacturer.

D. AUTHORITY Inspections: An AUTHORITY representative will be present during grinder pump unit initial installation and testing operations. To accommodate the AUTHORITY concerning the inspections, the DEVELOPER shall observe the following:

1. Notice: Give the AUTHORITY a minimum of 72 hours' notice for an inspection. Schedule inspection appointments with the AUTHORITY only between the hours of 7:00 a.m. and 2:00 p.m. prevailing time, Monday through Friday. No weekend or holiday inspection appointments allowed.

2. Initial Unit Installation and Inspection: To serve as the minimum acceptable conditions of installation throughout the Project, install the first unit in the Project to demonstrate the stages of installation stated in the following sentences. The AUTHORITY representative shall inspect each of the following stages of installation:

a. Basin installation.

b. Pipe connections to the unit and water tightness of the complete unit.

c. Proper electrical work operation of the unit.

d. Proper backfilling procedures.

1.04. DELIVERY, STORAGE AND HANDLING

A. To prevent damage and defects, transport, store and handle the units and products specified herein in a manner recommended by the respective manufacturers.

1.05. SITE CONDITIONS

A. Environmental Requirements: In no instance, set units on subgrade containing frost or on unacceptable subgrade, which condition has been determined unacceptable by the ENGINEER.

B. Electrical Interface: Install or mount those electrical components or apparatus as furnished by the product manufacturers of those products specified herein:

1. Property owner shall be responsible for permanent power wiring, including final connection of such to the electrical components or apparatus of the grinder pump units. Owner shall have all electrical work inspected by Township Code Department.

1.06. MAINTENANCE

A. Maintenance shall be the sole responsibility of the property owner in accordance with provisions of the AUTHORITY'S resolution for grinder pump use.

PART 2 MATERIALS

2.01. SUBMERSIBLE GRINDER PUMP STATION

A. General:

1. Simplex grinder pump unit shall be used at residential property locations. Duplex grinder pump unit shall be used at commercial facilities so that in the event one pump fails, the second pump will operate and the commercial facility can maintain service.

2. Grinder pump station shall be installed in a fiberglass-reinforced polyester basin or HDPE basin for outdoor installation only. Indoor installation will not be permitted.

3. Grinder pump station shall consist of submersible grinder pump and motor, complete with basin, junction box and all internal wiring, slide away mounting system, float switch system, high water alarm, piping and valves, and motor controller.

4. A control panel shall be provided for each unit and installed on the exterior of each home or commercial facility.

5. The manufacturer of the grinder pump station shall be:

a. Hydromatic Pump Co. Division.

b. Liberty Pumps – Model LSG202M.

c. Or approved equal. Approved equal shall be pre-approved by the Authority.

B. Grinder Pump and Accessories:

1. Grinder Pump:

a. Centrifugal pump units shall be driven by a minimum 2 HP 3450 RPM, 3450 RPM, suitable to operate on a 230 volt, 60 Hz, single phase service motor. Positive displacement pump units shall be driven by a minimum 1 HP, 1725 RPM, 240 Volt 60 Hertz, single phase motor.

b. The DEVELOPER shall submit calculations justifying the pump horsepower and impeller diameter selected.

c. The grinder shall be capable of shearing and reducing to a fine slurry all material normally found in domestic sewage. Impeller and pump housing shall be designed with passages capable of passing all materials macerated by the grinder assembly without clogging or nuisance roping within the pump chamber. Pump discharge shall be 1-¼ inches.

d. Major components of the pump end, such as casing, impeller, seal plate and intermediate housing, shall be of ASTM class 30 cast iron construction. Pump shaft and hardware shall be 300 series stainless steel.

2. Pump Suspension System-Centrifugal Pump:

a. The pump suspension system shall enable the pump to be removed from the basin by lifting the grinder pump unit only. Systems requiring removal of pump hardware or breaking of unions (or couplings) will not be acceptable. Removal of grinder pump shall consist of:

1) Removing basin cover.

2) Shutting isolation valve.

3) Lifting out pump assembly.

4) Removing pump cables form easily accessible waterproof junction box.

b. Mounting system shall be serviceable without entering the basin to replace or adjust components mounted on the bottom of the basin.

c. The slide rail assembly shall consist of 304 stainless steel upper guide rail brackets with the slide rail assembly of 14 gauge 304 stainless steel. The stationary and movable portions of the hydraulically sealed discharge coupling assembly shall be machined cast iron. The upper guide rail bracket shall mount to the basin wall and position the upper end of the stainless steel guide rail while the discharge pipe positions the lower end of the guide rail.

d. Stainless steel guide brackets shall be attached to the pump for positioning of the unit on the guide rail during installation or removal of the unit within the basin.

3. Pump Suspension System – Positive Displacement Pumps:

a. The grinder pump core, including level sensor assembly, shall have two lifting hooks complete with lift-out harness connected to its top housing to facilitate easy core removal when necessary. The level sensor assembly must be easily removed from the pump assembly for service or replacement. All mechanical and electrical connections must provide easy disconnect capability for core unit removal and installation. All motor control components shall be mounted on a readily replaceable bracket for ease of field service. Systems requiring removal of pump hardware or breaking of unions (or couplings) will not be acceptable.

4. Level Control:

a. Level control shall be by means of mercury float switches, single action design, capable of withstanding water penetration under 25 feet of water with at least a 3 to 1 safety factor. Float switches shall be mounted firmly in place in such a way that prevents tangling or fouling in the basin.

b. Two float switches shall be used to control level; one for pump turn on, and one for pump turn off. A third switch shall be provided for high water alarm.

5. Junction Box:

a. NEMA 4X watertight junction box shall be installed in the basin for connection of the pump and control wiring. The box shall be constructed of self-extinguishing ABS plastic with minimum wall thickness of 3/16 inch. The box cover shall be bolted on with stainless steel fasteners and sealed with a neoprene gasket. Individual corrosion-resistant and liquid tight cable connectors constructed of thermoplastic with neoprene bushing and sealing ring shall be provided. The box and all connections shall be completely watertight and shall be capable of withstanding an external liquid pressure of 10 PSI. The junction box and fittings shall be of waterproof design. All fittings and hardware shall be of non-corrosive construction.

b. Conduit and wiring between basin and control panel shall be installed in accordance with National Electric Codes and all electrical codes.

c. The junction box shall be mounted within easy reach from ground level and must open in such a manner that all connections within can be viewed from the surface without leaning into the basin.

C. Valves, Fittings and Piping:

1. Valves, fittings, and piping shall conform with the attached details and meet or exceed properties provided herein:

a. Influent connection shall be a four (4) inch cast iron or thermoplastic caulking hub shipped loose for field mounting by the installer. The hub shall be designed to be installed without personnel having to enter the basin. The hub shall be beveled approximately 3 ° to accommodate the gravity pipe. The influent hub shall have a textured surface in order to provide better caulking adhesion.

b. The discharge piping shall consist of 1 1/4 inch schedule 40, stainless steel pipe, or SDR 21 PVC. A ball check valve shall be installed between the pump discharge and the movable fitting.

c. The design of the check valve shall be such that the ball shall not impede flow through the valve. The operating flow area shall be equal to the nominal size of the valve. The ball shall clear the waterway providing “full flow” equal to the diameter of the pump discharge piping. It shall be non-clog in design. The ball shall be resistant to material normally found in sewage. The body and access plug shall be gray cast iron, ASTM Class 30, or better.

d. The movable fitting shall be positive seal, slide design having a working pressure rating of no less than 150 PSI. The movable fitting, when in position shall be held against the stationary fitting by the construction of the stainless steel rail, aligning the movable fitting for proper sealing of the two surfaces under pressure. A stainless steel lifting cable with a minimum breaking strength of 2100 pounds shall be provided for pump installation and removal.

e. A 1 ¼-inch bronze gate valve or 1 ¼-inch PVC plunger valve shall be installed in the discharge piping to provide shut-off capabilities during pump removal, and shall be fitted with an integral PVC or stainless steel extension handle. The extension handle shall extend up to within six (6) inches of the top of the basin and shall be secured at the top of the basin with a stainless steel bracket or within the guide rail channel.

f. A flushing connection shall be provided in the discharge line past the check and isolation valves. The connection shall include a 1 ¼-inch bronze gate valve, 1 ¼-inch stainless steel pipe, and a 1 ¼-inch female “Ever-Tite” quick disconnect coupling. The connection point shall be 6-inches below the top of the basin. The flushing valve shall be furnished with a handle of identical construction to that furnished for the isolation valve.

D. Grinder Pump Station Basin – Centrifugal Pumps:

1. The basin shall be constructed of fiberglass-reinforced polyester with molded top flange and bottom. The basin shall be free of imperfections, sound, watertight and of high quality workmanship. The polyester laminates shall provide a balance of

mechanical, chemical, and electrical properties to insure a long life. They must be impervious to microorganisms, mildew, mold, and fungus, and non-corrosive inside and outside when installed in soils deleterious to metal or concrete structures.

2. The basin minimum diameter shall be as follows:

   a. Simplex system – 24-inch diameter.

   b. Duplex system - 36-inch diameter.

3. Basin wall thickness shall be suitable to withstand wall collapse under a hydrostatic pressure of 120 pounds per cubic foot. Basin walls and bottom must be capable of withstanding at least two times the actual imposed loading at basin depth.

4. The fiberglass basin shall be equipped with a fiberglass cover. Covers shall be securely held in place by a minimum of six (6) stainless steel bolts threaded into stainless steel inserts in the top collar of the basin.

E. Grinder Pump Station Basin – Positive Displacement Pumps:

1. The tank shall be a wetwell design consisting of a corrosion resistant HDPE dual wall construction. The basin shall be free of imperfections, sound, watertight and of high quality workmanship.

2. The basin minimum diameters shall be as follows:

   a. Simplex system – 70 gallon capacity.

   b. Duplex system – 476 gallon capacity- W-Series.

3. Basin wall thickness shall be suitable to withstand wall collapse under a hydrostatic pressure of 120 pounds per cubic foot. Basin walls and bottom must be capable of withstanding at least two times the actual imposed loading at basin depth.

4. The HDPE basin shall be equipped with a HDPE cover. Covers shall be securely held in place and be water tight.

F. Controls:

1. Control Components:

   a. The control components for operation and protection of the grinder pump station shall consist of the following:

      1) Control transformer for supplying 24 volt A.C. power for all control apparatus plus an adequate amount of additional power for external alarm devices. The transformer shall have secondary protection accessible without opening the inner swing panel.

      2) A power disconnect with an operator handle extending through the inner swing panel without exposing live parts inside the control enclosure.

      3) Short circuit, lightning, overload, and motor running overload protection, which meet the National Electric Code standards.

4) Locked rotor protection for de-energizing the pump motor to protect the run windings of all motors and start windings of single phase motors. The circuitry shall contain a manual reset and shall not be subject to nuisance trips even during periods of power failure.

5) Motor start and under voltage release by means of an open frame, across the line magnetic motor contactor with contacts made of silver cadmium oxide.

6) A “Manual-Off-Automatic” selector switch shall be provided within the control panel for operating the pump manually when in “Manual”, pump disable when in “Off”, and normal operation when in “Automatic” position. The selector switch shall not disable the alarms under any condition.

7) Pump run light to indicate the pump motor has been energized.

8) Mercury Float switch mounted in the basin which energizes the high water light, alarm light, and alarm

9) Solid-state moisture sensing device to detect moisture signal from pump, which energizes seal failure light and alarm light.

10) A 24 volt A.C. 25 watt flashing alarm light with a red globe shall be included and mounted in a manner to prevent rain water from standing or collecting in any gasketed area of the fixture.

11) A 24 volt A.C. alarm horn with a rainproof conduit box and mounting fixture shall be included which is rated at a minimum of 106 DB at one (1) foot. A panel-mounted switch shall permit silencing of an external alarm device as well as a test mode to assure the alarm device is operable.

12) Overload reset device operable without opening the inner swing panel.

b. The control assembly shall be completely factory wired except for power feed lines, motor connections, and mercury float switches. Wiring shall be done in accordance with all applicable standards set forth by the National Electric Code and shall be color coded and numbered as indicated on factory wiring diagrams.

c. All components shall be electrically grounded to a common ground screw mounted on the removable back panel. Upon installation of the control assembly, and before connection of any power feed lines, installer shall extend a grounding wire from the control panel main ground screw to external ground in accordance with NEC and local electrical codes.

2. Control Enclosure:

a. The pump control enclosure shall be of fiberglass or stainless steel construction designed for corrosion resistance in compliance with NEMA 4X standards. The enclosure shall have a full inner swing panel mounted on a continuous piano type hinge. The inner swing panel shall be fabricated from steel having a minimum thickness of 0.06 inches (16 gauge). The inner swing panel shall have provisions for mounting all basic controls and instruments. It shall have a minimum horizontal swing of 90° and shall be

held in closed position by quarter-turn door latches. The outer door shall have a minimum horizontal swing of 180° and shall be held in a closed position by a padlock keyed to the AUTHORITY system. The outer door shall be mounted on a stainless steel continuous hinge and have a seal around its entire perimeter.

b. The enclosure shall have a removable back panel of a minimum thickness of 0.078 inches (14 gauge), secured to the enclosure on collar studs or weld nuts. The back panel shall be pre-drilled and tapped to accept mounting of control components. Self-tapping screws shall not be used to mount any component.

c. The enclosure shall be mounted at a position where it is visible from the sewage grinder pump station.

2.02. PRESSURE PIPE (FORCE MAIN)

A. General:

1. Pressure pipe shall be polyethylene plastic pipe of 1 ¼-inch in diameter.

2. Pressure pipe to be SDR 21 PVC.

3. Schedule 40 or Schedule 80 PVC is not permitted.

4. Approved Manufacturers:

a. Plexco Plastic Piping Systems.

b. CSR.

c. ENGINEER Approved equal.

PART 3 EXECUTION

3.01. INSTALLATION

A. General Requirements: Install units in strict accordance with manufacturer's instruction and installation manual, and at locations and in accordance with DEVELOPER'S Drawings and/or Detail Drawings.

B. Grinder Pump Station:

1. The grinder pump station shall be installed at a location to be determined by the property owner or DEVELOPER.

2. The depth of the grinder pump station will be dependent upon the location and depth of the existing house service. The influent to the basin shall be set so that a minimum grade of two (2) percent for the new gravity service line can be maintained. The minimum total unit depth from the invert of the sump to the top of the entry hatch shall be no less than six (6) feet and no greater than twelve (12) feet. The top of the station shall be 6-inches above final grade.

3. All grinder pump stations shall be installed on a bed consisting of A.A.S.H.T.O. No. 8 or No. 57 Coarse Aggregate and shall have a concrete anti-flotation collar poured around the bottom, or other anti-flotation means, recommended by the manufacture.

4. The remaining excavated area shall be backfilled to six (6) inches below grade with excavated material containing no soil lumps, stones, concrete, or foreign objects larger than one (1) inch in maximum dimension. Six (6) inches of topsoil with seed and supplements shall be placed to grade the surrounding area.

5. If the excavated material does not meet the requirements described above, a backfill material consisting of A.A.S.H.T.O. No. 8 or No. 57 Coarse Aggregate shall be used to a point six (6) inches below the finished grade.

6. The DEVELOPER shall schedule an inspection by the AUTHORITY before beginning work. The installation shall be approved by the AUTHORITY. The DEVELOPER shall be responsible for complete and approved installation.

7. Electrical system shall meet all of the latest requirements of the National Electric Code and the Public Utility furnishing power to the system. Nothing contained in this section shall be construed to conflict with these requirements and should a conflict occur, these requirements shall apply.

C. Pressure Pipe:

1. Pressure sewer shall be hydrostatically tested by the installer to the satisfaction of the ENGINEER in accordance with the procedures and requirements established in Section 02700-Piped Utilities-Sanitary Sewers.

2. Pipe to be installed with appropriate bedding and backfill as indicated on the Sewer Detail Drawings.

3. Connections to sewer system shall be made per appropriate detail.

3.02. FIELD QUALITY CONTROL

A. Performance Test: Demonstrate (with the Personnel of the AUTHORITY observing), to the satisfaction of the AUTHORITY or ENGINEER, the mechanical performance of each unit when operated in accordance with the design intent indicated by the DEVELOPER'S Drawings and/or Detail Drawings and described in this Section of these Specifications:

1. Connect temporary power source to the alarm circuit at the control panel.

2. Fill the tank with sufficient water to test the high level audible and visual alarms at the control panel.

3. Connect 24V temporary power source to the power circuit at the control panel and run the unit through a minimum of three operation cycles to check pump operation and shut-off.

4. If the demonstrations are satisfactory to the AUTHORITY or ENGINEER, the test will be considered concluded. If deficiencies are found, they shall be corrected as follows and the test repeated until the AUTHORITY or ENGINEER determines that the unit has performed satisfactorily.

a. Unit manufacturer shall correct pump, internal piping and control panel deficiencies.

b. Installer shall correct installation deficiencies.

B. Electrical Systems Test: Unless waived in writing by the ENGINEER, perform tests and trials in the presence of a duly authorized representative of the AUTHORITY:

1. Inspection: have the work inspected by an authorized inspection agency, and such other agencies having jurisdiction, for compliance with National Electrical Code and obtain certificates of approval, acceptance, and compliance with code regulations.

2. Correct failures in a manner satisfactory to the inspection agency.

END OF SECTION

Detail Drawings