

**REQUIREMENTS FOR THE CONNECTION AND USAGE
OF THE
WILLIAMS TOWNSHIP PUBLIC SANITARY SEWAGE SYSTEM**

**WILLIAMS TOWNSHIP
NORTHAMPTON COUNTY, PENNSYLVANIA**



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I. DEFINITIONS

Unless the context specifically and clearly indicates otherwise, the meaning of terms used in this Document shall be as follows:

Authority - The Williams Authority (if any is created), a municipal authority, incorporated pursuant to provisions of the Municipality Authorities Act of 1945, approved May 2, 1945, P.L. 382, as amended and supplemented, of the Commonwealth.

Authorized Agent - An employee of Williams Township and/or an individual certified pursuant to the Uniform Construction Code, and authorized to conduct inspections of grease interceptors/traps within Williams Township.

Building Sewer - The extension from the sewage drainage system of any structure to the Lateral of a Sewer.

Commonwealth - The Commonwealth of Pennsylvania.

Contractor - The person(s), firm, or corporation with whom the DEVELOPER has executed a contract, formally or informally, for the construction of the PROJECT.

Developer - The person(s), firm, or corporation with whom the TOWNSHIP has executed an Agreement covering the WORK to be performed.

Developer Drawings - The DRAWINGS which show the character and scope of the WORK to be performed, and which have been reviewed by the ENGINEER and approved by the TOWNSHIP.

Engineer - The consultant appointed and whose services are retained by the TOWNSHIP for the performance of engineering services.

Improved Property - Any property within this Township upon which there is erected a structure intended for continuous or periodic habitation, occupancy or use by human beings or animals and from which structure Sanitary Sewage and/or Industrial Wastes is or may be discharged.

Industrial Establishment - Any Improved Property located within this Township and used or intended for use, wholly or in part, for the manufacturing, processing, cleaning, laundering or assembling of any product, commodity or article, or any other Improved Property located in this Township from which wastes, in addition to or other than Sanitary Sewage, shall be discharged.

Industrial Wastes - Any and all wastes discharged from any Industrial Establishment, other than Sanitary Sewage.

Lateral - That part of the Sewer System extending from a Sewer to the curb line or, if there shall be no curb line, to the property line or, if no such Lateral shall be provided, then "Lateral" shall

mean that portion of, or place in, a Sewer which is provided for connection of any Building Sewer.

Owner - Any Person vested with ownership, legal or equitable, sole or partial, of any Improved Property.

Person - Any individual, partnership, company, association, society, trust, corporation, municipality, municipal authority or other group or entity.

Prohibited Discharge Standards - The regulations and standards as described in the collective Ordinances of Williams Township for industrial wastewater discharge and pretreatment rules as they relate to commercial, industrial, and institutional establishments.

Project - The entire construction to be performed as provided in the DRAWINGS and SPECIFICATIONS.

Sanitary Sewage - Normal water-carried household and toilet wastes from any Improved Property.

Sewer - Any pipe or conduit constituting a part of the Sewer System used or usable for sewage collection purposes.

Sewer System - All facilities, as of any particular time, for collecting, pumping, transmitting, treating and disposing of Sanitary Sewage and/or Industrial Wastes, situate in or adjacent to this Township, and owned by the Township (or its Authority).

Specifications - The Technical Section(s) and Standard Detail(s) adopted by the TOWNSHIP and as may be amended from time to time.

Street - Any street, road, lane, court, cul-de-sac, alley, public way or public square.

Township - Township of Williams, Northampton County, Pennsylvania, a township of the Second Class of the Commonwealth of Pennsylvania, acting by and through its Board of Supervisors or, in appropriate cases, acting by and through its authorized representatives.

Work - Any and all obligations, duties, and responsibilities necessary to the successful completion of the project assigned to or undertaken by the DEVELOPER and/or the CONTRACTOR under the DRAWINGS and SPECIFICATIONS, including the furnishing of all labor, materials, equipment, and other incidentals.

II. CONNECTIONS TO WILLIAMS TOWNSHIP PUBLIC SEWER SYSTEM

1. All New Connections: New connections to the public sewer system shall be made only under prior written agreement between a property owner and the Township. The property owner shall be responsible for all costs, including design review, legal and construction costs related to the new connection, which shall, at the discretion of the Township, be made either by the property owner's or Township's contractor. All costs for a new connection shall be escrowed in advance of the construction and a professional services agreement shall be entered into between the owner/applicant and the Township. Any new connection shall be made in accordance with the Township's Standard Specifications and Details.
2. Any Owner, Equitable Owner, or Subdivider or Developer who is proposing to subdivide or develop land may extend sanitary sewer collection system lines or interceptor lines to serve his Property, Development or Subdivision, if such extension of services conforms to the requirements of this Document and if;
 - A. The Township Official Sewer Plan (ACT 537) includes this proposed extension, service area and development in its plan as a Future Service area for the Township's System.
 - B. The Township has set aside or reserved capacity at the Easton Area Joint Sewer Authority (EAJSA) wastewater treatment facility for the property to be served by the extension. (It is stated here that setting aside capacity or reserving capacity for a property does not guarantee any approvals of specific plans by the Township or the Township Zoning Officer).
 - C. The Person requesting the extension has obtained all necessary permits for the sewer extension from the Pennsylvania Department of Environmental Protection (DEP), Northampton County Conservation District (NCCD) and any other agency requiring approval for the proposed project.
 - D. The Person requesting the extension has a proposed plan submission that has met the criteria established within this Document and the Township's Standard Specifications and Details and has been approved by the Township's Engineer and Board of Supervisors.
 - E. The Person requesting the extension has agreed to pay all costs associated with making the extension and has agreed to install the extension under the Township's inspection, has agreed to reimburse the Township for costs associated with Plan Review, Permit Submission and Construction Inspections.
 - F. The Person requesting the extension has agreed to a date of Project Completion and has posted Security with the Township sufficient to guarantee payment of costs and proper installation in a timely manner.
 - G. The Person requesting the extension has agreed to be responsible for the maintenance of the proposed extension for 24 months after its installation and has posted security with the Township sufficient to guarantee the estimated cost of such maintenance.

- H. The Person requesting the extension has agreed to provide dedication or dedicate the entire extension along with any required easements to the Township and to pay for or provide the Township with five (5) copies of "As Built" Plans prepared and sealed by a Registered Engineer showing the size, location and depth of all Lines and Laterals, all at no cost to the Township.
 - I. The Person requesting the extension has entered into an Improvements Agreement and Maintenance Agreement with the Township covering, at a minimum, all the requirements of this Document.
3. Individual or Improved Property Connections: The Owner of any Improved Property whose principal building is within 150 feet of the Township's sewer system shall connect such Improved Property with and shall use such sewer system. Connection shall be made within 60 days after notice to such Owner from the Township.
 4. Notice by the Township requiring the connection to the Township sanitary sewer system shall consist of a copy of this Document, including any amendments and/or supplements at the time in effect and a written or printed document requiring the connection in accordance with the provisions of this Document and specifying that such connection shall be made within 60 days after the date such notice is given or served. Such notice may be given or served at any time after a sanitary sewer is in place which can receive and convey sanitary sewage or industrial wastewater for treatment and disposal from the particular Improved Property.

Such notice shall be given or served upon the Owner in accordance with law. If for some reason the Owner cannot make the connection within this sixty (60) day period, the Township at its sole discretion may grant, case by case, extensions of time for a sixty (60) day period, if the following conditions are met;

- A. The Owner requesting such extension cites the reasons for the request in writing,
 - B. The Township determines that the reasons cited by the Owner are sufficient to justify the extension of time.
5. No Person shall discharge or permit the discharge of any sanitary sewage or industrial wastewater upon public or private property or to any natural outlet within the Township.
 6. No privy vault, cesspool, septic tank or similar receptacle shall be used or maintained at any time once an Improved Property has been connected to the Township's sewer system or is required to be connected to the sewer system.
 - A. Every such privy vault, cesspool, septic tank or similar receptacle in existence shall be abandoned, cleaned, and backfilled at the expense of the Owner of such Improved Property. All work shall be inspected by the Township. Any system identified by the Township to be abandoned and not done so shall constitute a nuisance, and as such

nuisance may be abated, as provided by law, at the expense of the Owner of such Improved Property.

- B. The fill for such privy vault, cesspool, septic tank, or similar receptacle shall constitute clean earth, stone, rock, sand or concrete and shall be approved by the Township on a case-by-case basis.
 - C. Under no circumstances shall a privy vault, cesspool, septic tank or similar receptacle be connected to the Township's sanitary sewer system.
7. Where an improved property which is currently serviced by its own sewage disposal system or device is required to connect to the sanitary sewer system, the existing house sewer line leading to the disposal system shall be broken prior to the structure. Following a structural evaluation and video inspection of the line and with prior approval of the Township the line from the home may be extended, with proper fittings, to continue as a sanitary lateral to the sanitary sewer main.

III. SEWER SYSTEM USE

- 1. No person shall uncover, connect to, alter or disturb, in any manner, any sanitary sewer or the sanitary sewer system without first making application for and securing a permit, in writing, from the Township.
- 2. Application for a sanitary sewer connection permit shall be made by the Owner of the Improved Property to be served or his duly authorized agent.
- 3. No person shall make or cause to be made a connection of any Improved Property to a sanitary sewer until such Person has fulfilled each of the following conditions:
 - A. Notification to the Township of the desire and intention to connect such Improved Property to the sanitary system.
 - B. Made application for and obtained a permit from the Township.
 - C. Provide the Township with at least 24 hours notice of the time when such connection will be made so that the Township may inspect the work for the proposed connection and necessary testing.
 - D. Paid to the Township any fee charged and imposed by the Township for the proposed connection.
- 4. Each Improved Property shall be connected separately and independently to a sewer main through a lateral. Grouping of more than one Improved Property to one lateral shall not be permitted.

5. All costs and expenses associated with the construction and connection of the sanitary lateral to the sewer main shall be borne by the Owner of the Improved Property to be connected; and as such the Owner shall indemnify and save harmless the Township from all loss or damage that may be occasioned, directly or indirectly, as a result of construction of the sanitary lateral or the connection of the lateral to a sewer main.
6. A sanitary lateral shall be connected to the sewer main at the place designated by the Township. The invert of the lateral at the point of gravity connection shall be at a higher elevation than the invert of the sewer main. Where any building drainage system is too low to permit gravity flow to the sewer main, the sewage discharge from such building drainage system shall be lifted by an approved means.
7. Every sanitary lateral of an Improved Property shall be maintained in a sanitary and safe operating condition by the Owner of such Improved Property.
8. No sanitary sewer shall be covered until it has been inspected and approved by the Township. If any part of a sanitary sewer is covered before so being inspected and approved, it shall be uncovered for inspection at the cost and expense of the Owner of the Improved Property being connected.
9. Every excavation for a sanitary lateral shall be adequately secured to protect all Persons from damage and injury. Streets, sidewalks and other public property disturbed in the course of installation of the lateral shall be restored, at the cost and expense of the Owner of the Improved Property being connected, in a manner satisfactory to the Township.
10. If any Person shall fail or refuse, upon receipt of a notice from the Township, in writing, to remedy any unsatisfactory condition with respect to a lateral service, within sixty (60) days of receipt of such notice, the Township may refuse to permit such Person to discharge sanitary sewage or industrial wastewater into the Township's sewer system until such unsatisfactory condition has been remedied to the satisfaction of the Township.

IV. DISCHARGES TO THE SANITARY SEWER SYSTEM

1. The Township reserves the right to refuse connections to the Township's sewer system, to compel discontinuance of use of the sewer system, or to compel the pretreatment of wastewaters by any individual or industry in order to prevent discharges deemed to be harmful, or which could have a deleterious effect upon any portion of the sewer system or treatment process.
2. Wastewater in any of the following categories shall not be discharged into the sewer system without the prior approval of the Township:
 - A. Industrial wastewater having a BOD greater than two hundred fifty (250) mg/L;

- B. Industrial wastewater having a content of suspended solids greater than three hundred and fifty (350) mg/L;
- C. Industrial wastewater having COD greater than six hundred (600) mg/L;
- D. Industrial wastewater slugs having an average daily flow greater than five percent (5) of the average daily wastewater flow at EAJSA sewage treatment plant;
- E. Any sewage, industrial wastewater, or other matter having the following:
 - a. a temperature higher than 150 degrees F or less than 32 degrees F;
 - b. containing more than 100 mg/L of fat, oil or grease;
 - c. containing any gasoline, benzine, naphtha, fuel oil, paint products, acid, or other inflammable or explosive liquids, solids, or gasses;
 - d. containing un-ground garbage;
 - e. containing any ashes, cinders, sand, mud, straw, shaving, metals, glass, rags, feathers, tar, plastics, wood, whole blood, paunch manure, bentonite, lye, building materials, rubber, hair, bones, leather, porcelain, china, ceramic wastes, or other solid or viscous substances capable of causing obstruction or other interference with the operation of the sewer system or the EAJSA sewage treatment plant;
 - f. having a pH lower than 5.5 or higher than 9.5 or having any other corrosive property capable of causing damage or hazard to structures, equipment, bacterial action or personnel;
 - g. containing a toxic or poisonous substance in sufficient quantity to injure or interfere with any sewage treatment process, to constitute a hazard to humans or animals or to create any hazard in the receiving waters sewer system;
 - h. containing total solids greater than 850 mg/L or of such character and quantity that unusual attention or expense is required to handle such materials in the operation of the Sewer System or the sewage treatment plant receiving wastes from the Sewer System;
 - i. containing noxious or malodorous gas or a substance which creates a public nuisance;
 - j. containing dye from any source that will not have an effluent the equivalent of that produced by alum coagulation and chlorination to remove suspended or colloidal matter and bleach the dissolved dyes;
 - k. containing radio-active substances and/or isotopes;

- l. containing wastes which are not amenable to biological treatment or reduction in existing treatment facilities, specifically non-biodegradable complex carbon compounds.
 - m. containing concentrations of anions, cations, and other various objectionable substances that would result in the City of Easton, even when using normal treatment plant operation practices, discharging such substances in amounts in excess of those amounts permitted to be discharged by the EAJSA WWTP sewage treatment plant National Pollution Discharge Elimination System (NPDES) Permit.
3. The Township reserves the right, at its sole discretion, to require non-domestic establishments having large variations in rates of wastewater discharge to install suitable regulating devices for equalizing wastewater flows to the sewer system.
 4. When directed by the Township, Owners of industrial establishments shall install, pay for, and maintain a manhole and any other devices as may be approved by the Township to facilitate observation, measurement, and sampling of wastewaters discharged to the Township's sewer system. The Township or its duly authorized representative, at all reasonable times, shall be permitted to enter upon any and all properties for the purpose of inspecting, observing, measuring, and sampling wastewaters discharged to the sewer system.
 5. Owners of industrial establishments desiring to discharge industrial wastewater to the sewer system shall obtain a permit from the Township to do so. Applications for a permit to discharge industrial wastewater shall be accompanied by all information requested by the Township for the determination of industrial wastewater volumes, characteristics, and constituents. The cost for obtaining such information shall be borne by the Owner of the industrial establishment.

The Owner of any industrial establishment which is connected to the sewer system who plans to change operations so as to materially alter the characteristics and volumes of wastewaters discharged to the sewer system shall notify the Township in writing at least sixty (60) days before making such connections or changing its operations.

6. When directed by the Township, grease, oil, and sand interceptors or traps shall be provided where, in the opinion of the Township, they are necessary for the proper handling of liquid wastes containing grease in excessive amounts, of any flammable wastes, sand and other harmful ingredients. All interceptors shall be of a type and capacity acceptable to the Township, and shall be located as to be readily and easily accessible for cleaning and inspection.
7. No person shall discharge or cause to be discharged to any sanitary sewer, any storm water, surface water, groundwater, roof runoff, subsurface drainage, uncontaminated cooling water, or unpolluted industrial process water.
8. No person shall discharge or cause to be discharged to any sewer, sanitary sewage or industrial waste from any commercial or industrial garbage grinder.

9. Drain lines from all swimming pools shall be connected to the storm sewer system where available. A pool drain shall not be connected to the sanitary sewer system unless such connection is required specifically by the PADEP. If such a connection is so required, the Township reserves the right to make such connection subject to reasonable conditions and additional sewer rental charges.
10. The Township reserves the right to adopt, from time to time, such additional rules and regulations as it shall deem necessary and proper in connection with use and operation of the Township's sanitary sewer system, which rules and regulations, shall become and shall be construed as part of this Document.
11. Nothing contained in this Article shall be construed as prohibiting any special agreement or arrangement between the Township and any Person whereby industrial wastewater of unusual strength or character may be discharged into the sewer system.

V. MEASUREMENTS, TESTS AND ANALYSES OF WASTEWATER

1. All measurements, tests, and analyses of the characteristics of wastewater to which reference is made here and above in this Document shall be determined in accordance with the latest edition of "Standard Methods for Examination of Water and Wastewater".
2. All samples shall be 24-hour composite wastewater samples, that is, twenty-four (24) hourly wastewater samples collected over a twenty-four (24) hour period with the sample volume proportioned according to the flow rate at the time of the sample. The cumulative sample shall be refrigerated. Exceptions to the 24-hour composite sampling procedure may be made at the sole discretion of the Township.
3. The frequency of sampling, measuring, and testing shall be as directed by the Township. All expenses of this activity shall be borne by the Owner, and all data obtained shall be sent to the Township, as requested, or shall be obtained directly by the Township at the Township's discretion.
4. The Owner of any improved property connected to the sanitary sewer system shall provide the Township and its representatives and agents the opportunity of access at any time to any part thereof, as shall be required for purposes of inspection, measurement, sampling and testing and for performance of other functions relating to service rendered by the Township related to the sanitary sewer system.

VI. WATER DIVERSION METERS

Meters which are installed for the purpose of measuring water use, which qualify for exclusion from the sanitary sewer system shall be referred to as a diversion meter. Diversion meters may be installed within all single family residential dwellings and commercial buildings served by

public sewer and public water. The cost of procurement, installation and maintenance of the water diversion meter shall be at the sole and exclusive expense of the landowner. All diversion meters must be obtained from Williams Township. Credit for water used through the diversion meter will be given only during quarter of consumption or month of consumption depending upon the customer's billing cycle. Diversion water meters shall be installed in accordance with all Williams Township Building Codes and Ordinances. Applications for a diversion meter/plumbing permit must be completed and the permit must be obtained prior to installation by a registered plumber. The cost of the permit shall be Three Hundred Twenty-Five Dollars (\$325.00). The following rules and regulations apply to the installation:

- A. A diversion meter shall be installed only when the local water company primary usage meter or a Williams Township primary usage meter installation is complete.
- B. Diversion meters shall measure in cubic feet with registration occurring in 100 cubic foot increments.
- C. The location of the diversion meter and the diversion meter remote is subject to the review and approval of the Township.
- D. Sewer billing deductions will be given in 100 cubic foot increments. Deductions will be given for the current reading cycle.
- E. A diversion meter used for the measurement of domestic water shall be installed on only one branch water supply line. The branch shall supply water for exterior use only. Under no condition shall exclusion be given for interior domestic use.
- F. Applications involving non-domestic use exclusion for commercial and industrial water uses, which qualify for exclusion from wastewater treatment need to submit three sets of complete facility plans. Such applications shall pay a fee of One Thousand Dollars (\$1,000.00) for facility inspection and plan review.
- G. The exterior branch shall remain completely visible for convenient inspection. The branch cannot be concealed in ceilings, walls or floors.
- H. Three detailed layout plans must be submitted to the Township illustrating the following:
 - i. The meter size and location.
 - ii. The exterior water supply branch showing the proposed location of the branch and the structure and all exterior supplies and uses. For all non-domestic water supplies, the plans must show all water supplies and wastewater lines and their uses.

- iii. The location of the remote.
 - iv. The proposed meter setter configuration.
 - v. All existing and proposed shut-off valves, bleed valves, blow-out ports and back-flow devices on the exterior branch supply.
- I. Meters shall be installed on an approved meter setter. Approved shut-off valves shall be required adjacent to both the inlet and outlet of the meter so service may be shut-off without undue inconvenience to the owner whenever the meter must be removed.
 - J. Blow-out ports (valves) for in ground sprinkler systems shall be installed after the diversion meter on an isolated T connection. A check valve prohibiting the back-flow of water through the blow-out port (valve) must be installed. The blow-out port assemble shall be installed after the meter's outlet gate valve. Prior to pressurizing the line both the inlet and outlet meter ball valves must be closed.
 - K. Drain (spigot) for in ground sprinkler systems shall be installed before the diversion meter and after the inlet meter ball valve on an isolated T connection. A check valve prohibiting blow-out through the drain (spigot) shall be installed. An inspection will be conducted by a representative of Williams Township after the installation of a diversion water meter. The Township representatives shall completely inspect the entire exterior water supply branch. If the complete installation meets all requirements, the meter shall be sealed and the initial reading shall be taken.
 - M. Meter readings shall be retrieved by the Township Public Works Department on a quarterly basis for customers billed on a quarterly billing cycle and on a monthly basis for customers billed on a monthly billing cycle.
 - N. The diversion meter and the exterior branch shall be inspected by a Williams Township representative, and tested a minimum of every five (5) years. Upon completion, the inspector shall re-seal and record the meter reading.
 - O. The property owner shall allow a Township employee, agent or representative to enter the structure during reasonable hours to inspect the diversion meter. Failure of the property owner to allow said inspection will result in the disallowance of any sewer billing deduction for water use during the period from the last diversion meter reading taken preceding the attempted inspection to the diversion meter reading taken following the date on which inspection is allowed.

- P. If an inspection reveals a faulty diversion meter, no credit for that quarter shall be given, and the meter will not be resealed. Reading will not be taken again until the meter is repaired or replaced and has passed a Township inspection. At that time, the meter will then be sealed and the new reading will be recorded.
- Q. Meters are intended for measuring potable, cold water in one direction only.
- R. Meters are to be installed in a horizontal pipeline with the register facing up. The meter must be readily accessible for interior reading. When connecting to a vertical supply, an approved vertical to horizontal supply to horizontal meter setter is required.
- S. To ensure unrestrictive flows of water through the meter, the proper size and types of gasket must be used. Meter connections shall be sufficiently tightened to a seal. Pipe sealant, tape or putty is not permitted on the meter spud threads.
- T. The attached as Appendix A, Installation Guidelines, are incorporated herein by reference thereto.

VII. ENFORCEMENT AND PENALTIES

1. Any Person who shall violate the conditions set forth in this Document shall be liable, upon summary conviction for a first offense and upon summary conviction for each subsequent offense, to a fine of not less than one hundred dollars (\$100) nor more than three hundred dollars (\$300), together with costs of prosecution in each case. Each day that a violation shall continue shall be deemed and shall be taken to be a separate offense and shall be punishable as such.
2. Fines and costs imposed under provisions of this Document shall be enforceable and recoverable in the manner at the time provided by applicable law.

APPENDIX A

**WATER METER
INSTALLATION GUIDELINES**

1. Meter is intended for measuring potable, cold water in one direction only.
2. Meter is to be installed in a horizontal pipeline with the register facing upward and readily accessible for reading.
3. Suitable shut-off valves should be installed adjacent to both the inlet and outlet of the meter so service may be shut off without undue inconvenience to the customer whenever the meter must be removed.
4. Clean and flush the service line thoroughly on the inlet side of the meter before installing the meter.
5. Remove the spud thread protectors and set the meter with the arrow on the meter pointed toward the outlet (customer's side).
6. To insure unrestricted flow of water through the meter, use the proper size and type of gaskets. Connections should only be sufficiently tightened to seal; do not over-tighten. Do not use pipe sealant, tape or putty on the meter spud threads.
7. After the meter is installed, shut the outlet shut-off valve. Open the inlet shut-off valve slowly until the meter is full of water and there are no leaks.
8. Open the outlet valve slowly until air is out of the meter and service line. Open a valve downstream of the meter slowly and insure that not foreign debris in the water obstructs the operation of the meter.

CAUTION: Introducing water too quickly into the meter will damage the meter's internal components. The meter and service line must be free of air before operating the meter at normal flow rates.

9. Install an electrical grounding strap around the meter for maintenance safety while repairing or removing meter.

NOTES:

1. For additional details, refer to the Water Meter Installation & Operating Instruction or the American Water Works Association (AWWA) Manual M6.
2. If the meter to be installed requires the installation of a remote, follow the applicable installation guide.

VIII. OIL AND GREASE INTERCEPTORS AND TRAPS

The purpose of this section is to assist the Township of Williams with respect to the maintenance and rehabilitation of oil and grease interceptor/trap systems and to prevent the discharge of certain grease, fats, grit and the like into the public sewer system, and to establish penalties for violations.

APPLICABILITY

- A. The provisions of this section shall apply to all commercial, industrial, and institutional establishments located within Williams Township.
- B. The Township of Williams agrees to cooperate with the EAJSA or any other public entity as necessary to fulfill the requirements of this section.
- C. Oil and grease interceptor/trap systems, except as may be modified by the provisions of the Uniform Construction Code, are required for all restaurants, food preparation facilities or other establishments within Williams Township that have the potential to discharge oil and/or grease into the sanitary sewer system.

PERMITS

- A. No person shall install, construct or alter an oil and grease interceptor/trap, or occupy or utilize any structure in which an oil and grease interceptor/trap system shall be installed, without first receiving a permit from Williams Township, which said approval shall identify the site and approve the plans and specifications so as to ensure compliance with the provisions set forth.
- B. All oil and grease interceptors/traps shall be available for inspection by appropriate representatives of Williams Township.
- C. After receipt of all required approvals, any person desiring to construct permanent oil and grease interceptor/trap system shall notify Williams Township.

DESIGN & INSPECTIONS

- A. Subject to the requirements of the Uniform Construction Code, an oil and grease interceptor must be the type and capacity approved by the owner's design professional and must be located for easy accessibility, for cleaning and inspection.
- B. The owner or person utilizing any property connected to the sanitary sewer system of the Township of Williams shall permit an authorized agent of the Township of Williams:
 - (1) To enter all properties and facilities for the purposes of inspection, sampling, and testing to determine compliance with the provisions of these regulations; and

(2) To examine and copy all records required to be maintained by the owner for the purpose of determining compliance with the provisions of these regulations.

- C. Any oil and grease interceptor/trap system may be inspected by an authorized agent of the Township of Williams at any reasonable time. Such inspection may require a physical tour of the property, sampling of the oil and grease interceptor/trap, and dye-testing of the interior plumbing to determine the path and ultimate destination of the generated wastewater.
- D. An authorized agent of the Township of Williams shall have the right to enter upon land for purposes of inspections.
- E. An initial inspection may be conducted by an authorized agent of the Township of Williams to determine the type and functionality of each oil and grease interceptor/trap.
- F. A schedule of routine inspections by the Township of Williams may be established to assure proper functioning of the oil and grease interceptor/trap.
- G. An authorized agent of the Township of Williams shall inspect systems known or alleged to be malfunctioning. Should said inspections reveal the system is malfunctioning, the authorized agent will order action to be taken to correct the malfunction.

MAINTENANCE

- A. Every person owning a building or structure containing an oil and grease interceptor/trap system, as well as any person making use of the oil and grease interceptor/trap system shall have the oil and grease interceptor/trap pumped by a qualified pumper/hauler within 60 days of the effective date of this article. Thereafter, all persons required to pump an interceptor system shall do so at least ever quarter. The owner and/or utilizer of the oil and grease interceptor/trap shall submit to the Township of Williams receipts from the pumper/hauler confirming the pumping of the oil and grease interceptor/trap within two weeks after the removal of the accumulated oil and grease.
- B. The required pumping frequency may be increased by the Township of Williams for good cause shown.
- C. Any person owning a property served by an oil and grease interceptor/trap, as well as any person making use of the oil and grease interceptor/trap system, must submit, with each required pumping receipt, a written statement from the pumper/hauler that the baffles in the oil and grease interceptor/trap have been inspected and found to be in good working order. Any person whose oil and grease interceptor/trap baffles are determined to require repair or replacement must first contact Williams Township for approval of the necessary repair.
- D. Any person owning a building served by an oil and grease interceptor/trap, as well as any person utilizing an oil and grease interceptor/trap system, must follow the operation and

maintenance recommendations of the equipment manufacturer. A copy of the manufacturer's recommendations and a copy of the service agreement must be submitted to Williams Township within 60 days following the installation of the system. In no case may the service or pumping intervals for the oil and grease interceptor/trap exceed those recommended by the manufacturer.

SYSTEM REHABILITATION

- A. A written notice of violation may be issued to any person who is the owner of any property which is found to be served by a malfunctioning oil and grease interceptor/trap system; and/or to any person utilizing said oil and grease interceptor/trap system, or who is discharging oil and grease without a permit.
- B. Within seven days of notification by Williams Township that a malfunction has been identified, the property owner, and/or the person utilizing the oil and grease interceptor/trap system, must make application to Williams Township for approval to repair or replace the malfunctioning system. Within 30 days of initial notification by Williams Township, construction of the permitted repair or replacement must commence. Within 60 days of the original notification by Williams Township, the construction must be completed, unless conditions mandate a longer period, in which case Williams Township may set an extended completion date.
- C. In the event the modifications do not result in the elimination of the malfunction of the existing oil and grease interceptor/trap system, the person owning and/or making use of the interceptor system shall bear responsibility for the continued malfunction of the system. The owner and/or utilizer of said system shall be required to take such action as necessary to eliminate the malfunction.

FAILURE TO COMPLY

- A. Williams Township, upon notice that an imminent public health or safety hazard exists due to failure of a property owner and/or utilizer to maintain, repair or replace an oil and grease interceptor/trap system, shall have the authority to contract to have the work performed. The owner of record of the property will be charged for the work performed and, if necessary, a lien will be entered therefore in accordance with the law.

OIL AND GREASE DISPOSAL

- A. All grease originating within a sewer system intended to flow within the Williams Township public sewer system shall be disposed of in accordance with the requirements of the Solid Waste Management Act (Act 97 of 1980, 35 P.S. §6018.101 et seq.) and all other applicable laws, and shall be disposed of at sites or facilities approved by PA DEP.
- B. Oil and grease pumpers/haulers operating within Williams Township's collection system shall operate in a manner consistent with the provisions of the Pennsylvania Solid Waste Management Act (Act 97 of 1980, 35 P.S. §§6018.101 through 6018.1003) and all other

applicable laws.

VIOLATIONS AND PENALTIES

- A. Should any person violate the provisions of the requirements, Williams Township is authorized to pursue all legal remedies available to it in order to effectuate compliance. In addition to any other remedies provided to the Township at law, any person violating any of the provisions of this section shall be guilty of a summary offense and, upon conviction thereof, shall be subjected to a fine in an amount not exceeding \$300.00.

VALIDITY

- A. If any section, clause, provision, or portion of this section or regulation incorporated herein shall be held to be invalid or unconstitutional by any Court of competent jurisdiction, such decision shall not affect any other section, clause, provision, or portion of this section or regulation.

IX. LOCAL LIMITS OF THE EASTON AREA JOINT SEWER AUTHORITY

The purpose of this section is to assist the Township of Williams with respect to the discharge limits to the Township's public sewer system as adopted by the EAJSA and established by the United States Environmental Protection Agency.

APPLICABILITY

- A. The provisions of this section shall apply to previously identified commercial, industrial, and institutional establishments located within Williams Township.
- B. The Township of Williams agrees to cooperate with the EAJSA or any other public entity as necessary to fulfill the requirements of this section.

LOCAL LIMITS

The following maximum weekly average pollutant limits are established to protect against pass through and interference at the EAJSA sewage treatment facility. No person shall discharge on a weekly average Wastewater containing in excess of the following:

Arsenic	<u>0.08</u> mg/l
Cadmium	<u>0.12</u> mg/l
Chromium (total)	<u>9.52</u> mg/l
Copper	<u>2.72</u> mg/l
Cyanide	<u>3.72</u> mg/l
Lead	<u>1.28</u> mg/l
Mercury	<u>0.07</u> mg/l
Molybdenum	<u>0.11</u> mg/l
Nickel	<u>0.92</u> mg/l
Selenium	<u>0.07</u> mg/l
Silver	<u>1.41</u> mg/l
Zinc	<u>1.53</u> mg/l

Weekly average shall mean the arithmetic means of all 24-hour daily results, whether composite or grab, collected in a one week period from Sunday through Saturday.

At no time shall the pollutant concentration of a 24-hour composite or grab sample exceed 1.5 times the weekly average limit listed above for the pollutant [nor shall a grab sample exceed twice the weekly average limit.] Should [either of] these limits be exceeded, it shall constitute a daily violation under this Resolution.

The above limits apply at the point where the Wastewater is discharged to the POTW. All concentrations for metallic substances are for "total" metal unless indicated otherwise. The Industrial Pretreatment Coordinator may impose mass limitations in addition to, or in place of, the concentration-based limitations above. All test procedures shall conform to an approval analysis method as indicated in 40 CFR Part 136.

SECTION X.
WILLIAMS TOWNSHIP
STANDARD TECHNICAL SPECIFICATIONS
FOR
NEW AND EXISTING SANITARY SEWER INSTALLATION

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GENERAL

1. These specifications cover the requirements for additions and extensions of the Williams Township sanitary sewer system. All additions and extensions shall be completed in accordance with the requirements contained herein. The work shall include furnishing of all plans, labor, new materials, equipment, supplies, transportation, fuel and power and performing all work as required by the specifications and including such detail drawings as may be required to prosecute the work. The work shall be executed in the best and most workmanlike manner by qualified, careful and experienced workmen.
2. The Township of Williams reserves the right to establish special supplemental requirements for any given addition or extension based upon unique features of the specific project, recent changes in standard sewer system operating and construction practices which may not be reflected within the specifications as herein contained, or for other legal or administrative reasons which the Township may identify, including, but not limited to, quality of wastewater discharged to the Township sewer system.

SUBMITTALS

1. Prior to the start of construction, the developer shall submit utility plans for the project to the Township for review. The Township will approve requests for sewer service only after approval of these utility plans. Once approved by the Township the Contractor is responsible for obtaining all necessary permits to complete the project. The Contractor is responsible for all permit fees.
2. These plans may be part of subdivision of land development plans prepared to meet regulatory requirements pertaining to land development activities, or the plans may be specifically prepared to meet the requirements of Williams Township. Four (4) copies of each set of submission documents will be submitted to the Township. The Township will cause the proposed additions or extensions, as described in the plans and supporting documentation to be reviewed by its Engineer, Solicitor, and Township staff, as required. When the plans describing the proposed work are found to be acceptable for construction, four (4) copies of the final plans, stamped "Approved for Construction," shall be submitted to the Township for its use during observation of construction. As necessary, additional sets of drawings may be required for attachments to legal agreements which address the provisions throughout which the extension or addition to the system may be constructed. The developer shall also furnish additional copies of the "Approved for Construction" plans as needed for the construction of the project.
3. All drawings shall show the location of the sanitary sewer mains, sanitary sewer manholes, and sanitary sewer laterals, and other necessary sewer appurtenances required for the completion of the work. All drawings shall incorporate both a plan view and a profile drawing which shall contain the proposed location of the proposed sanitary sewer, along with the location of the existing sanitary sewer, and existing and proposed sewer mains, and other underground utilities within the project site.

4. All drawings shall contain details for the proposed sanitary sewer facilities. Details should be sufficient for construction of the facilities, and should include, but not necessarily be limited to, restoration details, utility crossing details, standard installation details for sanitary sewer manholes, sanitary sewer laterals, pumping stations and other appurtenances, standard casing and concrete encasement details, and details of connections to the existing system(s).
5. In the case of submissions which are clearly incomplete or which are significantly non-responsive to the Township's standards for the system additions and extensions, the Township will reject the proposed submission without extensive review, pending the receipt of plans which reasonably address the Township's requirements. It shall not be the Township's responsibility to design such extensions or additions.
6. Shop Drawings: Four (4) sets of Shop Drawings for any material or equipment shall be submitted to the Township prior to the installation of such material or equipment.

TOWNSHIP REVIEW COSTS

1. The developer shall agree to pay all engineering, legal and administrative costs incurred by the Township in the review of the utility plans. These costs shall be in addition to and separate from any costs which may be required by the Township of Williams or the County Planning Agency.

DEVELOPER'S AGREEMENT

1. In all cases where a sanitary sewer will be installed or extended, the Developer shall enter into an agreement with the Township before commencing any work on the project. This agreement will be prepared by the Township, and will address the specific circumstances of each specific project.

CONSTRUCTION SECURITY

1. The Developer shall provide the Township with security to insure completion of the sewer facilities. This security shall be in the amount of one hundred ten percent (110%) of the construction cost of the facilities. Said security shall be in the form of a performance bond issued by a reputable insurance company and approved by the Township's Solicitor as to form and manner of execution. In the Township's discretion, a letter of credit drawn on a lending institution acceptable to the Township, in the form and manner approved by the Township's Solicitor, may be substituted, in the Township's discretion, for said performance bond.

2. A Maintenance Bond shall be required in an amount equal to fifteen (15%) percent of the contract price for a period of two (2) years from the date of acceptance of the Work by the Owner.

CONSTRUCTION OBSERVATION OF THE WORK

1. The Developer shall establish with the Township of Williams an escrow account in the amount sufficient to cover the established cost of construction observation, engineering expenses, administrative expenses, legal expenses, and other charges related to the proposed construction. The amount of the escrow fund for construction-related activities shall be established by the Township. The Developer, acting through its Contractor, shall notify the Township three (3) days in advance of the commencement of construction work, so that appropriate construction observation time may be scheduled. No work may be prosecuted in the absence of construction observation, and any work performed without construction observation shall be re-excavated, exposed and observed by the Township's representatives as ordered by the Township. Any defective work or work not conforming to the specifications is to be replaced to the satisfaction of the Township at no expense to the Township. The allowable working days are Monday through Friday of any week, excluding holidays. Should the escrow account be depleted prior to the completion of the construction, additional escrow funds shall be deposited by the Developer with the Township prior to continuing with any additional work. Any unused escrow funds shall be returned to the Developer upon completion of the construction.

RECORD PLANS

1. Before acceptance of the system extensions and additions, the Developer shall prepare and deliver to the Township in AutoCAD format; record plans consisting of one (1) set of reproducible mylars, three (3) sets of prints and one (1) digital copy of the data delineating the sanitary sewer facilities actually installed. The record plans shall clearly show the location of all sanitary sewer facilities and shall be free of extraneous markings which may obscure the sewer facilities. The material, size and location of all facilities shall be shown. The adequacy of the record plans will be determined by the Township, in its sole discretion.

ACCEPTANCE OF SYSTEM EXTENSIONS AND ADDITIONS

1. After any sewer facilities have been added to or extended from an existing system, have been satisfactorily tested and approved by the Township's representatives in accordance with Sections 104 m, n, and o, and 105 k of this document, and have been placed in operation, the Township will notify the Developer of its intention to accept dedication of the facilities. No sanitary sewer facility shall become the responsibility of the Township of Williams until a deed of dedication has been fully executed by the Developer and accepted by the Township. For a period of two (2) years after the date of dedication, the

Developer shall guarantee the stability of all materials and equipment and the workmanship of all labor, and shall correct and/or replace all defective materials, equipment and work at its own expense and to the satisfaction of the Township when notified in writing by the Township to do so. The Developer shall provide the Township with security for the aforesaid guarantee in the amount of fifteen percent (15%) of the Township Engineer's opinion of construction cost but not less than \$5,000.00. Said security shall be in the form of a letter of credit from a commercial banking institution acceptable to the Township and approved by the Township's Solicitor as to form and manner of execution; or a cash payment to be maintained by the Township in a non-interest bearing escrow account. Should the Developer not promptly address any defects in the work, the Township will invoke its security guarantee to provide funds for the repairs.

GOVERNMENT REGULATIONS AND AGENCIES

1. The Developer will be responsible for meeting all requirements of the various government agencies including applying and obtaining the necessary permits and approvals. Agencies include, but are not limited to, the PADEP, the NCCD, and Pennsylvania Department of Transportation.
2. All sewer system appurtenances shall comply with the requirements and guidelines of the Department of Environmental Protection's Domestic Wastewater Facilities Manual, latest edition.
3. All roadway construction within State Highways and Shoulders shall meet the requirements of the Pennsylvania Department of Transportation. State and local highway and shoulder restoration details provided in Part 3 - Standard Details of this report are provided as a reference only. Actual restoration requirements shall be confirmed with the Department of Transportation and Williams Township.

SEPTIC TANK CLOSURE

New connections to the sanitary sewer system, that require abandonment of existing septic tanks, in place, shall meet the following minimum requirements:

1. The existing lateral shall be cut off at the building wall foundation and permanently sealed. (Cases where the Owner is proposing to extend the existing lateral to the Township's sewer main shall be reviewed by the Township and the Township's Engineer on a case-by-case basis. Only those laterals of proper size and in good overall condition will be considered for extension).
2. The contractor shall connect new piping in accordance with the specifications and the standard details.

3. All existing liquid and solid content in the existing septic tank shall be removed and disposed of offsite, in accordance with all State requirements.
4. The existing septic tank shall be backfilled with 2A stone.
5. Closure of the septic tank shall be inspected by the Township as applicable.
6. All such work shall also comply with any requirements of Title 25.

LOW PRESSURE SEWER SYSTEMS AND PACKAGE GRINDER PUMP STATIONS

1. The Developer shall follow the minimum design requirements regarding a low pressure sewer system and package grinder pump station as provided in the Department of Environmental Protection's Domestic Wastewater Facilities Manual, latest edition.

NOTES TO BE PLACED ON THE CONTRACT PLANS

The following notes and/or notations should be added to the plans during preparation by the DEVELOPER and/or the DEVELOPER'S engineer.

1. Pipes should be buried a minimum of 4 feet to top of pipe with a minimum of 18 inches vertical separation or a minimum horizontal separation of 10 feet from other utilities. The requirements of PADEP apply.
2. The sanitary sewers and appurtenances must be constructed in accordance with the Township of Williams.
3. A notation should be placed on the plans stating that the sewers and appurtenances will or will not be dedicated to the Township.

101. STANDARDS AND SPECIFICATIONS

1. All sanitary sewer collection systems shall be constructed in accordance with first class procedures and with first class, new material in accordance with the Sanitary Sewer Collection System Industry Standards, including all the standards and specifications of this Contract Document and published standards and specifications referred to in this document, and in accordance with the conditions of the PA DEP and Department of Transportation, and/or Township Permits and/or approvals issued for this project.
2. Certain recognized industry associations, technical societies and governmental agencies which publish these standards and specifications are listed below for easy reference. The use of the association's, society's or agency's name, or abbreviation for the name, may be used interchangeably in this Contract Document.

A.S.T.M.	American Society for Testing Materials
A.W.W.A.	American Water Works Association
A.S.A.	American Standards Association
A. C. I.	American Concrete Institute
A. I.S. .C.	American Institute of Steel Construction
A.S.M.E.	American Society of Mechanical Engineers
P.C.A.	Portland Cement Association
PennDOT	Pennsylvania Department of Transportation
I. I.C.	International Construction Code
D.E.P.	Pennsylvania Department of Environmental Protection
E.P.A.	U.S. Environmental Protection Agency

3. Any reference in this Document to "PennDOT Pub. 408" or "Form 408", or other similar statement, will provide the CONTRACTOR with a reference to that Specification.
4. All work shall comply with the requirements of Chapter 459 of Title 67 of the Pennsylvania Code entitled "Occupancy of Highways by Utilities", latest edition, and the Township's Driveway Ordinance as amended for construction activities in State or Township roads unless otherwise specified herein.

102. EXCAVATIONS

1. The CONTRACTOR shall furnish all labor, materials, equipment and services required to perform all excavations, of every description, and of whatever substances encountered that may be necessary to complete the work. All excavation shall be in open trenches, except where shown otherwise on the Developer's drawings, or as the Township may authorize or direct. The use of excavation machinery will be permitted, except in places where operation of same will cause damage to trees, buildings, or existing structures above or below ground; in which case hand methods shall be employed. No tunneling, boring, or forcing will be allowed without approval from the Township. Excavated material must be piled so as not to encroach on private property, endanger the Work, obstruct sidewalks or roadways, nor interfere with proper drainage. The Contractor shall have no claim for compensation due to

- the fact that hand excavation instead of machine excavation may be necessary for whatever cause.
2. The Contractor shall perform all excavation of every description and of whatever substances encountered, to the depth indicated on the Developer's drawings, as specified herein, or as directed by the Township. All excavated materials not required or suitable for backfill shall be removed and wasted by the contractor or otherwise disposed of as directed or specified.
 3. The term "subgrade" as used herein shall mean the bed of the trench, and the term "grade" shall mean the surface on which the pipe is laid.

REMOVAL AND STORAGE MATERIALS

1. The CONTRACTOR shall clear and grub the surface and remove all surface materials, of whatever nature, within the area where construction is to be accomplished, and shall properly separate and classify the materials removed, and shall store, guard and preserve such quantities of said materials as may be required and are suitable for use in backfilling, regarding, resodding, or for other purposes. All perishable and objectionable material including, but not limited to boards, fences, trees, brush, vines, shrubs, bushes, logs, stumps, roots, weeds, rubbish and other organic matter shall be removed from the sewer construction area by, and at the expense of the CONTRACTOR. All stumps shall be cut off a minimum of three feet (3') below finished grade.
2. The CONTRACTOR shall remove all pavements, road surfaces, curbing, driveways and sidewalks within the lines of excavation. Concrete pavements shall be opened by sawing and asphalt pavements by cutting to neat straight lines with channeling machines, hand operated pneumatic tools, or by such other methods as will furnish a clean cut in the pavement and base without undue shattering. All concrete curbing, driveways or sidewalks within the lines of excavation shall be broken up and removed by the CONTRACTOR. All such work shall be done at the CONTRACTOR'S expense and in accordance with the rules and regulations of the governmental agencies having jurisdiction. The use of weights dropped on pavement for breaking will not be allowed except by written permission of the Township Engineer.
3. In case more material is excavated from any trench than can be backfilled over the completed work or may be stored on the street or within the limits of the right-of-way, leaving space for the traffic and drainage as herein provided, the excess material shall be removed to some convenient place, provided by and at the expense of the CONTRACTOR.
4. The Contractor shall remove paving to the widths as shown on the Standard Details and in the case where the paving is removed for a greater width, or in the case where

any paving is removed or disturbed on account of settlement, slides, or cave-ins, or in making excavation outside the lines of the Work without the written order of the Township, the Contractor shall pay all cost of permanently replacing the paving so removed or damaged.

5. When it is necessary to haul soft or wet material over streets, the CONTRACTOR shall provide suitably tight vehicles.

WIDTH AND DEPTH OF TRENCH

1. Width: Pipe trenches shall be sufficiently straight between designated angle points to permit the pipe to be laid true to line in the approximate center of the trench. The trench widths below an elevation three feet (3') above the top of the pipe when laid to the required grade shall be such as to provide a free working space on each side of the pipe as laid, but shall, in no event, exceed the outside diameter of the barrel of the pipe plus sixteen inches (16"). Where sheeting and shoring are used, the maximum allowable width shall be measured between the closest interior faces of the sheeting or shoring as placed. If trench widths exceed the above requirements, pipe of greater crushing strength and/or other bedding may be required.
2. Depth: The depth of the excavation for the sewer or other structure herein specified shall be such that they can be built to proper grade, due allowance being made for crushed stone bedding, crushed stone cradles, concrete cradles, and concrete encasement.
3. Unsuitable Subgrade: Except at locations where excavation of unsuitable material or concrete encasement is required, excavation shall be to a depth of four (4") inches below the bottom of the pipe. A four (4") inch crushed stone bedding, 2A Type C Aggregate, or 2RC Aggregate, shall be provided under all pipe to bring the pipe to grade as specified. The crushed stone bedding shall be formed to fit the lower two (2") inches of the outside periphery of the pipe, with holes being dug for the bells, and the pipe having full bearing on the stone bedding throughout its length. Bedding for PVC Force Main shall be Type A sand or No. 10 Aggregate-screenings-PennDOT Pub. 408, Sec. 703. When rock is encountered, it shall be removed to a depth of six inches (6") below the outside of the pipe barrel or bell and the excavation shall be backfilled with crushed stone, and the bed formed and shaped as required above.
4. Unstable Subgrade: When the material encountered at sub-grade is unstable, it shall be removed from the trench at the direction of the Township Engineer. The excavation below sub-grade of such unsuitable material shall be backfilled with 2RC Aggregate. In rock excavation, if trenches are shattered by blasting below or beyond the lines of excavation specified herein, the trench shall be refilled to specified lines of excavation with 2A, Type C Aggregate, or 2RC Aggregate at the CONTRACTOR'S expense. If earth trenches are excavated beyond the specified

depths, they shall be backfilled to the proper grade with 2A, Type C Aggregate, or 2RC Aggregate at the CONTRACTOR'S expense.

EXCAVATION OF UNYIELDING MATERIALS

1. Unless otherwise directed by the Township, unyielding material shall be removed at least twenty five feet (25') in advance of pipe laying, to the depths and widths specified in Section 102, C.
2. Unyielding material appearing in miscellaneous excavations, or where future pipes are to connect with those installed under this Contract, shall be excavated in accordance with the directions of, and to the lines prescribed by the Authority.
3. Where manholes, catch basins, inlets, or other special structures are excavated in unyielding material, they shall be excavated twelve inches (12") outside the exterior lines of the structure and to depths as shown on the Standard Details and Developer's drawings.

LENGTH OF OPEN TRENCH

1. The Township shall have the right to limit the amount of trench opened in advance of pipe laying and the amount of pipe laid in advance of backfilling. In no case shall more than four hundred feet (400') of trench be opened at anyone place in advance of the completed pipe. The trench shall not be opened for a distance of more than five hundred feet (500') at any one time.
2. Trench excavation shall be fully completed, except for forming of the trench subgrade, at least twenty feet (20') in advance of the pipe placement, and shall be kept free from obstructions, except that at the close of work at night, or at the discontinuance of work, the pipe laying may be completed to within five feet (5') of the end of the opened trench. The amount of pipe laid in advance of backfilling and tamping shall not exceed one hundred feet (100'). In state highways, all trenches in the cartway must be closed and not more than forty feet (40') of trench may remain open in shoulder areas at the close of the Workday or discontinuance of the work.
3. The Township may, at any time, require the backfilling of open trenches over completed pipelines.
4. If work is stopped or discontinued on any trench for any reason, except by order of the Township, and the excavation is left open for an unreasonable amount of time, in the opinion of the Township, the CONTRACTOR shall backfill such trench, at his own cost, and shall not again open said trench until he is ready to complete the structure therein.

ACCOMMODATION OF TRAFFIC AND PUBLIC SAFETY

1. The work in all streets and highways shall be in accordance with the Pennsylvania Department of Transportation Publication 203, latest edition. The CONTRACTOR shall familiarize himself with this bulletin prior to beginning the Work.
2. Streets shall not be unnecessarily obstructed, and, unless the Township, in writing, shall authorize the complete or partial closing of a Township street, the CONTRACTOR shall take such measures at his own expense, as may be necessary to keep the street or road open and safe for traffic. The CONTRACTOR shall construct and maintain such adequate and proper bridges over excavations as may be necessary or as directed for the safe accommodation of pedestrians or vehicles and at least one side of the trench shall be kept open at all times.
3. The CONTRACTOR shall furnish and erect and maintain substantial flashing light barricades at crossings of trenches, or along the trench, to protect the public. Any trench left open and unattended shall be protected with Suitable temporary fencing to minimize the risk of children or animals falling into the excavation. Driveways shall be backfilled, tamped, and covered with six (6") inches of 2A, Type A Aggregate so that the driveway is usable at the end of each day's work.
4. The CONTRACTOR shall observe due precautions for accessibility of firefighting equipment. Fire hydrants shall not be obstructed. At all times the CONTRACTOR shall maintain safe pedestrian traffic on sidewalks and over crosswalks by maintaining a straight and continuous passageway at least three feet (3') in width. In narrow or congested streets or alleys the CONTRACTOR shall complete his work as he goes along to minimize interference with access to garages and other places. The CONTRACTOR shall in all cases so arrange his work as to cause the least inconvenience to property owners consistent with the proper prosecution of this work.

DRAINAGE

1. The Contractor shall keep all excavation free from surface or subsurface water while the Work is in progress. The Contract shall use all means necessary for this purpose including lowering the water table below the trench subgrade.
2. The pipe trench must be in all cases kept substantially free from storm, surface and subsoil water or sewage, so that all masonry and joints may have ample time to set and harden and so that bedding and back fill can be undertaken in stable conditions. No joints shall be made under water. Gutters, sewers, drains and ditches shall be kept open at all times for surface drainage. No damming or ponding of water in gutters or other waterways will be permitted, except where stream crossings are necessary and then only to an extent which is indicated on the approved drawings. The grading in the vicinity of sewer trenches shall be controlled so that the ground surface is

properly pitched to prevent water running into the trenches or onto private property in an unnatural way or condition.

3. At any open water courses, ditches, culverts or storm or drain pipes encountered during the progress of the work, the CONTRACTOR shall provide for the protection and securing of a continuous flow in such courses or culverts or pipes and shall take care not to damage them during his work. If his work does result in damage to these facilities, the CONTRACTOR shall repair the damaged portion of the facility.

DEWATERING TRENCH

1. The CONTRACTOR shall keep all excavation free from water, at his own expense, while sewer construction work is in progress, and to such extent as may be necessary while excavation work alone is being carried out. The CONTRACTOR shall build all dams and other devices necessary for this purpose, including lowering the water table below trench bottom by well points and pumping, and provide and operate pumps of sufficient capacity for dewatering the excavations. He shall provide for the disposal of the water removed from excavations in such manner as shall not cause injury or damage to the public health, to public or private property, to the work of other CONTRACTORS, to any portion of the work completed or in progress, or produce any impediment to the use of the highways, roads, lanes, streets, sidewalks and foot paths by the public.

SHEETING, BRACING AND SHORING

1. Wherever it is required by state or federal occupational safety laws or regulations and wherever it is necessary, to prevent injuries or to avoid damage to existing structures, pavement or foundations, or to prevent excessive trench loads on pipe, due to caving or sliding of banks of excavations, the CONTRACTOR shall sheet, brace or shore such excavations and shall be solely responsible for their installation. In all cases, the excavation shall be protected in accordance with the requirements of any and all regulatory agencies having jurisdiction.
2. All sheeting, sheet piling, bracing and shoring shall be installed by personnel skilled in such work. Timber or steel members used shall be sound, straight and free from defects. The design of this temporary sheeting, bracing and shoring shall be the CONTRACTOR'S responsibility.
3. In withdrawing sheeting and sheet piling, special care shall be taken to insure that all voids or holes are filled with satisfactory material and thoroughly compacted, so as to prevent injury to the pipe and its appurtenances and injury or settlement of adjacent structures and pavement.

EXPLOSIVES AND BLASTING

1. Blasting will be permitted only with the written approval of the Township, which will establish the time when blasting may be done. When explosives are used, they shall be transported, stored and used in accordance with all applicable Federal, State and Local Laws and Regulations. Blasting operations shall only be performed by a Licensed Blaster.
2. Blasting operations, when required, shall be covered by a rider to the insurance policy or policies required or by separate insurance policies. The amount of blasting insurance shall be a minimum of one million dollars (\$1,000,000). If the CONTRACTOR anticipates that blasting may be required, a Certificate of Insurance shall be provided sufficiently in advance so that it may be approved prior to any actual blasting.
3. If blasting is anticipated within a State Highway right-of-way, a Blasting Permit is required from PennDOT. The CONTRACTOR is reminded to file an Application for such a Permit well in advance of blasting to allow time for the Permit to be processed.
4. Special care shall be taken when blasting is to be performed in the vicinity of existing structures or utilities to preclude damage to them and applicable regulations pertaining to such operations shall be strictly followed. Utility companies shall be notified of proposed blasting so they may provide information, including location, depth, material, age and bedding of the facilities, and make recommendations concerning blasting procedures and precautions.

When blasting in the vicinity of existing structures it is recommended that the contractor televise existing foundations to document current structural condition. Copies of video tape results shall be provided to the Township prior to any blasting activity. The cost of televising shall be borne by the Contractor.

5. The CONTRACTOR shall be responsible for injury to persons or property that may result from the use of explosives.

SINKHOLES

1. It shall be the CONTRACTOR'S responsibility to fill all underground voids or sinkholes encountered during construction. Generally, all loose or soft materials shall be removed from the sinkholes prior to backfilling. Excavation shall continue until all underground voids and caverns are uncovered and until rock or firm material is encountered in the excavation.
2. Once all loose or soft materials have been removed from the sinkhole the Contractor shall hire a licensed geotechnical engineer to inspect the site prior to backfilling. The

geotechnical engineer shall verify that all of the loose material has been removed from the sinkhole and backfilling can begin.

3. Should rock crevices be uncovered, PennDOT Class C cement concrete shall be placed a minimum of twelve inches (12") thick at an approximate slump of four inch (4") to seal the openings.
4. After curing, above the cement concrete, or if rock is not encountered, the backfilling shall consist of placing and compacting clay backfill. The clay earth backfill shall be placed in uniform horizontal layers, not more than six inches (6") in depth and thoroughly compacted to 98% of standard Proctor.

103. BACKFILLING

1. It is the intent of the following requirements for the backfilling of trenches to specify materials and methods which will (1) result in thorough compaction of the backfilled material without displacement of the grade or alignment of the sewer line and its appurtenances, and (2) minimize settlement of the backfilled material. If displacement of the sewer or settlement of the backfilled material does occur it will be considered as conclusive evidence of improper workmanship or the inclusion of unsuitable materials or both and it shall be the CONTRACTOR'S responsibility to remove and recompact the settled material and regrade and realign the sewer. During the course of the backfilling operation the Township Engineer may, at any location or depth of trench, order the CONTRACTOR to perform tests to determine whether the compaction operations are sufficient to meet the requirements specified below.

BACKFILL MATERIAL

1. Only material approved by the Township shall be used for backfilling under and along the sides of the pipe and to a height of one foot (1') over the top of the pipe across the entire width of the trench, or for backfilling around structures and appurtenances. For sanitary sewer pipe, storm sewer pipe, water mains, and force mains, this material shall consist of 2A stone.
2. If the trench is located within a street, street right-of-way, a sidewalk area or a potential future street right-of-way (as determined by the Township), the remainder of the trench shall be backfilled using 2A stone as defined by the Specifications of PennDOT Form 408, latest edition.
3. For grassed areas such as yards and lawns, backfilling under and along the sides of the pipe and to a height of one foot (1') over the top of the pipe and across the entire width of the trench. From one foot (1') above the top of the pipe to subgrade elevation, material excavated from the trench may be used if free from stones larger than 12 inches in size and free from wet, frozen, or organic materials.

INITIAL BACKFILLING

1. After the sewer and its appurtenances have been constructed, inspected and approved by the Township, including the placement of the bedding material under the pipe haunches as specified elsewhere, the trench shall be backfilled to a height of one (1') foot above the top of the pipe in horizontal layers not to exceed twelve inches (12") with this same bedding material. This material shall not be frozen nor be placed when the material in the trench is frozen. The material shall be carefully placed to avoid damage to the pipe or lateral displacement of the pipe by uneven distribution of material. Each layer shall be compacted with a hand tamper when pipe is not covered or covered with less than 6" of backfill and compacted with a mechanical tamper for the last layer at 12" over the pipe.

BACKFILL IN STATE HIGHWAY AND EXISTING OR PROPOSED TOWNSHIP STREET RIGHTS-OF-WAY

1. The Contractor shall determine backfilling requirements of PennDOT. In the absence of any specific requirements from PennDOT, the Contractor shall comply with the paragraph below.
2. Following the installation of the pipe and related appurtenances, the trench shall be backfilled to a height of one foot (1') above the top and across the full width of the trench of the pipe with 2A stone deposited in twelve inch (12") layers and in such a manner as to not disturb the pipe. The fill material shall be placed by hand with shovels and solidly compacted around the pipe. The trench shall then be backfilled with 2A, as defined by PennDOT Form 408, latest edition, compacted in layers not to exceed twelve inches (12") using a mechanical tamper.

BACKFILL IN AREAS OTHER THAN STATE HIGHWAY AND EXISTING OR PROPOSED TOWNSHIP STREET RIGHTS-OF-WAY

1. After initial backfilling, the remainder of the trench shall be backfilled in layers not to exceed twelve inches (12") compacted to produce a density at the bottom of the compacted layer of not less than 95% of maximum dry density as determined by the Standard Compaction Test, ASTM 0698. The backfill may consist of the earth excavated from the trench, but shall be subject to the approval of the Township Engineer and shall not contain rocks larger than eight inches (8") in any dimension. Rocks shall be entirely surrounded by fine material and not constitute more than twenty-five (25") percent of the total volume of backfill. Backfill material shall not be frozen nor placed when the material in the trench is frozen.
2. All backfill shall be free of topsoil and organic material. All backfill shall meet the requirements of embankment material as specified by PennDOT 408, Section 206.

COMPACTION REQUIREMENTS

1. If tests indicate that the Work does not meet the specified requirements, it shall be removed, replaced, and retested until compliance is achieved at no additional costs to the Township.
2. Maintain moisture content of backfill materials, within the range of two percentage points (plus or minus) of optimum as determined by laboratory analysis in accordance with ASTM D1557 ("standard proctor").
3. Compact materials to the following percentages of maximum lab density as determined by ASTM D1557.
 - a. Bituminous or concrete roadways (other than PennDOT highways); driveways, and parking areas (except within public highway right of ways): 95% of laboratory determined maximum dry density.
 - b. Bituminous or concrete walkways: 95% of laboratory determined maximum dry density.
 - c. Within public rights of way: per PennDOT 408 Specification, latest Edition.
 - d. Grassed areas 90%.

104. SANITARY SEWER PIPE

1. The CONTRACTOR shall install all sanitary sewers and appurtenances of the size and type shown on the drawings and in accordance with these specifications and pertinent recommendations of the manufacturer.

HANDLING

1. Pipe and accessories shall be distributed at the project site and at all times carefully handled to avoid damage. All pipe shall be rolled or lifted, care being taken not to bump or drop pipe or fittings. The interior and machined ends of all pipe shall be kept free from dirt and foreign matter.

TRENCH PREPARATION

1. The trench shall be excavated in accordance with these specifications. Except in areas where a concrete cradle or concrete encasement is specified, all gravity pipe shall be laid in a bed of 2A Type C Aggregate, or 2RC Aggregate which shall have a minimum thickness of four inches (4") below the bottom of the pipe, and all pressure pipe shall be laid in a bed of sand or stone screenings which shall have a minimum thickness of four inches (4") below the bottom of the pipe.

LAYING PIPE

1. Following the trench excavation and preparation of the crushed aggregate bedding, pipe laying shall proceed upgrade with pipe laid carefully, bells upgrade, spigot ends fully entered into adjacent bells, and true to lines and grades shown on the drawings. Each length or section of pipe shall be carefully inspected before installation and those containing cracks or other defects shall be removed from the site or destroyed. Extreme care must be exercised to prevent breakage when the pipe is handled. Bells and spigots shall be carefully cleaned before pipes are lowered into trenches. The pipes shall be lowered so as to avoid unnecessary handling in the trench. Each section of pipe shall rest upon the pipe bed for the full length of its barrel, with recesses prepared where required to accommodate bells and joints. Each pipe shall be firmly held in position so that the invert forms a continuous grade with the invert of the pipe previously placed. The interior of all pipe and the inside of the bell and outside of the spigot shall be thoroughly cleaned of all foreign matter before being lowered into the trench, and shall be kept clean during laying operations by means of plugs or other approved devices.
2. Under no conditions shall pipe be laid in water or subgrade containing frost, and no pipe shall be laid when trench conditions are unsuitable for such work. In all cases, water shall be kept out of the trench until concrete cradles or supports, where used, and materials in the joints have hardened.
3. Walking or working on the completed pipeline except as may be necessary in tamping or backfilling will not be permitted until the trench has been backfilled to a height of at least two (2') feet over the top of the pipes. Any pipe that has its grade or joint disturbed after laying shall be taken up and re-laid. Any section of pipe already laid and found to be defective shall be taken up and replaced with new pipe.
4. The CONTRACTOR shall furnish all material equipment and labor to provide a laser beam grade control on the pipe center line.
5. Satisfactory means shall be used to hold the pipe in line while the pipes are being joined, and due precaution shall be taken to insure that the spigot end of the pipe being laid is pushed home into the groove of the preceding pipe.
6. No pipe shall be laid within ten feet of the machine excavating the trench nor within twenty-five feet of any place where blasting is being done. In all cases the mouth of the pipe shall be provided with a board or other stopper, carefully fitted to the pipe to prevent all earth or other substances from washing in. In rock excavation, the mouth of the pipe shall be carefully protected from all blasts.
7. Pressure pipe shall be installed in strict conformity to the Manufacturer's recommended installation practice. In place concrete thrust blocking shall be provided in accordance with the "Standard Details" at the following locations;

changes in direction, bends, crosses, tees, laterals, changes in size, stops, valves and check valves.

JOINTS

1. All joints shall be bell and spigot type with rubber ring and any leaks or defects discovered shall be immediately repaired. Joints shall be manufactured in accordance with ASTM 3212. The ring groove shall be so designed as to prevent ring displacement. Sizes shall be as indicated in the Contract Specifications as required by field conditions. Jointing shall be in accordance with the recommendations of the manufacturer. After joints are made, any superfluous material inside the pipe shall be removed by means of an approved follower or scraper.

BRANCH CONNECTIONS

1. Wye branches shall be installed at the locations indicated by the approved plans, or the Township Engineer. Branch connections shall be of the type that are commercially manufactured integrally with the main sewer pipe and shall be PVC 45 degree or 60 degree wye connections or 90 degree tee connections of four (4") inch, six (6") inch, or eight (8") inch diameter; depending upon the diameter of the existing service connection pipe. All branch connections shall be best quality unplasticized polyvinyl chloride (PVC) sewer pipe. Wye branches shall be set at such vertical angle as required to bring the service connection to the proper depth, or at the minimum angle shown on the drawings or standard details.

FLEXIBLE PIPE COUPLING

1. The flexible pipe coupling shall be an elastomeric plastic fitting which shall fit over the ends of plain end of spigot end pipe. The coupling shall be appropriately sized to join any two (2) sewer pipe materials of compatible outside diameter. The joint shall be sealed by tightening a stainless steel clamp at each end of the coupling according to the manufacturer's specifications. A calibrated torque wrench shall be used to tighten the clamps. The flexible pipe couplings shall be as manufactured by Fernco Inc., Mission Coupling, or equal.

STUBS

1. When indicated on the approved Plans or where directed by the Township Engineer, a pipe stub of at least four (4') feet in length shall be built into manholes for connections to future extensions. The outer end of such connections shall be closed with a watertight stopper.

DROP CONNECTIONS

1. The Contractor shall build drop connections where shown on the drawings or where directed by the Township Engineer, in accordance with the Standard Details. Drop connections shall be constructed of the same material used to construct the main pipe.

LATERALS

1. The Contractor shall build complete to the right-of-way line or other designated points; all service connections as shown in the Standard Details, or as directed by the Township Engineer. Actual locations and lengths and depths shall be recorded by the Contractor and provided to the Township Engineer. All laterals shall be of the same material and installed to the same specifications as the main sewer pipe.
2. Construct laterals from the wye or tee – wye branch to a terminal point in accordance with the Construction Details. Laterals shall be of the following diameter:
 - a. Single family residential unit: four inch (4")
 - b. Multi – family residential or commercial building: six inches (6")
3. Cleanout(s) must be installed at the right-of-way line, at every bend and every 50 feet thereafter for four inch (4") PVC and 100 feet for six inch (6") PVC, regardless of length of lateral. The cleanout must be located in the right-of-way.
4. Install an approved watertight plug braced to withstand pipe line test pressure thrust at the termination of the lateral. Install a temporary marker stake extending from the end of the lateral to one foot (1') above finished grade. The top of the marker shall be painted green with durable paint and labeled "sewer".
5. Laterals shall be installed in accordance with the standard details at a grade of one-quarter inch (1/4") per foot minimum. The depth at the end of the lateral shall be sufficient to allow construction of the lateral complete to the house at a minimum slope of 1/4 inch per foot, unless pump service is required for service from the house or building.
6. For force main laterals, pipe shall be 1 1/4" PVC. A brass corporation stop shall be installed at the main with a suitable adaptor. A PVC gravity-operated flapper-type check valve shall be installed generally three feet (3') outside the road pavement or shoulder. A brass shut-off valve shall be installed 12" beyond the check valve, and a cast iron valve box with an inside diameter of 2 1/2" and cover shall be installed to grade, over this valve.

LATERAL STANDPIPES OR RISERS

1. In general, where the depth of the sewer invert is more than twelve feet (12') and where indicated on the plans, service connections shall enter the sewer through standpipes or risers. Standpipes shall be of the same material as the sewer main unless otherwise directed, and shall enter the sewer through wye or tee branches. The upper ends of standpipes shall be either wye branches or bends, as may be directed. Double wye branches shall be used, where directed, to allow two (2) or more service connections to enter through one separate standpipe.

SANITARY PIPE MATERIALS

A. Polyvinyl Chloride (PVC) Pipe (Gravity)

1. All pipe installation shall be best quality unplasticized polyvinyl chloride (PVC) sewer pipe, with joints providing requisite flexibility and water tightness under service conditions. Smooth internal surfaces, producing high carrying capacity obtainable with best standard practice and best workmanship will be required.
2. PVC pipe and fittings for gravity sewer shall be the bell and spigot type and shall meet the following requirements:
 - Pipe 15" diameter and smaller: ASTM D3034, SDR 26
 - Pipe 18" to 27" diameter: ASTM F679
3. Joints: Push on type, integral bell with elastomeric gasket, ASTM D3212 and ASTM F447. Assembly of the joints shall be in accordance with the pipe manufacturer's specifications.
4. PVC Pipe, SDR 26, may be used for the Building Sewer on private property, except that Schedule 40 pipe will be required under any concrete building slabs.

B. Pressure Sewer Pipe and Fittings (for pipe less than 3-inches in diameter)

1. Pressure-Rated Pipe: AWWA C900, pressure rated pipe SDR21 (200 psi) with ductile iron equivalent O.D. and integral bell and gaskets ASTM D2241 and ASTM F477.
2. Joints: Push-on type, flexible elastomeric seal ASTM D3139, material ASTM F477. Use thrust blocking or approved equivalent restraint for all changes in alignment, valves, tees, caps, and plugs.
3. Fittings: Mechanical joint- type conforming to ANSI A21.10 and A21.11, coat inside and out with bitumastic seal coat.

4. Appurtenances:

Cleanouts: Schedule 80 PVC pipe, fittings, couplings, and transition gaskets, installed as shown on the Developers drawings. Required every 50 feet (minimum) and at all changes in direction.

C. Ductile Iron Pipe (DIP) – (for pipe equal to or greater than 3-inches in diameter)

1. Ductile iron pipe shall conform to the latest specifications as adopted by the American National Standards Institute, Inc., (ANSI) and the American Water Works Association (AWWA). Specifically, ductile iron pipe shall conform to ANSI/AWWA C151/A21.51.
2. Pipe:

Pressure Applications: minimum pipe thickness Class 52, double cement lined with push-on type joints with rubber gaskets.

Deep Sewer Mains: sewer mains located 15 feet deep or greater shall be Class 50 thickness (minimum) double cement lined.
3. Fittings: Ductile iron, mechanical joint type complying with ANSI A21.10.
4. Coating: Pipe and fitting exteriors shall be painted in accordance with ANSI/AWWA C151/A21.51. The pipe interior shall be double cement mortar lined and seal coated in compliance with the latest revision of ANSI/AWWA C104/A21.4. The cement mortar lining shall be double thickness.
5. Rubber gaskets, lubricants, glands, bolts and nuts: ANSI A21.11.
6. Each length of pipe shall be subjected to a hydrostatic proof test as required by ANSI/AWWA C151/A21.51.

FIELD TESTS ON GRAVITY SEWERS

1. Upon completion of the Work, all gravity sewer lines will be tested to determine their degree of watertightness and the correctness of their horizontal and vertical alignment. The Contractor shall furnish all necessary labor, material and equipment and shall perform all specified tests for every length of sewer pipe, in the presence of the Township Engineer. The Contractor shall follow a testing program and schedule that is acceptable to the Township Engineer. All testing shall be performed after backfilling of both main line sewer and laterals so that it is representative of the “in service” condition.

2. If any section of sewer line fails to meet the specified test requirements, the Contractor shall repair or replace all defective material and/or workmanship and shall conduct additional tests to demonstrate that the sewer line meets the specified test requirements.
3. The Contractor shall provide as-built locations of wye branches and lateral ends, and elevations or depths of pipe inverts at manholes and lateral ends. As-built data shall be marked on a set of plans and shall be given to the Township Engineer. Manhole or pipe locations out of the horizontal design location by two feet or more can be ordered by the Township Engineer to be reconstructed. A pipe more than 0.5 feet out of design vertical location can be ordered by the Township Engineer to be reconstructed.

Closed Circuit Television Inspection

1. A television inspection of all newly installed sewer mains shall be made following the completion of the Work. A video tape recording of the inspection along with an inspection log shall be provided, reviewed and approved by the Township prior to acceptance by the Township and any discharge into the sewer mains.
2. The cost of the testing and inspection shall be borne by the Contractor.

Inspection Equipment

1. The Contractor shall provide a mobile vehicle large enough to accommodate at least four (4) people at any one time for the purpose of viewing the monitor while the inspection is in progress. The Owner's representative shall have access to view the television screen and observe all operations at all times.
2. The television equipment used for the inspection shall be specifically designed and constructed for sewer line inspection. The camera shall operate in 100 percent humidity conditions, provide a color picture, be capable of showing the entire inside periphery of the pipe, and remain functional in the event the camera becomes submerged or inundated. Camera movement through the sewers shall be accomplished by means of a winch and cables or by a motorized transporter (a self propelled camera).
3. The cameras, television monitors, and other components of the video system shall be capable of producing a picture and videotape quality satisfactory to the Engineer. Unsatisfactory equipment shall be removed and no payment will be made for an unsatisfactory inspection.
4. Camera adjustments shall be set to produce a clear and sharp picture of the internal conditions within the combined sewer line. A television picture with interference lines, blurry vision or distortions will not be acceptable. Equipment, if determined to be unsatisfactory by the Engineer shall be removed from the job site and replaced

with acceptable equipment at no additional cost. The Contractor shall certify that backup equipment is available and can be delivered to the site within 24 hours. He shall also submit an equipment list to the Engineer for approval before commencement of the work.

5. The preferred camera deployment shall be by self-propelled crawler. A power winch or sewer jet cleaner may also be used to move the camera during the inspection. When a sewer jet is used, excellent communication among the Contractor's personnel will be required to insure the camera operator maintains control of the camera.

Pan and Tilt Cameras

1. Television inspection of non-problematic sewers will be performed with a color pan and tilt camera designed for deployment in the diameter of the sewer to be inspected.
2. The camera shall have the following features:
 - a) Lens sensitivity 3 lux
 - b) Rotation 360° axial
 - c) Pan and Tilt 240°
 - d) Vertical Resolution 400 lines
 - e) Lighting head and camera mounted
 - f) Camera adjustment remote focus and iris adjustment
 - g) Camera realignment auto centering to axial viewing

Non Pan and Tilt Cameras

1. The Contractor shall use color non pan and tilt cameras within problematic sewers where conditions such as protruding connections, severely offset joints, structurally damaged pipe, etc. prevent the effective use of a pan and tilt camera or may cause damage to the equipment.
2. The alternative camera shall be a radial view or fixed view camera. A pan and tilt camera designed for deployment in a smaller diameter than the problematic sewer can be used to complete the inspection. The Engineer and Contractor shall determine which equipment should be used to successfully complete the inspection.

Camera Lighting

1. Lighting for the camera shall be suitable to allow a clear picture of the entire periphery of the pipe. When the pan and tilt capabilities are used, head mounted lighting shall be adequate to illuminate defects and the interiors of tributary pipe connections with the camera viewing range.

Counting Meter

1. Measurement to locate the camera's position and to note features along the pipe alignment shall be by means of a counting meter located at ground level. The counting meter is to be provided and operated by the Contractor. The counting meter shall be mounted on the TV reel power winding assembly. The meter shall be equipped with a local mechanical readout for use at the rear of the TV inspection vehicle and an electric counter connected to the data view system. The counting meter shall record the distance in tenths of a foot and be accurate to three-tenths (0.3) of a foot per 100 feet of length.
2. Marking on the camera cable, or the like, which requires interpolation for manhole depth, will not be allowed.

Video System

1. The Contractor shall provide a video system with high-resolution color monitor, DVD video recorders, audio dubbing capabilities, and a data view system. The monitor must be a picture tube a minimum of 11" diagonally across positioned to allow multiple persons to observe the inspection.
2. The Contractor shall furnish all equipment for videotape recording with audio commentary. All inspections shall be recorded on DVD. The video recorder shall have an operational index display to permit recording the inspection's position on the tape. DVDs are to be provided by the Contractor and shall be high quality. All DVDs obtained during the work shall be turned over to the Engineer and shall become the property of the Owner. All costs for DVDs shall be included in the appropriate unit prices bid for cleaning.
3. The data view system shall continuously display the date of inspection, manhole numbers of the sewer being inspected and the cameras position along the pipe alignment. The data view system information must be recordable onto the inspection videotape.

Horizontal and Vertical Location and Alignment

1. A test of correctness of horizontal and vertical alignment shall be performed on each and every length of sewer main between adjacent manholes.
2. A single manhole to manhole section shall not be acceptable unless an acceptable source of light can be beamed through the main pipe and directly observed as a full circle of light in the manhole at the opposite end of each test section. In the event the light cannot be directly observed passing through the manhole or inlet section, the Contractor shall attempt to pass a hardwood ball through the main pipe between manholes at a time that the main pipe is free of flowing liquids. This ball shall be a sphere two inches less in diameter than the nominal inside diameter of the pipe under

test. Successful passing of the ball in a continuous roll within the dry pipe between manholes shall be a prerequisite to the acceptance of the construction work of sections not passing the light test. In any particular case, the Contractor shall be required to successfully complete the ball rolling test on pipe sections that have previously conveyed light beams between manholes or inlet sections but which may still indicate questionable alignment. This case will arise if a full circle of light cannot be seen at the manhole where light is observed.

Low Pressure Air Test

1. All sections of gravity sewer lines shall be tested for leakage by a low pressure air test. The test procedure shall be as recommended by the Uni-bell Plastic Pipe Association, Dallas, Texas, Publication UNJ-B-6-79 (or equivalent test). The basic test procedure and allowable air loss requirements are as follows:
 - a. The inside of the pipe shall be thoroughly cleaned, removing all debris and mortar. The sewer shall be thoroughly flushed with water to clean and wet the pipe.
 - b. All laterals, stubs and other fittings shall be plugged, and shall be adequately braced to withstand test pressures.
 - c. The main sewer between two manholes shall be plugged at the upper and lower manholes by the use of inflatable air tight plugs, one of which shall be equipped with an air hose to the pipe interior.
 - d. The test equipment shall consist of a compressor with air bleed valve, throttling valve, and sensitive air pressure test gauge with gage cock. This equipment shall be connected with the air hose connection to the sewer.
 - e. If the sewer is laid in groundwater, the elevation of the groundwater level shall be determined and compensations will be made in the test pressure at the direction of the Township Engineer.
 - f. Air shall be slowly added to the sewer until the pressure reaches four (5.0) psi in excess of the groundwater head. After five (5) minutes stabilization time, air shall be added as required. Plugs shall be checked for leaks.
 - g. The air supply shall be disconnected and, if necessary, air shall be released until the gauge reads exactly 3.5 psi above the groundwater head. The time for the pressure to drop from 3.5 to 2.5 psi above the groundwater head shall be noted.
 - h. The minimum allowable time for the air pressure to drop 1.0 psi, for a typical section of 8" dia. pipe of lengths up to 300 ft. shall be 7 minutes, 34 seconds.

2. For lengths of 8" diameter pipe greater than 300 ft. the minimum allowable time (in sec.) shall be computed as $1.52 \times L$, Where L is the total horizontal length of pipe (in feet) between manholes. This time period shall be used whether or not laterals are attached to this run of pipe. This time period shall also be used to test 10" diameter gravity sewer pipe. For other pipe sizes the Township Engineer will direct the test period in accordance with the aforementioned Uni-bell Pipe Association recommendations.

Ex-filtration Test

1. If no groundwater is present, the Township Engineer may allow the Contractor to perform an ex-filtration test on individual sewer sections in lieu of the low pressure air test.
2. The basic test procedure and allowable water leakage rate is as follows:
 - a. The inside of the pipe shall be thoroughly cleaned and all laterals, stubs and fittings plugged and braced.
 - b. Water shall be introduced at the downstream pipe end through a test plug, until the section of pipe being tested has been filled and the water level in the upstream manhole or standpipe installed therein is at a point four feet (4') above the top of pipe at the upstream end. If this would result in more than 25 feet of water head or 10 psi against the downstream end, the Township Engineer may allow a lower head in the upstream manhole.
 - c. This water level shall be maintained for a period of thirty (30) minutes, after which the volume of water leakage shall be measured for at least two (2) thirty (30) minute intervals.
 - d. The maximum allowable ex-filtration shall be 100 gallons per inch of inside pipe diameter per mile per 24 hours.

Infiltration Test

1. Where the groundwater level is at least two feet (2') above the top of the pipe for the entire length of a section of sewer or where a noticeable flow is observed in a completed portion of sewer, the Township Engineer may require the Contractor to perform an infiltration test, even if a low pressure air test has already been conducted.
2. The basic test procedure and allowable infiltration rate is as follows:
 - a. At the upstream manhole, all inlets shall be plugged.
 - b. All laterals, stubs and fittings into the sewer line being tested shall be plugged.

- c. A V-notch weir, or other flow measuring device approved by the Township Engineer, shall be installed in the end of the pipe in the downstream manhole, in such a way that no water bypasses the device.
- d. After steady flow has been achieved (usually less than one (1) hour), six (6) flow readings shall be recorded over a thirty (30) minute interval. If the readings vary more than $20\% \pm$ from the average of the readings the test should continue until a more steady flow is observed. If the readings vary less than $20\% \pm$ from the average of the readings the test shall stop and the average shall be the "infiltration."
- e. This maximum allowable infiltration rate shall be 100 gallons per inch of inside pipe diameter per mile per 24 hours.

Vertical Deflection Test for PVC Pipe

1. All PVC pipe shall be tested for pipe deflection after backfilling. The deflection test shall be conducted after the pipe has been backfilled for at least thirty days (30) but not longer than twelve (12) months.
2. The maximum allowable pipe deflection (reduction in vertical inside diameter) for installed sanitary sewer pipe shall be 5% of the original vertical internal diameter.
3. Deflection testing shall be performed with a calibrated internal television camera, deflectometer, or properly sized go, no-go mandrel. The mandrel (s), or other testing equipment, shall be provided by the Contractor at his expense. Mandrels shall be sized at 95% of the original vertical internal diameter of the pipe. Mechanical pulling devices for mandrels shall not be used.
4. Pipe which exceeds the allowable deflection shall be located, excavated, replaced, and retested by the Contractor at no expense to the Township.

HYDROSTATIC TESTS FOR PRESSURE PIPE (FORCE MAIN)

1. Sewer force mains shall be tested for leakage by means of a hydrostatic pressure test. After the pipe has been laid and partially backfilled between joints, each section of pipe between valves or temporary plugs shall be tested as follows:
2. The pipe shall be slowly filled with water and tested at a pressure fifty (50%) percent above normal working pressures, as determined by the Township Engineer, but in no case less than one hundred fifty (150) psi, based on the elevation of the lowest point of the line or section under test. The pressure shall be applied by means of a pump connected to the pipe in a manner satisfactory to the Township Engineer. A meter to

measure makeup water required shall also be installed. The pump, pipe connections, taps into the pipe and all necessary apparatus shall be furnished by the Contractor. Before applying the specified test pressure, all air shall be expelled from the pipe.

3. All exposed pipes, fittings, valves and joints shall be carefully examined during the open-trench test. Any cracked or defective pipes, fittings or valves discovered as a consequence of this pressure test shall be removed and replaced by the Contractor with sound material and the test shall be repeated until satisfactory to the Township Engineer. Should the Contractor elect to backfill the entire trench, or any portion thereof, prior to testing, it shall be the responsibility of the Contractor to locate and repair any leaks which occur during this test.
4. While the test pressure is being maintained, all exposed pipes, fittings, valves and joints shall be inspected for leaks. Leakage shall not exceed ten (10) gallons per day per inch of diameter per mile of pipe. In the case of piping which will remain permanently exposed, no leakage will be permitted. The test pressure shall be maintained for a period of not less than one (1) hour if joints are exposed and four (4) hours when joints are covered.

SHOP TESTS ON SEWER PIPE

1. The materials listed below shall be tested at the shop or plant of, and by, the manufacturer. Each manufacturer of such materials shall be fully equipped to carry out the tests herein designated. Upon demand of the Township Engineer, the manufacturer shall perform such additional tests as the Township Engineer may deem necessary to establish the quality of the material offered for use. The Township Engineer shall be furnished with certified reports or records of the results of all tests, such records or reports to contain a sworn statement that the tests have been made as specified. The number of tests performed shall be specified in the appropriate ASTM or AWWA Test Method.

<u>PIPE MATERIAL</u>	<u>TEST METHOD</u>
Polyvinyl Chloride Sewer Pipe	ASTM D 3034
Polyvinyl Chloride Pressure Pipe	AWWA C 900
Ductile Iron Pipe, Class 52	AWWA C 151

105. SANITARY SEWER MANHOLES

1. Precast concrete manholes shall be constructed at such locations and to such sizes, lines and elevations as shown on the drawings and as required by these specifications. Drop manholes shall be constructed at such locations and with such drops as are shown on the drawings.

2. Excavation for manholes shall be made to a vertical plane and existing paving shall be cut to a square or rectangular shape with dimensions two feet (2') greater than the outside of the walls. Manholes shall be completely built and fitted with their frames and covers as the work progresses.
3. Manholes made of precast, reinforced concrete sections shall conform with ASTM C478, "Precast Reinforced Concrete Manhole Sections". Special chambers and vaults made of precast, reinforced concrete sections shall conform with ASTM C857, "Standard Recommended Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures", and ASTM C858, "Standard Specifications for Underground Precast Concrete Utility Structures". The Contractor is required to submit shop drawings, which will include complete fabricated details and design calculations for each type of structure.
4. The pre-cast concrete structures described in this section shall be designed to withstand a live loading for H-20 per AASHTO Standard Specifications for Highway and Bridges and a wheel loading at 16 kips. Reinforcing bars conforming to ASTM A615 Grade 60 and wire fabric conforming to ASTM A185 and Portland cement conforming to ASTM C150, Type 1 and aggregate conforming to ASTM C33 shall be used in construction. Cement content in amounts adequate to produce a minimum strength of 4,000 psi concrete shall be added to the mix.
5. Pre-cast concrete structures shall be manufactured by Atlantic Concrete Products, Inc.; Monarch Pre-cast Concrete Corporation; A. C. Miller Concrete Products, Inc.; Terre Hill Concrete Products, Inc. or approved equal.

DELIVERY, STORAGE AND HANDLING

1. Comply with precast concrete manufacturer's instructions for unloading, storing and moving precast manholes (and structures).
2. Store precast concrete manholes (and structures) to prevent damage to Owner's property or other public or private property. Repair property damaged from materials storage.
3. Mark each precast structure by indentation or waterproof paint showing date of manufacture, manufacturer, and identifying symbols and numbers shown on Drawings to indicate its intended use.

MANHOLE BASES

1. Manhole bases may be either cast in place with Class A concrete or precast reinforced concrete.

2. Where the sanitary sewer pipe enters and exits manholes, the joint with the manhole shall be made in accordance with the following:
 - a. When a precast base is used, the pipe shall be sealed into the cored hole of the base with a rubber or neoprene flexible sleeve as manufactured by A-Lok Corp., Lock Joint Division of Interpace Corp., Link-Seal as manufactured by Thunderline Corp. or approved equal.
 - b. When tying into an existing manhole where no opening exists, the Contractor shall core drill a hole in the precast section in a circular pattern as approved by the Township, remove the core, grout in place, a Press Seal Gasket as manufactured by Press-Seal Gasket Corporation or Link Seal as manufactured by Thunderline Corporation, and insert the pipe into the gasket or seal.
3. Inverts shall be formed directly in the manhole base. Changes in size and grade shall be made gradually and evenly. Changes in the direction of the sewer entering branches shall have a smooth curve with a radius as large as the size of the manhole will permit. Steep slopes outside the invert channel shall be avoided.

PRECAST SECTIONS

1. Manhole wall sections shall be constructed of precast reinforced concrete pipe having an inside diameter of 48". The sections shall have tongue and groove joints made watertight using "RAM-NEK", "MAS-TIK", or approved equal gaskets. Certain manholes may be required to be larger than 48". This requirement would be noted on the plans.
2. Lifting slots shall be sealed watertight with a pre-manufactured flexible "plug" made for the purpose of plugging these holes. If the plug does not fully seal the opening, non-shrink mortar may be used to provide additional sealing.
3. The top section shall be an eccentric tapered section, tapering from 48" ID to 24" ID, unless a larger taper is required for larger manholes, or unless a slab top is required because the manhole is too small in height to accept a tapered top section.
4. A bitumastic protective coating shall be applied to all underground exterior surfaces of all pre-cast concrete structures. The coating shall be a minimum of 20 mils thick of Koppers Bitumastic No. 300-M or approved equal, applied as recommended by the manufacturer.
5. A white epoxy coating shall be applied to the entire interior pre-cast concrete surface of all sanitary sewer manholes. The coating shall consist of two (2) coats, each six (6) mils thick, of Penn-Chem Coating #54-W-23 by Pennsbury Coatings or approved equal, as recommended by the manufacturer.

6. The manhole chimney area shall be sealed with an internal flexible rubber sleeve, extension and expansion band, supplied by Cretex or approved equal.
7. All manholes are to include a high density polyethylene insert to reduce or prevent surface water inflow to the collection system through the manhole lid. Cap shall include a heavy weight corrosion resistant lifting strap.

RUBBER SLEEVE AND EXTENSION

1. The flexible rubber sleeve, extensions and wedge strips shall be extruded from a high grade rubber compound conforming to the applicable requirements of ASTM C-923, with a hardness (durometer) of 48 ± 5 .
2. The sleeve shall be double pleated with a minimum unexpanded vertical height of 8 inches, a minimum thickness of 3/16 inches and shall be capable of a vertical expansion when installed of not less than 2 inches. The top and bottom section of the sleeve shall contain an integrally formed expansion band recess and multiple sealing fins.
3. The extension shall have a minimum thickness of 3/16 inch. The top section of the extension shall be shaped to fit into the bottom band recess of the sleeve under the bottom chimney seal band. The bottom section of the extension shall contain an integrally formed expansion band recess and multiple sealing fins matching that of the rubber sleeve.
4. Any splice used to fabricate the sleeve and extension shall be not vulcanized and have a strength such that the sleeve shall withstand a 180 degree bend with no visible separation.
5. The continuous wedge strip used to adapt the rubber sleeve to sloping surfaces shall have the slope differential needed to provide a vertical band recess surface, be shaped to fit into the band recess and have an integral band restraint. The length of the wedge strip shall be such that, when its ends are butted together, it will cover the entire inside circumference of that band recess needing slope adjustment.

EXPANSION BANDS

1. The expansion bands used to compress the sleeve against the manhole shall be 16 gauge stainless steel conforming to ASTM A-240, Type 304, with a minimum width of 1 3/4 inches.
2. The expansion mechanism shall have the capacity to develop the pressures necessary to make a watertight seal and shall have a minimum adjustment range of 2 diameter inches. Studs and nuts used for this mechanism shall be stainless steel conforming to ASTM F-593 and 594, Type 304.
3. Installation shall be per manufacturer's specifications.

MANHOLE STEPS

1. Manhole steps shall be polypropylene as manufactured by M.A. Industries, Inc. of Atlanta Georgia, or equal. Manhole steps shall be cast into the wall, field installation of steps is not acceptable.

SURFACE FOR FRAMES

1. The top of the walls of precast manholes shall be properly contoured to the street or ground surface so as to form a flat surface upon which the manhole frame is to rest. If precast sections do not conform to the required grade, precast grade adjustment rings shall be used to bring the manhole frame to proper elevation. The final elevation of the manhole shall be at finished grade unless otherwise specified on the plans, for manholes in fields where flooding is expected.

FRAMES AND COVERS

1. Castings for manhole frames and covers shall be as shown on Standard Details S-S-9 and S-S-10, and shall conform with the requirements as ASTM A 48, Class 30. The covers shall be self sealing.
2. Where located in streets or subject to traffic loads, castings shall be capable of safely supporting an HS-25 loading, in accordance with specifications of the American Association of State Highway and Transportation Officials (AASHTO), with the allowance for impact included in the design.
3. Castings shall be true to pattern in form and thickness, free from cracks, gas holes, flaws, excessive shrinkage, sound, cleaned by means of sandblast, and neatly finished.
4. Runners, fins, risers, and other cast-on pieces shall be removed. All castings shall be tough and of even grain. All parts of castings shall be thoroughly coated at the factory with one coat of black asphaltum paint or other impervious preparation approved by the Township.
5. Castings shall have metal bearing areas machine ground and finished to ensure satisfactory seating so that it will be impossible to rock the cover after it has been seated in its proper position in the frame. Covers shall include a flexible gasket installed in a machined groove in the lid of the casting for a watertight seal. Pickholes shall not extend completely through the cover.
6. All covers shall have "SANITARY" cast in raised letters, which shall have a height of not less than two inches (2").

INVERTS

1. Invert channels shall be pre-cast and be smooth and accurately shaped to a semicircular bottom conforming to the inside shape of the adjacent sewers. Changes in size and grade shall be made gradually and evenly. Changes in the direction of the sewer and entering branches shall have a smooth curve of as large a radius as the size of the manhole will permit. The slope of the floor adjacent to the channel shall generally not exceed one (1) inch per foot.

MATERIALS

Frames and Covers

1. Castings for manhole frames and covers shall be Neenah Foundry Company as shown in Standard Details S-S-9 and S-S-10 and conform to the requirements of ASTM A48, Class 25. The castings shall be sound, true to form and thickness, cleaned by means of sandblast and neatly finished, to insure satisfactory seating. The cover shall have cast thereon the word "SANITARY" in letters not less than two (2") inches in heights.
2. Runners, fins, risers, and other cast-on pieces shall be removed. All castings shall be tough and even grain. All parts and castings shall be thoroughly coated at the factory with one coat of black asphaltum paint or other impervious preparation approved by the Township.
3. Castings shall have metal bearing areas machine ground and finished to ensure satisfactory seating so that it will be impossible to rock the cover after it has been seated in position in the frame. Covers shall include a flexible gasket installed in a machined groove in the lid of the casting for a watertight seal. Pickholes shall not extend completely through the cover.
4. Castings shall be capable of safely supporting an HS-25 loading, in accordance with specifications of the American Association of State Highway Transportation Officials (AASHTO), with due allowance for impact included in the design.

Precast Manhole Sections

1. All precast manhole sections shall meet or surpass the requirements of ASTM C478.

Mortar

1. The mortar for masonry shall be either a prepared mortar conforming with the requirements of ASTM C91, Type II, or shall be made of one (1) part cement, one (1) part lime and five (5) parts sand in a damp, loose condition. The cement shall conform to the requirements of ASTM C150, Type I. The lime shall be hydrated lime

conforming to the requirements of ASTM C207; Types S. The sand shall conform to the requirements of ASTM C144.

Grout

1. The grout mix shall be one (1) part cement and two (2) parts sand, plus the minimum amount of water necessary for proper placement, which shall not exceed a water to cement ratio of 0.49 by weight. When permitted to stand until setting takes place, the grout should neither bleed nor segregate. Cement shall conform to the requirements of ASTM C150, Type 1, and the sand shall conform to the requirements of ASTM C144. Immediately before placing the grout, the area to be grouted shall be thoroughly cleaned and moisture applied. The grout shall be carefully placed and completely fill all voids. Exposed edges of the grout should be kept moist and at temperatures above 40 degrees F for at least three (3) days after placement.

PRESSURE OR VACUUM TEST

1. Each manhole shall be tested. The manhole to be tested shall be completely filled with water for a period of 12 hours prior to the commencement of the test. The manhole shall be filled with water to a point level with the top of the frame and this water level shall be maintained for a period of 12 hours during which period an accurate record of the amount of water to be added by reason of leakage (ex-filtration) will be kept. The amount of ex-filtration so determined from the initial observation when converted into gallons per day, must be within the following limits.

The total rate of ex-filtration shall not exceed a rate of 0.038 gallons per inch of diameter per vertical foot per day.

2. If any manhole fails to meet the ex-filtration requirements specified herein, the Contractor shall determine at his own expense the source or sources of leakage. The Contractor shall repair or replace all defective material and/or workmanship and shall conduct such additional tests, as required to demonstrate that the manhole meets the test requirements.
3. As an alternate, the Contractor shall test all complete manholes by the vacuum testing method. A vacuum of 10" mercury shall be placed on the manhole and the time measured for the vacuum to drop to 9" mercury. The vacuum shall not drop more than 1" in less than 60 seconds. If the manhole fails the vacuum test, the Contractor shall make the necessary repairs and then retest the manhole.
4. In making the above tests, all equipment and labor shall be furnished by the Contractor.

106. LOW PRESSURE SEWER SYSTEMS

In those cases where an improved property is required to connect to the public sanitary sewer system but is unable to do so via gravity due to local topography an individual low pressure sewer system is required. The cost associated with the installation and maintenance of the system including pumping related equipment and piping shall be the sole responsibility of the property owner.

1. Description

The manufacturer of the low pressure system shall furnish complete factory-built and tested Grinder Pumping Station(s), each consisting of a basin package, alarm device, unitized level control system, grinder pump and all necessary appurtenances to form a complete U.L. listed package system. Grinder pump to be listed to U.L. 778 and CSA 108, basin package shall be listed to U.L. 1951, and alarm device shall be listed to U.L. 508. All equipment in the wet well shall be capable of constant submergence in sewage to a minimum depth of ten feet without electrical power being energized. The waste handling capabilities of the grinder pump and station shall be tested and certified to NSF/ANSI 46.

2. Shop Drawings and Manuals

After receipt of notice to proceed, the manufacturer shall furnish the Township Engineer a minimum of eight (8) sets of shop drawings detailing the equipment to be furnished including dimensional data and materials of construction. The Engineer shall promptly review this data, and return two (2) copies to the manufacturer as approved, or approved as noted. Upon receipt of accepted shop drawings, the manufacturer shall proceed with order entry and fabrication of the equipment. Prior to completion of equipment delivery, the manufacturer shall supply four (4) copies of Operation and Maintenance Manuals to the owner, and one (1) copy of the same to the Township Engineer.

3. Pre-Approval of Manufacturer

Any pump manufacturer not specified, but wishing to be pre-approved as an acceptable supplier shall submit a complete hydraulic analysis based on the design detailed in the contract documents at least fifteen days prior to bid date. All manufacturers must have been in the business of manufacturing complete grinder pump stations for a minimum of ten years. Manufacturer Representatives, Distributors or Packagers will not be considered as manufacturers. Manufacturer must demonstrate to the satisfaction of the Engineer that the proposed pumping equipment will meet system flows and heads required. In addition, pre-submittal must also demonstrate to the satisfaction of the Engineer that the equipment being proposed meets or exceeds all performance and safety requirements, materials of construction and user benefits of the specified equipment. Only pre-approved grinder

pump station manufacturers will be considered. All bids utilizing manufacturers not pre-approved will be considered non-responsive.

4. Warranty

The manufacturer shall provide a warranty on materials and workmanship for a period of twenty-four (24) months after notice of Property Owner's acceptance, but no grater than twenty-seven (27) months after receipt of shipment. The Owner will return any equipment found defective to the manufacturer for inspection and validation of the defect. Defective equipment will be repaired or replaced at manufacturer's discretion and shipped back to Owner at no charge.

5. Acceptable Manufacturer(s)

Acceptable grinder pumping station manufacturer(s) are the Barnes brand of Crane Pumps & Systems, as sold and serviced by CW Sales Corporation phone or pre-approved equal.

6. Corrosion Protection

All materials exposed to wastewater shall have inherent corrosion protection: i.e., coated cast iron, fiberglass, polyethylene, engineered polypropylene copolymer, stainless steel, bronze, PVC or CPVC.

7. Safety

The grinder pumping station shall be from electrical and fire hazards as required in a residential environment. As evidence of compliance with this requirement, the completely assembled, factory wired and tested grinder pump station shall be U.L. listed. Grinder pump stations without U.L. listing will not be acceptable.

8. Station Configuration

Basins shall be supplied in a wet well configuration. The wet well must have storage volumes according to the following table:

<u>Volumetric Range</u>	<u>Capacity</u>
Volume at "Off"	11 Gallons Maximum
"Off" to "On" Volume	20 Gallons Minimum
"On" to "Alarm" Volume	18 Gallons Minimum
"Alarm" to "Inlet" Volume	15 Gallons Minimum

9. Factory Wiring

All wiring in the grinder station shall be installed and functionally tested prior to shipment from the factory. All electrical cables penetrating or passing through the silhouette of the pump station must be guaranteed to be water-tight by the manufacturer and must be installed at the factory prior to shipment. The pump power cable shall be connected to the direct burial cable with a waterproof electrical connector certified to NEC and IEC IP68 ratings. Direct burial cable must be factory installed in the station and arrive at the job site with a minimum length of (fifty (50)) (one hundred (100)) (one hundred fifty (150)) feet external to the station ready to unroll and connect the alarm panel/power source. Factory wiring and testing shall be a specific part of the U.L listing.

10. Check Valve

The pump discharge shall be equipped with a factory-installed gravity-operated flapper-type check valve. Ball-type check valves shall not be permitted. The valve will provide a fully ported passageway when open and shall introduce a friction loss of less than six inches of water at maximum rated flow. Working parts shall be made of 300 series stainless steel and non-wicking fabric reinforced neoprene flap to ensure corrosion resistance, repeatability and dimensional stability.

11. Redundant Check Valve

Each basin package shall include one (1) Schedule 40 PVC type II swing check valve for installation by others in the service lateral between the grinder pump station and the low-pressure main. Valves shall be 1.25 inch NPT and only require ½ pound of backpressure for complete closure.

12. Level Detection

Level detection for controlling pump and alarm operation shall be accomplished by use of a detection device specifically designed for use in a sewage grinder station. Switches utilized in the system shall be hermetically sealed in a submersible, watertight protective housing, with an integral pressure-compensating diaphragm. Level controls requiring breather tubes are not acceptable as they are susceptible to moisture infiltration issues. Level detection device shall be Barnes ESPS 150 AUTOMATIC type design to protect switch from solids, greases, oils, fats and corrosive sewer gasses. Level detection device shall not require any regular preventative maintenance. The level detection device shall consist of two independent switches, one for each function (High Water Alarm and On/Off actuation). In addition, the device shall include a solid-state relay for directly controlling the pump motor. The level detection device shall include an automatically resetting, heat sensing thermal switch that interrupts current flow if excessive liquid temperature is detected. This thermal switch shall be part of the U.L. listing. The level switch assembly shall be provided with type 14-5 SOW cable, with

color coded leads and be 100% tested prior to shipment. The power cable and switch leads shall be connected via quick connect pin terminals located within the switch housing. Pin receptacles shall be crimped and molded to the power cord in a PVC plug. The plug assembly shall be guaranteed by the manufacturer to meet UL approval for submersion. The plug shall be secured with a stainless steel compression plate to prevent water from entering the switch housing and to provide strain relief at the point of cable entry. The control assembly shall be part of the U.L. 1951 listing. The level control shall be serviceable without confined space entry as defined by OSHA. Conventional mercury floats are not acceptable.

13. Shut-Off Valve

The pump discharge shall be equipped with a factory-installed manual ball valve. Ball valves shall be fully ported, constructed of bronze with stainless steel ball, stainless steel stem and hardware, and Teflon seats, with a minimum rated pressure of 150 PSI. All valves shall be operable from ground level with a color-coded actuation cord tagged green to open, red to close. Shut-off valve must be replaceable from above without confined space entry.

14. Anti-Siphon Valve

The pump shall be constructed for a positively primed, flooded suction. As added assurance that the pump cannot lose prime, even under negative head conditions in the discharge piping, the pump must include provision for a flapper-style valve in the discharge line prior to the check valve. The design shall provide for a maximum bypass, under normal operating conditions, of no more than 1GPM.

15. Basin Construction and Assembly

- A. The basin shall be injection-molded engineered polypropylene copolymer thermoplastic with a corrugated high-density polyethylene riser. The riser shall be sealed to the basin and cover adapter with a high surface contact engineered gasket designed specifically for use with corrugated piping. The basin shall be provided with three blanked-off inlet positions, 90 degrees apart, for field selection to simplify installation. Only one port is to be opened in the field, with connection to the 4" inlet piping with a flexible "Fernco" type fitting supplied by manufacturer. Basin dimensions shall be as shown on the contract drawings or specified herein. The basin must be designed to withstand wall collapse or buckling based on a hydrostatic pressure of 62.4 pounds per square foot, a saturated soil weight of 135 pounds per cubic foot, and a soil modulus of 700 pounds per square foot. The basin must be constructed to withstand or exceed 200% of the assumed loading at any depth.
- B. All piping within the basin silhouette shall be at a level in the station that is lower than the frost depth; i.e. no higher than the inlet. The basin package shall be furnished with a factory pre-wired waterproof power connector.

- C. Cover shall be a molded LLD polyethylene, shaped to resemble a rock in order to minimize visual impact. Manufacturer to offer covers in three colors: dark gray, sandstone and red-brown, for owner selection. Cover shall attach to riser with quarter-turn to fasten in place, with hasps and safety padlock provided by the manufacturer.
 - D. Basin shall be U.L. listed to Standard 1951.
 - E. All internal discharge pipe shall be constructed of bronze and terminate outside the bulkhead with a stainless steel flexible fitting with female NPT connection. The manufacturer shall guarantee all bulkhead penetrations be watertight.
16. Each basin shall be equipped with an injection-molded engineered polypropylene thermoplastic POD to locate and position the grinder pump and level control device. Pump and control to be removable without requiring the loosening of fasteners. POD to provide automatic alignment and connection of pump to discharge piping and level control with no additional adjustment required. A ½" diameter knotted polypropylene rope harness with a minimum breaking strength of 3750 pounds shall be attached to the pump at two locations for removal and installation purposes. The POD shall be designed to facilitate removal of the shut-off valve without basin entry in the event maintenance is required.

17. Pumps

A. Design

A two-stage submersible grinder pump shall be furnished, designed to reduce all materials found in normal domestic sewage into a finely ground slurry. The pump is to be capable of pumping the resultant slurry through small diameter piping to a gravity interceptor or treatment facility at the flows and heads specified. The pump is to be capable of continuously operating with a maximum liquid temperature of 104 F (40 C) and shall be capable of running dry for extended periods of time.

Pump shall be suitable for long-term submergence in sewage. Grinder pump shall be U.L. listed to Standard 778 and CSA listed to Standard 108, as well as to NSF/ANSI 46.

B. Performance

In order to ensure proper operation under all conditions, pump must provide, without overheating in continuous operation, the maximum head condition required by the system. Pump must also be capable of operating at zero or negative heads without damage to the pump. Pump shall be capable of 19 GPM @ 160' TDH.

C. Construction

The volute, seal plate and motor housing shall be constructed of high quality ASTM A-48 class 30 iron. The pump shall be painted. All exposed hardware shall be 300 series stainless steel. Discharge connection shall be a horizontally oriented discharge flange with integral sealing diaphragm.

The pump impellers shall be of the recessed, vortex design. Pumps with standard centrifugal semi-open or enclosed impeller designs are not acceptable. The impellers shall be of 85-5-5-5 bronze construction and machined such that the upper impeller is locked against rotation by a stainless steel positioning sleeve threaded to the shaft and the lower impeller is threaded, against rotation, directly to the motor shaft. Impellers to be dynamically balanced to ISO G6.3 specifications.

The pump shall be a two bearing design consisting of upper and lower angular contact ball bearings capable of handling all radial and axial thrust loads. Bearings to be oil lubricated and selected to provide a minimum L-10 life of 100,000 hours at design operating conditions. Permanently sealed, grease lubricated bearings are not acceptable.

D. Grinder

The grinder mechanism shall be specifically designed for use in a grinder pump; garbage-disposal-style cutting mechanisms are not acceptable. The grinder shall consist of a radial cutter threaded and locked to the motor shaft, and a matching shredding ring. Grinding shall be accomplished by a slicing, rather than chopping, action. The shredding ring shall be reversible to provide twice the cutting life. The grinder components shall be constructed of 440C stainless steel hardened to a minimum Rockwell C55 and shall be finish ground for a fine cutting edge. Two-stage cutter mechanisms and those requiring external adjustment shall not be acceptable.

The grinder shall be placed directly below the pumping elements and shall be direct driven by the motor shaft. The grinding mechanism shall operate without objectionable noise or vibration over the entire range of recommended operating pressures. The grinder shall be constructed so as to eliminate clogging and jamming under all normal operating conditions including starting. The grinder must be capable of handling a wide variety of solids, including cloth, paper, grit, sanitary products, and other foreign materials as defined by NSF/ANSI 46.

E. Electric Motor

Motors shall be capacitor-start capacitor-run single-phase design rated 2 HP, 240 volt with NEMA L characteristics, and shall be non-overloading throughout the entire pump curve. The motor windings shall be located within a sealed housing filled with

non-toxic dielectric oil for heat dissipation and bearing lubrication, making it capable of operation in a totally submerged, or partially or fully non-submerged, condition for extended periods without damage. Air-filled motors will not be accepted. The stator assembly shall be attached to the motor housing components using threaded fasteners to ease serviceability. Motor designs incorporating shrink or press fits for mounting will not be accepted. The motor shaft shall be 416 series stainless steel.

An automatically resetting heat sensing thermal switch that interrupts current flow shall be provided to protect against excessive temperature. Such device shall be a part of the U.L listing.

The pumps shall be equipped with type SOW power cable. The power cable shall be connected to the motor with quick connect pin terminals located on the motor housing. Pin receptacles shall be crimped and molded to the power cord in a PVC plug. The plug shall be secured with a stainless steel compression plate to prevent water from entering the connection area, and to provide strain relief at the point of cable attachment. A polybutylene terephthalate terminal plate with brass pins shall connect the power cord leads with the motor leads. The ground pin shall be longer than the power pins such that the ground connection is the first to be connected and the last to be disconnected. A Buna O-Ring shall provide isolation sealing between the terminal plate and the motor housing. The plug assembly shall be provided to meet U.L. approval for submersion.

F. Mechanical Seal

The pump shall be equipped with a floating-style single mechanical seal to prevent leakage between the motor and pump. Seal faces shall be silicon carbide for both the rotary and stationary seats, lapped and polished to a tolerance of one light band. Seal shall be provided with 300 series stainless steel hardware and Buna elastomers.

G. Testing

Each grinder pump shall be submerged, operated and tested for performance compliance to its respective curve. Testing process shall be approved and periodically audited by U.L.

18. Automatic Alarm Panel

A. General

A wall mounted alarm panel shall be supplied with each station. Alarm panel to be U.L. listed to meet Standard 508. Panel to be constructed with a NEMA 4X fiberglass enclosure and utilize stainless steel hardware and be provided with hasps for locking.

B. Controls

The alarm panel shall be equipped with a circuit breaker, ground lug and relays in order to facilitate pump operation and high-level alarm indication. Terminal strips to facilitate both input power and connection to the grinder station shall be provided.

C. High Water Alarm Indication

Each alarm panel shall include both visual and audible alarm indications. The alarm circuit shall be separately fused from the motor control circuit. The visual indication shall be provided by a red fluted lens mounted to the top of the enclosure in such a manner as to maintain rainproof integrity. A 90 dB audible device shall also be provided with a NEMA 4X silence button mounted on the exterior of the enclosure. The visual alarm will remain on as long as the high water condition exists in the basin; both visual and audible alarms to automatically reset when the high water condition subsides.

107. PAVING RESTORATION - STATE ROADS (LEGISLATIVE ROUTES)

1. Any area paved prior to construction of this project and disturbed by the Contractor during the project shall be repaved after construction in accordance with the specifications and drawings. In addition, shoulder areas along the edge of State Roads that may not be paved prior to construction, shall be paved after construction to the limits shown on the approved PennDOT plans or the contract documents.
2. All work and materials shall be provided in accord with the Permit issued by the Pennsylvania Department of Transportation for this project.
3. The Contractor shall restore all line striping and regulatory signs as they existed prior to the start of the project.
4. The Contractor shall provide wearing course material meeting the skid resistance level required for the traffic volumes on the roads being paved. The Contractor shall obtain traffic volume data from PennDOT or the Township Engineer prior to paving.

TEMPORARY PAVING

1. In streets, highways, alleys, driveways, after the trench has been backfilled and properly compacted to the depths below the street or pavement grade hereinafter described, temporary repaving shall be installed as follows:
 - a. Sidewalks: Trenches shall be temporarily resorted by placing and compacting No. 2A aggregate.

- b. Unpaved Township Streets and Unpaved Shoulders: Trenches shall be temporarily restored by placing and compacting No. 2A aggregate, in twelve inch (12") lifts. This shall constitute both temporary and permanent restoration.
- c. Township Paved Streets: Trenches shall be temporarily restored by placing and compacting twelve inches (12") of No. 2A followed by the following method:

Bituminous stockpile patching material, PennDOT Bulletin 27, shall be applied with a minimum thickness of two inches (2"), thoroughly rolled and compacted.

PERMANENT PAVING

- 1. After ninety (90) days have elapsed from the date of placement of temporary paving, the Contractor shall install permanent pavement meeting the appropriate Township or State requirements.
 - a. Sidewalks: Unless otherwise ordered by the Township, or required by local regulations, the Contractor shall remove or compact the top four inches (4") of aggregate and a concrete sidewalk four inches (4") thick shall be constructed to replace the sidewalk removed as a result of work. Sidewalk width shall be the same as the width of the sidewalk replaced. All concrete shall be air entrained and the total air content shall be six percent (6% +/- 1%) by volume. The air-entraining admixture shall conform to ASTM C260.
 - b. Paved Township Streets – Bituminous Paving and Concrete Paving: The temporary restoration shall be removed to the depths required and the existing paving shall be cut, sawed, or removed in such a manner as to provide a clean cut in the cartway surface and base without undue disturbance to subgrade or fragmentation of surrounding areas for a distance of twelve inches (12") on both sides of the trench area. Prior to the placement of permanent materials, the area shall be thoroughly rolled and compacted.
 - c. State Highways: Prior to the Work in state highways, the Contractor shall determine permanent restoration requirements of PennDOT.
 - d. Bituminous Sealer: When the wearing course is placed adjacent to curbs to form a bituminous gutter, upon existing bituminous material, or adjacent to structures, utilities, etc., it shall be sealed with a bituminous sealer for a distance of twelve inches (12") from curbs, structures, utilities, etc., or six inches (6") on both sides of a bituminous joint in order to prevent accelerated deterioration caused by natural elements. On concrete surfaces, all joints between existing and new construction shall be sealed with a bituminous sealer. The bituminous sealer shall be a product in accordance with PennDOT Publication 408, latest Edition.

OVERLAY PAVING

1. In accordance with Section 459.8(n) of Chapter 459, Title 62 of the Pennsylvania Code, existing State highways may have to be overlaid as part of the permit requirements or field orders by PennDOT.
2. The Contractor is responsible for any restoration or lane overlay(s) required due to damage caused by his equipment or operations. Required restoration and/or overlay shall be at the sole determination of the Township and/or PennDOT. Prior to final restoration even if such required restoration differs from restoration type or extent as shown on plans approved by the Township and/or PennDOT.

JOINT MILLING

1. Joint milling shall be undertaken in accordance with PennDOT Specifications, Pub. 408, Sec. 491.

108. PAVING RESTORATION - TOWNSHIP ROADS (OR OTHER NON-STATE ROADS)

1. The specifications regulating paving in PennDOT highways shall govern.

EXCEPT:

- a. Temporary paving: Immediately upon completion of backfill with specified material, the Contractor shall temporarily patch all paved areas with two (2") inches, minimum, of cold patch material or Superpave material, in accordance with PennDOT Pub. 408.
 - b. Permanent paving: Permanent paving shall be done only after temporary paving has been installed thirty (30) days. Permanent paving shall be in accordance with the appropriate Township road paving requirement. Permanent paving shall be prepared by cutting the existing pavement one (1') foot beyond the trench wall as described in Section 106, and joints shall be sealed as described in the same section. If the piping is located along the road center and if the road has little or no crown, the Township Engineer may direct that the base and wearing course be installed in such a way as to introduce a crown in the road.
2. Where required by the Township Engineer, in writing, the Contractor shall provide permanent paving restoration consisting of five inches (5") of Superpave in the trench areas, with no temporary paving. At the end of 30 days from this paving, the road shall be overlaid with one inch (1") of wearing course for one or two lanes of width as directed by the Township's Engineer. If this overlay option is used for Township roads, the Contractor shall feather the edges of the overlay or transition to existing

- paving. These joints shall be sealed and sanded to PennDOT Standards for a width of at least two feet (2').
3. Prior to such overlay, the Contractor shall properly clean, fill depressions, adjust manholes and valve boxes and tack coat all existing surfaces prior to the overlay. All material and work is to be provided to meet PennDOT Standards.

109. PAVING RESTORATION - PRIVATE PAVED AREAS

1. The specifications regulating temporary and permanent paving in Township roads shall govern.

EXCEPT:

- a. Temporary restoration shall consist of eight inches (8") of No. 2A aggregate.
- b. Permanent paving shall consist of pavement equal to the existing paving, but no less than two inches (2") of Superpave course material.

110. SURFACE RESTORATION - UNPAVED SHOULDERS, ROADS, DRIVEWAYS, ALLEYS AND PARKING LOTS

1. Unpaved shoulders, roads, private drives, parking lots or alleys shall be restored after construction to their condition before construction, or better as outlined below:
 - a. Backfill shall be brought to within eight inches (8") of finished grade and compacted.
 - b. Immediately upon completion of backfill, eight inches (8") of compacted sub-base material shall be installed in the trench area to bring the excavation to grade. The stone for this surfacing is to be 2A aggregate and shall be rolled and shaped to meet existing grades.
 - c. Along State Roads a more improved condition may be required.
 - d. Refer to the project drawings and PennDOT Permit.

111. LAND SURFACE RESTORATION

1. Any areas in grass, or field, or non-stone or non-paved condition prior to construction of the project, which are disturbed by the Contractor during construction, shall be replaced after construction to their condition before construction or better as outlined below:

a. FORMULA "B" SEEDING

1. In existing grass and field areas the Contractor shall restore disturbed areas with at least six inches (6") of clean topsoil and seeding soil supplements and mulching.
2. Installation and materials shall conform to PennDOT Specification Pub. 408, Section 802 (topsoil) and Section 804 (Formula B seeding), and soil supplements, and Section 805 (mulching).
3. Newly seeded areas which are not at grade and in an approved healthy growing condition after the first complete growing season (March 1 through October 1), shall be re-prepared and reseeded by the Contractor with new seed prior to the beginning of the next growing season.

112. SOIL EROSION AND SEDIMENTATION CONTROL

1. Throughout the course of the project the Contractor shall provide and maintain temporary soil erosion or sedimentation control features shown on the plans and or as required by field conditions.
2. If the total disturbance is greater than one (1) acre in size an NPDES permit is required from the Northampton County Conservation District.
3. Any topsoil stockpile area or graded area shall be seeded within twenty (20) days of placement.
4. Topsoil replacement and seeding and mulching on slopes that are steeper than 5 horizontal to 1 vertical shall be protected with staked mat or staked netting during initial seed growth.
5. The Contractor shall not drive equipment through a flowing stream. The Contractor shall remove mud from vehicle tires or treads before moving his equipment off the construction sites. If his equipment does track stone or mud onto adjoining roads or properties, he will be responsible for promptly picking up this debris so it does not become a nuisance or traffic hazard.

SPECIFIC CONTROL FACILITIES

Staked Straw Bales:

1. Place straw bales as needed to trap sediment and filter storm water flows during upstream and channel construction. The bales shall be of standard size and bound

securely with wire or twine, straw bales shall be staked with wooden or steel stakes, a minimum of three feet (3') in length, a minimum of two (2) stakes per bale. Damaged or deteriorated straw bales shall be removed and replaced. Periodically, the straw bales shall be inspected for condition and function. Trapped sediment shall be removed and re-distributed on the site, when straw bales have backed up more than nine inches (9") of sediment.

Stone Riprap:

1. Stone riprap shall be placed at storm sewer pipe outlets, earth embankments at culverts and at other locations which may experience storm water scour as found during construction. The riprap blanket dimensions and stone sizes shall be field determined. The stone riprap blanket shall be placed in an irregular fashion on a filter bed of 2A aggregate six inches (6") deep. The stone used for riprap should be hard, durable, angular in shape and free from organic material. Rounded stone or shale is not an acceptable "dumped" riprap material. During construction, any sediment trapped in the stone shall be removed periodically to enable the riprap blanket to function properly in reducing pipe outfall water velocities.

Stone Filter Berm:

1. Where needed, the Contractor shall place a stone filter berm to dissipate water velocities and trap sediment. The berm shall be typically 24 inches (24") high, mounded five feet (5') wide, minimum and approximately twenty feet (20') long. Stone used in the berm shall be PennDOT #5.

Aggregate:

1. Upon stabilization of roadway or other disturbed areas, the berm may be removed and used elsewhere on the site if the condition of the stone is acceptable for the desired use.

Filter Fabrics:

1. Filter fabric fencing shall be placed as a sedimentation control device as needed and as elected by the Contractor to check particular events of soil erosion and sedimentation. The construction fabric shall be a woven or nonwoven fabric consisting only of long chain polymeric filaments or yarns such as polypropylene, polyethylene, polyester, polyamide or polyvinylidene-chloride formed into a stable network such that the filaments or yarns retain their relative position to each other. The fabric shall be inert to commonly encountered chemicals. Periodically the filter fabric fence should be inspected as to condition and function. Sediment which has been trapped may be redistributed on the site. Upon stabilization of disturbed areas the filter fabric fence may be reused if in good condition, otherwise it may be discarded.

Vegetated Ground Cover:

1. Immediately upon final grading of any phase of any section topsoil shall be brought back over disturbed areas which will not be paved or built upon. This topsoil shall be spread in a smooth finish grade fashion as required by Section 110.

113. WATERLINE RELOCATION AND REPAIR

1. All waterline relocations and repairs shall be provided in accordance with the specifications of the ultimate owner of the lines (Municipality, Authority, Private Entity, etc.).

114. CONCRETE

1. All concrete on the project will be provided and installed in conformance with PennDOT Specification Pub. 408.
2. The Contractor is required to observe, in particular, that section dealing with concrete placement in cold weather, Section 1001.3(i).
3. All concrete shall be PennDOT Class A (3300 psi) unless otherwise shown.

115. STEEL CASING FOR BORINGS

1. Steel pipe casing shall have a wall thickness of 0.563 inches when installed under railroad crossings and 0.375 when installed under streets and highways. In both cases, circular steel pipe shall be not less than 24 inches in diameter. A coal tar epoxy protective coating shall be applied to the pipe interior and exterior.

116. FLOW METERING EQUIPMENT

1. The Contractor shall supply and install flow metering equipment within the gravity sewer system at location(s) shown on the plans. This equipment and installation shall be reviewed and approved by the Township Engineer.
2. A factory approved representative shall provide a one day instructional demonstration of the metering and processing equipment at a time and location specified by the Township Engineer.
3. All equipment shall be installed in accordance with the manufacturer's recommendations.

SECTION XI.
WILLIAMS TOWNSHIP
STANDARD DETAILS
FOR
NEW & EXISTING SANITARY SEWER INSTALLATION

INDEX

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