

CUMBERLAND-FRANKLIN JOINT MUNICIPAL AUTHORITY

SPECIFICATIONS GOVERNING THE

CONSTRUCTION OF SANITARY SEWER EXTENSIONS

AND THE

INSTALLATION, REPAIR OR ALTERATION

OF

SANITARY SEWER SERVICE LINES

IN THE

CUMBERLAND-FRANKLIN JOINT MUNICIPAL AUTHORITY SERVICE AREA

IN

FRANKLIN AND CUMBERLAND COUNTIES, PENNSYLVANIA

ADOPTED APRIL 1976

AMENDED JULY 1982

AMENDED FEBRUARY 1985

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AMENDED AND ADOPTED FEBRUARY 2008

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PART I

SEWER SERVICE EXTENSIONS

1. PURPOSE

The purpose of these regulations and specifications is to provide a policy to be used by the Cumberland-Franklin Joint Municipal Authority for any and all applicants who may desire to construct sanitary sewers and appurtenances to connect to the existing and/or proposed sewerage system of the Authority, whether immediately or in the future.

2. WHO IS COVERED

These regulations and specifications shall apply to any individual, builder or developer, who desires to construct sewer lines, sewer laterals, and house connections to a residence, or to more than one residence in a residential development, or to any commercial or institutional building, prior to their use or sale.

3. WHAT IS REQUIRED

The individual, builder, or developer must submit plans on standard-sized 24"x36" sheets showing the proposed location (in both plan view and profile of sewer centerline) of the residence(s) or commercial or institutional building(s); the topography of the site in 1.0 foot contours for both existing and proposed ground elevation; the exact location, slope, diameter, length, and construction material of the proposed sewer line(s); the exact location, size, and type of each proposed manhole, to include all invert and rim elevations; the relative position of all existing or proposed sewer, water, stormwater, or other underground utility infrastructure within the project area; and all necessary plan notes and Standard Details to demonstrate that the plans have been prepared in compliance with these specifications.

Following Final approval by the Authority, three (3) sets of Final Construction Plans must be provided to the Authority.

The plans may be prepared by either method shown in a. or b. below:

- a. At the request of the individual, builder or developer, the Authority can provide the plans, and detailed design of the sewer extension, including the required applications and supporting documents required for approval and permits from the PA Department of Environmental Protection. The charges for this service by the

Authority will be at its cost, plus 10% to cover administrative costs. The engineering fees for the design will be in accordance with the current schedule of the Pennsylvania Society of Professional Engineers, together with the necessary legal and other related costs which shall be paid by the individual, builder, or developer. The total estimated costs of the engineering, legal and other charges shall be deposited with the Authority before the commencement of any engineering, surveying, or planning work. Other forms of financial guarantees may be considered by the Authority upon special request. No estimate shall be binding upon the Authority or its Engineer.

- b. The individual, builder or developer (applicant) may employ any professional Engineer or Surveyor qualified and competent in the field of sanitary engineering to develop the necessary plans and specifications for the sewer extension(s). The plans and specifications must comply with the technical specifications contained in this publication. Vertical data shown on the plans, including project benchmarks, topographic contours and manhole inverts shall be based on the National Geodetic Vertical Datum of 1929 (NGVD 29). The completed plans and specifications shall be submitted to the Authority for its consideration and action. The Authority will transmit copies of the submission to its Engineer and Solicitor who shall perform respective reviews. The individual, builder or developer shall pay the Authority for all cost incurred during the review process.
- c. Any and all applicants who may desire to construct sanitary sewer extensions to connect to the existing and/or proposed sewerage system of the Authority shall be required to extend the sewer line, onto the parcel of land to be serviced, as far as necessary to make the lateral connection in accordance with the Regulations and Specifications of the Authority.

Bonding

- d. The individual, builder or developer shall be required to furnish a Performance and Maintenance Bond in accordance with the requirements of Acts (Pennsylvania) 230 and 231, as appropriate to guarantee the completion of and the structural integrity of the sewer facilities. The term of the Maintenance Bond shall be eighteen (18) months from the date of acceptance of dedication to the Authority.

Construction and Inspection

- e. After receipt of the necessary State permits and approvals, the construction of the sewer extension(s) may commence at the expense of the individual, builder or developer. The construction shall be inspected by an inspector designated by the Authority. The cost of such inspection, including salaries and expenses, shall be paid by the individual, builder, or developer. A sum equal to three (3) percent of

the total construction cost estimate shall be included in the Performance Bond as surety for payment of inspection costs. In order to secure inspectors, the Authority shall require a notice of three (3) working days in advance of the actual inspection date for all field inspections.

- f. When the construction is completed, the individual, builder or developer shall deed the extensions, free of all encumbrances, to the Authority. The extension shall be accepted only after an inspection is made by the Authority or its official representative. No house connections shall be made until after the extension has been inspected, accepted and formally dedicated to the Authority. The deed dedicating the system to the Authority shall be accompanied by “as-built” drawings consisting of one set of reproducible mylar prints and three sets of black and white prints. All house connections shall be made in accordance with the rules and regulations of the Cumberland-Franklin Joint Municipal Authority, including securing permits and inspection for the house connections and other applicable requirements and fees.
- g. If the sewer extension traverses any private property, the individual, builder or developer shall arrange and pay for a 20’ easement over the private property, and record the easement with the County Recorder of Deeds in the name of the Authority. The sewer extension must be aligned in the center of the 20’ easement. Right-of-way plats and deed descriptions as recorded shall be submitted to the Authority for their permanent record with a notation as to the date and deed book in which recorded. All such easements shall be obtained in advance of commencement of construction and shall be reviewed by the Solicitor of the Authority.
- h. In the event additional parcels of land are connected to this sewer extension by another individual, builder or developer, the original Owner of this extension shall have no reimbursement claim against the Authority or the additional party or parties tapping into this extension, except as specifically allowed for under Pennsylvania Act 57.
- i. The Authority will attempt to provide the individual, builder or developer with access to any public streets or roads under its right of access. The cost of any State or Municipal Permits and Inspection Fees for entry into roads shall be borne by the individual, builder or developer. APPLICABLE FEDERAL, STATE, AND MUNICIPAL RULES AND REGULATIONS regarding construction within public streets and roads shall be strictly adhered to and an agreement legally binding the individual, builder or developer to all Regulations and Specifications of the Authority and the PA Department of Transportation, in effect at the time of construction, shall be required.

- j. No individual, builder or developer shall be permitted to uncover, make any opening into or near, or attempt any connection to any part of the sewer system, including house service laterals, without first obtaining a permit from the Authority.

4. TAPPING FEE AND CONNECTION CHARGE

It is the present policy of the Cumberland-Franklin Joint Municipal Authority to charge all individuals, builders or developers a Tapping Fee and Connection Charge for each Equivalent Domestic Unit (E.D.U.) proposed to discharge sewage into the sewer system. Upon request, the Authority will provide a current list of tapping fees and connection fees.

5. LEGAL AGREEMENT

Before issuing final approval to an applicant to construct and/or connect a sewerage system within the municipalities comprising the service area of the Cumberland-Franklin Joint Municipal Authority, there may be required an Agreement binding the individual, builder or developer and Cumberland-Franklin Joint Municipal Authority to certain terms and/or conditions relative to the proposed project. The Authority and the municipalities within which the project is to be located shall determine the need for and/or terms and/or conditions of such an Agreement.

Should the proposed project contain either a pumping station or a treatment facility, the Authority shall have final approval (subject to PA Department of Environmental Protection approval) with regard to all aspects of the pumping station or treatment facility, including but not limited to location, size, capacity, type, specifications, method and cost of operation. The Authority may require an operation and maintenance agreement binding the applicant to the cost of operation and maintenance of the proposed facility until such time sufficient revenue is generated by the proposed project to meet the costs of operation and maintenance.

6. INSURANCE

The Cumberland-Franklin Joint Municipal Authority shall require that any individual, builder or developer desiring to construct sewer line extensions, laterals and/or appurtenances to the Authority's system have the following minimum insurance coverage:

	Each Occurrence	Aggregate
Bodily Injury	\$1,000,000	\$1,000,000
Property Damage	\$1,000,000	\$1,000,000

A Certificate of Insurance naming the Authority as Certificate Holder shall be required prior to construction.

7. **ALTERNATIVE SEWER SYSTEMS**

As an alternative to a conventional gravity sewer system, the use of such systems as small diameter variable grade, S.T.E.P. (Septic Tank Effluent Pumping) and low pressure sewer systems may be considered in designing waste water conveyance systems. The selection of the conveyance systems should be based on both monetary and non-monetary (topographical, environmental, social, institutional) considerations. An alternative collection system may be considered in situations where the use of conventional gravity sewers is deemed not feasible and/or cost-effective. It is expected that an alternative sewer system would generally be used only in small sub-systems or areas.

The individual, builder or developer should consult with the Authority to determine the viability of an alternative collection system for a project before proceeding with the design phase. Proposals received for the use of alternative conveyance systems will be reviewed on a case-by-case basis. In general, the Authority will use the consultant's analysis and recommendations, manufacturer's literature, experience with similar facilities and good engineering practice in reviewing such proposals.

- a. For design purposes, all extensions or additions to the existing Letterkenny Low Pressure Sewer System shall use the pumping equipment and design principals of the Barnes Eco-Tran System as manufactured by The Crane Pump and System Co., 420 Third Street, Piqua, Ohio 45356 as their basis of design. No other equipment or design will be permitted in this system. It shall be the policy of the Authority that the purchase, ownership and maintenance of any individual pumping unit shall be the sole responsibility of the owner on which property the unit is located.
- b. For design purposes, all other projects using low pressure sewer systems shall use the pumping equipment and design principals of the Environment One Corporation, 2773 Balltown Road, Schenectady, New York 12309-1090 as their basis of design. No other equipment or design will be considered. It shall also be the policy of the Authority that the purchase, ownership and maintenance of any individual pumping unit shall be the sole responsibility of the owner on which property the unit is located.
- c. For design purposes, projects using small diameter variable grade collection systems shall use the design procedures and methodology set forth in the publication entitled "Design Workbook for Small-Diameter, Variable-Grade, Gravity Sewers" by John D. Simmons and Jerry O. Newman. This publication and additional information is available from the Authority and its engineer.

- d. For design purposes, projects using “Septic Tank Effluent Pumping” (S.T.E.P.) pressure sewer systems shall use the design program and principles of the Barnes Pressure Systems (available from C. W. Sales Corporation, www.cwsalescorp.com) as their basis of design. Standard Details contained herein pertaining to S.T.E.P. systems shall be used in the proposed system. Additional information can be obtained from the Authority and its engineer.

8. AS-BUILT DRAWING REQUIREMENTS AND STANDARDS

As-Built drawings shall be completed in accordance with the following requirements and standards.

As-Built drawings shall be submitted prior to the commencement of the eighteen (18) month maintenance period. The performance bond shall not be released until the As-Built drawings are accepted by the Cumberland-Franklin Joint Municipal Authority Board of Directors.

The Developer shall verify that the As-Built drawings contain both horizontal and vertical data that has been field checked by a registered surveyor or engineer. A statement added to the As-Built drawings to this effect shall be required.

If in any case, the As-Built drawings are found to be incomplete or not accurate by the Authority, an As-Built field survey may be conducted by the Authority’s engineer and all cost associated with the survey and resulting As-Built drawings shall be borne solely by the Developer.

The As-Built drawings shall consist of one set of reproducible mylar prints and three sets of black and white prints.

The As-Built drawings shall be at a scale of one inch equals fifty feet (1” = 50’) horizontal scale and one inch equals five feet (1” = 5’) vertical scale.

The As-Built drawings shall clearly show the following data:

- a. Direction of North.
- b. Sewer line diameter, type and class of pipe.
- c. Plan and profile on same sheet showing sewer run from manhole to manhole with the length of sewer run shown as measured from center of lid to center of lid.
- d. Slope in percentage of the main line between manholes.
- e. Invert elevations of all pipes entering or exiting manholes.
- f. Depth of manholes.
- g. Profile of existing ground at manholes.

- h. Manhole numbers.
- i. Manhole rim elevations.
- j. Lateral “Y” stations on mainline shall be noted along with depth.
- k. Lateral ends shall be located with their stations along the main sewer line and the distance to the ends measured perpendicular to the main sewer line.
- l. The depth of the lateral end from the current ground surface.
- m. The lateral size and type of pipe.
- n. The locations of all ball markers (see Pipeline Construction, Marking Pipelines) installed for the project. Ball markers shall also be labeled with their identification numbers.
- o. Culvert pipes, gas lines, water lines, electric, etc. as they relate to the location of the sewer installation.
- p. Road profiles and existing structures.
- q. Match lines to existing drawings.
- r. Deflection angles from one manhole to another.
- s. Low pressure sewer sizes, cleanouts, air/vacuum valves and manholes.

PART II

TECHNICAL SPECIFICATIONS
FOR THE
CONSTRUCTION OF SANITARY SEWER EXTENSIONS
BY
INDIVIDUALS, BUILDERS OR DEVELOPERS

Note:

Reference to the PA Department of Transportation Regulations and Specifications shall be understood to mean Publication 408 and Chapter 459, and/or any other requirement of PA DOT or the Authority in effect at the time of construction.

EROSION AND SEDIMENTATION CONTROL

1. SCOPE

This section of the specifications includes all labor, supervision, materials, equipment, tools, transportation and insurance to be provided by the individual, builder or developer necessary to implement the erosion and sedimentation controls as shown on the project drawings or as needed for small repairs or lateral installations.

2. GENERAL

The individual, builder or developer shall install and maintain in good condition, the soil erosion and sedimentation control measures specified on the project plans. All costs involved in securing and implementing an approved Soil Erosion and Sedimentation Control Plan shall be paid by the individual, builder or developer. The individual, builder or developer shall be liable for any damages or fines resulting from project soil erosion regardless of the circumstances.

All projects requiring drawings shall have a Soil Erosion and Sedimentation Control Plan. Minor projects such as single lateral tap-ons or lateral repairs shall be started only after adequate soil erosion and sedimentation control measures are in place and approved by the Authority's Engineer.

All Soil Erosion and Sedimentation Control Plans and measures shall comply with the latest edition of the Commonwealth of Pennsylvania, Department of Environmental Protection, Office of Water Management, "Erosion and Sediment Pollution Control Program Manual."

3. MINIMUM REQUIREMENTS FOR PROJECTS NOT REQUIRING PLANS

All earthmoving involving trenches for the construction of sanitary sewer lines shall be performed, restored and maintained as follows:

- a. Existing topsoil shall be stripped from the area to be excavated, segregated and stockpiled for replacement on the trench.
- b. Excavated trench spoil shall be placed on the uphill side of the trench for reuse as backfill. If the soil is not to be used as backfill, it shall be removed from the trench site at the time of excavation and utilized as fill material where required. No excavation material shall be placed in or adjacent to drainage courses or gutters in any manner so as to interfere with the flow of storm water.

- c. Care shall be taken not to disturb the existing vegetative cover on areas not to be excavated.
- d. Trench restoration in vegetative areas shall commence immediately upon completion of backfill operations. Topsoil shall be placed on the disturbed trench line, 6" thick, and slightly mounded to avoid a depressed gutter.
- e. Restoration of trenches in areas of streets or roadways shall be with material equal of that removed during excavation.
- f. Trench excavation shall be limited to the amount of work that can be completed in one day. No trench shall be left open overnight and the pipe ends shall be plugged.
- g. Permanent seeding requirements for trenches:

Formula 1 = 95% KY 31 Tall Fescue plus 5% Redtop -
Application Rate = 63 lbs. per Acre

Recommended Time of Seeding: April 1-June 15
or July 25-September 15

Perennial Ryegrass may be substituted for Redtop at the rate of 15 lbs. per Acre plus the 60 lbs. per Acre of KY 31 Tall Fescue making the mixture application rate 75 lbs. per Acre.

PIPELINE CONSTRUCTION

EXCAVATION

1. SCOPE

The work covered by this section includes all excavation and backfill to be provided by the individual, builder or developer necessary to construct sewer lines, manholes and other appurtenances for the proposed project.

2. GENERAL

The individual, builder or developer shall excavate and backfill all trenches and other excavations that may be necessary for completing the work to be done for the project. All excavations shall be in open cuts, unless otherwise allowed by the Authority. Trenches may be excavated and backfilled by machinery or by hand as the individual, builder or developer may elect; provided however, that the Authority shall be empowered to direct that hand excavation shall be employed wherever they shall decide that such necessity exists. The individual, builder or developer shall have no claim for compensation due to the fact that hand instead of machine excavation may be required at any location where necessary for any cause whatsoever.

The individual, builder or developer shall perform all excavation of every description and of whatever substance encountered, to the lines and grades or depths indicated on the approved project. All excavated material not required for backfill shall be removed and wasted.

The term "Subgrade" as used herein shall have the following meanings:

- (a) The bed of a trench prepared as specified to receive pipe.
- (b) The area upon which the lower surface of roadway paving rests.
- (c) The areas upon which rest the planned bottoms of manholes.

The Contractor shall conform to the current regulations of the Pennsylvania Department of Labor and Industry for excavations and construction.

3. **CUTTING OF PAVED SURFACES**

In all locations where installation of pipelines, miscellaneous structures and appurtenances necessitate the breaking of a paved surface, the surface shall be cut in a neat uniform fashion. All cuts of paved surfaces shall form straight lines parallel with the centerline of the trench. No paving shall be broken except that which has been previously cut. Pavement shall be cut six (6) inches wider on each side than the anticipated excavation. Edges of cut pavement shall be protected at all times during the course of excavation and construction to prevent raveling or breaking the edge. Any raveled or broken edges that exist after completion of work shall be squared up previous to placing repavement.

4. **EXCAVATION, STRUCTURES**

Excavation for structures shall be performed as required to provide sufficient working space to permit placing, inspection and completion of work. Limits of excavation shall at all times provide for the conduct of all work in the safest possible manner and shall be in complete accordance with all applicable Federal, State and Local laws.

5. **TRENCH EXCAVATION**

Open Trenches

All excavation for installation of pipelines shall be open cut trenches unless otherwise specifically indicated on the Plans or instructed by the Authority.

The Contractor shall be entirely responsible for prevention of stream siltation and pollution.

Tunneling

Tunneling will not be permitted except upon receipt of written instructions from the Authority. Hand excavation inside casings will not be considered tunneling.

Minimum Burying Depth – All Pipes

The minimum burying depth for all pipelines shall be three (3) feet from finished grade to top of pipe. Pipe designs at depths less than three (3) feet must receive pre-approval from the Authority and be ductile iron or concrete encased.

Depth of Excavation - Gravity Pipelines

The depth of excavation for gravity pipelines shall be as indicated on the approved project plans plus that excavation necessary for placement of bedding.

Where soft or insufficient bearing material is encountered, excavation shall be continued until unsuitable material is removed, solid bedding can be obtained, or concrete cradle can be placed. If no concrete cradle is to be installed, trench shall be refilled to required pipeline grade with bedding material.

Where rock is encountered at the trench bottom the rock shall be removed to provide for bedding.

Where the individual, builder or developer, by error or intent excavates beyond the required depth, the trench shall be refilled with bedding material.

Depth of Excavation - Laterals

The depth of excavation for laterals shall be as required to provide a straight uniform grade from the main pipeline or riser stack, to the elevation at the curb line, or property line plus excavation necessary for placement of bedding where required.

Where soft or insufficient bearing material is encountered, excavation shall be continued until unsuitable material is removed, solid bedding can be obtained, or concrete cradle can be placed. If no concrete cradle is to be installed, trench shall be refilled to required pipeline grade with bedding material.

Where rock is encountered at the trench bottom the rock shall be removed to provide for bedding.

Where the individual, builder or developer, by error or intent excavates beyond the required depth, the trench shall be refilled with bedding material.

Depth of Excavation - Pressure Pipes

The depth of excavation for pressure pipelines shall be to minimum depth as shown on the approved project plans. Where required to maintain a uniform grade the excavation shall be carried to a greater depth but in no case shall the depth of excavation be less than the minimum indicated on the approved project plans. Bedding shall be utilized for pressure pipelines. All provisions applying to insufficient bearing and rock for gravity pipelines are applicable to excavation for pressure pipelines.

Width of Excavation - Gravity Pipelines

Excavation for installation of gravity pipelines shall in all cases be sufficient to allow for proper placing and joining of the pipe. Excavation for manholes and riser stacks shall be only sufficient width to allow proper placing of concrete and construction.

Width of Excavation - Pressure Pipelines

Excavation for installation of pressure pipeline shall in all cases be sufficient to allow proper placing and joining of the pipe. Excavation for thrust blocks shall be sufficient to allow for placement of concrete. All earth surfaces which provide bearing for thrust blocks shall be free of loose or soft material and the bearing face shall be perpendicular to the direction of thrust. If material does not provide sufficient bearing, excavation shall be continued until a satisfactory bearing surface is attained.

6. **BEDDING REQUIREMENT**

Bedding conditions shall be provided throughout all projects, unless otherwise directed. Bedding shall conform to the Standard Details and shall be PA AASHTO # 10 Aggregate.

Grading of Trench Bottom

Stone bedding of PA AASHTO # 10 Aggregate or the equivalent shall be required and upon completion of excavation and placement of bedding, the material shall be to the shape of the lower quadrant of the pipe. All loose material shall be removed.

Additional recesses for the bell of the pipe shall be shaped by hand. Recesses shall be of sufficient size to assure that no load is placed on the bell of the pipe and that sufficient space is allowed for making a joint. In all cases the pipe shall be supported on the entire lower quadrant over the entire length of the barrel. Grading for gravity pipelines shall in all cases result in the required bearing and the invert of the pipe in place conforming exactly to the grades indicated on the project plans. Utilization of the trench bottom as bedding shall not be permitted.

7. **BLASTING**

Blasting will not be permitted on or in the vicinity of existing Cumberland-Franklin Joint Municipal Authority Rights-of-Way and/or sewer mains without prior written approval by the Authority. Blasting in areas other than those stated above shall be at the discretion of the individual, builder or developer whom shall assume all liabilities for damages.

Nothing in this section shall relieve the individual, builder or developer of their responsibility for damages, nor shall it result in any responsibility of the Authority.

Blasting work shall at all times be supervised by personnel licensed and experienced in this type of work and shall be performed in complete conformance with all applicable Federal, State and Local codes. All explosives shall be stored in State approved magazine off the job site and shall be delivered to the site in vehicles clearly marked to indicate cargo.

The quantity of explosives on the job site shall at all times be limited to that required for one days work. All explosives brought on the job site shall be stored in locked heavy shock proof, State approved containers. Detonators and explosives shall be stored in separate containers which shall at no time be placed closer together than permitted by State requirements. Detonators and explosives shall be checked at the completion of each days work and all items accounted for; any missing items shall at once be reported to the proper authorities.

Blasting machines shall be of State approved type. When electric detonators are utilized, a galvanometer shall be used to check circuits previous to firing and in the event of misfire. All personnel shall be cleared from the area during loading and no explosives shall be discharged until the area to be blasted has been covered by a blasting mat. No blasting shall be done unless sufficient personnel are available to assure that the area is clear and traffic stopped. Additional shoring, sheeting, braces, etc., which may be required due to blasting shall be provided and installed.

All blasting work shall conform in all respects to Part 1518 of the Federal Bureau of Labor Standards with regard to Safety and Health Regulations for construction.

8. SHEETING, SHORING, BRACING, ETC.

All excavation shall be shored to comply with Federal, State and Local Codes and safety requirements. When required, due to ground condition or to facilitate the work, excavation shall be tight sheeted. The individual, builder or developer shall at all times be responsible for the safety of the work, personnel and adjacent structures.

Any damage resulting from failure to provide shoring, sheeting, bracing, etc., shall be the entire responsibility of the individual, builder and developer whether or not shoring, sheeting, bracing, etc., was required or approved. Nothing in this section shall in any way relieve the individual, builder or developer of his responsibility for damages, nor shall it result in any responsibility of the Authority. All shoring, sheeting, bracing, etc., shall be designed to allow sufficient space to properly install, complete inspect and backfill the work. Shoring, sheeting, bracing, etc., shall in all cases prevent the sloughing off of material from the banks of the excavation. In general, all shoring shall be removed from the excavation. Any shoring, sheeting, bracing, etc., deemed necessary by the

Authority to remain and any shoring, sheeting, bracing, etc., which extends from the top of the pipe to the bottom of the excavation shall remain in place. All sheeting, shoring, bracing, etc., shall conform in all respects to Part 1518 of the Federal Bureau of Labor Standards with regard to Safety and Health Regulations for Construction.

9. **CONTROL OF EXCAVATED MATERIAL**

The individual, builder or developer shall provide and utilize all facilities required to control excavated material. The ground surface, within two (2) feet, on both sides of the excavation shall be kept free of excavated material. Any barricades, walls or other temporary facilities required to prevent excavated material from encroaching on private property, walks, gutters, trenches or other areas shall be furnished, installed and removed at the completion of work.

In areas where the sewer lines parallel or cross streams, the individual, builder or developer shall take special care to insure that no material slides or is washed or dumped into the stream course.

Where stream crossings are constructed and cofferdams maintained during construction of same, these cofferdams must be entirely removed by the individual, builder or developer immediately upon completion of pipeline constructed therein.

10. **MAINTENANCE OF TRAFFIC**

The individual, builder or developer shall at all times coordinate his work, utilize any required facilities and provide all equipment necessary to maintain traffic in construction areas. All temporary facilities, including flagmen, warning signs, lights, barricades, bridges, ramps, etc., shall be furnished, installed and removed at the completion of work. All pedestrian ramps, bridges, etc., shall be a minimum of three (3) feet wide and shall be complete with handrails and barricades. Vehicle bridges, ramps, etc., shall be of sufficient design and strength for use intended. All temporary facilities and structures shall conform to Federal, State, and Local code requirements.

11. **STORAGE OF EXCAVATED MATERIAL**

All excavated material shall be stored only in locations approved by the Authority. No excavated material shall be placed or stored on private property without the written consent of the Owner.

12. **DISPOSAL OF EXCAVATED MATERIAL**

All excavated material remaining after completion of backfilling shall remain the

property of the individual, builder or developer and shall be removed from the Construction Area at no cost to the Authority.

13. DEWATERING

Excavations shall at all times be maintained free of water. No grading of trench bottom, placing or joining of pipe or placing or compaction of backfill shall be done unless the trench is in a dry condition. The individual, builder or developer shall take all action and shall provide and utilize all facilities required to prevent the entrance of surface water into the trench. The individual, builder or developer shall maintain open and in operation all stormwater facilities, gutters and natural water courses and shall provide and install all temporary facilities required. The individual, builder or developer shall be responsible for any damage resulting from failure to maintain existing facilities or control water. The individual, builder or developer shall utilize all required facilities including pumps, well point systems and drainage structures to maintain the excavation free of water at all times. Under no circumstances shall trench water be diverted into or allowed to enter the pipeline under construction.

When any mechanical equipment is utilized to control water conditions, a similar standby unit shall be provided on the job site. Equipment for use on other parts of the project shall not be considered standby equipment. All facilities required to transport water from excavation to natural watercourses shall be utilized and any damage resulting from failure to provide such facilities shall be the entire responsibility of the individual, builder or developer. All required measures to exclude sand, dirt, etc., resulting from the construction operations, from the existing and new sewer facilities shall be utilized.

If, for any reason an appreciable quantity of sand, dirt, etc., enters the existing or new sewers it shall be the responsibility of the individual, builder or developer to clean and flush the sewers at his own expense. Control of water shall be exercised at all times and, if required, the individual, builder or developer shall provide twenty-four (24) hour operation of facilities.

During dewatering operations, water discharged to any watercourse must be clear and free of silt, mud, and other deleterious materials. The individual, builder or developer shall construct and maintain all settling ponds necessary to prevent stream degradation.

14. CHANGES IN LINES AND GRADES AND ADDITIONAL WORK

All pipelines, miscellaneous structures and appurtenances shall be installed in accordance with the lines, grades and details shown on the project plans. The right of the Authority, acting through their engineer, to alter, add, deduct, or change the line, grade or extent of any gravity pipeline or pressure pipeline or other item of work is hereby expressly

reserved and understood. The Authority shall make all decisions regarding changes or extra work necessitated by unexpected conditions, obstructions or other causes.

15. **PROTECTION OF EXISTING UTILITIES AND STRUCTURES**

The individual, builder or developer shall take all precautions and utilize all facilities required to protect existing utilities and structures. When existing pipelines must be exposed and undercut the individual, builder or developer shall install timber supports. The individual, builder or developer shall allow free access at all times to representative(s) of the local utility companies for purposes of maintenance, repair and inspection . Any damage to existing utilities or structures shall be immediately reported to the utility company and the Authority. The individual, builder or developer shall be responsible for all damages to existing utilities and structures and shall bear all cost of repair and replacement.

16. **LENGTH OF OPEN TRENCH**

Unless otherwise directed by the Authority, the individual, builder or developer shall not advance trenching operations more than four hundred (400) feet ahead of the completed pipelines.

Trench excavation shall be limited to the amount of work that can be completed in one day. No trench shall be left open overnight and the pipe ends shall be plugged.

PIPELINE CONSTRUCTION

CONSTRUCTION OF SANITARY SEWER PIPELINES LATERALS AND APPURTENANCES

1. SCOPE OF WORK

This section of the specifications covers all labor, supervision, materials, equipment, tools, transportation and insurance to be provided by the individual, builder or developer necessary to complete the installation of pipelines, laterals and appurtenances for the proposed project.

2. HANDLING AND STORAGE OF PIPE

The individual, builder or developer shall take all precautions required to prevent damage to pipe while in transit, storage and during and after pipe laying operations. All measures required to preclude the installation of damaged pipe shall be utilized. Upon delivery of pipe to the job site the individual, builder or developer will thoroughly examine and immediately remove any damaged pipe or pipe with defective or damaged joints. No pipe or other material shall be placed on private property without the written permission of the property owner.

3. PIPE LAYING, GRAVITY PIPELINES

The individual, builder or developer shall give the required notice to the Authority in advance of any pipe laying and shall at all times allow access to the work for proper inspection. After the trench has been graded as specified under Excavation for Pipelines the pipe, fittings and appurtenances shall be installed. All pipe and fittings shall be thoroughly cleaned and inspected as to soundness of structure and joint material before lowering into the trench. No pipe shall be lowered into the trench except that which is to be immediately installed and jointed. Pipe shall only be lowered into the trench by methods which assure the safety of personnel and materials. Each pipe installed shall be checked as to line and grade in place and any deviation shall be immediately corrected. The invert grade as shown on the project plans and grade sheets indicate the elevation of the inner side of the bottom of the pipe in place and a deviation of one quarter (1/4) inch from the grade as shown or required will be deemed sufficient cause for rejection. Under no circumstances shall pipe be dropped or blocked up to attain the required grade. Upon completion of work the pipe shall present a smooth straight uniform invert free of any irregularity or projection. All pipe laying shall be started at the lowest point and shall

proceed with the spigot ends pointing in the direction of flow. The minimum burying depth for all pipelines shall be 3' from finished grade to top of pipe. Pipe designs at depths less than 3' must receive pre-approval from the Authority and be ductile iron or concrete encased.

4. **PIPE LAYING, PRESSURE PIPELINES**

All provisions regarding notification of the Authority, cleaning, inspection and handling specified under Pipe Laying Gravity Pipelines shall apply to this work. After the trench has been graded as specified under Excavation for Pipelines the pipe fittings, valves and appurtenances shall be installed. Deflection of pipe at joints shall be limited to the maximum recommended by the pipe manufacturer.

5. **PIPE AND PIPE JOINTS**

All pipe and pipe joints shall be as shown on the project plans and as specified herein. Prior to joining, all parts of joint surfaces and materials shall be wiped clean and closely examined for defects. Any defective material shall be immediately removed from the trench and indelibly marked or destroyed.

Pipe and pipe joints shall meet the requirements specified under Materials and Equipment.

6. **PROTECTION OF PIPE**

During any interruption in pipe laying and at the end of work for the day, the end of the pipe in place shall be securely plugged to prevent the entrance of trench water and dirt. Backfilling, as specified under Backfilling, Trenches, shall be done concurrently with all pipe laying operations so that when pipe laying is terminated for any reason the pipe shall be covered by a minimum of two (2) feet of backfill to provide protection. No pipe in place shall be left uncovered overnight except the last piece laid. On pressure pipelines the pipe shall not be covered at joints but backfill shall be heaped between joints and anchor rods installed to prevent floating or displacement during testing.

7. **MANHOLES**

Location and depth of manholes shall be as indicated on the project plans and grade sheets unless otherwise authorized in writing by the Authority. Manholes shall be built in accordance with the Standard Details.

All materials for manholes including concrete and reinforcing for precast units and bases, mortar, manhole frames, cover, steps and accessories shall be as specified under Materials and Equipment.

Precast manhole sections shall be complete with steps as specified and shall require no cutting or patching to install accessories. Joints shall be sealed watertight by application of preformed joint sealing compound similar to "Ram-Nek", manufactured by K.T. Snyder Co., Inc., Houston, Texas, and distributed by Gerlitz & Associates, 1110 Spring Grove Avenue, Lancaster, Pennsylvania 17603 or ConSeal (CS-302) as manufactured by Concrete Sealants, Inc., New Carlisle, Ohio 45344.

The bases of all manholes shall be constructed and reinforced as shown on the Manhole Specification Detail sheets and shall be sealed watertight. All ground water shall be excluded from freshly poured concrete and masonry work until set. Any noticeable leakage into or out of the manhole shall be repaired by the individual, builder or developer at his expense to the satisfaction of the Authority. Flow channels in manhole bases shall be as shown on the Standard Detail sheet and shall slope uniformly from influent invert to effluent invert. Unless otherwise noted on the plans, the fall from influent to effluent shall be 0.10 foot. Bends in channels shall be of the largest possible radius. Channel sides and invert shall be smooth and uniform and free of cracks, holes or protrusions. Ends or edges of cut pipe shall be rounded to remove all sharp or jagged edges.

Drop connections shall be constructed in accordance with the standard details as shown on the Standard Detail sheets. All required pipe, fittings, concrete encasement, dams, etc., shall be furnished and installed. Dimensions of drop shall be as shown on the grade sheet.

Manhole steps, frames, covers and any other accessories indicated or required shall be furnished and installed. Manhole steps shall be imbedded as shown on the details. Manhole frames shall be installed in a bed of mortar and flange covered by a minimum of three (3) inches of mortar neatly troweled. Manholes located in streets shall have covers and frames installed flush with street surface. Manholes located off streets or in undeveloped areas shall have frames installed at the elevation designated on the project plans. All other accessories shall be installed in strict accordance with the manufacturer's recommended procedure.

Where indicated on the plans the individual, builder or developer shall install a terminal type manhole as shown on the Standard Details.

Manholes shall be constructed as the sections of pipeline between them are completed.

Manholes deeper than 20' are considered deep manholes and shall have aluminum safety landings installed at specified intervals (see Standard Details 1.102 and 1.103). The platforms shall be similar and of equal quality to those manufactured by "Midco Manufacturing" (866-295-6838) or "Stepcon Industries Inc." (888-783-7266).

Before incorporating manholes deeper than 30' into a sewer design, the design engineer must consult the Sewer Authority. Approvals for depths greater than 30' may not be granted and if granted, special requirements regarding pipe class, manhole diameter, wall thickness, soil bearing, buoyancy, etc. may apply.

Manholes receiving force mains, and the next gravity manhole downstream shall have a protective lining installed for protection against deterioration from sewer gases. Existing manholes shall be cleaned and repaired to restore interior surfaces to a suitable condition before applying the coating. The coating shall be a sprayed on, structural enhanced monolithic liner covering all interior surfaces of the structure including benches and inverts. The liner shall be Spray Wall ® as manufactured by "Sprayroq, Inc." or approved equal. The liner shall be installed by the "Able Recon Company" of Mountville, PA (717-285-3103) or approved equal. Manhole cleaning, repair and coating shall be done according to the Able Recon Co. process specification entitled "Structural Rehabilitation & Corrosion Protection for Circular Structures in Wastewater Collection Systems.

8. THRUST AND SUPPORT BLOCKS

The individual, builder or developer shall furnish and install, complete in place, thrust and support blocks and tie rods at all bends, fittings and valves on pressure mains. All thrust and support blocks shall be poured in place. All tie rods shall be securely installed and tightened. Typical thrust block details are shown on the Standard Detail sheets. Support blocks shall be as shown on the Standard Details.

9. CONCRETE CRADLE ARCH AND ENCASUREMENT

Where shown on the plans and where the Authority considers it necessary, the individual, builder or developer shall provide a concrete cradle arch or encasement. Where cradle arch or encasement is to be installed excavation shall be completed as specified under Excavation for Pipeline. Pipe shall be installed to the indicated invert elevation and supported on bricks or concrete blocks. No wood or other organic material, earth or rock shall be used. Concrete shall be placed utilizing all possible care to prevent displacing the pipe. Any pipe displaced shall be immediately returned to line and grade. No backfilling shall be done until concrete has achieved initial set and any forms are removed. Typical concrete cradle arch and encasement details are shown on the Standard Details sheets.

10. WYE BRANCHES

Wye branches shall be furnished and installed at locations shown on the project plans. Wye branches shall be standard pipe fittings, and shall be installed in the pipeline

concurrent with pipe installation, as shown on the Standard Details sheets. No connection shall be made to new pipelines by cutting or breaking into the pipe. Wye branches shall be of the same material and shall utilize the same type joint as the pipeline into which they are installed. Wye branches shall be provided with watertight plugs which shall be removed when laterals are installed. All wye branches shall be installed in accordance with the Standard Details. Tees shall not be considered as a substitute for wye branches.

All wye branch fittings shall have a No. 1404-XR 4” Green 3M Electronic Ball Marker installed directly above the fitting. See “Pipeline Construction – Marking Pipelines” for details and specifications.

11. **LATERALS**

Laterals shall be constructed from the wye branch to the point at the curb line or property line as shown on the Standard Details.

Where the depth of main pipeline warrants, the individual, builder or developer shall construct risers from the wye branch to the elevation required to meet the portion of the lateral extending to the curb or property line. Risers shall be either of two types as designated by the Authority.

Vertical Risers

Vertical risers shall be constructed in complete accordance with the Standard Details.

Sloped Risers

Sloped risers shall be constructed in complete accordance with the Standard Details.

Laterals, where risers are not required, as well as the horizontal portion of laterals requiring risers shall be constructed in complete accordance with the Standard Details.

Laterals Under Main Highways

Laterals shall be installed in a casing pipe which has been placed under the road by boring and jacking. The installation shall be in accordance with the Standard Details and/or as required by the township or state at time of construction.

At the termination of the lateral at the curb or property line an approved adapter and watertight plug shall be furnished and installed. The adapter shall be of a type supplied by the pipe manufacturer which will readily receive the four (4) and six (6) inch diameter building sewer pipes from the service connections. The plug shall be capable of withstanding test procedures and shall be temporarily blocked for thrust. The plug shall be removable for building sewer connection without damage to terminal pipe or pipe joint. At the termination of the lateral at curb or property line the individual, builder or developer shall install a temporary marker stake extending up from the end of lateral to a point 3 feet above the ground.

He shall also install a No. 1404-XR 4" Green 3M Electronic Ball Marker in the trench directly above the lateral plug. The marker ball shall be recovered when the building sewer is connected to the lateral. See "Pipeline Construction – Marking Pipelines" for details and constructions.

PIPELINE CONSTRUCTION

BACKFILLING OF PIPELINE TRENCHES AND RESTORATION OF UNPAVED SURFACES

1. SCOPE OF WORK

This section of the specifications covers all labor, supervision, materials, tools, transportation, insurance, and appurtenances to be provided by the individual, builder or developer necessary to refill excavations or trenches to existing grade or grades shown on the project plans and to restore or replace all existing surfaces as required herein and necessary to complete the construction of the project.

Certain areas, in the area of streams, must be regraded and restored including seeding as soon as construction is completed in each section between manholes.

2. BACKFILLING, STRUCTURES

No filling is to be done around any part of the structure, until such parts have been inspected. No filling inside structures and backfilling against the foundations, wells, curbs, footings and platforms shall be done until concrete forms have been removed and masonry work has been completed. Backfilling shall be completed in layers uniformly spread and tamped and then leveled or sloped as required.

Where concrete slabs are to be placed on earth, any loam or organic or other unsuitable material shall be removed and fill added to bring subgrade to proper elevation. Fill shall be compacted to 90% of maximum density obtained at optimum moisture content as determined by AASHTO Standard Method T-99.

For backfilling, Contractor shall use earth, free from waste or objectionable matter; and shall not place stone over 1/2 cu. ft. or frozen material in backfill.

3. "THOROUGH COMPACTION" DEFINED, TESTS REQUIRED

Where the term "thorough compaction" is utilized in this section and elsewhere in these documents such terms shall be defined as compacted to ninety percent (90%) of maximum density obtained at optimum moisture content as determined by AASHTO Standard Method T-99. The individual, builder or developer shall, if requested by the

Authority, provide and pay for tests and examination to verify that compaction obtained conforms to this requirement. Should any test prove inadequate compaction is being obtained, additional compaction shall be completed and retested at the individual, builder or developer sole expense until compaction meets minimum standards.

4. **BACKFILLING TRENCHES - AROUND PIPELINES**

After the pipe has been installed, joined, inspected and tested, the trench shall be backfilled, as shown on the Standard Details. Backfill from trench bottom or from the top of bedding to a depth of twelve (12) inches over the top of the pipe shall be placed by hand in six (6) inch thickness layers over the entire trench length and along the pipe. Each six (6) inch layer shall be carefully and thoroughly compacted by hand operated mechanical tampers or other methods approved by the Authority. Backfill material from the trench bottom or top of bedding to a depth of twelve (12) inches over the pipe shall be Pennsylvania AASHTO # 10 Aggregate or other approved material.

5. **BACKFILLING TRENCHES - ABOVE PIPELINES**

Install detectable utility marking tape and 3M ball markers above all pressure and non-pressure pipe lines. See "Pipeline Construction – Marking Pipelines" for details and specifications.

Unpaved Areas

From twelve (12) inches over the pipe to the elevation of subgrade, all material shall be placed in uniform even eight (8) inch layers and each layer shall be carefully and thoroughly compacted by hand operated mechanical tampers. Backfill material within these levels may be placed by machine providing sufficient personnel are utilized to properly spread the material, to prevent the inclusion of objectionable material and attain complete compaction.

Backfill material from twelve (12) inches over the pipe to subgrade shall be the material removed from the trench with the exception that no organic material or rock larger than four (4) inches shall be included in the backfill.

Paved and Shoulder Areas - State, Township and Borough Roads

All trenches in state, township and borough road rights-of-way shall be backfilled in accordance with PA Department of Transportation Chapter 459 (January 1982) or any revision thereto at the time of construction. Backfill material shall be as specified in PA DOT Publication Form 408, Latest Edition.

Paved Area, Driveways and Parking Lots

Trenches cut through paved driveways and parking lots shall be backfilled as required for backfilling of trenches cut in the shoulders of state, township and borough roads rights-of-way.

6. **UNSUITABLE BACKFILL MATERIAL**

Where the backfill material is deemed by the Authority to be unsuitable, due to rejection of all or part thereof, existing conditions or conditions prevailing at the time of construction, the individual, builder or developer shall remove the unsuitable material and replace with selected material stone backfill as hereinafter specified.

Where the backfill is deemed by the Authority to be unsuitable due to conditions resulting from the individual, builder or developer's method of operation or construction, removal of unsuitable material and replacement with select material stone backfill shall be at no cost to the Authority.

7. **SPECIAL PROVISIONS FOR PRESSURE PIPELINES**

Backfill procedure for pressure pipelines shall be as specified above for gravity pipelines except that no backfill shall be placed at the joints until testing is completed. Pipe between joints shall be backfilled as specified for gravity pipelines to full depth prior to testing. At the completion of tests backfilling shall be completed for the entire pipe as specified for gravity pipelines.

8. **HYDRA-HAMMERS**

The use of hydra-hammers and similar machines will be strictly limited to those areas where the Authority permits. Under no circumstances will the use of hydra-hammers be considered an acceptable substitute for the compaction procedure detailed under Backfilling Trenches however, when permitted by the Authority these machines may be used to compact the top layer of backfill or to drive down temporary paving for placement of permanent paving. Extreme care shall be taken at all times to prevent damage to underground structures and buckling of adjacent street surfaces.

9. **RESTORATION OF UNPAVED SURFACES**

All unpaved surfaces shall be restored to their previous condition prior to excavation at the completion of work. Topsoil shall be replaced to its original location and any damaged areas reseeded. Any shrubs or bushes designated to be removed and replaced shall be replanted and if damaged replaced and replanted. Agreements with property

owners will be considered completion of restoration only if a notarized release signed by the property owner is presented.

Unpaved surfaces in cultivated areas or areas formerly cultivated shall receive a minimum restoration consisting of at least the topsoil replacement and planting of grass seed.

In areas paralleling and/or crossing streams, restoration including topsoil replacement and seeding shall immediately follow each phase of construction and shall not be delayed until all construction is completed. This work shall be completed in this sequence in order to prevent degradation of the stream regimen.

10. **SPECIAL REQUIREMENTS FOR BACKFILL**

The individual, builder or developer shall verify with the Pennsylvania Department of Transportation or the applicable permitting agency regarding the requirements for backfilling of roadways at the time of actual construction based on permits issued for the work to be done for the project.

PIPELINE CONSTRUCTION

RESTORATION OF PAVED SURFACES

1. SCOPE OF WORK

This section of the specifications includes all labor, supervision, materials, equipment, tools, transportation, insurance, permits and appurtenances to be provided by the individual, builder or developer necessary to complete the repaving work indicated on the project plans and required by the installation of pipelines, miscellaneous structures and appurtenances.

2. USE OF STATE SPECIFICATIONS

All temporary and permanent paving and repaving work shall be in complete accordance with the Pennsylvania Department of Transportation General Provisions and Specifications Regulating Occupancy of State Highway Right-of-Ways by Utilities (Chapter 459, dated January 1982). Reference in the Chapter 459 and this specification to the State Specifications covering materials shall refer to PA DOT Specifications, Publication 408, 1983 edition or revisions thereto. When particular articles or section(s) of Publication 408 are referred to, all except those portions relating to payment shall apply. Where no section of the State Specifications shall cover a particular material, the latest ASTM Specifications shall govern.

TEMPORARY AND FINAL PAVING

State Highways - Rigid Concrete Pavement

Shall conform to the requirements of Chapter 459.

TEMPORARY PAVING

State Highways - Bituminous Pavement

Shall conform to the requirements of Chapter 459.

TEMPORARY AND FINAL PAVING

State Highways - Improved Shoulders

Shall conform to the requirements of Chapter 459.

All backfill material shall be Pennsylvania AASHTO # 10 Aggregate.

3. **MAINTENANCE OF TEMPORARY PAVING**

The individual, builder or developer shall maintain all temporary paving on all state and township roads until final repaving is completed. Maintenance of temporary paving shall include but not be limited to, refilling and repaving all depressions which may occur; cutting down and repaving any high spots; cleaning up and replacing paving in the trench or removing any material scattered on the streets or roads or dislodged from the trench; sprinkling, sweeping or washing down streets or roads as may be directed by the Authority to control dust or clean streets or roads. In all cases the individual, builder or developer shall maintain the temporary paved surfaces in a condition satisfactory to the Authority, township and the PA Department of Transportation.

4. **FINAL REPAVING - GENERAL**

The individual, builder or developer shall start repaving work only upon receipt of written instructions from the Authority. Temporary paving shall be examined by the Authority and if found to be in satisfactory condition may be utilized as base course. If temporary paving is rejected by the Authority it shall be removed and the base course prepared as previously specified under Temporary Paving.

Upon receipt of written instructions from the Authority to begin repaving, the existing paving shall be trimmed back as necessary to remove all damaged pavement. In all cases the joint between the existing pavement and the repavement shall be straight lines and all offsets shall be at right angles.

a. Private Driveways and Walkways

Private driveways and walkways shall be restored to their original shape, size and location using similar materials and in accordance with PA DOT Specifications contained in the Latest Edition of Publication 408.

b. Painting

Where paving markings have been removed or obliterated during construction the paving markings shall be repainted in the same color and location after the final repaving.

5. **MAINTENANCE OF REPAVING**

The individual, builder or developer will be responsible for all maintenance of the repaved areas until the end of the maintenance period specified. All defects in paved surfaces which may occur during the maintenance period shall be repaired immediately by the individual, builder or developer. The repaved surfaces must be satisfactory to the Authority, Owner or Township Supervisors and the PA Department of Transportation at the time of acceptance and at the end of the maintenance period.

6. **CONTROL OF TRAFFIC**

The individual, builder or developer shall take all measures to control traffic as hereinbefore specified during repaving operations. No traffic will be allowed on paved areas until authorized by the Authority.

PIPELINE CONSTRUCTION
MATERIALS AND EQUIPMENT

1. **SCOPE OF WORK**

This section of the specifications covers all labor, supervision, materials, equipment, tools, transportation, insurance and appurtenances to be provided by the individual, builder or developer necessary to supply the materials indicated on the project plans as specified herein and as required to construct the project.

2. **SHOP DRAWINGS**

The individual, builder or developer shall submit shop drawings, catalog cuts, mill test reports or laboratory analyses indicating manufacturer or producer, quality, size or detail of fabrication for all materials and equipment to the Authority. Such drawings, cuts or data must be approved before any materials or equipment are purchased, delivered or installed.

3. **GENERAL**

All materials and equipment shall be new and of the standard specified herein. All materials and equipment offered under these specifications shall be limited to products regularly produced and recommended for service intended and so rated in accordance with engineering data or other comprehensive literature in effect at the time of project design. Pipe class data shown on the plans shall mean resistance to crushing strength per lineal foot.

4. **PIPE AND FITTINGS**

Gravity Sewer Pipe and Fittings:

a. Polyvinyl Chloride (PVC) Gravity Sewer Pipe

Shall conform to ASTM D3034 SDR 26 & 35, with compression type gasket joints. Pipe fittings shall be as manufactured by Johns-Manville, Certain-teed, or approval equal. SDR 35 pipe shall be used for mainline sewer construction for burying depths between 3' and 14' only.

Installation of PVC gravity sewer pipe in bedding shall conform to the section for Excavation and Pipeline Construction of these Specifications and Standard Details.

b. Ductile Iron Pipe

Shall conform to American Standard Associations Specification A21.51 and shall have a "Tyton" type joint. The interior surface of the pipe shall have a 3/16 inch mortar lining and bituminous seal coat in accordance with ASA Specification A21.4-1953. The exterior surface shall have a one mil thick bituminous coating. Installation shall conform to the sections for Excavation and Pipeline Construction of these Specifications.

c. Reinforced Concrete Pipe

Concrete pipe may only be used in certain circumstances and will require pre-approval by the Authority before sewer design. The pipe shall conform to the requirements of ASTM Designation C76, and shall be manufactured with Type II Portland cement conforming to ASTM C150. Pipe shall be Class III unless otherwise indicated on the drawings. Sizes up to and including 24-inch diameter shall be bell and spigot. Sizes over 24-inch diameter may be bell and spigot or tongue and groove joints. The pipe shall be absolutely free of honeycombs and shall present a hard dense surface inside and outside. The roughness coefficient of the pipe (Kutters "n") shall not exceed 0.013. The pipe shall be furnished with butyl rubber gasket joints compressed in such a manner as to provide a watertight joint under all conditions of service. The rubber gasket shall be the sole element depended upon to make the joint watertight and shall have a smooth surface free from any imperfections whatsoever.

All reinforced concrete pipe and fittings shall conform to the requirements specified above, with modifications thereto and additional requirements specified hereinafter.

The acceptance of reinforced concrete pipe will be made on the basis of plant loading test (three-edge bearing load test to produce 0.01-inch crack and to produce ultimate load), material tests and inspection of manufactured pipe for visual defects and imperfections as specified in Section 4.1.1. of ASTM Specification C76. Certified copies of the results of tests of pipe in all diameters and classes shall be furnished to the Authority.

All pipe and fittings shall be designed to withstand all trench loadings and conditions imposed by the various locations. All pipe and fittings shall have circular reinforcement. All fittings shall be manufactured in accordance with the

requirements of Section 4 of AWWA Standard C302. The wall thickness of all fittings shall be equal to that of adjoining pipe.

Joints for all pipe and fittings shall be formed of special shaped steel joint rings, and sealed by a round rubber gasket contained in an external groove in the spigot or tongue ring. Joints and rubber gaskets shall conform to the requirements specified in Sections 3.3 and 3.4 respectively of AWWA Standard C302. In addition, the annular space on the interior and exterior of each joint which remains after the joint has been completed with the rubber gasket shall be sealed with a sealing compound conforming to the requirements specified immediately hereinafter.

Sealing Compound

The sealing compound for filling the joint spaces shall consist of a cold-applied preformed plastic compound conforming to Federal Specification SS-S-210A, Type I, rope form or a cold-applied, mineral-filled, joint sealing compound conforming to Federal Specification SS-S-168 at the option of the individual, builder or developer. The preformed plastic sealing compound shall be supplied in extruded rope form of suitable cross section. The size of the preformed plastic sealing compound shall be in accordance with the manufacturer's recommendations and sufficient to obtain "squeeze-out". The preformed plastic sealing compound shall be protected by a suitable removable two-piece wrapper which shall be so designed that one-half may be removed longitudinally without disturbing the other half to facilitate application of the sealing compound. All excess material on the interior of the pipe formed during the "squeeze-out" shall be removed to provide a smooth joint.

Joint Priming

A suitable primer of the type recommended by the manufacturer of the preformed joint sealer shall be brush-applied to the joint surfaces and the end surfaces and allowed to dry and harden. No primer shall be applied over mud, sand or dirt or sharp concrete protrusions. The surfaces to be primed must be clean and dry when the primer is applied.

Coating, Pipe Interior

The entire surface area of the pipe interior shall be coated with a four (4) mil thickness of protective coating which shall be "Koppers" 300m or equal.

5. **PRESSURE SEWER PIPE AND FITTINGS**

a. Polyvinyl Chloride (PVC) Pressure Sewer Pipe (For P.S. Force Mains)

This pipe shall be SDR-18, (150 P.S.I.) and shall meet the requirements of AWWA C 900 for PVC pipe. The pipe shall have bell and spigot joints. The pipe shall be installed in accordance with the Uni-Bell Plastic Pipe Association guide for installation of PVC pressure pipe. All pipe shall be suitable for use as a pressure conduit. Provisions must be made for expansion and contraction at each joint with a rubber ring. The bell shall consist of an integral wall section with a solid cross section rubber ring which meets the requirement of ASTM F477 - "Elastomeric Rings for PVC Pipe". Standard laying lengths shall be twenty (20) feet for all sizes. At least 85% of the total footage shall be furnished in standard lengths. Random lengths shall not be less than ten (10) feet.

Nominal Pipe Sizes	O.D.	Min. pipe Wall Thickness (inches)
4"	4.80	0.267
6"	6.90	0.383
8"	9.05	0.503
10"	11.10	0.617
12"	13.20	0.733

b. Polyvinyl Chloride (PVC) Pressure Sewer Pipe (For S.T.E.P. System Force Mains)

This pipe shall be SDR-21 (200 P.S.I.) and shall meet the requirements of ASTM D-2241 for PVC pipe. The pipe shall have bell and spigot joints. The pipe shall be installed in accordance with the Uni-Bell Plastic Pipe Association guide for installation of PVC pressure pipe. All pipe shall be suitable for use as a pressure conduit. Provisions must be made for expansion and contraction at each joint with a rubber ring. The bell shall consist of an integral wall section with a solid cross section rubber ring which meets the requirements of ASTM F 477 – “Elastomeric Rings for PVC Pipe”. Standard laying lengths shall be twenty (20) feet for all sizes. At least 85% of the total footage shall be furnished in standard lengths. Random lengths shall not be less than ten (10) feet.

Nominal Pipe Sizes	O.D.	Min. pipe Wall Thickness (inches)
2"	2.375	0.113
4"	4.500	0.214
6"	6.625	0.316
8"	8.625	0.410
10"	10.750	0.511
12"	12.750	0.606

c. Ductile Iron Pipe

Same as Item No. 4b, Ductile Iron Pipe listed under Gravity Sewer Pipe and Fittings.

d. Copper Tubing

Copper water tubing shall conform to ASTM Standard Specification B88. Pressure tubing shall conform to ASTM Standard Specification B67. Potable water lines shall be Type K soft conforming to the above requirements with all connections and fittings to be the flare type.

e. High Density Polyethylene (HDPE) Pipe

Pipe shall be manufactured from a P-3408 resin listed with the Plastic Pipe Institute (PPI) as TR-4. The resin material shall meet the specification of ASTM 03350-02 with minimum cell classification of PE 345464C. Pipe shall have a manufacturing standard of ASTM D 3035 and be manufactured by an ISO 9001 certified manufacturer. The pipe shall contain no recycled compounds except that generated in the manufacturer's own plant from resin of the same specification and from the same raw material. The pipe shall be homogeneous throughout and free of visible cracks, holes, foreign inclusions, voids or other injurious defects.

Butt fusion fittings shall be in accordance with ASTM D3261 and shall be manufactured by injection molding a combination of extrusion and machining, or fabricated from HDPE pipe conforming to this specification. All fittings shall be pressure rated to provide a working pressure rating no less than that of the pipe. Fabricated fittings shall be manufactured using a McElroy Datalogger to record fusion pressure and temperature. A graphic representation of the temperature and pressure data for all fusion joints made producing fittings shall be maintained as part of the quality control. The fitting shall be homogeneous throughout and free of visible cracks, holes, foreign inclusions, voids, or other injurious defects.

6. PIPE JOINTS

a. Polyvinyl Chloride Gravity Sewer Pipe Joints

Shall be compression type rubber ring joints conforming to the manufacturer's recommendations and shall be of the same manufacturer as the pipe.

b. Reinforced Concrete Pipe Joints

Shall conform to AWWA Standard 302, Section 3.3 and 3.4.

c. Copper Tubing Sweat Joints

Joints between copper tubing and brass sweat fittings and valves shall be made with solder containing no lead. Before soldering all surfaces to be jointed shall receive a coat of soldering flux.

d. Copper Tubing, Flange and Flare Joint

Tubing shall be properly flared to match flange without breaks or splitting and all joints shall be drawn tight.

e. Ductile Iron Pipe Push-On Joint

Shall conform to ANSI A21.11 and AWWA C111 for push-on joints.

f. Ductile Iron Pipe Mechanical Joints

Shall conform to ANSI/AWWA C110/A21.10 for mechanical joints.

g. High Density Polyethylene (HDPE) Pipe Joints

BUTT FUSION: Sections of polyethylene pipe should be jointed into continuous lengths on the job site above ground. The joining method shall be the butt fusion method and shall be performed in strict accordance with the pipe manufacturer's recommendations. The butt fusion equipment in the joining procedures should be capable of meeting all conditions recommended by the pipe manufacturer, including but not limited to, temperature requirements of 400 degrees Fahrenheit, alignment, and an interfacial fusion pressure of 75 PSI. The butt fusion joining will produce a joint weld strength equal to or greater than the tensile strength of the pipe itself. All field welds shall be made with fusion equipment equipped with a McElroy Data Logger. Temperature, fusion pressure and a graphic representation of the fusion cycle shall be part of the quality control records.

SIDEWALL FUSION: Sidewall fusions for connections to outlet piping shall be performed in accordance with HDPE pipe and fitting manufacturer's specifications. The heating irons used for sidewall fusion shall have an inside diameter equal to the outside diameter of the HDPE pipe being fused. The size of the heating iron shall be 1/4 inch larger than the size of the outlet branch being fused.

MECHANICAL: Bolted joining may be used where the butt fusion method cannot be used. Flange joining will be accomplished by using a HDPE flange

adapter with a ductile iron back-up ring. Mechanical joint joining will be accomplished using either a molded mechanical joint adapter or the combination of a Sur-Grip Restrainer and Pipe Stiffener as manufactured by JCM Industries, Inc. Either mechanical joint joining method will have a ductile iron mechanical joint gland.

OTHER: Socket fusion, hot gas fusion, threading, solvents, and epoxies may not be used to join HDPE pipe.

7. VALVES

Gate Valves

All gate valves for all pipes 2 inches or less in diameter shall be standard bronze, ASTM B62, with a one piece wedge gate, non-rising stem and screwed bonnet. The gate valves shall be Class 125, WOG 200 such as Walworth Company valves or equal.

Gate Valves

All gate valves for all pipes 2-1/2 inches or larger in diameter shall be all iron valves. Valves exposed in buildings shall be standard outside screw and yoke with flanged ends similar to Class 125, WOG 200, equal to Walworth Co. No. 727 or Mueller No. A-2483-6. Valves buried outside shall be standard non-rising stem with mechanical joint ends by Mueller, Stockham or equal.

Air Release Valves

The air release valves shall be Apco, Crispin or Valmatic, with inlet pipes as detailed in the Standard Details.

Air Release Valve Manhole

The air release valve manhole shall be located in a precast manhole complete with top and cast iron manhole frame and cover (24") as shown on the Standard Details.

Accessories

All valves, curb stops and boxes shall be supplied with the required keys and wrenches. Where indicated on the plans extension stems, stem supports, guides, and operators shall be furnished and installed. Accessories shall be products of the same manufacturer as the valves installed.

8. CONCRETE WORK

Definitions, details of fabrication and placement of reinforcement or other factors entering into concrete work shall conform to American Concrete Institute Standard "Building Codes Requirements for Reinforced Concrete" ACT 31R and as modified by general notes on plans, except that no provisions therein which are in conflict with requirements of local building code or codes where concrete work is being performed shall be applicable. Measuring, mixing and placing shall be in accordance with American Concrete Standard "Recommended Practice for Measuring, Mixing and Placing Concrete" ACI 614.

Bar and mat reinforcement shall be deformed steel bars or cold-drawn steel wire or fabricated forms of these materials as required by plans or specifications or both. Bars shall be deformed, intermediate grade, new billet steel. These materials shall conform to Standard Specifications of ASTM as follows:

Wire

A-82, A-185, A-184

Concrete Finishes

- a. Unexposed surfaces shall have "spade" finish.
- b. Exposed surfaces shall have "trowelled" finish.

Concrete Type and Design

Concrete for projects shall be Ready-Mixed concrete, conforming to ASTM Standard Specification C94. Class A structural concrete shall have a 28-day compressive strength of 3,000 P.S.I.. Class B non-structural concrete shall have a compressive strength of 2,500 P.S.I. and its use shall be limited to non-structural applications such as thrust blocking, pipe encasements and anchors.

For structures and concreting below grade, Type I cement shall be used. Type IA cement shall be used for any structure or concreting above grade and exposed to the weather.

9. CONCRETE TESTING

Throughout the construction period the individual, builder or developer shall retain and pay for the services of a qualified testing laboratory to determine the quality of concrete

produced. The individual, builder or developer shall furnish all cylinder molds and pay for all expenses of shipping and testing.

The taking of samples, making cylinders, and curing of test cylinders shall be done by the individual, builder or developer under supervision of the Authority. All work shall conform to ASTM C31 and C172. Testing for compression shall conform to ASTM C37 and flexure tests according to ASTM C78. Tests shall be made for 7-day tests and 28-day tests using one-half of the cylinders of each test for 7-day test and the balance for the 28-day test.

The individual, builder or developer shall be responsible for maintaining proper controls and shall adjust proportions as required to maintain strength requirements. Basis of strength testing shall be four (4) cylinders taken for the initial 100 cubic yards or fraction thereof but not less than four (4) cylinders for each individual structure. Should any cylinder fail to meet strength requirements the individual, builder or developer shall have additional tests made at his own expense.

10. **ALTERNATE STRENGTH TEST**

Where the questions exist as to concrete quality supplied for the project, the Authority may require alternate strength tests as per ASTM C42 or load tests for that portion of job where questionable concrete has been placed. When required, make load tests as per ACI Building Code ACI 318. If load tests indicate that concrete placed does not conform to plans and specifications, the individual, builder or developer shall take all measures as directed to correct deficiency without cost to the Authority.

11. **PRECAST CONCRETE MANHOLES**

All precast concrete manholes shall conform in all respects including materials, reinforcing, precasting and workmanship to the requirements of ASTM Standard Specification C478, latest edition. Precast manhole bases including steps will be permitted. The flow channels in the manhole bases shall be as shown on the Standard Details and shall slope uniformly from influent invert to effluent invert. Unless noted otherwise on the plans, the fall from influent to effluent shall be 0.10 foot. Bends in channels shall be of largest possible radii. Channel sides and inverts shall be smooth and uniform and free of cracks, holes, or protrusions. The precast manhole bases shall conform in all respects including materials, reinforcing, precasting and workmanship to the requirements of ASTM-C478, latest edition. A pipe-to-manhole seal shall be provided that meets ASTM C-923 material specifications. The seal shall provide a watertight joint between the pipe and manhole and approximately 10 degree deflection in any direction. The seal shall be a PSX seal manufactured by the Press-Seal Gasket Corporation and shall have double stainless steel take-up clamps.

All exterior surfaces of the manhole shall have one 8 mil (dry) coat of polyimide-cured coal tar epoxy applied at the factory. The coating shall be Epoxy-Tar Kote Black No. 775 as manufactured by Coopers Creek Chemical Corporation, or equal. The coating shall be applied as specified by the manufacturer. Areas where the coatings has been scraped or rubbed off during shipment or installation shall be recoated in the field.

12. **STRUCTURAL STEEL**

All structural steel material shall be new and ordered specifically for this work. All structural steel shall be in accordance with the requirements of ASTM A36.

13. **STONE BACKFILL**

Stone backfill in all locations except state highway rights-of-way shall be 2RC Aggregate. Stone backfill used within state highway rights-of-way shall be as specified in the Latest Edition of PA DOT Publication 408.

14. **PIPE BEDDING MATERIAL**

Bedding material shall be AASHTO # 8, # 10, # 67 or 2RC Aggregate.

15. **MANHOLE FRAMES AND COVERS**

Manhole covers and frames shall be gray iron castings, Class 30 conforming to ASTM A48 and shall have a minimum tensile strength of 30,000 P.S.I. Covers and frames shall be as indicated on the standard details drawings. Casting shall be completely free of bubbles, blisters, sand, air holes, or other imperfections. Contact surfaces of covers and frames shall be machined and shall provide a smooth uniform matched surface. Top of covers shall be cast with "CFJMA". Covers and frames shall be as manufactured by East Jordan Iron Works, Inc., or equal.

Manhole frames shall be installed in a bed of mortar and flange covered by a minimum of three (3) inches of mortar neatly troweled. Manholes located in paved surfaces shall have covers and frames installed flush with street surface. Manholes located in unpaved areas shall have covers and frames installed at the elevation shown on the drawings. Covers and frames that rock or are noisy due to traffic impact shall be replaced at no cost to the owner. All manhole covers shall be heavy traffic type as shown on Standard Details unless otherwise indicated on the drawings. All manhole frames shall be bolted to the manhole by a minimum of three (3) 3/4 -inch diameter bolts. The bolts shall extend into the last precast concrete section a minimum of six (6) or into an integrally cast receiving unit securely anchored in the precast section. The bolts shall extend through any riser units (precast concrete "donuts") to resist forces created by traffic, frost expansion, etc. All riser units shall be sealed with a layer of mortar between units.

Upon recommendation of the Cumberland-Franklin Joint Municipal Authority's engineer, watertight manhole frames and covers (as shown in the Standard Details) shall be required where, in the opinion of the engineer, the possibility of surface and/or ground water entering the sewer system is present.

16. PIPE JOINT SEALS FOR EXISTING MANHOLES

Pipe connections to existing manholes shall be made by the boring method only. The annular space between the manhole and pipe shall be closed with a modular mechanical type seal consisting of interlocking synthetic rubber links shaped to continuously fill the annular space. No jack hammering of manholes shall be permitted. If a casing pipe must enter a manhole, the casing pipe shall be steel and shall be sealed with an interlocking synthetic rubber link seal (see Standard Detail).

17. CASING PIPES

Casing pipes shall be installed as needed. The casing pipes and joints shall be of metal and of leakproof construction designed for earth and/or other pressures present, plus a Cooper's E-80 railroad line loading for impact.

TABLE OF MINIMUM WALL THICKNESS FOR STEEL CASING PIPE (For Information Only)		
Nominal Thickness - Inches		
Coated or Cathodically Protected	Uncoated and Unprotected	Nominal Diameter Inches
0.188	0.251	Under 14
0.219	0.282	14 and 16
0.250	0.313	18
0.281	0.344	20
0.312	0.375	22
0.344	0.407	24
0.375	0.438	26
0.406	0.469	28 and 30
0.438	0.501	32
0.469	0.532	34 and 36
0.500	0.563	38, 40 and 42
0.563	0.626	48
Steel pipe shall have a minimum yield strength of 35,000 P.S.I.		

Corrugated metal pipe may be used for casings. It shall be bituminous coated and shall conform to the current American Railway Engineering Association Specifications Chapter I, Part 4.

Corrugated structural plate pipe and tunnel liner plates may be used for a casing. They shall be galvanized and bituminous coated.

The inside diameter of the casing shall be such as to allow the carrier pipe to be removed subsequently without disturbing the casing or the roadbed. For steel pipe casings, the inside diameter of the casing pipe shall be at least 2 inches greater than the largest outside diameter of the carrier pipe joints or couplings for carrier pipe less than 6 inches in diameter, and at least 4 inches greater for carrier pipe 6 inches and over in diameter.

When steel casing pipe is used the joints shall be welded completely around the circumference of the pipe.

ANSI Codes B 31.8 and B 31.4 current at time of constructing the pipeline, shall govern the inspection and testing of the facility on railroad property, except that proof-testing of strength of carrier pipe shall be in accordance with the requirements of ANSI Code B 31.8 for location Classes 2, 3 or 4 or ANSI Code 31.4, as applicable for all pipelines carrying oil, liquified petroleum gas, natural or manufactured gas, and other flammable substances.

PIPELINE CONSTRUCTION

TESTING

1. SCOPE OF WORK

This section of the specifications includes all labor, supervision, materials, equipment, tools, water, transportation, insurance and appurtenances to be provided by the individual, builder or developer necessary to complete the testing of all gravity and pressure pipelines.

2. TESTING METHODS

The testing program for the project is undertaken to establish and demonstrate the sufficiency of workmanship provided and materials utilized in the construction.

Gravity Pipelines

Upon completion of laterals and backfilling a program of testing for the completed pipeline section will be conducted. Each section of pipeline between manholes shall be tested. The testing methods shall be Deflection and Low Pressure Air as hereinafter described.

Pressure Pipelines

All pressure pipelines shall receive a hydrostatic test and a leakage test at the completion of each valved section. In addition the entire pressure piping system shall be tested hydrostatically prior to final completion.

3. GRAVITY PIPELINES - TESTING

Deflection Testing of Plastic Sewer Pipe

- a. Perform vertical ring deflection testing on all portions of PVC and ABS sewer piping, in the presence of the Engineer, after backfilling has been in place for at least 30 days but not longer than 12 months.
- b. The maximum allowable deflection for installed plastic sewer pipe shall be limited to 5.0% of the original vertical internal diameter.
- c. Perform deflection testing with a deflectometer, calibrated television, or a

properly size “Go, No-Go” mandrel; the mandrel(s) shall be provided at the contractor’s expense and subject to the approval of the Engineer.

- d. Pipe exceeding the allowable deflection shall be located, excavated, replaced, and retested.

Low Pressure Air Tests

The individual, builder or developer shall test each section of pipeline between manholes using low pressure air. The following procedure shall be used:

Slowly introduce air pressure to approximately 4.0 psig, in the Test Section.

- a. If ground water is present, determine its elevation above the spring line of the pipe by means of a ground water height indicator or other means. For every foot of ground water above the spring line of the pipe, increase the starting air test pressure reading by 0.43 psig; do not increase pressure above 10 psig.

Allow pressure to stabilize for at least five minutes. Adjust pressure to 3.5 psig or the increased test pressure as determined above if ground water is present. Start the test.

- a. Determine the test duration for a sewer section with a single pipe size from the following table. No allowance will be made for laterals.

AIR TEST TABLE
Minimum Test Time for Various Pipe Sizes

Nominal Pipe Size (Inches)	T (time), min/100 ft.
3	0.2
4	0.3
6	0.7
8	1.2
10	1.5
12	1.8
15	2.1
18	2.4
21	3.0
24	3.6
27	4.2
30	4.8
33	5.4
36	6.0

- b. Record the drop in pressure during the test period; if the air pressure has dropped more than 1.0 psig during the test period, the line is presumed to have failed; if the 1.0 psig air pressure drop has not occurred during the test period, the test shall be discontinued and the line will be accepted.
- c. If the line fails, determine the source of the air leakage, make corrections and retest; the Contractor has the option to test the section in incremental stages until the leaks are isolated; after the leaks are repaired, retest the entire section between manholes.

The individual, builder or developer shall submit to the Authority's engineer, for approval, the test procedure and list of test equipment he proposes to use prior to testing.

4. **PRESSURE PIPELINES - TESTING**

Hydrostatic Tests

Hydrostatic tests shall be applied as follows to all pressure pipelines. Each valved section shall be slowly filled with water so that all air in the pipe is displaced. Test pressure of 150 PSI shall then be applied in a manner satisfactory to the Authority. The test pump, power and fuel, pipe connections, gauges, and taps on the main, as well as all apparatus necessary for conducting the tests shall be furnished by the individual, builder or developer. All air must be removed from the line before starting the test through air release valves, or, if necessary, through special taps at the high points and at the end of lines. All exposed piping, valves and joints shall be carefully examined during the test. Any joints showing visible leakage, any cracked pipe or fittings and any defective valves showing evidence of leakage shall be replaced. The test shall continue for a period of thirty minutes after all deficiencies appear to be corrected and shall be repeated as often as necessary, until all parts of the system are satisfactory to the Authority's engineer. At system completion the entire pressure pipe network shall receive one (1) final hydrostatic test.

Pressure Leakage Tests

After the hydrostatic test has been satisfactorily completed, the pipeline shall be subjected to a pressure of 150 PSI for a period of two (2) hours.

Leakage is defined as the quantity of water supplied to the newly laid pipe, or any valve section thereof, necessary to maintain the specified test pressure over the period of the test. No pipe installation will be accepted until leakage in number of gallons is less than

the quantity computed from one of the following appropriate formulas:

a)
$$L = \frac{ND P}{44,400}$$

for Mechanical Joints and Push-On Joints, or

b)
$$L = \frac{ND P}{22,200}$$

for Caulked Bell and Spigot Joints where:

L is number of gallons leakage allowable per hour

N is number of joints in the pipeline tested

D is nominal diameter of the pipe in inches

P is the average test pressure (during the leakage tests in pounds per square inch gage)

Note:

The formula for mechanical and push-on joints is based on an allowable leakage of 23.8 GPD per mile of pipe per inch of nominal diameter, for pipe in 18 foot lengths evaluated at a pressure of 150 PSI. The formula for caulked bell and spigot joints is based on an allowable leakage of 47.6 GPD per mile of pipe per inch of nominal diameter for pipe in 18 foot lengths evaluated at a pressure of 150 PSI.

Should any test of pipe laid disclose leakage greater than that specified, the individual, builder or developer shall, at his own expense, locate and repair the defective portions of the installation until the leakage is within the specified limits. All sections under test shall be provided with concrete reaction blocking. The hydrostatic pressure test shall not be made until at least five (5) days have elapsed from the time the reaction blocking was installed. If high early strength cement is used in concrete blocking, the hydrostatic pressure test shall not be made until at least two (2) days time have elapsed.

5. MANHOLE TESTING

Vacuum Testing

- a. Each manhole shall be tested immediately after assembly and prior to backfilling.
- b. All lift holes shall be plugged with an approved non-shrink grout.

- c. All pipes entering the manhole shall be plugged, taking care to securely brace the plug from being drawn into the manhole.
- d. The test head shall be placed at the inside of the top of the cone section and the seal inflated in accordance with the manufacturer's recommendations.
- e. A vacuum of 10 inches of mercury shall be drawn and the vacuum pump shut off. With the valves closed, the time shall be measured for the vacuum to drop to 9 inches. The manhole shall pass if the time is greater than 60 seconds for 48" diameter, 75 seconds for 60", and 90 seconds for 72" diameter manholes.
- f. If the manhole fails the initial test, necessary repairs shall be made with a non-shrink grout applied from outside, while the vacuum is still being drawn. Retesting shall proceed until a satisfactory test is obtained.

PIPELINE CONSTRUCTION

TOPSOIL AND SEEDING

1. SCOPE OF WORK

This section of the specifications includes all labor, supervision, materials, equipment, tools, transportation, insurance, permits and appurtenances to be provided by the individual, builder or developer to complete the placement of topsoil, seeding and mulch for installation and/or repair of minor pipeline extensions, laterals, miscellaneous small structures and appurtenances. For major pipeline extensions, pumping stations and treatment plants, Pennsylvania Department of Transportation Publication 408 Topsoil, Seeding and Mulch Specifications shall be followed along with instructions from the project's approved Soil Erosion and Sedimentation Control Plan.

All unpaved surfaces shall be restored to their condition previous to excavation at the completion of work. Topsoil shall be replaced to its original location and any damaged areas reseeded. Any shrubs or bushes designated to be removed and replaced shall be replanted and if damaged, replaced and replanted.

Unpaved surfaces, in cultivated areas or areas formerly cultivated, shall receive a minimum restoration consisting of at least the topsoil replacement and planting of grass seed.

2. TOPSOIL

Material

Topsoil shall be selected from material stored on the site, or, obtained from other sources if sufficient topsoil has not been stockpiled. Topsoil obtained from other sources shall be approved by the Authority's engineer prior to transporting it to the site. The topsoil shall consist of natural, friable loam with the characteristics of the best soil in the area which produces a heavy growth of crops, grass and other vegetation. It shall be free from subsoil, clay lumps, stones over one and one-half (1-1/2) inches, roots, and other litter or materials which may be a hindrance to plant growth, grading, planting or maintenance.

3. TIME OF SEEDING

Spring

Seed bed preparation may be commenced after March 15 as ground conditions permit. Seeding will be permitted between April 1 and May 15.

Autumn

Seed bed preparation may be commenced at any time after August 1. Seeding operations must be completed prior to September 30.

Preparation of Subgrade

The general area shall be plowed or disked for a depth of six (6) inches and leveled. All stone over one and one-half (1-1/2) inches and other debris shall be removed from the site by hand raking or other approved method.

Placing Topsoil

After all construction work is completed topsoil shall be dumped in piles uniformly spaced or otherwise distributed by approved equipment. The piles may be spread with a blade grader or other equipment. The spreading shall be done in a manner which will provide a finished grade without any low places or pockets. During all operations the surface shall be kept free of stones over one and one-half (1-1/2) inches or any debris. Depth of topsoil over the disturbed area shall be equal to depth prior to disturbance or a minimum of six (6) inches. Topsoil shall not be placed when the subgrade or topsoil are frozen, muddy, or extremely dry.

Lime

Agricultural grade lime shall be applied at a rate of 90 Lbs. per 1,000 Square Feet.

Fertilizing and Seeding

Fertilizer of the formula 40-40-40 shall be spread uniformly at a rate of 2.75 Lbs. per 1,000 Square Feet. The area shall then be disked and dragged to a smooth even grade.

Seed shall be sown at a rate of 10 Lbs. per 1,000 Square Feet of area in two applications. One application of five (5) Lbs. shall be sown in one pass and five (5) Lbs. shall be sown in a second pass at a right angle to the first pass. Seeds shall be sown by the use of approved equipment.

The seed shall be as follows by weight:

Fescue, Kentucky 31	50%
Fescue, Pennlawn	20%
Bluegrass, Kentucky	20%
Bluegrass, Merion	10%

The area shall be raked to obtain a light cover over the seeds. After raking, the area shall be lightly rolled in two directions.

Mulching

Place hay and/or cereal straw at the rate of 140 Lbs. per 1,000 Square Feet to produce a layer of 1.0" to 1.5" deep immediately after seeding.

Hydroseeding may be used in lieu of the above. Fertilizer and seeds, as specified herein, shall be used when hydroseeding.

4. **MAINTENANCE OF SEEDED AREAS**

All seeded areas shall be kept constantly wet for a depth of three (3) inches for ten (10) days immediately following the seeding. All water must be furnished by the individual, builder or developer.

All areas on which seeds do not promptly germinate shall be reseeded, and this operation repeated until a complete ground cover is obtained.

Within the eighteen (18) month maintenance period as specified in these documents, the individual, builder or developer shall reseed any areas, where in the opinion of the Authority, satisfactory growth has not been obtained.

PIPELINE CONSTRUCTION

MARKING PIPELINES

1. SCOPE OF WORK

This section of the specifications covers all labor, supervision, materials, tools, transportation, insurance and appurtenances to be provided by the individual, builder or developer necessary to provide means to locate pipelines and fittings after they have been installed and the trenches restored. All marking systems shall have a service life of 20 years minimum.

2. DETECTABLE UNDERGROUND MARKING TAPE

All pipelines, including all sizes of gravity sewers, laterals, force mains, low pressure sewers, small diameter variable grade gravity sewers and S.T.E.P. system sewers shall have detectable marking tape installed in the trench at the time of construction.

The underground marking tape shall be a 3” wide (minimum) detectable marking tape, with a minimum 5.0 mil overall thickness. The tape shall be manufactured using a 0.8 mil clear virgin polypropylene film, reverse printed and laminated to a 0.35 mil solid aluminum core, and then laminated to a 3.75 mil clear virgin polyethylene film. The tape shall be printed using a diagonally striped design for maximum visibility, and be green with the words “caution buried sewer line below”. The tape shall be manufactured by “Pro-Line Safety Products”, “Terra Tape” or approved equal. Placement depths shall be 18” below finished grade or as recommended by the manufacturer.

3. 3M ELECTRONIC MARKER SYSTEM (EMS)

In addition to detectable underground marking tape, the following list of pipelines and fittings shall also have 3M electronic markers installed in the trench at the time of construction. The markers shall be No. 1404-XR 4” Green Ball Markers as manufactured by the 3M Corporation. The ball marker shall be installed 2-3 feet below finished grade following the manufacturer’s instructions and specifications.

On certain applications, and as directed by the Authority, 1400 Series ID ball markers may be required. This series of marker balls can be programmed with site specific information such as depth, size, material, placement date, etc.

Required marker ball locations:

A. Gravity Sewers:

1. Above all lateral wyes.
2. At ends of all lateral stubs, in addition to surface wooden stake (marker balls to be recovered for reuse upon lateral hook-up).
3. At all utility crossings (ID ball marker required).
4. Other locations as directed by the Authority.

B. Major Force Mains:

1. At all utility crossings (ID ball marker required).
2. Every 200 feet on straight sections.
3. Every 50 feet (maximum) on curved sections.
4. At all fittings that produce bends.
5. Other locations as directed by the Authority.

C. Low pressure sewer systems (grinder pump and S.T.E.P.) and small diameter variable grade gravity sewer system:

1. At all utility crossings (ID ball marker required).
2. Every 200 feet on straight sections.
3. Every 50 feet (maximum) on curved sections.
4. At all fittings that produce bends.
5. At all mainline wyes, tees and crosses.
6. At all lateral tees or saddles.
7. Other locations as directed by the Authority.

PART III
RULES AND REGULATIONS
FOR
SANITARY SEWER SERVICE LINES
CUMBERLAND-FRANKLIN JOINT MUNICIPAL AUTHORITY
CUMBERLAND & FRANKLIN COUNTIES, PENNSYLVANIA

1. **GENERAL**

These Rules and Regulations are intended to regulate and govern the installation and/or repair or alteration of sanitary sewer service lines required under existing and/or future Ordinances or Resolutions of (Cumberland-Franklin Joint Municipal Authority and/or Southampton Township and Orrstown Borough, Franklin County, and Southampton and Shippensburg Townships, Cumberland County, Pennsylvania) the "Municipalities". Where these Rules and Regulations may from time to time conflict with Ordinances of the Municipalities, the Rules and Regulations of Cumberland-Franklin Joint Municipal Authority shall govern. For any situation not governed or covered by Ordinances of the Municipalities or by these Rules and Regulations or where amplification thereof is required, the procedures set forth in appropriate specifications of the A.S.T.M. and W.P.C.F. Manual of Practice No. 9 shall apply.

2. **PERMITS**

- a. Any person required or desiring to connect to an existing or proposed sanitary sewer system owned and operated by the Cumberland-Franklin Joint Municipal Authority (the "Authority"), shall first secure an application and permit from the Authority.
- b. Any person desiring to repair and/or alter an existing sanitary sewer service lateral shall be required to present a detailed plan of the repair and/or alteration to the Authority for its approval. No service lateral repair or alteration shall be backfilled until inspected by the Authority or its representative. No permit will be required, only a presentation of the plan and inspection by the Authority.

Applications and Permits shall be of three (3) types:

1. Domestic
2. Non-Domestic
3. Industrial, Commercial

3. **FEES**

No permit to connect to the sewer system shall be issued until the applicant has paid in full all related fees and other charges including, but not limited to, Tapping and Connection Fees.

4. **PIPE SIZE**

All "Building Sewers", as defined herein, shall be adequately sized to be able to convey the intended hydraulic flow. In no instance shall the pipe be less than four (4) inches in inside diameter.

5. **MATERIALS**

All "Building Sewers", as defined herein, shall be of any of the following types and materials:

a. Ductile Iron Pipe

All pipe of this type shall conform to the following specifications and/or latest revision thereto:

1. ASA - A21.51, A21.50
2. ASTM - A536

b. ABS – DWV and PVC – DWV Pipe and chemically welded fittings and joints

All pipe and fittings of this type shall conform to the following specifications and/or latest revision thereto:

Materials: ABS – ASTM D-3965
PVC – ASTM D-1784

Pipe & Fittings: ABS – ASTM D-2661 and D-3311
PVC – ASTM D-2665 and D-3311

Note: Cellular Core PVC and ABS DWV Pipe shall not be used for building sewers.

c. PVC Schedule 40 Pipe with chemically welded joints

All pipe of this type shall be used with PVC – DWV fittings (Schedule 40 fittings are not acceptable) and shall conform to the following specifications and/or latest revision thereto:

Materials: ASTM D-1784

d. Polyvinyl Chloride (PVC, SDR26 Gravity Sewer Pipe)

Use of this piping system shall be limited to 6" building sewers only and all applications shall require prior approval by the Authority's engineer.

All pipe of this type shall conform to the following specifications and/or the latest revision thereto:

1. ASTM - D3034, SDR26 with compression type gasketed joints or chemically welded fittings and joints.

6. **INSTALLATION**

All Building Sewer Lines, as defined herein, shall be installed in accordance with the following minimum requirements:

- a. All lateral taps into the main line shall be made by the Authority or by a plumber with a current license to do work on the Authority's system. All tap-in work by licensed plumbers shall be made with an Authority representative present.
- b. The property owner shall be responsible for all maintenance and repairs to the lateral from the building to and including the saddle or wye fitting on the sewer main. The Authority shall be responsible for maintenance and repairs of the main line only.
- c. Normally shared laterals shall not be permitted. Each E.D.U. must have a separate lateral and connection to the main line.
- d. No building floor drain, sump pump, or any device permitting storm water, ground water or surface water to enter the sewer system shall be permitted.
- e. All lines must be installed with the related couplings of the pipe material utilized excepting transitions to other pipe materials already in existence.
- f. No lines shall be installed in unstable fill.
- g. The minimum slope for four (4) inch lines shall be one-eighth inch fall per lineal foot. Larger lines may have a flatter slope when approved by the Authority's engineer.
- h. No line shall have a straight run of pipe in excess of seventy-five (75) lineal feet unless it is provided with a cleanout extending to ground level consisting of a 45-degree wye and ell.

- i. No directional changes of more than 45-degrees will be permitted unless with multiple fittings. All directional changes in excess of forty-five (45) degrees must be equipped with a cleanout extending to ground level.
- j. No line shall be installed with less than two (2) feet of cover unless special provisions are made that meet with the approval of the Authority's engineer.
- k. All lines immediately adjacent to building foundations shall be constructed in accordance with the following in order to protect against excessive forces caused by backfill and earth settlement:
 - 1. Be constructed of service weight ductile iron or Schedule 40 pipe to a point at least five (5) feet outside the building foundation wall or;
 - 2. Be constructed of other approved materials provided the pipe is suitably protected against forces caused by backfilling and earth settlement by blocking or concrete encasement for the entire length subjected to these forces.

In all installations the requirements and decisions of the Authority or their representative(s) shall be final and binding.

- l. Any line passing under driveways or other areas of potential heavy wheel loading must be constructed of service weight ductile iron or Schedule 40 pipe, protected by concrete encasement or backfilled and compacted by hand operated mechanical tamper, in six (6) inch layers, for the entire depth of the trench with Pennsylvania AASHTO # 10 Aggregate.
- m. All lines shall be bedded in and covered with Pennsylvania AASHTO # 10 Aggregate (limestone dust). The bedding and cover shall surround the pipe at least four (4) inches.
- n. No potable water service line may be installed in the same trench as a sewer service line unless separated by at least three (3) feet as measured in a horizontal plane.
- o. Cleanout Wyes & House Traps

Each building sewer shall be equipped with a four (4) inch cleanout wye at the adjacent property line where the main sewer line is located in a roadway bordering the property. If the main sewer line is located in a side or rear lot line easement the cleanout wye shall be located as close as practical to the main sewer line. A four (4) inch house trap with cleanout and vent shall be located as close as practical to the outside wall or basement of the structure being served. Both

cleanout and vent shall be brought to existing grade.

p. Sanitary Sewage Pumping Devices

Any sewage pumping device shall be constructed and installed in such a manner to preclude the introduction of any ground water or leakage of any fluid other than sanitary sewage into the building sewer. The sump, container, or wet well to house a pumping device shall be of monolithic construction and made of a flexible watertight material that will preclude the entrance of ground water.

q. Interceptors and Separators

1. Interceptors

Interceptors (including grease, oil and sand interceptors, etc.) shall be provided when, in the opinion of the Authority, they are necessary for the proper handling of liquid wastes containing grease, flammable wastes, sand and other ingredients harmful to the building drainage system, the public sewer, sewage treatment plant or other processes or facilities.

2. Approval

The size, type, and location of each interceptor or separator shall be approved by the Authority, and no wastes other than those requiring treatment or separation shall be discharged into any interceptor.

3. Grease Interceptor

No grease interceptor shall be hereinafter installed which does not comply, in all respects with the requirements of the Borough of Shippensburg and the Cumberland-Franklin Joint Municipal Authority. Grease interceptors shall be sized in regard to both the maximum rate of inflow (retention time) and volume of waste to be stored in a given period (cleanout cycle). Design calculation by qualified personnel must be submitted to the Authority to justify the size and configuration of the proposed interceptor. At minimum, the grease interceptor shall be a single or double compartment design with a minimum capacity of 1000 gallons. The interceptors shall be similar or equal to the 1000 gallon and 1500 gallon interceptor manufactured by the C. R. Semler, Inc. Pre-cast Concrete Company of Smithburg, Maryland.

Grease interceptors shall be vented as required by local plumbing codes and have flow restriction valves installed if necessary. Interceptors shall be accessible for cleaning and inspection.

Once installed, grease interceptors shall be maintained and cleaned at regular intervals that will prevent pass through of grease into the wastewater collection system.

The Borough of Shippensburg requires all facilities with grease interceptors installed to be permitted and shall inspect the facility at their discretion. Failure to obtain a permit and/or maintain grease interceptors as required will result in penalties by the Borough and/or Authority.

4. Oil Separators

An oil separator shall be installed in the drainage system or section of the system where, in the opinion of the Authority, a hazard exists or where oils or other flammables can be introduced or admitted into the drainage system by accident or otherwise.

5. Where Required

Oil separators shall be installed when required by the Authority and shall conform to requirements of Minimum Dimension.

6. Minimum Dimension

Oil separators shall have a depth of not less than two (2) feet below the invert of the discharge drain.

7. Motor Vehicle Storage

Interceptors shall have a capacity of six (6) cubic feet where not more than three (3) vehicles are serviced and one (1) cubic foot in net capacity shall be needed for each additional vehicle up to ten (10) vehicles. Where more than ten (10) vehicles are serviced and stored, the Authority shall determine the size of separator required.

8. Motor Vehicle Servicing

Where storage facilities are not maintained, as in repair shops, the capacity of the separator shall be based on a net capacity of one (1) cubic foot for each 100 square feet of surface to be drained into the interceptor with a minimum capacity of six (6) cubic feet.

9. Special Type Separators

Before installing any special type separator a drawing including all pertinent information shall be submitted for approval of the Authority's engineer, as being in accordance with this code.

7. **PROHIBITED WASTES**

- a. No waste shall be discharged into the sewer system:
1. having a temperature higher than 120° F.
 2. containing more than 100 ppm by weight of fats, oils and grease.
 3. containing any gasoline, benzine, naptha, fuel oil or other inflammable or explosive liquids, solids or gases.
 4. containing any garbage that has not been ground by household type or other suitable garbage grinders.*
 5. containing any ashes, cinders, sand, mud, straw, shavings, metal, glass, rags, feathers, tar, plastics, wood, paunch manure, or any other solids or viscous substances capable of causing obstructions or other interferences with proper operation of the facilities.
 6. having a pH lower than 6.5 or higher than 9.0 or having any other corrosive property capable of causing damage or hazards to structures, equipment or personnel.
 7. containing toxic or poisonous substances in sufficient quantity to injure or interfere with any wastewater treatment process, or constitute hazards to humans or animals, or to create any hazard in waters which receive treated effluent from the treatment facilities. Toxic wastes shall include, but not by way of limitation, wastes containing cyanide, chromium, cadmium, mercury, copper and nickel ions.
 8. containing noxious or malodorous gases or substances capable of creating a public nuisance.
 9. containing solids of such character and quantity that special and unusual attention is required for their handling.

- * Garbage grinders and the discharge of garbage into systems containing septic tanks (STEP systems and small diameter variable grade gravity sewer systems) is prohibited.

8. EXISTING SEWAGE DISPOSAL SYSTEM PIPING

All existing sewage disposal system piping shall be deemed not capable of meeting the requirements of the Authority, and therefore must be considered unusable unless proven acceptable by an Exfiltration Test, as provided herein. Unless existing piping is proven acceptable by test, all of the service connection from the building being served to the Lateral (defined herein) connection terminum shall be of new piping meeting the requirements of these Rules and Regulations.

9. EXFILTRATION TEST

All new Building Sewer connections and existing piping desired to be retained for usage shall be independently tested for leakage by an Exfiltration Test. The line to be tested shall be separated at both ends, the lower end shall be plugged with a watertight stopper and the highest end of the piping subjected to a vertical water test to provide for at least eight (8) feet of water column on any portion of the line. All such piping tested shall not show leakage in excess of 100 gallons per inch of diameter per mile of sewer per day. Tests on new or existing piping shall be witnessed by the Authority or its appointed representative.

10. BACKFILLING

No Building Sewer or other line or portion connected to the sewer system thereof shall be backfilled until inspected by the Authority or its appointed representative. All backfilling shall be performed with materials and in accordance with procedures recommended by the manufacturer of the pipe being used. In no event shall stones in excess of four (4) inches in diameter be allowed in the backfill of any building sewer trench.

11. VENTING AND/OR TRAPS

In order to protect against the possibilities of sewer gas and odors all internal plumbing of buildings connected to the sewer system shall be provided with suitable traps and vents in accordance with the requirements of the Building Officials Conference of America Basic Building Code (B.O.C.A.). The responsibility of ascertaining the existence and/or need of vents and traps shall remain with the property owner. FAILURE BY THE PROPERTY OWNER TO PROVIDE PROPER VENTING AND TRAPS SHALL IN NO MANNER IMPOSE ANY LIABILITY UPON THE AUTHORITY.

12. **METERS**

The Authority shall require the owner of a non-domestic establishment to install, to pay for and to maintain a meter approved by the Authority for measuring volumes of sanitary sewage and/or industrial wastes, discharged into the sewer system, or in lieu thereof, may permit such owner to provide and pay for such other means of determining the volume of sanitary sewage and/or industrial wastes discharged into the sewer system, as shall be permitted from time to time by the Authority by individual determination of the Authority's engineer or as shall be approved by and satisfactory to the Authority.

13. **MANHOLES**

If it is requested, and approved by the Authority, to make a direct connection of a service line to a manhole, it shall be accomplished by boring only. No jack hammering of manholes will be permitted.

14. **INSPECTION**

The Authority or their representative shall from time to time have the right to inspect the plumbing of all properties, buildings, systems, etc., connected to its sewer system to insure compliance to its rules, regulations and/or ordinances of the municipalities. All inspections shall be performed during normal business hours or at other times mutually acceptable to the property owner and the municipalities and/or the Authority. All plumbing or other items found not to be in conformity with the rules and regulations of the Authority and/or ordinances of the municipalities shall within thirty (30) days after receipt of written notice be corrected to conform to said rules, regulations and/or ordinances.

15. **INSURANCE**

The Cumberland-Franklin Joint Municipal Authority shall require that any individual, builder or developer desiring to construct sewer line extensions, laterals and/or appurtenances to the Authority's system have the following minimum insurance coverage:

	Each Occurrence	Aggregate
Bodily Injury	\$1,000,000	\$1,000,000
Property Damage	\$1,000,000	\$1,000,000

A Certificate of Insurance naming the Authority as Certificate Holder shall be required prior to construction.

PART IV

DEFINITIONS

1. GENERAL

Unless the context specifically and clearly indicates otherwise, the meaning of terms and phrases used in the documents contained herein shall be as follows:

- a. "Authority" shall mean Cumberland-Franklin Joint Municipal Authority, an Authority of the Commonwealth.
- b. "Building Sewer" shall mean the extension from the sewage drainage system of any structure to the Lateral of a Sewer, and shall include any existing sewer line which shall continue as part of a Building Sewer.
- c. "Commonwealth" shall mean the Commonwealth of Pennsylvania.
- d. "Improved Property" shall mean any property within the municipalities upon which there is erected a structure intended for continuous or periodic habitation, occupancy or use by human beings or animals and from which structure Sanitary Sewage and/or Industrial Wastes shall be or may be discharged.
- e. "Industrial Establishment" shall mean any Improved Property located within the municipalities and used or intended for use, wholly or in part, for the manufacturing, processing, cleaning, laundering or assembling of any product, commodity or article, or any other Improved Property located within the municipalities, from which wastes, in addition to or other than Sanitary Sewage, shall be discharged.
- f. "Industrial Wastes" shall mean any and all wastes discharged from an Industrial Establishment, other than Sanitary Sewage.
- g. "Lateral" shall mean that part of the Sewer System extending from a sewer to the curb line or, if there shall be no curb line, to the property line or, if no such Lateral shall be provided, then "Lateral" shall mean that portion of, or place in, a Sewer which is provided for connection of any Building Sewer.
- h. "Owner" shall mean any Person vested with ownership, legal or equitable, sole or partial, of any Improved Property.

- i. "Person:" shall mean any individual, partnership, company, association, society, trust, corporation or other group or entity.
- j. "Sanitary Sewage" shall mean normal water-carried household and toilet wastes from any Improved Property, excluding such ground, surface or stormwater as may be present.
- k. "Sewer" shall mean any pipe or conduit constituting a part of the Sewer System used or usable for sewage collection purposes.
- l. "Sewer System" shall mean all facilities, as of any particular time, for collecting, pumping, transporting, treating and disposing of Sanitary Sewage and/or Industrial Wastes, situated in the municipalities and owned by the Authority.
- m. "Street" shall mean and shall include any street, road, lane, court, cul-de-sac, alley, public way or public square.
- n. "Municipalities" shall mean Southampton Township and Orrstown Borough, Franklin County, and Southampton and Shippensburg Townships, Cumberland County, Pennsylvania, municipal subdivisions of the Commonwealth.

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STANDARD DETAILS

SECTION 1

STANDARD DETAILS FOR CONVENTIONAL GRAVITY SEWER SYSTEM AND FORCE MAINS

STANDARD DETAILS

SECTION 2

STANDARD DETAILS FOR ENVIRONMENT ONE GRINDER PUMPS IN GRAVITY AND LOW PRESSURE SEWER SYSTEMS

NOTE: UNLESS OTHERWISE NOTED, DESIGN PROCEDURES, EQUIPMENT, MATERIALS AND INSTALLATION INSTRUCTIONS FOR THE ABOVE STATED APPLICATIONS SHALL BE AS SPECIFIED BY THE ENVIRONMENT ONE CORPORATION, 2773 BALLTOWN ROAD, SCHENECTADY, NY 12309-1090 PHONE: (578) 346-6161

STANDARD DETAILS

SECTION 3

STANDARD DETAILS FOR SMALL DIAMETER VARIABLE GRADE GRAVITY SEWER (S.D.V.G.G.S.) SYSTEMS

NOTE: FOR DESIGN PURPOSES, PROJECTS USING SMALL DIAMETER VARIABLE GRADE COLLECTION SYSTEMS (S.D.V.G.G.S.) SHALL USE THE DESIGN PROCEDURES AND METHODOLOGY SET FORTH IN THE PUBLICATION ENTITLED "DESIGN WORKBOOK FOR SMALL-DIAMETER, VARIABLE-GRADE, GRAVITY SEWERS" BY JOHN D. SIMMONS AND JERRY O. NEWMAN. THIS PUBLICATION AND ADDITIONAL INFORMATION IS AVAILABLE FROM THE AUTHORITY AND ITS ENGINEER.

STANDARD DETAILS

SECTION 4

STANDARD DETAILS FOR SEPTIC TANK EFFLUENT PUMPING (S.T.E.P.) SYSTEMS

NOTE: FOR DESIGN PURPOSES, PROJECTS USING “SEPTIC TANK EFFLUENT PUMPING” (S.T.E.P.) PRESSURE SEWER SYSTEMS SHALL USE THE DESIGN PROGRAM AND PRINCIPLES OF THE BARNES PRESSURE SYSTEMS (AVAILABLE FROM C. W. SALES CORPORATION, www.cwsalescorp.com) AS THEIR BASIS OF DESIGN. STANDARD DETAILS CONTAINED HEREIN PERTAINING TO STEP SYSTEMS SHALL BE USED IN THE PROPOSED SYSTEM. ADDITIONAL INFORMATION CAN BE OBTAINED FROM THE AUTHORITY AND ITS ENGINEER.

STANDARD DETAILS

SECTION 5

STANDARD DETAILS FOR EXTENSIONS OR ADDITIONS TO THE EXISTING LETTERKENNY TOWNSHIP LOW PRESSURE (GRINDER PUMP) SEWER SYSTEM

NOTE: FOR DESIGN PURPOSES, ALL EXTENSIONS OR ADDITIONS TO THE EXISTING LETTERKENNY TOWNSHIP LOW PRESSURE SEWER SYSTEM SHALL USE THE PUMPING EQUIPMENT AND DESIGN PRINCIPLES OF THE BARNES ECO-TRAN SYSTEM AS MANUFACTURED BY THE CRANE PUMP AND SYSTEM CO., 420 THIRD STREET, PIQUA, OHIO 45356 AS THEIR BASIS OF DESIGN. NO OTHER EQUIPMENT OR DESIGN WILL BE PERMITTED IN THIS SYSTEM.

PART I

SEWER SERVICE EXTENSIONS

PART II

TECHNICAL SPECIFICATIONS FOR THE CONSTRUCTION OF SANITARY SEWER EXTENSIONS BY INDIVIDUALS, BUILDERS OR DEVELOPERS

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Reference to the PA Department of Transportation Regulations and Specifications shall be understood to mean Publication 408 and Chapter 459, and/or any other requirement of PA DOT or the Authority in effect at the time of construction.

PART III

**RULES AND REGULATIONS
FOR
SANITARY SEWER SERVICE LINES
CUMBERLAND-FRANKLIN JOINT MUNICIPAL AUTHORITY
CUMBERLAND & FRANKLIN COUNTIES, PENNSYLVANIA**

PART IV
DEFINITIONS