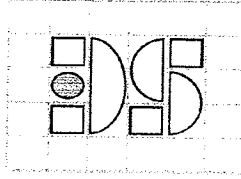


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PREPARED BY

ISSUED
January 2005

STANDARD TECHNICAL SPECIFICATIONS
AND
REQUIREMENTS
FOR THE
CONSTRUCTION
OF
SANITARY SEWERS AND APPURTENANCES



FRANCONIA SEWER AUTHORITY
MONTGOMERY COUNTY, PENNSYLVANIA

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PART 1 - GENERAL

1.1 SCOPE

A. These specifications have been adopted by the Franconia Sewer Authority to specify the manner in which sanitary sewers and force mains shall be installed by Developers/Builders in Franconia Authority.

B. The Developer/Builder prior to construction shall comply with all regulations and requirements of Franconia Sewer Authority, Pennsylvania Department of Environmental Protection and where applicable, all Federal regulatory agencies.

C. Before any work is started at the construction site, the Developer/Builder shall notify the Franconia Sewer Authority, Franconia Authority, the Franconia Police Department, the Souderton Area School District and the various utility companies serving the Authority and shall schedule a preconstruction meeting with the Authority and their Engineer.

D. It shall be understood that the Authority at their discretion reserves the right to visit the construction site(s) and inspect the installation of the sanitary sewers and force mains and require corrective actions to assure compliance with these standards.

E. All work is subject to the inspection and final acceptance by the Authority's Engineer.

1.2 DEFINITIONS

Wherever the following terms are used, hereinafter they shall have the following meanings:

A. *Authority* shall mean the Franconia Sewer Authority, which is responsible for the public sanitary sewer system in Franconia Authority.

B. *Engineer* shall mean the Authority's Engineer: SC Engineers Inc., Fort Washington, PA, Telephone (215) 836-9912, or their representative in the field during construction.

C. *Contractor* shall mean the company performing the sanitary sewer construction for the "Developer/Builder."

D. *Developer/Builder* shall mean the party responsible for the sanitary sewer system installation pursuant to an agreement with the Authority.

E. *Drawings* shall mean the construction plans prepared for the Developer/Builder, and approved by the Authority.

E. *Authority* refers to Franconia Authority and its Public Works Department.

1.3 AUTHORITY POLICIES REGARDING SANITARY SEWERS

- A. The Developer/Builder is responsible for the following:
1. Construction of the on-site sewer system.
 2. Extension of the sewers across the property to facilitate future extension.
 3. Extension of an off-site sewer to connect to an existing sewer, as directed by the Authority.
 4. Reimbursement, as provided under the provisions in PA Act 57, for connection to an existing sanitary sewer installed at the expense of another developer.
 5. Payment of the then-current tapping fee to Authority.
 6. Reservation and purchase (through Authority) of treatment capacity, in terms of EDU, from the appropriate treatment agency.
 7. Application, payment and receipt of all required permits and approvals.
- B. Sanitary sewers should be constructed in accordance with the current Authority standard specifications and details.
- C. Sanitary sewers are based on providing service to the first floor of houses.
- D. Sewers located outside of the public right-of-way require a 30-foot wide easement. The metes and bounds of these easements should be shown on the Record Plan. Copies of the recorded sanitary sewer easements, including legal descriptions and plans and executed agreements, should be provided by the developer prior to the initiation of construction.
- E. To the extent possible, manholes should be installed at the centerline of the roads or, alternatively, in the center of a traffic lane in the road.
- F. Watertight manhole covers should be used in the flood plain vicinity, as directed by the Authority.
- G. Manholes installed outside of paved areas shall have a rim elevation 12 inches above the final grade, as directed by the Authority.
- H. The proposed sewer system shall be dedicated to the Authority and so noted on the Record Plan.
- I. Private sewer laterals are subject to review and approval by the Authority Code Enforcement Officer (CEO). Subject to the review by the CEO, lateral requirements include the following:
- a. The lateral should have a minimum slope of $\frac{1}{4}$ " per foot (2%).
 - b. A horizontal separation of 5 feet of undisturbed earth (measured between the outer walls) should be provided between the sanitary lateral and the water service line and so dimensioned on the plans. Alternatively, the required distance shall not apply where there is a minimum 12" vertical clearance between the bottom of the water service and the top of the sewer lateral and (2) a minimum 12" horizontal separation.
 - c. Clean-outs should be installed in the lateral every 50 feet and/or at bends that exceed 45°.
- J. The property owner is responsible for the maintenance of the sewer lateral: (a) to the curb line where the sewer main is located in a road way or (b) to the sewer main where the sewer main is located in a non-traffic area.

K. Facilities providing food preparation/service require (a) an appropriately sized and designed oil and grease separator and (b) a sampling manhole in the sewer lateral.

PART 2 - REQUIREMENTS

2.1 DOCUMENTS TO BE SUBMITTED TO OBTAIN PLAN APPROVAL

A. The Developer/Builder shall, in order to obtain approval of plans, submit his proposed plans and data to the Authority with sufficient information to enable the Authority's Engineer and Attorney to review same for compliance with sound engineering practices and legal requirements and all Authority rules and regulations. The Drawings shall be clear and legible. The plan view shall be drawn at a minimum scale of one (1) inch equals forty (40) feet. The profiles shall be drawn at a minimum scale of one (1) inch equals four (4) feet vertical and one (1) inch equals forty (40) feet horizontal with an accompanying plan view. Each drawing shall contain a North arrow. Each Drawing shall name the legal owner of the land on which the construction is to occur and the legal name of the Developer/Builder.

B. The Authority's review of the Developer/Builder's plans is for the purpose of determining general conformance with the Authority's Standard Specifications and requirements and details of the Authority. The Developer/Builder remains responsible for implementation of the Authority's Specifications, requirements and details. The Developer/Builder is also responsible for the accuracy of the Approved Drawings and for the designed facility to function as intended. The Developer/Builder is also responsible for determining the size and location of all existing utilities. The Developer/Builder is hereby notified that any purchase of material and/or equipment etc., prior to the Authority's approval thereof is at the Developer/Builder's risk.

C. When the Authority through its Engineer indicates its general acceptances of the proposed plans, the Developer/Builder shall provide an estimate of the construction of the proposed facilities in sufficient detail for the Engineer to establish an escrow amount for the proposed work. Standard estimating procedure shall be used. In general, sewer installation shall be classified by depth and size for estimating. An estimate for rock excavation shall also be included. It is preferred that the estimate be done by a contractor competent in the work to be performed. The Engineer will have the right to adjust the estimate to reflect his understanding of the cost to perform this work.

2.2 SUBMITTALS

A. The Developer/Builder shall submit copies of all required permits and other various requirements as itemized herein.

B. All submittals shall be made in accordance with Section 01300 SUBMITTALS of these specifications.

Section 01010: SUMMARY OF REQUIREMENTS

C. The Developer/Builder shall, in accordance with the following schedule, transmit to the Authority two (2) copies or sets of the following data, unless otherwise noted.

1. Two (2) weeks prior to construction.

- a. Four (4) sets of the approved Drawings signed and sealed by a Professional Engineer licensed to practice in the Commonwealth of Pennsylvania.
- b. Pennsylvania Department of Environmental Protection permits (when required).
- c. PennDOT, County and/or Authority Highway Occupancy Permit (when required)
- d. Montgomery County Conservation District erosion and sediment control plan approval
- e. Any other permits or approvals, as required
- f. Easement documents (executed), as required for construction
- g. Shop Drawings (see Section 01300, SUBMITTALS for further information)
- h. Blasting Report, if required

2. During Construction

- a. Letters of Certification as to compliance with the Specifications for:
 - (1) Paving material
 - (2) Select backfill - Type No. 2A (PennDOT)
 - (3) Crushed stone for pipe bedding
 - (4) Concrete
 - (5) Pipe
 - (6) Manholes

3. After Construction (see Part 3 of this section for further information)

- a. Certificates of system testing results
- b. Blasting records
- c. Paving core tests
- d. Record Drawings
- e. Warranties and Guarantees
- f. Maintenance Bond
- g. Easement documents, including recorded legal descriptions and plans
- h. Dedication documents.
- i. Contractor's waiver of lien rights.

2.3 COORDINATION WITH UTILITIES

A. All work done by the Developer/Builder shall comply of all requirements of PA Act 187 requiring the location of existing utility lines.

- 2.4 ROCK EXCAVATION
 - A. All blasting shall be performed under the supervision of a professional engineer licensed to practice in the State of Pennsylvania as described in Section 02230, ROCK EXCAVATION.

2.5 SOILS TESTING

- A. All soils testing as described in Section 02220, EARTHWORK FOR UTILITIES of these Specifications shall be performed by a reputable testing and control firm when required by the Authority.

2.6 BUILDING LATERALS

- A. Building laterals are to be installed from the sewer to a point 10 feet past the Street Right-of-Way Line, in accordance with the Construction Details. Laterals installed from the Street Right-of-Way Line to the building shall be installed in accordance with local plumbing code.
- B. Where sewer's are to be capped, the, Developer/Builder shall install Building Laterals from the sewer to the Street Right of Way Line, for each property.

2.7 SPECIAL PRECAUTIONS

- A. Relation of New Sewers to Existing or Proposed Water Mains

1. Horizontal Separation

- a. Whenever possible, sewers should be laid at least 10 feet, horizontally, from water mains. Should local conditions prevent a lateral separation of 10 feet, a sewer may be laid closer than 10 feet to a water main if:
 - 1) It is laid in a separate trench; or if
 - 2) It is laid in the same trench, with the water main located at one side on a bench of undisturbed earth; and if
 - 3) In either case the elevation of the top (crown) of the sewer is at least 18 inches below the bottom (invert) of the water main.

2. Vertical Separation

- a. Whenever sewers must cross under water mains, the sewer shall be laid at such an elevation that the top of the sewer is at least 18 inches below the bottom of the water main. When the elevation of the sewer cannot be varied to meet the above requirements, the water main shall be relocated to provide this separation, for a distance of 10 feet extending on each side of the sewer. If possible, one full length of water main should be centered over the sewer so that both joints will be as far from the sewer as possible. Where less than an 18 inch vertical separation exists between the water and sewer line, the sewer line shall be concrete encased 10 feet on each side of the water main.

b. No water main shall cross under a sewer line unless absolutely required, in which case, the water main shall be encased in concrete for a distance of 10 feet either side of the intersection or until the horizontal separation is equal to or greater than 10 feet from the intersection.

3. If possible, sewers crossing water mains shall be constructed so that the sewer joints will be equidistant and as far as possible from the water main joints. Where a water main crosses under a sewer, adequate structural support shall be provided for the sewer to prevent damage to the water main and both the sewer and the water main shall be encased in concrete for a distance of 10 feet on each side of the intersection.

B. Relation of New Sewers to existing Public Water Supplies and Private Wells

1. In general, sanitary sewers should be located at least 100 feet from public water supply sources and 50 feet from private water supply sources unless the sanitary lines are encased in concrete or constructed of ductile iron pipe with mechanical joints or equivalent.

C. Wells

1. Prior to construction of the sewers the Developer/Builder shall locate all domestic wells within the construction area. If a new sewer falls within a 50-foot radius of an existing well, that segment of the sewer within the 50-foot radius shall be encased in concrete.

2. The Developer/Builder shall report to the Authority any possibility of damage, caused by blasting to existing underground water supply wells. In the event that the Developer/Builder's activities affect the groundwater supply to wells, such that the wells do not yield their normal amount of water, the Developer/Builder shall provide temporary water service until the original groundwater level has been reestablished.

D. Septic Systems

1. Any septic systems which are disturbed by the Developer/Builder during construction shall be returned to operational status as quickly as possible, at no cost to the owner.

E. Safety and Protection

1. The Developer/Builder will be solely responsible for initiating, formulating, supervising, reviewing and overseeing any and all safety precautions, practices, procedures, and programs which are or should be provided in connection with the Work. Developer/Builder will take all necessary or proper precautions for safety of and will provide the necessary protection to prevent damage, injury or loss to:

a. All employees on the Work and any other person who may be affected thereby whether or not such person is involved with the Work.

b. All the Work and all materials or equipment to be incorporated therein whether in storage on or off the site.

- c. Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.
- F. Gabions for Protection of Creek Banks
 - 1. Gabions shall be installed along all creek banks disturbed by sewer construction.

2.8 ACCESS TO WORK

- A. Representatives of the Authority shall have access to the work. The Developer/Builder shall provide proper and safe facilities for such access and observation of the work and also for any inspection or testing thereof by others.

2.9 AUTHORITY MAY STOP THE WORK

- A. If the work is defective, or the Developer/Builder fails to supply suitable materials, the Authority may order the Developer/Builder to stop the work, or any portion thereof, until the cause for such order has been eliminated.

2.10 TESTS AND INSPECTIONS

- A. Where so indicated in these specifications, or if the laws, ordinances, rules, regulations or orders of any public agency having jurisdiction require any work to specifically be inspected, tested, or approved by some public body, the Developer/Builder shall assume full responsibility thereof, pay all cost in connection therewith and furnish the Authority the required certificates of inspection, testing or approval.
- B. The Developer/Builder shall give timely notice of readiness of work for all inspections or approvals.
- C. The Contractor shall be responsible for obtaining and disposal of all liquids used for testing. Water based liquids used for testing shall be potable water, creek or stream water or other Authority approved sources.

2.11 FINAL INSPECTION

- A. Upon written notice from the Developer/Builder that the project is complete, the Authority will make a final inspection with the Developer/Builder and will notify the Developer/Builder in writing of all particulars in which this inspection reveals that the work is incomplete or defective. The Developer/Builder shall immediately take such measures as are necessary to remedy such deficiencies.

2.12 FINAL APPLICATION FOR ACCEPTANCE

- A. After the Developer/Builder has completed all such corrections to the satisfaction of the Authority and delivered all schedules, bonds, guarantees, bonds, certificates of inspection and other documents, the Authority shall issue a letter of final acceptance.

PART 3 – SYSTEM DEDICATION

3.1 GENERAL

- A. After the Contractor has completed all corrections to the installed sewer system and the Authority issued final acceptance, the Developer/Builder shall offer the system to the Authority for dedication. The Developer/Builder shall deliver the following documentation as part of dedication:

- 1. Warranties and Guarantees.
- 2. Easement documents, including legal descriptions and plans suitable for recording.
- 3. As-built drawings.
- 4. Dedication documents.
- 5. Contractor's waiver of lien rights.
- 6. Maintenance Bond

3.2 WARRANTY AND GUARANTEE

- A. Warranties and guarantees shall be turned over to the Authority. The Developer/Builder warrants and guarantees to the Authority that all work will be of good quality and free from faults or defects. All unsatisfactory work, all faulty or defective work, and all work not conforming to the Approved Drawings and these Specifications shall be considered defective. The Authority will give timely notice of all defects to Developer/Builder. At the option of the Authority, all defective work, whether or not in place, may be rejected, or accepted with or without requiring corrections from Developer/Builder.

3.3 RECORD PLANS

- A. At completion of work, the Developer/Builder shall provide the Authority with Record Plans, in a neat and clean condition, showing the "As-Built Conditions".
- B. Plans shall be marked "Record Plans" and maintained at the Project site during construction by the Contractor. The Contractor shall record on the prints all vertical and horizontal deviations from his approved Drawings and these specifications, at the time that such deviations are made. Drawings shall also indicate a profile showing the depths where rock was encountered and all other changes made to his approved Drawings and these specifications.

- 1. The Record Plans should be prepared, signed and sealed by a professional engineer registered in Pennsylvania. The following statement is required on all record drawings.

Section 01010: SUMMARY OF REQUIREMENTS

These record plans have been completed and certified by _____ as reflecting as-built conditions. Responsibility for accuracy of the record plans rests with the above engineer.

Engineer's Signature and Seal

The as-built certification should be sealed on each plan.

2. An overall sewer system plan for the entire development should be provided. In addition to the reproducible mylar set and four (4) sets of blueprint drawings, an AutoCAD file of the approved as-built plans shall be submitted at time of plan acceptance.
3. Internal TV inspection reports and videotapes should be provided to the Authority.
4. The benchmark for the as-built elevations should be noted on the plans and should be based on USGS or NAVD datum and established by control monumentation.
5. Sewer mains should be shown in profile drawings, showing (a) pipe diameter, material, length, and slope, (b) manhole rim and invert elevations, and (c) other pipelines crossing or within 10 feet of the sanitary sewer.
6. A note should be added to the plans to clarify whether the sewer lengths are measured between manhole exterior walls, manhole cover center points, or some other points.
7. The installation and lengths of concrete encasements should be shown.
8. As-built road stations and offsets (from centerline) should be provided for the manholes.
9. Manholes and other fittings in the rear and sides of the properties should be referenced to some permanent features, such as by triangulation to building corners.
10. The size, material and depth of the lateral services should be noted shown on the plan.
11. Laterals and clean-outs should be located on the Utility Plans and respective plan/profile drawings by station, depth and distance behind the face of curb. Stations for the wye connections should also be provided and can be taken from the internal TV inspection reports. A tabulation of lateral data should be provided on each plan.
12. The basis for locating the lateral wyes and clean-outs should be specified in a note on the plans:
 - Baseline.** The sewer appurtenances should be referenced to some baseline, typically the centerline of the sewer.
 - Station.** Manholes (which are more readily located) should serve as the basis of the as-built stationing. Each manhole should serve as a 0+00 station so that appurtenances are never more than about 400 feet from a reference point and can be readily located. Manholes should include "back" and "ahead" (0+00) stations for easy reference.
 - Offset or Distance behind face of curb.** The lateral clean-outs should be located by station and offset distance measured to the curb closest to the specific house. The

note should specify whether the distance is measured perpendicularly to the sewer main or the curb line. If necessary (a) along curves in the road or (b) near the end of cul-de-sacs, an additional note should clarify how to measure the offset distance. In any case, the location data should allow Authority personnel to quickly locate sewer appurtenances in the field with simple measurements, without the use of survey equipment.

13. Laterals and clean-outs located in the rear and side yards can be referenced to the sewer main using the manholes 0+00 stations and the sewer as the baseline.

C. A complete file of accepted field sketches, diagrams, and other changes as may become necessary during the progress of the work shall also be maintained and attached to the set of marked-up prints.

D. At completion of the work, the Developer/Builder shall provide, for the information of the Authority, each sheet of marked prints and all accepted field sketches and diagrams.

E. When this data has been checked and returned by the Authority, the Developer/Builder shall record all field changes and conditions on the reproducible mylar "Record Drawings." Each sheet of these "Record Drawings" shall be signed by an Officer of the Company certifying that each sheet reflects the as-built conditions.

F. Before final acceptance of the Work, deliver "Record Drawings" in a clean and neat condition to the Authority.

3.4 MAINTENANCE BOND

A. The Developer/Builder shall be required to provide a Maintenance Bond equal to fifteen percent (15%) of the construction cost of the completed work, or ten thousand dollars (\$10,000.00) whichever is greater. The Maintenance Bond shall be held for a period of 18 months from the date of acceptance. The Developer/Builder shall also purchase and maintain such insurance as will protect the Authority from any claims. The said insurance shall be as required under the laws of Pennsylvania.

3.5 CORRECTION PERIOD

A. If after final inspection and prior to the expiration of the 18-month maintenance bond or such longer period of time as may be prescribed by law or, by the terms of any applicable special guarantee required by the Authority any work installed by the Developer/Builder is found to be defective, Developer/Builder shall promptly, in accordance with Authority's written instructions, either correct such defective work, or, if it has been rejected by Authority, remove it from the site and replace it with non-defective work. If Developer/Builder does not promptly comply with the terms of such instructions, the Authority may have the defective work corrected or the rejected work removed and replaced, and all direct and indirect costs of such removal and replacement, including compensation for additional professional services shall be paid by Developer/Builder.

** END OF SECTION **

SECTION 01020: EROSION AND SEDIMENT CONTROL PLAN

PART 1 - GENERAL

1.1 INTENT

A. The Department of Environmental Protection of the Commonwealth of Pennsylvania (PADEP) requires the preparation and implementation of a plan for the prevention of accelerated soil erosion and sedimentation of the streams of the Commonwealth under Title 25, Chapter 102 of their regulations. Such plans are required for all earthmoving activities and it is intended that this plan will fulfill this PADEP requirement and prevent sedimentation.

B. It shall be the responsibility of the Contractor to implement this plan in the field and meet all state and local regulations pertaining to it. A copy of this plan shall be kept at the project site. The Contractor shall assign this responsibility to a person experienced in erosion and sediment control procedures. Modifications or deviations from this plan will be allowed only if the Contractor first obtains written permission from PADEP and/or other agencies having jurisdiction.

1.2 APPLICABLE STANDARDS

A. All soil erosion and sediment control practices on the drawings shall be construed in accordance with the "Erosion and Sediment Pollution Control Program Manual" of the Commonwealth of Pennsylvania, Department of Environmental Protection, as printed in April 1990 with all current revisions and amendments.

1.3 RELATED WORK SPECIFIED ELSEWHERE

A. Clearing and grubbing: Section 02110, CLEARING AND GRUBBING
B. Excavation and backfilling: Section 02220, EARTHWORK FOR UTILITIES
C. Paving: Section 02602, REPAVING
D. Seeding and Sodding: Section 02810, RESTORATION OF DISTURBED AREAS
E. Details of Controls Control measures shall be installed per the details in the Drawings and/or in accordance with the PADEP Manual.

1.4 STANDARD CONDITIONS RELATING TO PADEP WATER QUALITY MANAGEMENT PERMITS

A. The Contractor shall familiarize himself and shall be responsible for carrying out all requirements stated in the Standard Conditions Relating to Erosion Control which are attached to the PADEP Water Quality Management Permit issued for the construction of this project.

1.6 MEASUREMENT AND PAYMENT

A. The cost for erosion and sedimentation controls must be included in the unit prices for the items to which the erosion controls pertain or be included in the lump sum price of the Contract wherever applicable.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All products and materials shall meet the requirements of the local soil conservation service or as specified elsewhere in these Specifications.

PART 3 - EXECUTION

3.1 PLANNING AND DESIGN FOR CONSTRUCTION

- A. Construction projects that involve major land disturbance such as municipal plants, roadways and pipelines shall be planned and designed with soil erosion and sediment control in mind. While erosion and sedimentation controls are important on all sites, particular attention should be given to areas of steep topography and highly erodible soils. Cleared areas shall be kept to a minimum and the shortest practical distance ahead of construction.

- B. Where practical, a construction sequence and schedule of earth moving activities shall be included in the submittals for the project.

- C. Restoration work shall be done as the project progresses and not be left until the end of the project. No areas shall be left unprotected for more than twenty (20) days without some form of temporary seeding or if in a non-growing season, some other form of stabilization such as mulch.

3.2 SEDIMENT CONTROL MEASURES

- A. Some of the sediment control measures or devices which can be used to control sedimentation of streams, water courses or pipelines are:

- 1. Stabilized Construction Entrance
 - a. Where construction traffic will enter paved roads, a stabilized construction entrance shall be provided to prevent tracking or flow of sediment onto public rights-of-way.
- 2. Earth Berms and/or Diversion Ditches
 - a. These structures shall be constructed at locations shown on the drawings. The primary purpose of these structures is to divert stormwater runoff to sediment traps or basins, thus preventing sediment from reaching streams, etc. The berm/ditch is usually constructed simultaneously by compacting the material just excavated from the ditch to form the berm.
 - b. Earth berm/diversion ditches are normally 12 inches to 18 inches in width and have an average depth of 12 inches to 18 inches
 - c. Side slopes should not exceed 2 horizontal to 1 vertical. If ditch slopes exceed 4 percent, they shall be stabilized with crushed stone.
 - d. Whether the berms are temporary or permanent, they shall be stabilized immediately with seed or other acceptable stabilizers.

3. Sediment Basins
 - a. These structures shall be constructed at locations shown on the drawings. Sediment basins may be temporary or permanent, formed by excavation and/or embankment to intercept sediment-laden runoff and to trap and retain sediment.
 - b. Embankments shall not exceed 4 feet in height as measured at the low point of the original ground along the centerline of the embankment. Embankments shall have a minimum 4-foot top width at stone filter outlets and 2-foot minimum width for earth berms connecting the trap. Side slopes shall be 2:1 or flatter. The embankment shall be compacted while being constructed.
 - c. All excavation operations shall be carried out in such a manner that erosion and water pollution shall be minimal. Any excavated portion of sediment traps shall have 2:1 or flatter slopes.
 - d. There are two types of outlets generally used for basins.
 - (1) Stone filter outlet. This outlet consists of a basin formed by embankment or a combination of embankment and excavation. The outlet is a built-up stone embankment with a core of straw bales and covered by a minimum of 6 inches of crushed stone. Crushed stone shall be similar to AASHTO PennDOT No. 57 stone. A stone emergency overflow weir shall be constructed 1 foot below the top of embankment.
 - (2) Pipe outlet. The outlet is a combination of a corrugated metal perforated riser pipe connected to a horizontally sloped pipe going through the embankment. Trash rack, anti-vortex device and anti-seep collars, if required, shall be as specified in PennDOT Standards for Roadway Construction.
 - e. Embankments and other areas disturbed by construction of basins shall be temporarily stabilized by seeding with temporary approved mixture at the rate of 1 pound per 1,000 square feet. After contributing areas have established permanent vegetation, the temporary sediment traps shall be removed, the areas regraded and reseeded permanently.
4. Sediment Traps
 - a. Sediment traps are the same as the sediment basins described above but are normally existing low spots where stormwater runoff drains to naturally. The construction is mostly excavating to form a more shallow type earth containment system. Generally, a crushed stone filter berm outlet is sufficient for these traps similar to Paragraph 3.2, A, 3, d, (1) above. If earth berms are constructed, they shall be stabilized immediately.
5. Filter Berms
 - a. When construction operations take place within existing curbed roadways and backfilling will not immediately take place, crushed stone filter berms may be required by the Engineer. The filter shall be 6 inches high placed perpendicular to the curb, and be shaped with side slopes which will facilitate vehicular traffic.

6. Filter Inlets

a. Temporary filter inlets shall be used at existing stormwater inlets where required by the Engineer and are built by first setting concrete blocks in circle around the inlet and then piling crushed stone against the blocks. The stone filters sediment from the runoff and the blocks prevent the stone from being washed into the storm sewer system. After all disturbed areas draining to the inlet have been stabilized the filtering materials can be removed.

7. Silt Fence

a. Materials

(1) Synthetic filter fabric shall be a pervious sheet of propylene, nylon, polyester or ethylene yarn and shall be certified by the manufacturer or supplier as conforming to the following requirements:

Physical Property	Test	Requirements
Filtering Efficiency	VTM-51	75% (minimum)
Tensile Strength at	VTM-52	Extra Strength: 20% (max.) Elongation* 50 lbs./linear inch (min.) Standard Strength: 30 lbs./linear inch (min.)
Flow Rate	VTM-51	0.3 gal./sq.ft./min. (minimum)

* Requirements reduced by 50 percent after 6 months of installation.

Synthetic filter fabric shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of 6 months of expected usable construction life at a temperature range of 0°F to 120°F.

(2)

Posts for Silt Fences shall be either 4-inch diameter wood or 1.33 pounds per linear foot steel with a minimum length of 5 feet. Steel posts shall have projections for fastening wire to them.

(3)

Wire fence reinforcement for silt fences using standard strength filter cloth shall be a minimum of 42 inches in height, a minimum of 14 gauge and shall have a maximum mesh spacing of 6 inches.

b.

This sediment barrier utilizes standard strength or extra strength synthetic filter fabrics. It is designed for situations in which only sheet or overland flows are expected.

(1)

The height of a silt fence shall not exceed 36 inches (higher fences may impound volumes of water sufficient to cause failure of the structure).

(2)

The filter fabric shall be purchased in a continuous roll cut to the length of the barrier to avoid the use of joints. When joints are necessary, filter cloth shall be spliced together only at a support post, with a minimum 6-inch overlap, and securely sealed.

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- (3) Posts shall be spaced a maximum of 10 feet apart at the barrier location and driven securely into the ground (minimum of 12 inches). When extra strength fabric is used without the wire support fence, post spacing shall not exceed 6 feet.
 - (4) A trench shall be excavated approximately 4 inches wide and 4 inches deep along the line of posts and upslope from the barrier.
 - (5) When standard strength filter fabric is used, a wire mesh support fence shall be fastened securely to the upslope side of the posts using heavy duty wire staples at least 1 inch long, the wires or hog rings. The wire shall extend into the trench a minimum of 2 inches and shall not extend more than 36 inches above the original ground surface.
 - (6) The standard strength filter fabric shall be stapled or wired to the fence, and 8 inches of the fabric shall be extended into the trench. The fabric shall not extend more than 36 inches above the original ground surface. Filter fabric shall not be stapled to existing trees.
 - (7) When extra strength filter fabric and closer post spacing are used, the wire mesh support fence may be eliminated. In such a case, the filter fabric shall be stapled or wired directly to the posts with all other provisions of Subparagraph (6) applying.
 - (8) The trench shall be backfilled and the soil compacted over the filter fabric.
- c. Maintenance
- (1) Silt fences shall be inspected immediately after each rainfall and at least daily during prolonged rainfall. Any required repairs shall be made immediately.
 - (2) Should the fabric on a silt fence decompose or become ineffective prior to the end of the expected usable life and the barrier still be necessary, the fabric shall be replaced promptly.
 - (3) Sediment deposits should be removed after each storm event. They must be removed when deposits reach approximately one-half the height of the barrier. At no time shall they be permitted to reach one-half the height of the barrier.
 - (4) Silt fences shall be removed when they have served their useful purpose, but not before the upslope area has been permanently stabilized.
 - (5) Any sediment deposits remaining in place after the silt fence or filter barrier is no longer required shall be dressed to conform with the existing grade, prepared and seeded.
8. Straw Bales
 - a. Staked straw bales shall be installed where indicated on the drawings or required.
 9. Other Filter Devices
 - a. Other devices which can be used to trap sediment are straw bales, rock and stone dams, planting of grass or other vegetative cover on bare areas.

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3.3 EROSION CONTROL MEASURES

A. Steep slopes, potential landslide areas, stream crossings, stream encroachments, cut and fill sections and trenching operations are the potential sources of soil erosion and the resulting sedimentation. Some soil erosion control measures which are available are:

1. Earth Slope Protection
 - a. Earth slopes shall be protected from accelerated erosion as soon as possible after the cut or fill operation. This can be done by quick establishment of vegetative cover (temporary and/or permanent), benching or terracing or making flatter slopes where possible; mulches, providing jute matting or synthetic netting on steeper slopes or a combination of the above.
 - b. On stream crossings, special planning and design consideration shall be done and complete details included in the Drawings and/or in these specifications.

2. Pipeline Trenches
 - a. When trenches are backfilled, they shall be filled above the original ground to allow for settling and to allow water to run off instead of following the trench line when backfill settles.
 - b. Where the grade along the top of the backfilled trench is over 5 percent, water breaks shall be installed diagonally across the trench to divert water onto grassy areas at about a 30-degree angle from a line perpendicular to the trench line and spaced at proper intervals. Intervals shall not exceed one hundred (100) feet.
 - c. A water break may be an earth berm 6 inches to 8 inches high, a crushed stone berm or a straw bale barrier constructed diagonally across the trench to divert runoff to one side of the trench at intervals, thus preventing a constant flow of stormwater along the side of the backfilled trench.

3. Large Diversion Channels
 - a. Where large stormwater diversion channels are to be constructed as a permanent facility, crushed stone, rip-rap or gabions shall be required as indicated on the drawings for bottom and/or slope protection.
 - b. Every effort should be made to preserve and upgrade existing natural channels.
 - c. Where space limitations are not a factor, wide channels with flat slopes lined with grass are normally sufficient to control erosion.
 - d. Depending on the diversion channel gradient, grade control shall be required:

Slope	Requirement
1% to 2%	a drought resistant seed mixture shall be seeded to the channel bottom, and mulch material applied
2% to 4%	the channel bottom shall be seeded with a drought resistant seed mixture, the area mulched and the mulch stabilized with either jute matting or some commercial mulch and netting
>4%	channel shall be protected with erosion resistant materials according to the surface water velocities expected during a design storm

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4. Preservation of Existing Vegetation
 - a. Good stands of existing vegetation adequate to control erosion should be preserved wherever possible. Regeneration of wood plants should be encouraged where acceptable.
 - b. New vegetation, soil treatments, etc. shall be done as specified on the Drawings and in the applicable sections of these specifications.
5. Storm Inlets and Endwalls
 - a. Storm inlets and endwalls in grassy areas are usually permanent but are still devices that will slow erosion and sedimentation by directing surface waters safely underground. They may require special treatments at entrances or outlets to control erosion.
 - b. All storm drainage inlets collecting sediment laden water from the project area shall be provided with inlet protection or shall be temporarily capped until permanent stabilization has been provided within the area tributary to the affected inlets.

3.4 STREAM PROTECTION

A. Where construction is close to existing streams and other waterways, construction shall be performed in a manner which will not contribute to stream pollution. Construction practices shall include the following:

1. Construction debris, excavated materials, brush, rocks, refuse and topsoil shall be kept as distant from the stream as is possible.
2. Stream crossings and machinery operation in streams is prohibited. Under no circumstances will a stream bed be permitted to become a highway for machinery traffic.
3. There shall be no change in preconstruction contours (excess material must be removed to an upland disposal area).
4. The discharge of dredged or fill material shall not destroy a threatened or endangered species as identified under the Endangered Species Act, or endanger the critical habitat of such species.
5. The discharge of dredged or fill material shall consist of suitable material free from toxic pollutants in other than trace quantities.
6. The fill created by the discharge of dredged or fill material shall be properly maintained to prevent erosion and other non-point sources of pollution.
7. The discharge of dredged or fill material shall not occur in a component of the National Wild and Scenic Rivers System or in a component of a State Wild and Scenic River System.
8. The discharge of dredged or fill material shall not be located in the proximity of a public water supply intake.
9. The discharge of dredged or fill material shall not occur in areas of concentrated shellfish production.

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10. Discharges of dredged or fill material into waters of the United States shall be avoided or minimized through the use of other practical alternatives.

11. Discharges in spawning areas during spawning season shall be avoided.

12. The discharge shall not restrict or impede the movement of aquatic species indigenous to the waters or the passage of normal or expected high flows or cause the relocation of the waters (unless the primary purpose of the fill is to impound waters).

13. If the discharge creates an impoundment water, adverse impacts on the aquatic system caused by the accelerated passage of water and/or the restriction of its flow, shall be minimized.

14. Discharges in wetland areas shall be avoided.

15. Heavy equipment working in wetlands shall be placed on matting. Matting shall be wood or other suitable protective material having a minimum thickness of 4 inches. The length and width, as determined by the contractor, shall be sized to protect the wetlands.

16. Discharges into breeding and nesting areas for migratory waterfowl shall be avoided.

17. All temporary fills shall be removed in their entirety.

18. Pollutants such as chemicals, fuels, lubricants, bituminous, raw sewage and other harmful waste shall not be discharged into or alongside of water sources or into natural or man-made channels leading thereto.

3.5 TRAFFIC CONTROL

A. Minimization of the area of disturbance also involves traffic control. Corridors for equipment travel shall be established to protect those areas that will not be denuded. Instructions shall be issued that routes for convenience shall not be allowed and that the established equipment travel corridors must be used. These instructions must be enforced. Traffic shall be kept to an absolute minimum. Delivery of material will be required and this traffic shall enter and leave on a designated access route. Passenger vehicle traffic shall be discouraged. Workmen shall walk from the street rather than drive and they shall park on stabilized areas whenever possible. The filtering of sediment-laden runoff by the vegetation is an important measure in the reduction of sediment delivered to downstream areas and it must be preserved. Indiscriminate and convenience travel shall not be allowed to destroy these natural filter areas.

3.6 STOCKPILES

A. All stripped topsoil and excavated earthen material to be used within the project site shall be properly stockpiled. Material found to be unsuitable for subsequent use or in excess of the quantity required shall be disposed of. The location and method of disposal, and means of transport shall be in accordance with state and local laws.

B. Stockpile areas shall be selected and maintained by on-site personnel. Site selections and stockpile design shall incorporate sediment and erosion control facilities to prevent the potential direct

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production and delivery of sediment to waterways, damage to vegetation that is part of the total sediment and erosion control plan, and the unnecessary destruction of trees that are selected for preservation. Temporary or interim stabilization of soil stockpiles shall be promptly instituted. The existence of critical slopes on stockpiles shall be avoided. Stockpiling in or immediately adjacent to diversion channels will not be allowed because the stockpiled material may provide a direct and high volume source of sediment due to storm runoff. Containment structure shall be installed on large stockpiles. Their design and implementation shall be accomplished by competent on-site personnel.

C. All soil that is to be stockpiled for a period of greater than 20 calendar days shall be temporarily stabilized as described in the "Temporary Stabilization" section of these specifications.

D. Temporary vegetative measures planned for implementation on stockpile areas shall be established immediately after the stockpile operation is completed or within twenty (20) days. Proper mulching and soil stabilization in conjunction with seeding operations shall also be carried out.

E. A staked straw bale berm shall be provided at the base of all the stockpiles for additional protection.

3.7 PUMPED WATER

A. Pumped water management shall be practiced by the Contractor to reduce the production of sediment. Pumped water shall be discharged onto stabilized surfaces and then allowed to be filtered by existing vegetation. If ditches are required to remove water pumped from construction excavations they shall be given the same consideration as any other man-made waterway and they shall be stabilized so they do not degrade and produce sediment.

3.8 EXCAVATION AND BACKFILL

A. Excavation shall be closely controlled. The material removed from the excavation shall be selectively stockpiled in areas where a minimum of sediment will be generated and where other damage will not result from the piled earth. Drainage ways shall be protected at all times and the piling of soil in drainage ways will not be allowed. Backfilling operations shall be performed in such a manner that remaining trees are not damaged. Temporary repaving shall be placed promptly after backfill operations are completed in improved areas.

3.9 TEMPORARY STABILIZATION

A. All areas disturbed by on-site grading that will not be constructed upon within the next 20 calendar days shall be temporarily stabilized:

1. Vegetative cover

Temporary vegetative cover shall be provided in areas requiring temporary stabilization during construction, and as specified by the owner as follows:

- a. Fertilizer: apply 10-20-10 fertilizer or equivalent at the rate of 500 lbs per acre.
- b. Limestone: shall be equivalent to 50% calcium plus magnesium oxides, and applied at the rate of 2 tons per acre.

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- c. Seed type shall be as indicated below:
- (1) Optimum seeding dates are February 15 thru May 1 or August 15 thru October 15 for the following species:

Species	Pounds per Acre	Optimum Seed Depth (Double for Sandy Soil)
Annual Ryegrass	40	0.5 inch
Perennial Ryegrass	40	0.5 inch
Oats	86	1 inch
Barley	96	1 inch

- (2) Optimum seeding dates of May 1 thru August 1 for the following species which may be planted throughout summer if the soil moisture is adequate or can be irrigated.

Species	Pounds per Acre	Optimum Seed Depth (Double for Sandy Soil)
Pearl Millet	20	1 inch
Sudangrass	30	1 inch
Millet (German or Hungarian)	30	1 inch
Weeping Lovegrass	5	1 inch

2. Mulching
 - (1) Mulch materials shall be unrotted salt hay, hay or small grain straw applied at the rate of 70 to 90 pounds per 1000 square feet. Mulch blowers shall not grind or chop the material.
 - (2) Mulch shall be spread uniformly by hand or mechanically so that approximately 75 percent of the soil surface will be covered.
 - (3) Mulch anchoring shall be accomplished immediately after placement to minimize loss by wind or water. This may be done by one of the following methods, depending upon the size of slopes and costs.
 - (a) Peg and Twine - Drive 8 to 10 inch pegs to within 2 to 3 inches of the soil surface every 4 feet in all directions. Stakes may be driven before or after applying mulch. Secure mulch to soil surface by stretching twine around each peg with two or more round turns.
 - (b) Mulch Nettings - Staple paper, jute, cotton or plastic nettings to the soil surface. Use a degradable netting in areas to be mowed.
 - (c) Liquid Mulch Binders - may be used to anchor salt hay, hay or straw mulches.

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- (d) Applications should be heavier at edges where wind catches the mulch, in valleys and at crests of banks. Remainder of area should be uniform in appearance.
- (e) Wood-fiber or paper-fiber mulch at the rate of 1,500 pounds per acre may be applied by a hydroseeder. Use is limited to flatter slopes and during optimum seeding periods in spring and fall.

3. Other

a. Where excessive soil erosion, tracking, or flowing of sediment is evident or anticipated, a minimum of 4 inches of crushed stone shall be placed within the affected area and maintained until permanent stabilization is provided. Additional stone shall be placed as required until stabilization is achieved. Crushed stone shall conform to AASHTO designation M43, size no. 2 (2 1/2" to 1 1/2").

3.10 FINAL GRADING AND SEEDING

- A. The establishment of permanent vegetative cover such as seeding or sodding on all areas shall be accomplished within 10 days after final grading operations have been completed. Time extensions beyond the 10 day requirement must be requested in writing and are subject to written approval.
- B. After the construction phase is complete permanent vegetation on the areas that have been disturbed shall be reestablished as rapidly as possible. If the completion of the construction activities does not coincide with a season in which permanent vegetation can be started an interim or temporary program is required. This shall include soil stabilization, mulching, or the establishment of filter strips. In any case erosion and sediment controls shall be installed promptly and their maintenance assured.
- C. Finish grading, topsoiling, seeding and/or sodding shall be performed as specified on the Drawings and in Section 02810, RESTORATION OF DISTURBED AREAS, of these Specifications. Types and quantities of soil conditioners, fertilizers, and seed mixtures shall be as specified above or in accordance with the recommendations of the local state agricultural agent.
- D. Sod shall be installed on all slopes steeper than 2 to 1 or where indicated on the Drawings. Under no circumstances shall slopes exceed 1 1/2 to 1 after final grading is completed.
- E. Two (2) one-pint samples from each source of topsoil proposed for use shall be forwarded to the local state agricultural agent for his recommendations as to types and quantities of soil conditioners, fertilizers and seed mixtures. As a minimum, permanent vegetative cover shall be established by providing the following:

- 1. Fertilizer: 500 lbs per acre of 10-20-10 or equivalent, in addition, 300 lbs per acre of 38-0-0 of slow release nitrogen or equivalent may be used in lieu of topdressing.
- 2. Limestone: shall be equivalent to 50% calcium plus magnesium oxides, and applied at the rate of 3 tons per acre.
- 3. Permanent seeding (minimum requirements) shall be as follows:

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- a. Sandy, Dry Soils
 (1) Optimum seeding dates: February 15 - May 1
 (2) Seed mixtures:

Type "B"	
Redtop	10
Red fescue (creeping's or chewing's)	40
Blackwell switchgrass	10
Reed canarygrass	10
Weeping lovegrass	10
Perennial ryegrass	5
Kentucky-31 tall fescue	15
Pounds per acre	

- b. All except Sandy, dry soils
 (1) Optimum seeding dates: February 15 - May 1 or August 15 - October 15
 (2) Seed mixtures:

Type "A"	
Kentucky bluegrass	20
Red fescue (creeping's or chewing's)	35
Kentucky-31 tall fescue	20
Redtop	10
Perennial ryegrass	10
White clover	5
Pounds per acre	

4. Mulching, if required, shall be provided as described herein.

3.11 MAINTENANCE

- A. Sediment and erosion control practices will not function properly throughout their designed life span if they are not maintained. Periodic inspection shall be made at frequent intervals and after each storm event to detect any impairment in the ability of the erosion control facilities installed as part of this plan to continue to function effectively. Responsibility for maintenance shall be assigned to an individual who has access to equipment, material and funds required to sustain the maintenance schedule.

- B. Most control structures require work to restore them after each storm. This maintenance shall be performed to allow the structure to continue to perform the function for which it was designed.

- C. Vegetative practices require maintenance. Frequently, a stand of vegetative cover established in the sediment and erosion control program is allowed to deteriorate and become ineffective. A fertilization and reseeding program shall be established and carried out as the construction proceeds. Areas where failures have been experienced in the establishment of vegetative protection shall be promptly treated. The reestablishment of permanent vegetative cover shall be initiated as soon as possible in an effort to keep the area requiring maintenance work to a minimum.

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- D. Information shall be distributed to all persons on the construction site describing and stressing the importance of the proper installation and maintenance of the erosion and sediment control procedures included in this plan. The actions and language of supervisors on the project shall continually emphasize the seriousness and importance of sound erosion and sediment control procedures.
- E. The approved erosion and sediment control plan and any standard conditions relating to Soil Erosion and Sediment Control issued as part of any permits shall be available at the immediate site of construction activity at all times.
- F. Maintenance of soil and erosion control facilities shall continue throughout the life of the project.

3.12 SUGGESTED SEQUENCE OF EARTHMOVING RELATED ACTIVITY

- A. The following is a suggested sequence of earthmoving related activity that may be implemented in sections within the project site.

1. Construct silt fence in accordance with the grading, soil erosion control plan and site details.
2. Stabilize potential heavily traveled entrance/exit ways to active work areas in accordance with these specifications.
3. Construct inlet protection in accordance with these specifications, and as indicated on the drawings.
4. Strip topsoil within the proposed construction and regrading areas and stockpile. Provide a staked straw bale berm around stockpile.
5. Clear and grub site as required.
6. Conduct excavation operations in accordance with the drawings. Excavated material suitable for backfill shall be utilized within the site.
7. Rough grade the site as per the grading drawings.
8. Stabilize potential soil erosion areas per these specifications, and as indicated on the drawings.
9. Stabilize proposed pavement areas by constructing subbase as soon as practical. Temporarily stabilize problem areas in accordance with these specifications prior to subbase installation if required.
10. Construct all footings, subbases, underground utilities, and complete all other subsurface work.
11. Complete as much final grading as practical.
12. Construct all structures, pavements, and complete all other above grade work.
13. Complete all final grading.
14. Fertilize, seed, lime, and mulch areas designated to receive a grass cover within 10 days after final grading.
15. Remove all staked straw bales, silt fence, and other temporary soil erosion and sediment control materials after all areas have been permanently stabilized.

**** END OF SECTION ****

PART 1 - GENERAL

1.1 SCOPE

A. Description of Work

1. The Contractor shall comply with PA Act 287 of 1974 as amended by Act 172 (enacted June 10, 1987), by Act 38 (enacted December 12, 1991) and by Act 187 (effective December 19, 1996) and any subsequent amendments or revisions enacted by the Commonwealth of Pennsylvania. Accordingly, the Contractor, prior to performing excavation or demolition work on the job site shall obtain all recorded locations of existing lines as outlined herein.

2. Contact the Utility companies to provide exact locations of utilities before excavation or demolition work is started.

3. Attention is directed to the fact that there may be other lines in certain locations in addition to the recorded locations.

B. Related Work Specified Elsewhere

1. Act No. 187, Commonwealth of Pennsylvania
2. Excavation, Section 02220, EARTHWORK FOR UTILITIES.
3. Rock excavation, Section 02230, ROCK EXCAVATION.

1.2 SUBMITTALS

A. The Contractor shall furnish the Engineer a certification listing the names of the users whom he has contacted during course of construction.

1.3 DEFINITIONS

A. The "Definitions" defined below are intended to be the definitions used in PA Act No. 187.

1. "Communications expenses" means the direct telecommunications costs incurred by a one-call system in notifying a user of a potential excavation, including any costs billed directly to a user by a telecommunications company other than a one-call system.

2. "Contractor" means any person who or which performs excavation or demolition work for himself or for another person.

3. "Demolition work" means the use of powered equipment or explosives to destroy or raze any structure.

4. "Designer" means any architect, engineer or other person who or which prepares a drawing for a construction or other project which requires excavation or demolition work as defined by Act 187.

5. "Emergency" means any condition constituting a clear and present danger to life or property by reason of escaping gas, exposed wires, or other breaks or defects in a user's lines.

6. "Excavation work" means the use of powered equipment or explosives in the movement of earth, rock or other material, and includes but is not limited to anchoring, augering, backfilling, blasting, digging, ditching, driving-in, grading, plowing-in, pulling-in, ripping, scraping, trenching and tunneling; but shall not include such use in agricultural operations or operations necessary or incidental to the purposes of finding or extracting natural resources including all well site operations and shall not include work within a State highway right-of-way, performed by employees of the Commonwealth acting within the scope of their employment, which does not extend more than twenty-four inches beneath the existing surface or political subdivisions performing minor routine maintenance within the right-of-way of roads within their jurisdiction.
7. "Line" means an underground conductor or underground facility used in carrying or providing electric or communication service, or an underground pipe used in carrying or providing gas, oil or oil product delivery, sewage, water or other service to one or more consumers or customers of such service and the appurtenances thereto. The term does not include storm drainage facilities which are located within a public highway right-of-way. The term shall not include oil and gas production and gathering pipeline systems designed principally to collect oil or gas production from wells located in this Commonwealth provided such systems are marked or staked where they cross a public highway right-of-way.
8. "Minor routine maintenance" means shaping of or adding dust palliative to unpaved roads, patching of the surface or base of flexible base, rigid base or rigid surface roads by either manual or mechanized method to the extent of the existing exposed base material, crack and joint sealing, adding dust palliative to road shoulders, patching of shoulders and shoulder bases by either manual or mechanized methods to the extent of the existing exposed base, and cleaning of inlets and drainage pipes and ditches.
9. "One-call system" means a communication system established within the Commonwealth of Pennsylvania to provide a single telephone number for contractors or designers or any other person covered by this act to call to notify users of underground lines and pipe of the caller's intent to use powered equipment for excavating, tunneling, demolition or similar work. A one-call system shall be incorporated and operated as a nonprofit corporation pursuant to 15 Pa C.S. Part III (relating to corporations not-for-profit).
10. "Operator" means any individual in physical control of powered equipment or explosives when being used to perform excavation or demolition work.
11. "Owner" means any person who or which engages a contractor for a construction or other project which requires excavation or demolition work as herein defined.
12. "Person" means an individual, partnership, corporation, political subdivision, a municipal authority, the Commonwealth and its agencies and instrumentalities, or any other entity.
13. "Powered equipment" means any equipment energized by an engine or motor and used in excavation or demolition work.

14. "Site" means the specific place or places where excavation or demolition work is being or is to be performed.
15. "User" means the public utility, political subdivision, municipality, authority, rural electric cooperative or its named representative trade association, or other person or entity who or which owns or operates a line. The term does not include the Commonwealth or its agencies.
16. "Working day" means any day except a Saturday, Sunday or legal holiday prescribed by act of the General Assembly.

PART 2 - PRODUCTS

2.1 NONE

PART 3 - EXECUTION

3.1 GENERAL

- A. It shall be the duty of each Contractor who intends to perform excavation or demolition work within the Commonwealth to ascertain the exact location and type of users' lines which are located within the limits of work of this Contract.

3.2 OBTAINING LOCATION OF EXISTING USERS' LINES

- A. The Contractor shall obtain the list of users from any of the following sources:
 1. By inspection of the Drawings which show the approximate location of the users' facilities, and/or the "List of User's" shown thereon. The Contractor is responsible to verify and/or update this "List" prior to starting construction.
 2. By requesting a list of users from the Montgomery County Recorder of Deeds.

- B. The Contractor shall secure all necessary municipal permits relating to road occupancy prior to commencing excavation.
- C. Not less than three nor more than ten working days prior to the day of beginning such work, to notify each user of the Contractor's intent to perform such work at its site or sites, and to request the information prescribed herein, from each such user's office designated on the Drawings or on the list of users obtained. The Contractor shall be deemed to have given the notice described in this clause if he calls a one-call system serving the location where the excavation is to be performed.
- D. The following are the minimum cooperative steps which the Contractor shall take, either at or off the excavation or demolition site:
 1. Before the Contractor starts any demolition work in the area of a particular user's line, the Contractor shall ascertain from the User if the user wants to have a representative present

during the excavation within this area. Additionally, the Contractor will comply with all standard regulations and necessary precautions as may be required by the User.

2. Inform each operator, employed by him at the site of such work, of the information obtained by him as noted above.
3. Report immediately to the User any break or leak on its lines, or dent, gouge, groove or other damage to such lines or to their coating or cathodic protection, made or discovered in the course of the excavation or demolition work.
4. Alert immediately the occupants of premises as to any emergency that he may create or discover at or near such premises.

E. The User may require additional cooperative steps be taken beyond those noted above depending on the circumstances of the time and/or location of this work.

F. The Contractor shall exercise due care; and take all reasonable steps necessary to avoid injury to or otherwise interfere with all lines where positions have been provided to the Contractor by the Users. If insufficient information is available the Contractor shall employ prudent techniques, which may include hand-dug test holes, to ascertain the precise position of such facilities.

3.3 LOCATING LINES

A. All recorded or unrecorded lines shall be located on the ground with pipe locating equipment well ahead of the work at all times. All such locations shall be plainly marked by coded paint symbols on pavement or by marked stakes in the ground. Such locations shall be established at least 50 feet in advance of all trench excavation. All such location work shall be provided by the Contractor to the satisfaction of the Engineer at no extra cost.

**** END OF SECTION ****

PART 1 - GENERAL

1.1 SCHEDULES

A. The Contractor shall be responsible for preparing a Progress or Work Schedule for the project.

1.2 SHOP DRAWINGS, SAMPLES AND MANUALS

A. The Contractor shall process the Shop Drawings required by his Work to the Engineer and he shall be responsible for their timely submission in accordance with the Shop Drawing schedule which is included in the overall progress or work schedule as described in Part 2 of this Section.

B. Any proposed deviations/substitutions from that specified shall be clearly noted on the cover letter transmitting the shop drawing. Failure to so note will be cause for rejection of equipment, materials, etc. after installation.

C. All submissions shall be marked with the Specification Section Number containing the item submitted for review, or Drawing number for items specified on Drawings only.

D. Revised shop drawings submitted for review shall be marked "RESUBMISSION."

1.3 CONSTRUCTION PHOTOGRAPHS

A. The Contractor shall be responsible for all construction progress photographs.

1.4 SUBMITTAL PROCEDURES

A. All submittals shall be delivered to the Engineer.

B. The Engineer will screen the submittals to ensure that they have been properly certified and identified by the Contractor. If they are submitted properly, the items will be processed for review.

C. The processed submittals will be returned to the Contractor.

PART 2 - SCHEDULE

2.1 PREPARATION

A. The Contractor shall prepare a Progress or Work Schedule for the Project, using CPM, showing the order in which the Contractor proposes to carry on his work and salient features, including submissions of shop drawings and samples and procurement of materials, to meet date of completion.

B. Each activity in the Progress or Work Schedule shall be identified and a time for the performance of such activity indicated. Each activity shall be preceded by all work that must be accomplished prior to that activity. All abbreviations, codes and/or symbols used shall be described on the Schedule.

C. In addition to the schedule described above, the Contractor shall submit a list of shop drawings he proposes to submit for review which shall include the following:

1. Specification Section Number (description of all items within section)
2. Drawing Number (description of all items on each Drawing, if not previously covered by the Specifications)
3. Approximate Date of Submittal

2.2 SUBMISSION

- A. The Contractor shall submit six (6) copies of Schedule to the Engineer for review fourteen (14) days prior to starting construction. Update and resubmit Schedule monthly thereafter until completion of the work. Updated Schedule shall have completed activities removed or indicated as such. Whenever modifications are made to the Contract which add or delete activities and/or revise time of completion, Schedule shall be revised and resubmitted to the Engineer within ten (10) days after such modification is authorized.
- B. In the event that the work is behind schedule, the Schedule shall be revised, through the use of overtime work or by other means, to ensure that the work is completed within the scheduled time.

PART 3 - SHOP DRAWINGS AND MANUALS

3.1 GENERAL

- A. Shop drawings are defined as drawings, diagrams, illustrations, schedules, performance charts, brochures and other data prepared by the Contractor which illustrate how specific portions of the work shall be fabricated and/or installed.
- B. Shop drawings are a supplementary means of communications to assist in the understanding of what the Contractor proposes to provide and to establish that whatever he intends to install either does or does not conform to the Drawings and/or Specifications.
- C. In the instance of a request for a substituted item, the Contractor shall verify that it will fit into the space allocated to the originally required item giving due regard to all other trades' requirements. Where modifications to the Contract Documents are proposed, the Contractor must clearly indicate such deviation in writing in his transmittal letter.

3.2 CATALOG SHEETS

- A. For standard manufactured items considered by the Engineer as not requiring special Shop Drawings, the Contractor shall submit three (3) copies of manufacturer's catalog sheets showing model numbers and illustrated cuts of the items to be furnished, scale details, sizes, dimensions, performance characteristics, capacities, wiring and control diagrams and all other pertinent information. This information shall be highlighted on all three (3) copies when appropriate.
- B. The Engineer will retain two (2) copies and return the third to the Contractor submitting the catalog sheets.

3.3 SHOP DRAWINGS

A. The Contractor shall submit for review six (6) white prints of shop and working drawings of materials fabricated especially for his Contract, and of equipment and materials for which such drawings are specifically requested.

B. Shop drawings are to be submitted all at one time and in one package.

C. Prior to submitting drawings to the Engineer, the Contractor shall check thoroughly all such drawings to satisfy himself that the subject matter conforms to the Drawings and Specifications in all respects. Drawings which are correct shall be marked with the date, checker's name and certification of the Contractor's approval, and then shall be submitted to the Engineer. Any Shop Drawings submitted without the Contractor's certification will be returned without review.

D. The Engineer will retain two (2) copies, return two to the Contractor and transmit two to the Township.

E. Shop Drawings shall show the principal dimensions, weight, structural and operating features, performance characteristics and wiring diagrams, space required, clearances, type and/or brand of finish or shop coat, grease fittings, etc., depending on the subject of the drawing. The shop drawing shall identify where the material is to be used, where appropriate. When it is customary to do so, when the dimensions are of particular importance or when so specified, the drawings shall be certified by the manufacturer or fabricator as correct for this application.

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

G. The Contractor shall be responsible for the prompt submission of all shop and working drawings in accordance with the shop drawing schedule so that there shall be no delay to the work due to the absence of such drawings.

H. No material shall be purchased or fabricated especially until the required shop and working drawings have been submitted and reviewed as conforming to the Authority Standard Specifications. All materials and work involved in the construction shall then be as represented by said drawings.

I. The Engineer's review of shop and working drawings will follow a general check made to ascertain conformance with the design concept and functional result of the project and compliance with the information given in the Standard Specifications. Each Contractor is responsible for details and accuracy, for conforming and correlating all quantities and dimensions at the job site; for information that pertains solely to the fabrication processes or to techniques of construction; and for coordination of the work of all trades. Markings or comments placed on a submittal by the Engineer shall not be construed as relieving the Contractor from compliance with the Drawings and Standard Specifications nor departures therefrom.

J. Shop drawing approval shall be obtained prior to the initiation of any construction. The Developer/Contractor should anticipate a shop drawing review period of up to four (4) weeks.

3.4 MANUALS

- A. The Contractor shall submit four (4) copies of all requested operating and maintenance manuals with the shop drawing submittals.
- B. The Operating and Maintenance manuals shall provide, as a minimum, the following information for any major component of the equipment and the total assembly:
 1. Installation Instructions.
 2. Startup and operating procedures.
 3. Maintenance and lubrication procedures.
 4. Equipment drawings with parts list.
 5. Electrical drawings
 6. Troubleshooting guide.
 7. Recommended spare parts.

C. The Engineer will retain three (3) copies and return the fourth to the Contractor.

D. Prior to project close-out, Contractor shall provide six (6) updated operating, maintenance manuals and parts lists for the Authority's use.

PART 4 - SAMPLES

4.1 SUBMISSION OF SAMPLES

A. Unless otherwise specified, each Contractor shall provide samples in duplicate and identify each sample by an appropriate tag or label listing the name of the Project, the Owner, the Engineer and the Contractor as well as the exact identification of the sample. Tag or label shall be large enough to provide a blank space for review stamps.

B. Samples of items submitted for destruction tests or for use in testing mixture with other materials will not be returned. Review of these items will be given by letter.

C. When reviewed, one sample of each item, not submitted for destruction, will be returned to the Contractor and shall be kept and maintained in good condition in the Contractor's office at the project site for later use in comparison with material actually delivered for the work. When samples of large fabricated items or of costly items are required, reviewed samples may be installed in the work if the exact location of such samples is recorded on the Record Drawings.

PART 5 - CERTIFICATIONS AND TESTS

5.1 GENERAL

A. Two (2) copies of certifications and reports of tests when required under the various sections of the Specifications shall be submitted.

PART 6 - CONSTRUCTION PHOTOGRAPHS

6.1 GENERAL

A. The Contractor shall provide pre-construction views, submitted in duplicate of the entire construction area before any work begins. Views shall be in the form of video tapes and/or 8-inch by 10-inch photographs at the discretion of the Engineer.

B. The Contractor shall provide, from commencement of Project through completion of all Work, clear, sharp, color, 8-inch by 10-inch photographs, in duplicate. These progress photographs shall be submitted to the Engineer each month.

C. Each photograph shall have the following information clearly noted on the picture. The information shall be typed or neatly printed on a label and placed on the face of the picture, and not obliterate important construction features.

1. Date Photo was taken and photo number
2. Client/Owner
3. Project Title
4. Contractor
5. Description of what is shown on the photo including direction

6.2 NUMBER OF VIEWS

A. For sewer lines and force mains, the Contractor shall provide from three to six views for each working crew every month depending on the progress of the Work.

**** END OF SECTION ****

PART 1 - GENERAL

1.1 SCOPE

A. The Contractor is referred to conditions and requirements given in various Divisions of the Specifications

1.2 OCCUPYING PRIVATE LAND

A. Written consent from the proper parties shall be obtained by the Contractor prior to entering or occupying with men, tools, materials or equipment any land other than his property or that of the Owner for any purpose related to his performance of the Work on this Contract.

1.3 PROTECTION OF EXISTING UTILITIES

A. The Contractor shall conduct his operations and take all special precautions necessary to protect equipment, utility lines, roadways and subsurface, submerged and overhead facilities which are to remain in place and undisturbed by his operations. The offending Contractor shall immediately notify the owner of the facilities or areas which are disturbed, damaged or injured as a result of the Contractor's operations, and determine the proper method of replacing or repairing the affected facilities at least to the conditions which existed prior to the Contractor's operations. The offending Contractor shall, at his own expense, replace, repair or restore the affected facilities or areas to their original condition or shall reimburse the owner of said facilities or areas for such expenses as the said owner may accrue in performing the work.

1.4 INTERFERENCE WITH/AND PROTECTION OF STREETS

A. The Contractor shall not close or obstruct any portion of a street, road or private way without obtaining permits therefore from the proper authorities. If any street or private way shall be rendered unsafe by the Contractor's operations, he shall make such repairs or provide such temporary ways or guards as shall be acceptable to the appropriate authority.

B. The Contractor shall assume full responsibility for the maintenance and restoration of those roadways within the construction area and also those roadways on which equipment must operate to reach the construction area.

C. Streets, roads, private ways and walks not closed shall be maintained passable by the Contractor at his expense, and the Contractor shall assume full responsibility for the adequacy and safety of provisions made.

D. The Contractor shall, 72 hours in advance of closing any street, notify the police and fire departments and school district in writing, with a copy to the Engineer. He shall cooperate with the police department in the establishment of alternate routes and, at his own expense, shall provide adequate, plainly marked detour signs. The signs shall be as required by the agency that has jurisdiction over the roadway.

E. For the proper control of traffic, the Contractor shall provide an adequate number of persons employed at his own expense.

F. The Contractor shall immediately report in writing, giving full details, to the Engineer all accidents that arise out of or in connection with the performance of the Work, whether on or adjacent to the site, which cause death, personal injury or property damage. In addition, the accident shall be reported immediately by telephone or messenger to the municipality in which it occurred. If a claim is made or suit is filed by anyone against the Contractor on account of any accident, the Contractor shall promptly report the facts in writing to the Engineer, giving full details of the claim.

1.5 PROTECTION OF FACILITIES AND EQUIPMENT

A. Until final acceptance of the Work, the Contractor shall continuously maintain adequate protection of his work and work in progress from damage, and shall protect from loss or damage Contractor furnished and Township furnished machinery, equipment, materials and supplies being handled, including property considered for progress payments wherever located as well as other property of the Township from loss or damage arising out of or in connection with the prosecution of his work. He shall make good any such loss or damage. He shall adequately protect adjacent private and public property as provided by law and these Specifications.

B. The Contractor shall not load or permit any part of any structure to be loaded with a weight that would endanger its safety. It shall be the Contractor's responsibility to verify the acceptable load carrying capacity of any structure his equipment or work will affect, unless the load carrying capacity is so stated by the Engineer.

C. The Contractor shall immediately report in writing, giving full details, to the Owner all accidents which arise out of or in connection with the performance of the Work, whether on or adjacent to the site, which cause death, serious personal injury or substantial property damage. In addition, the accident shall be reported immediately by telephone or messenger to the Engineer. If a claim is made or suit is filed by anyone against the Contractor on account of any accident, the Contractor shall promptly report the facts in writing to the Engineer, with a copy to the Owner, giving full details of the claim.

D. The Contractor shall assume all risks of loss or damage of any kind to any vehicles, machinery, equipment, materials or supplies which he shall provide in doing the Work.

E. The Contractor shall conduct his work in such a manner as to adequately protect property owned by others on or about the Owner's premises from damage by the construction operations.

1.6 DUST CONTROL

A. During the progress of the work, the Contractor shall conduct his operations and maintain the area of his activities so as to minimize the creation and dispersion of dust.

1.7 SANITARY

A. The Contractor shall provide, maintain and remove when no longer required, an adequate number of temporary, prefabricated, chemical-type toilets with proper enclosures for the use of workmen and women of all trades during construction. Toilets shall be located where directed. When connected to water and sewer, meet all code requirements and take precautions to prevent freezing.

B. The Contractor shall keep toilets clean and supplied with toilet paper at all times. The Contractor shall comply with all local and state health requirements and sanitary regulations.

1.8 BYPASSING FLOWS

A. The Contractor is responsible that the flow is maintained when making new connections to existing sewer. When conditions require and with the Authority's permission, Temporary Bypass Pumping will be allowed. No more than one section of sewer (between manholes) may be isolated at any one time. When this is done flow must be pumped around the isolated area and back into the existing system. All this shall be done without causing sewer backups. In no case will residents be without sewer service overnight.

B. When Temporary Bypass Pumping is required, the Contractor shall be required to plug the manhole section in which the work is being done and provide a temporary bypass pumping system from the upstream manhole to the downstream manhole. The temporary bypass pumping system shall consist of a minimum of two (2) pumps, one to be a standby, each capable of pumping the peak anticipated flows, the required lengths of pipe, and all temporary power, etc.

C. No sewer section shall be shut down unless residents affected by the shut down are notified at least twenty-four (24) hours in advance so that they may make preparations for same.

D. It shall be the Contractor's responsibility to provide whatever temporary facilities that are needed in order to collect and dispose of sewage from the individual homes in the area of construction.

E. Pumping between the hours of 7:00 P.M. and 7:00 A.M. will not be permitted. The Contractor shall make what watertight temporary sewer connections that are necessary at the end of the work day in order that the sewer and laterals can flow by gravity, uninterrupted, without the need for temporary pumps. Also, no temporary pumping will be permitted on Sunday.

F. Flows shall be bypassed in such a way that basements are protected from back flows. The Contractor shall not allow the sewage to surcharge into basements.

G. At no time will the Contractor be permitted to pump the sewage either directly or indirectly onto the ground or street or into any storm sewer, stream, drainage ditch or water course.

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

1.9 POWER, WATER, ETC., FOR TESTING

A. The Contractor shall pay for all natural gas, water and/or electricity required for testing of installed Work. Labor and supervision required for making tests shall be provided by the Contractor for the installed work involved.

1.10 OFFICES AND STORAGE

- A. The Contractor shall, for his own use, provide and maintain such temporary office facilities as he may require and such watertight storage sheds with floors as may be required for storage of his materials which might be damaged by weather.
- B. Depending on the extent of the project, the Authority at its discretion may require a temporary office for its Engineer. After first obtaining a building permit from the Township code enforcement department, the Contractor shall provide a lockable office, with a minimum space of 600 square feet for the Engineer. For duration of the entire project construction, provide this office with:
 - 1. Adequate lighting, regular toilet facilities of the non-chemical type with drain to existing sewer system or to a holding tank, heating, ventilation and air conditioning throughout.
 - 2. Daily janitorial services
 - 3. Telephone
 - a. Provide two (2) telephone lines, one for telecommunications and one for a FAX machine.
 - b. Provide telephone with capacity of placing calls on hold, transferring calls and conference calling.
 - c. Provide one automatic phone answering/recording device.
 - d. Provide facsimile machine (FAX) complete with paper supplies and maintenance.
 - 4. Provide hot and cold water to office, properly insulated.
 - 5. Furniture and equipment as follows:
 - a. One (1) desk, with swivel chair and two (2) side chairs
 - b. One (1) lockable, four (4) drawer file cabinets
 - c. One (1) draftsman's stool and one (1) drafting table with a 36-in. x 60-in. top
 - d. One (1) copying machine complete with paper supplies and maintenance
 - e. One (1) first-aid cabinet complete with supplies.
 - f. One (1) water cooler
- C. Materials stored in the open at the Project site shall be stored on planks or other dunnage as necessary to keep materials from contact with the ground and shall be covered with tarpaulins for protection from weather.
- D. All temporary offices and storage facilities shall be removed by their installer when no longer required.

** END OF SECTION **

PART 1 GENERAL

1.1 SCOPE

- A. Description of Work
 - 1. Provide all labor, material and equipment to perform all clearing and grubbing as shown on the Drawings and as specified herein.

- B. Related Work Specified Elsewhere

Contractor shall obtain specific direction from the Engineer regarding the following:

- 1. Removal of peat, moss, lignite and vegetable matter below ground other than as specified in this section and Section 02220, EARTHWORK FOR UTILITIES.
- 2. Pruning, shearing and trimming of trees, shrubs and bushes.
- 3. Stripping and stockpiling topsoil, other than as specified in this section and Section 02220, EARTHWORK FOR UTILITIES.
- 4. Soils erosion, EROSION AND SEDIMENT CONTROL PLAN shown on the Drawings.

- A. Streets, roads, adjacent property and other works to remain shall be protected throughout the Work.

- B. Existing trees, shrubs and bushes:

- 1. Trees shall be protected by fencing, barricades, or wrapping as may be required.
- 2. Shrubs and bushes shall be protected by fences or barricades as may be required.
- 3. Shallow-rooted plants shall be protected at ground surface under and in some cases outside the spread of branches by fences, barricades or ground cover protection as may be required.

1.3 REQUIREMENTS OF REGULATORY AGENCIES

- A. Federal, State and Local laws and code requirements shall control the disposal of trees and shrubs.

PART 2 EXECUTION

2.1 GENERAL

- A. When working within temporary or permanent Rights-of-Way, use every means possible to protect from injury and damage, all property, including trees, shrubbery, lawns, fences, buildings, walls, roads, water courses, natural features or any improvements thereto, which may exist. Do not willfully or maliciously injure or destroy trees, shrubs or vegetation and do not remove or cut them without permission of the Authority.

- B. All operations must be confined to the width of the Rights-of-Way secured by the Authority or property lines unless further restrictions are shown on the Drawings and specified in Section 01010, SUMMARY OF THE WORK. All damage done to property resulting from the Contractor's negligence shall be repaired without charge to the satisfaction of the Authority with the exception of

Section 02110: CLEARING AND GRUBBING

those items (trees, shrubbery, etc.) that must be removed for construction and have been agreed upon beforehand, in writing, between the Contractor and Authority.

2.2 CLEARING

A. Limits of clearing shall be within the Rights-of-Way, to limits shown on the Drawings or to limits staked on the ground by the Authority.

B. Trees in construction zones or Rights-of-Way shall not be removed until inspected and/or tagged by the Authority or its representative.

1. No trees shall be removed within the construction zone or Rights-of-Way, except the following:

- a. Trees or vegetation within PennDOT's Rights-of-Way shall not be removed or altered unless a separate specific permit is obtained from the District Roadside Development Specialist authorizing such removal or alteration.
- b. Trees within an excavated area such as footing or trench.
- c. Trees whose root system will be destroyed by the excavation with the approval of the Engineer.
- d. Trees that interfere with the movement of the Contractor's equipment with the approval of the Engineer.

approval of the Engineer. Any trees that interfere with the movement of the Contractor's equipment shall be reviewed by the Engineer before they are removed.

C. All trees bordering any construction zone or Right-of-Way shall be protected by acceptable methods. Trees damaged by the Contractor will be either repaired or replaced as determined by the Authority or his Representative at the Contractor's expense.

D. Vegetation within the areas to be cleared, which may be designated to be saved by the Authority shall be left standing and uninjured.

E. Remove trees, sapling, shrubs, bushes, vines and undergrowth within the limits of clearing to the heights above ground given in the following table:

Type of Vegetation	Height of Clearing
Trees over 6-inches in diameter	12 inches
Shrubs, saplings, bushes and trees under 6 inches in diameter	3 inches
Vines and undergrowth	2 inches

1. Stumps required to be removed shall be to a depth of 18 inches. This depth shall be measured from existing ground surface or proposed finished grade, whichever is the lower.

2. Engineering requirements shall control removal of stumps under fills, foundations, or any construction in contact with the stumps.

Section 02110: CLEARING AND GRUBBING

2.3 GRUBBING

- A. Limits of grubbing shall coincide with the limits of clearing.
- B. Remove all stumps, roots over 4 inches in diameter, and matted roots within the limits of grubbing to the depths below. Such depths shall be measured from the existing ground surface or the proposed finish grade whichever is the lower.

Location	Depth of Grubbing
Footings	36 inches
Walks	12 inches
Roads	18 inches
Parking Areas	12 inches
Lawn Areas	8 inches
Fills	12 inches

2.4 TRIMMING OF TREES

- A. When required, with the Authority's and/or Property Owner's approval, trees shall be trimmed to remove branches or roots which interfere with construction or traffic. Paint all cut branches and roots with wound paint as recommended for the application.
- B. No trees or vegetation shall be removed or altered within PennDOT's rights-of-way unless a separate specific permit is obtained from the District Roadside Development Specialist authorizing such removal or alteration.

2.5 SALVAGE

- A. Material that is to be salvaged, as a result of the clearing operations, shall include the following items which are to be turned over to the Property Owner if the Property Owner so desires.
 - 1. Logs over 12 inches, butt diameter
 - 2. Branches over 6 inches, butt diameter
 - 3. Parts suitable for use as mulch
 - 4. Live plants suitable for replanting

- B. Cut logs and branches into cordwood, 2 feet-6 inches in length and store on site where acceptable to the Engineer and Property Owner.

- C. All salvageable material not desired by the Property Owner shall be removed as part of the Work.

2.6 DISPOSAL

- A. Burning of materials on the site will not be permitted.
- B. Removal:
- 1. Material to be removed shall be removed from the site daily as it accumulates.

2. Should the Contractor elect to continue work beyond normal working hours, material to be removed shall not be allowed to accumulate for more than 48 hours.
3. Disposal of surplus material within PennDOT's rights-of-way is prohibited. All surplus material must be disposed of as the work progresses and shall not be stored on PennDOT's rights-of-way for future removal.

C. Dumping

1. Surplus material shall not be permitted to be dumped within the Contract area at any location.
2. Prior to depositing surplus material at any off-site location, the Contractor shall obtain a written agreement between himself and the owner of the property on which the disposal is proposed. The agreement shall state that the owner of the property gives permission for the Contractor to enter and deposit the material at no expense to the project owner. A copy of the agreement shall be furnished to the Authority. Contractor's disposal shall comply with all Federal, State and Local laws and regulations.

**** END OF SECTION ****

PART 1 - GENERAL

1.1 SCOPE

A. Description of Work

1. Provide all labor, material and equipment to excavate pipe trenches and backfill after the installation of the pipe, all in accordance with the Drawings and as specified herein.

B. Related Work Specified Elsewhere

1. Clearing, Section 02110, CLEARING AND GRUBBING
2. Rock Excavation, Section 02230, ROCK EXCAVATION
3. Piping, Section 02551, SANITARY SEWERS AND APPURTENANCES
4. Concrete, Section 03301, CAST-IN-PLACE CONCRETE

1.2 LINES AND GRADES

A. Grades

1. Pipes shall be laid true to the lines and grades shown on the Drawings. The grade shown on the profile is the invert to which the Work must conform. Work not conforming to the lines and grades shall be removed and reinstalled to the proper depths and locations by the Contractor at his own expense.

2. The Contractor is responsible for maintaining the line and grade. The pipe shall be checked at each manhole to assure that it is on the correct line and grade.

B. Locations of Lines

1. The locations of the proposed lines are shown on the Drawings.
2. Approximate depths are shown on the Drawings.
3. The Engineer reserves the right to make changes in lines and grades of pipe lines and in locations of pipes and manholes when such changes may be necessary or advantageous.

C. Changes in Pipe Location or Grade

1. The Authority will allow no claims for changes in locations or grade unless such changes are made after trenching has been done.
2. All changes in locations or grade within PennDOT's right-of-way will require prior approval of PennDOT. The Developer, based on information provided by the Engineer, shall submit a supplemental permit application to PennDOT.

1.3 TRENCHING REGULATIONS

- A. In open trenching on State, County and Township highways, the Contractor shall be governed by the conditions, restrictions and regulations made by the PA Department of Transportation, the County Commissioners, and the Township Supervisors. All such regulations shall be in addition to the ones set down in these Specifications.

PART 2 - PRODUCTS

2.1 BACKFILLING MATERIALS

A. Suitable Materials

1. General

a. Suitable material, when used as backfill in paved areas, shall be capable of being compacted as specified in paragraph "Compaction and Testing in Paved Areas" in Part 3 of this Section of these Specifications.

b. The final determination of suitability of materials for backfill purposes shall be made by the Engineer.

2. Type 1 Material

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

3. Type 2 Material

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

B. Crushed Stone

1. Crushed stone shall be not washed, with fines present to stabilize it in the trench. If amount of fines is insufficient, then stone screenings shall be added to extent required to stabilize it in the trench. Crushed stone shall be as specified in PennDOT Publication 408, Section 703 *Aggregate* and as specified below.

2. Crushed stone bedding and haunching for sewer pipes shall be AASHTO #57 (formerly known as PennDOT No. 2B), as specified in PennDOT Publication 408, Section 703 *Aggregate* and as shown in table below:

Square Mesh	Sieve Size	Percent Passing by Weight
1 1/2-inches	1 1/2-inches	100
1 inch	1 inch	95-100
1/2-inch	1/2-inch	25-60
#4	#4	0-10
#8	#8	0-5

3. Crushed stone backfill (initial and final) in Township roads shall be PennDOT No. 2A as specified in PennDOT Publication 408, Section 703 Aggregate and as shown in table below:

Square Mesh	Sieve Size	Percent Passing by Weight
2 inches	2 inches	100
3/4-inch	3/4-inch	52-100
3/8-inch	3/8-inch	36-70
#4	#4	24-50
#16	#16	10-30

4. Crushed stone backfill in State highways shall be as specified by PennDOT or, in the absence of specific direction from PennDOT, stone shall be PennDOT No. 2A.

5. Sharp stones and crushed rock (larger than 3/4-inch) shall be excluded from bedding material.

C. Concrete
 1. Concrete used for cradles, thrust blocks, or encasement shall be High Early Strength concrete (3,750 psi) as specified in Section 03301, CAST-IN-PLACE CONCRETE. Tests of concrete for this usage are waived.

2.2 WARNING TAPE
 A. Underground marking tape shall be placed at two levels above all sewer mains and laterals. Tape shall be 3 inches wide and imprinted with a continuous warning message (*Caution, Sewer Line Buried Below*) repeated every 24 inches.
 1. Metallic Detection Tape shall be placed approximately 1 foot below subgrade, above all sewer mains and laterals, and have a metallic lining. Tape shall be *Sentry Line Detectable* tape by Reef Industries, or approved equal.
 2. Early Warning Tape shall be placed approximately 18 inches above all sewer mains and laterals. Tape shall be *Terra-Tape* by Reef Industries, or approved equal.

B. Tapes shall have the following physical properties:

Property	Detection	Warning	Test Method
Thickness (min.)	5.0 mils	4.0 mils	ASTM D-2103
Std. Weight	28.0 lbs/1,000 sq ft.	18.5 lbs/1,000 sq ft.	ASTM D-2103
Tensile Strength/3" width	70.0 lb.-ft.	30.0 lb.-ft.	ASTM D-882
Elongation	100%	800%	ASTM D-882
PPT Resistance	8.0 lbf	14.0 lbf	ASTM D-2582

PART 3 - EXECUTION

3.1 EXCAVATION

A General

1. Perform all excavation of every description and of whatever substances encountered to the depth shown on the Drawings.
2. All excavated materials not required for fill or backfill shall be removed from the site of the Work by the Contractor, but none shall be deposited on private property until written consent of the property owner has been filed with the Engineer.
3. All excavation, unless otherwise authorized by the Engineer, shall be made by open cut. Side walls of trenches shall be kept vertical and shall be properly braced.
4. Trenches shall be excavated true to line so that the trench width is not more than necessary or allowed by the Engineer.
5. Care shall be taken not to excavate below the depth specified.

1. Rock excavation, when needed, shall be done in accordance with Section 02230, ROCK EXCAVATION.

C. Excavation Below Grade

1. Where the bottom of the trench, by mistake of the Contractor, is taken out to a greater depth than specified for a given pipe bedding the trench shall be brought back to grade as follows:
 - a. Where the pipe was to be supported by crushed stone cradle, crushed stone embedment, concrete encasement or concrete cradle, the over-excavation shall be filled with crushed stone so as to comply with the requirements for crushed stone foundation.
2. Refilling with earth to bring the bottom of the trench to the proper grade will not be permitted.
3. This additional material required due to the over-excavation shall be furnished and installed by the Contractor at his own expense.

D. Blasting

1. Blasting, when needed, shall be done in accordance with the specification for blasting in Section 02230, ROCK EXCAVATION.

2. As required, no blasting will be permitted within PennDOT Rights-of-Way until the Contractor has provided the required insurance on PennDOT prescribed forms, obtained approval from PennDOT, and delivered a copy of same to the Authority. The Contractor