

# **THE MARSHALL TOWNSHIP MUNICIPAL SANITARY**

## **MINIMUM STANDARDS**

### **FOR THE DESIGN AND CONSTRUCTION OF SANITARY SEWER SYSTEMS**

**REVISED AND CURRENT AS OF 5/28/2015**

This document may be purchased at the Authority's Main Office:

**Marshall Township Municipal Sanitary Authority  
525 Pleasant Hill Road  
Wexford, PA 15090**



**Prepared by  
Groundwork Civil**

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### 1.1 INTRODUCTION

1.1.1 All contractors, developers, consulting engineers, architects and other firms, corporations, associations, persons, or individuals, hereinafter collectively called the **Contractor**, involved in the construction of sanitary sewer systems to be connected to The Marshall Township Municipal Sanitary Authority system, hereinafter called the **Authority**, shall read and take notice of this document.

1.1.2 All costs shall be as per the Authorities Current Fee Schedule.

### 1.2 PURPOSE AND SCOPE

1.2.1 This document sets forth the minimum design and construction standards for acceptance by the **Authority** of all sanitary sewers and appurtenances to be connected to the **Authority's** system. This document presents the minimum standards for design and construction of gravity sanitary and service sewers, pumping stations, force mains and appurtenances. Standards for design and construction of waste water treatment facilities and alternatives to gravity sewers are not presented in this document.

- 1.2.2 The minimum standards described herein establish the general criteria to be used to review, approve, and if constructed in accordance with the approved design, accept the sanitary sewers as part of the **Authority's** system. The **Authority** reserves the right to request, at its discretion, additional data, tests, drawings, details, or other such information as it deems necessary to judge the adequacy or acceptability of any sewer extension.
- 1.2.3 Achievement of minimum standards for construction of sanitary sewers and appurtenances by Contractor does not insulate Contractor against any claim or defense which may be brought by the Authority with respect to such sanitary sewers or appurtenances.

### 1.3 METHODS OF CONSTRUCTION AND COMPLIANCE

- 1.3.1 The **Contractor** is to supervise all of the construction work and is responsible for the means, methods, techniques, sequences, and procedures of construction and for safety precautions and programs incident thereto and for compliance with all rules, regulations or laws of all governmental agencies having jurisdiction over design and/or construction of such facilities.
- 1.3.2 Prior to initiating construction, the **Contractor** shall comply with all the requirements of the **Authority** as defined in the "Rules and Regulations Governing Sewage Service".
- 1.3.3 All sanitary sewer extensions shall be consistent with the Official Sewage Facilities Plan (Act 537 Plan) for the Township in which the extension is constructed.
- 1.3.4 All sanitary sewers and appurtenances shall comply with the requirements of, and shall be approved by (if necessary), the Pennsylvania Department of Environmental Resources, the Allegheny County Department of Health, and all other required agencies.
- 1.3.5 The **Contractor** shall comply with the Commonwealth of Pennsylvania Department of Labor and Industry Regulations for Excavations and Constructions. The **Contractor** shall file the required notification with the Bureau of Inspection, Department of Labor and Industry prior to starting work on this project. A pre-construction conference shall also be held with the **Authority Engineer**.

- 1.3.6 It shall be the responsibility of the **Contractor** to devise and implement a Soil Erosion and Sedimentation Control Plan in conjunction with the completion of the work. The provisions of this plan shall be in accordance with the requirements of the "Soil Erosion and Control Manual" of the Commonwealth of Pennsylvania Department of Environmental Protection. If the project required an NPDES Permit for Construction Discharge, the **Contractor** shall, prior to commencing with the work, schedule a meeting with the Allegheny County Conservation District for the review and approval of the final Erosion and Sedimentation Control Plan.

The **Authority** assumes no responsibility in assuring that the **Contractor** adheres to the approved Soil Erosion and Sedimentation Control Plan, and as such, any fines and/or violations shall be the responsibility of the **Contractor**.

- 1.3.7 Where the construction work is across, along or through rights-of-way, roadways, streets or alleys, belonging to the State, County, Municipality or utility companies, the regulations and stipulations set up and required by those OWNERS shall be observed, and all work shall be in conformance with the requirements set forth by that OWNER. Any and all permits required for opening roadways or streets shall be obtained by the **Contractor** at the **Contractor's** expense. The cost of all inspection required by those OWNERS shall be borne by the **Contractor**.
- 1.3.8 Sheeting, solid shoring and/or bracing shall be utilized in excavations, where necessary or required, to protect existing or proposed structures, pipe lines or other facilities, pedestrian or vehicular traffic, and where necessary or required to prevent injury to construction personnel and other persons and property. All systems of sheeting, shoring and bracing shall be designed and installed by the **Contractor** for materials and depths encountered and shall be adequate to withstand the loads to be imposed and superimposed. Materials and design for the sheeting, shoring and/or bracing shall be in conformance with the regulations prescribed by any Federal, State or local agency having jurisdiction over the work. The **Contractor** shall be fully responsible for the adequacy of the system to withstand all loads thereon and shall save harmless the **Authority** and Engineer from any and all personal and property damages resulting from his failure to properly provide and maintain sufficient sheeting, shoring and bracing.

Trench excavation shall be in strict conformance with OSHA Regulations regarding the selection of 1) sloping and benching systems, and/or 2) support, shield or other systems. A registered professional engineer's certified design calculations is required by OSHA for protective systems where trench depth is greater than 20 feet, in accordance with paragraphs

1926.652 (b) and (c) of the Regulations. In addition, a professional engineer's certification and usage specification for trench shoring/shielding systems or sloping of trenches will be required where the trench depth is 20 feet or less in accordance with Subpart P of the Regulations. The professional engineer must be registered in the state where the work is performed.

- 1.3.9 In keeping with the "**Project Environment**" that the Commonwealth of Pennsylvania has undertaken for the decade commencing with the year 1970, the Department of Environmental Protection (PaDEP) and the Allegheny County Health Department (ACHD) require conformation with practices which will alleviate pollution of the atmosphere, the ground, and all waters.

The **Contractor's** attention is also directed to the following:

- A. Air Pollution Control Act, of January 8, 1960, P. L. 2119, as amended.
- B. Clean Streams Law, the Act of June 22, 1947, P. L. 1987, as amended.
- C. Solid Waste Management Act, Act No. 241 of July 31, 1968, as amended.

The **Contractor** is advised that he/she shall acquaint himself/herself with and shall abide by all provisions of the aforementioned Acts, as well as any other Federal, State and local legislation which applies to the **Contractor's** specific project.

#### 1.4 **CONTRACTOR NOT AGENT OF AUTHORITY**

- 1.4.1 No **Contractor** involved in the construction of sanitary sewers to be connected to the **Authority's** system, except those specifically retained by the **Authority** by virtue of a properly executed construction contract, shall be considered to be an agent, employee, or assign of the **Authority**.
- 1.4.2 The **Contractor** shall be fully responsible and liable for, and shall indemnify, defend and hold harmless the **Authority**, its Engineer, employees, or representatives from all claims, and shall pay all legal costs incident to claims for personal or property damage arising from construction of sanitary sewer extensions.

## 1.5 **GENERAL REQUIREMENTS - SEWER EXTENSIONS**

- 1.5.1 All sanitary sewer extensions shall be designed by and bear the seal of an Engineer registered in the Commonwealth of Pennsylvania.
- 1.5.2 Five copies of proposed sanitary sewer extension designs shall be submitted to the **Authority** along with five copies of the design report. A PDF copy of the plans and design report are also to be provided,
- 1.5.3 All sanitary sewer extensions shall be constructed according to plans approved by the **Authority's** Engineer.
- 1.5.4 A sanitary sewer shall not cross watershed boundaries that exist prior to the time of land development activity, unless written permission is otherwise granted by the Authority's Board.

## 1.6 **SEWAGE FACILITIES PLANNING MODULES SUBMISSION**

- 1.6.1 Following the initial meeting with the **Authority** and other governmental agencies, the **Contractor** shall submit the completed Sewage Facilities Planning Modules.
- 1.6.2 The necessity for the preparation and submission of Planning Module Components to the PaDEP is determined by the following criteria:
  - A. If the flow from the proposed building (s) is equal to or greater than 800 gallons/day then the modules are required. A single family dwelling (or equivalent dwelling unit) has been established at 400 gallons/day/EDU. In other words, if two homes are to be constructed, then the total flow equals 800 gallons/day; thereby requiring a module. For other types of establishments (non-residential), the PaDEP Chapter 73 may be used to determine the total flow from the building. If the total flow is under 800 gpd then the modules are not necessary. An individual, single connection of house or on existed deeded parcel of property does not require the submission of modules.
  - B. If an existing building is demolished and the identical tap is utilized for a new building, then only the net increase in flow will be calculated as the need to submit modules.

As an example; if an existing home is torn down, which contributes 400 gpd and a new office building is proposed with a total flow of 700 gpd, the net increase in flow is only 300 gpd. Thereby, no modules are necessary. However, if a subdivision of property has occurred (in accordance with 2. above) then modules are necessary.

1.7 **CONTRACTORS SEWER EXTENSION AGREEMENT**

1.7.1 The **Contractor** shall enter into an agreement with the **Authority** in which the **Authority** will agree to take over the sanitary sewer system for maintenance and ownership, if the system is approved by the **Authority**. Such approval being based on compliance with the specifications, rules and regulations contained within this manual.

1.8 **WARRANTY REQUIREMENTS**

1.8.1 All sanitary sewers shall be of the conventional gravity flow type.

1.8.2 All equipment and materials installed by the **Contractor** shall be guaranteed by the **Contractor** and manufacturer to be free from defects in design, materials, and workmanship for a period of eighteen (18) months following the installation of said equipment and materials. Equipment and materials which prove to be defective or which show undue wear within eighteen (18) months of acceptance in the opinion of the **Authority's** representative, shall be replaced without cost to the **Authority**.

1.9 **MAINTENANCE OF EXISTING FACILITIES**

1.9.1 The **Contractor's** attention is directed to the fact that any and all existing facilities must be maintained in continuous operation throughout the course of the work. To that end, he/she shall so schedule his/her work as to avoid interruptions in the operation of the present facilities.

1.9.2 Should it prove impossible to avoid an interruption of the present facilities, the **Contractor** shall notify the **Authority** of the intended start and duration of the interruption at least seven (7) days in advance, and shall receive written approval for the interruption before causing any of the existing facilities to be taken out of operation. Before the facility is taken out of operation, the **Contractor** must have all materials, equipment, tools, plans, etc. to complete the work at hand. The **Authority** shall decide, and its decision shall be final, in regard to whether the equipment, tools, plans, etc., at hand are adequate to complete the work. If so directed, the **Contractor** shall work around the clock on that portion of the work which necessitated the interruption.

1.10 **FLOOD CONDITIONS**

1.10.1 It shall be the **Contractor's** responsibility to take whatever measures he/she deems necessary to protect the facilities from damage due to flood waters during the construction stage and until such time as they are formally accepted by the **Authority**.

1.11 **MAINTENANCE OF TRAFFIC**

- 1.11.1 On all streets and roads, unless otherwise permitted by the Engineers, the **Contractor** shall maintain not less than one lane of traffic at all times. The stipulation regarding traffic, however, shall conform to the **Authority** having jurisdiction over the highway in question. All necessary barricades, flashing lights, flagmen, night warning signs and flares and other items of traffic control and safety shall be provided and maintained in working order by the **Contractor**.

1.12 **RIGHTS-OF-WAY CROSSINGS**

- 1.12.1 Where the **Contractor** must construct sewers underneath transportation utility installations, such as main highways and other similar locations where the authorities having jurisdiction over the work will not permit open cutting for the installation of the sewer, or where full traffic is required to be maintained, the **Contractor** shall make the installation by method generally outlined under the section entitled "Jacking and Boring."

1.13 **INTERFERENCE WITH UTILITIES AND STRUCTURES**

- 1.13.1 It is the responsibility of the **Contractor** to contact the owners of the various utilities in this area, prior to starting work, and also during construction, and determine the exact location of any structures, gas or water mains, electric conduits, sewer lines, and all service lines the utilities may have along the route of the work so that the **Contractor** may locate and protect them, whether or not such gas and water mains, electric conduits, sewer lines or service lines are shown on the plans.
- 1.13.2 The **Contractor** assumes all responsibility and liability for all property damage and bodily injury that may result from his/her damaging or disturbing any subsurface lines regardless of the nature or purpose of the structure. The **Contractor** must comply with all provisions and requirements of PA Act No. 172 (which amended PA Act No. 287) (HB-2543).
- 1.13.3 The **Contractor** shall be responsible for all damages to utilities, structures, power lines, gas, water and drain lines, sewers, etc., that may result from his/her operations and shall restore same to their original conditions as soon as possible and prior to completion of his contract. Water, sewer, gas and power service to dwellings or places of business shall be maintained with a minimum of interruption throughout the program of construction. No service shall be interrupted without the



approval of the utility company concerned and without first giving due warning to the occupant of said dwelling or business establishment.

#### 1.14 **ELECTRIC POWER LINES**

1.14.1 The **Contractor** is hereby notified that at many locations the proposed work may be in close proximity to overhead high voltage power lines. It is the **Contractor's** responsibility to take such precautions as are necessary or required and to inform his/her personnel and his/her subcontractors of and enforce all safety rules and regulations when working near such power lines. The **Contractor** assumes all responsibility and liability for all property damage and bodily injury that may result from his or his subcontractor's personnel contacting directly or indirectly the overhead high voltage electric lines.

#### 1.15 **PROPERTY RESTORATION**

1.15.1 The **Contractor** shall be responsible for all damages to private properties, structures, fences, lawns, landscape plantings, sidewalks, etc., that may result from his/her operations and shall restore same to their original condition as soon as possible and prior to completion of his work.

#### 1.16 **BLASTING**

1.16.1 No blasting shall be done without first notifying the **Authority** and Engineer and appropriate Federal, State and local government agencies. The **Authority** reserves the right to prohibit blasting where, in its opinion, it is not warranted.

Generally, the **Contractor** will not be permitted to blast where Federal, State or Local government law prohibits, or where adjacent existing utility structures and other new or existing facilities are endangered by such an operation in the opinion of the **Authority**. Where blasting is permitted, all blasts shall be covered with heavy timbers, chained together, or with suitable metal mats. The amounts of explosives used shall be such that nearby properties and facilities are not damaged and persons in the vicinity of the blast are not endangered. The **Contractor** shall take out and maintain, during the period of his blasting operations special liability and property damage insurance to cover blasting operations and shall notify all governmental agencies as required by law. No explosives shall be delivered to the site until proof of such insurance coverage is delivered to the **Authority**. If a special bond is required by Federal, State or Local government agencies covering the blasting operations its cost shall be paid by the **Contractor**.

- 1.16.2 All blasting shall be done by licensed blasters and the **Contractor** shall conform to all Federal, State and Local laws and regulations regarding transportation, storage and use of explosives.
- 1.16.3 The **Contractor** shall be fully responsible and liable for all personal and property damage incurred as a result of his/her use of explosive and blasting operations regardless of whether or not he has complied with such Federal, State and/or Local laws and regulations.

## **SECTION 2 - SEWER EXTENSIONS**

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## 2.1 DESIGN REQUIREMENTS

- 2.1.1 In general, the sanitary sewers are to be designed for the ultimate tributary population. The design report to accompany the application for connection shall clearly present the design flow basis, including the breakdown of residential, commercial, and industrial flow rates. The average daily and peak hourly flow rates for each category shall be included.
- 2.1.2 Residential sewage flows shall be determined on the basis of 100 gallons per person per day and 3.5 persons per residential unit. Commercial and industrial sewage flows shall be determined on a fixture unit basis, or historical evidence documented by a similar establishment. The peak flow factor for sizing lateral and submain sewers shall be four (4) times the average flow rate. The peak flow factor for sizing main, trunk, and interceptor sewers shall be 2.5 times the average flow rate.
- 2.1.3 Sub-main, main, trunk and interceptor sewers shall be eight (8) inches in diameter or larger.
- 2.1.4 Service sewers to homes and commercial establishments and facilities shall be six (6) inches in diameter, unless a minimum grade of 0.25 inches per foot can be maintained in which case service sewers may be four (4) inches. Minimum allowable grade for all service sewers is 0.125 inches per foot in all cases.
- 2.1.5 Service sewers to all food service establishments shall be equipped with an approved grease removal system in conformance with the standard details and Section 4.2.14 of the Minimum Standards. The grease removal system will be approved by the **Authority**.
- A. No wastewater other than from kitchen fixtures or food processing equipment shall discharge into the grease removal system unless approved in writing by the **Authority**.
  - B. All wastewater from the pre-rinse station must discharge to the grease removal device. All other dishwater wastewater must discharge to the grease removal device. The wastewater discharged to the grease removal device shall not exceed 130 degrees Fahrenheit.
  - C. A facility must keep interceptor cleaning records on file a minimum of three (3) years. The following information must be maintained: receipt for job performed signed by contractor and

cost, clean-out date, person responsible for cleaning, name of firm, address and contact information.

- 2.1.6 Eight (8) inch diameter sub-main, main, trunk and interceptor sewers shall have a minimum grade of one (1) percent (one (1) foot of fall per 100 feet of length).
- 2.1.7 Sewers shall be designed and constructed to give mean velocities, when flowing full, of not less than 2.0 feet per second based upon Kutter's Formula or Mannings' Equation using an "n" value of 0.013.
- 2.1.8 All sewers shall be designed to line and grade with uniform slope between manholes. Curvilinear alignments between manholes shall not be permitted.
- 2.1.9 In general, sewers should not be designed to be located in fill areas. The pipe zone, as defined herein, and shown in the standard drawing, should be located in undisturbed virgin ground.

Only under conditions approved by the Authority and Engineer will sewers be permitted in engineered fill areas. Engineered fill is defined as suitable material compacted to ninety-five percent (95%) of maximum modified proctor density at moisture content within three percent (3%) of optimum moisture content. Testing and fill operations must be certified by a geotechnical engineer. Compaction tests in the sewer trench are required to be submitted to MTMSA prior to authorization being given to install the pipe.

The fill shall be brought up to an elevation of a minimum of two (2) feet above the pipe invert, compaction test performed, then the sewer line may be trenched and installed.

The pipe and manholes located within the fill area shall be structurally enhanced.

- 2.1.10 All sewers shall be designed to prevent damage from superimposed loads.
- 2.1.11 All sewers shall be designed to provide a minimum of four (4) feet of cover above the crown of the pipe, and to the extent practicable, a maximum depth of 15 feet.
- 2.1.12 Except where pipe crossings are required, a minimum of 10 feet horizontal and 18 inch vertical clearance shall be maintained between all other subsurface utilities including but not limited to gas, water, storm sewer, and electric. Where regulatory agency requirements are more stringent, they shall supersede this requirement.

- 2.1.13 All sewers at a depth over 15 feet shall be SDR-21, ductile iron pipe or SDR-35 with concrete encasement.
- 2.1.14 Service sewer lateral piping shall be supplied and installed in minimum 13-foot sections.
- 2.1.15 Ductile iron pipe shall not be permitted for use within the immediate 2500 lineal feet of a sewage force main discharge
- 2.1.16 Design of pressure sewer system shall provide hydraulic calculations for review by **Authority's** Consulting Engineer for determination of piping size.

## 2.2 EASEMENTS

- 2.2.1 An exclusive permanent easement recorded in the name of the **Authority** of at least twenty (20) feet shall be provided for all proposed sanitary sewers. All sewers to be approved, accepted and conveyed to the Authority must be within the center of the sanitary sewer right-of-way (center 10 feet of a 20-foot wide right-of-way). For new subdivision plans, the 20-foot sanitary sewer easement shall be shown on the recorded subdivision plan. One blue line drawing and one reproducible Mylar of the recorded plan must be supplied to the **Authority** prior to construction of any sewer lines.
- 2.2.2 For proposed sewers, located outside the limits of the subdivision plan, rights-of-way agreements in the name of the **Authority** must be obtained prior to construction of the sewer lines. It is the responsibility of the **Contractor** to supply the **Authority** rights-of-way drawings in a form satisfactory to the **Authority** in order that the **Authority** may have its Solicitor prepare the necessary rights-of-way.

## 2.3 **CONSTRUCTION DRAWING REQUIREMENTS**

- 2.3.1 All sets of plans shall be prepared on standard 24" x 36" sheets with a 1" border on the left hand side and a 1/2" border on all other sides, and shall include a 3" x 5" title box in the lower right hand corner.
- 2.3.2 All sets of plans shall include a title sheet to identify the project by name, owner, and location, as well as a key map drawn at a scale not smaller than four hundred (400) feet per one (1) inch covering the entire area and boundary of the proposed project. The project key map shall show general layout of the sewers, and the arrangement of the construction drawings referenced by drawing number as they appear in the set.
- 2.3.3 The key map shall show all existing and proposed streets, water courses, and other salient topographic features, control lines for intervals of not less than five (5) nor more than ten (10) feet, general locations of all bench marks set during the design, and other such information as may be requested.
- 2.3.4 Construction drawings shall include both plan and profile views and shall be drawn at a horizontal scale of fifty (50) feet per one (1) inch maximum and a vertical scale of ten (10) feet per one (1) inch maximum and shall include the following information at a minimum:
- A. **Plan**
- 1) Title block identifying project name, owner, date, sheet numbers, scale, and revision date/description blocks.
  - 2) Design survey points, references, and baseline.
  - 3) Base datum location, description and elevation. North American Horizontal Datum (NAD) 1983; North American Vertical Datum (NGVD) 1929.
  - 4) Temporary bench marks for reference during construction (at least one every 1500').
  - 5) All pertinent topographic features, including all man made structures.
  - 6) All existing or proposed subsurface utilities to include water, storm sewers, gas, electric, etc.
- 7) North arrow.

- 8) Locations of proposed service connections.
- 9) Proposed manhole locations with manhole reference number.
- 10) Location and perimeter limits of existing or proposed fill areas.

**B. Profile**

- 1) Sewer Centerline profiles to show existing and proposed surface elevations.
- 2) Minimum basement elevations for all proposed connections.
- 3) Pipe inverts at all manholes for all pipes.
- 4) Invert and surface elevation of all manholes.
- 5) Horizontal stationing at all manholes.
- 6) Length, grade and diameter of pipe between manholes.
- 7) Elevation table (in feet at Median Sea Level)
- 8) Location of all special appurtenances (i.e. concrete cradle, borings with casing pipe, concrete encasement, ductile iron pipe, anchors, drop connections, air/vacuum release valves, etc.)

**C. Detail Sheets**

- 1) Tabulation of design data by manhole run to include design flow rate, velocity, minimum design grades.
- 2) Scale construction drawings for all special conditions.

D. All copies of drawings furnished to the Authority should be of the dark-line type. At the time of the initial submission, a total of five (5) complete sets of drawings, including Plan of Subdivision, will be forwarded to the Authority.

All construction drawings stamped “approved” may be subject to a current review after three (3) years from the original approved date.

E. During construction, the contractor is responsible for maintaining record drawings and shall deliver said record drawings to the design engineer. The design engineer shall produce and deliver to the Authority two (2) complete sets of as-built drawings and one (1) electronic copy in PDF



format, including the final recorded Plan of Subdivision. As-built drawings shall include, but not be limited to:

1. Locations of as-built service connections as measured from the center of the nearest downstream manhole;
2. Sewer centerline profiles;
3. Pipe inverts at all manholes for all pipes;
4. Invert and top elevations for all manholes;
5. Length, grade and diameter of pipes between manholes;
6. Location of all special appurtenances; i.e. concrete cradle, concrete encasement, borings with casing pipe, anchors, etc.;
7. Location of subsurface utilities to include water, storm sewers, gas, electric, etc., on plan and profile drawings; and
8. Design engineer's seal.

## 2.4 **PRE-CONSTRUCTION SUBMITTALS**

2.4.1 Prior to initiation of construction, the **Contractor** shall submit the following to the **Authority**:

- A. A construction schedule showing dates of commencement and completion.
- B. Four (4) copies of all shop drawings, manufacturers certifications and specifications, and drawings for all materials to be installed.
- C. One (1) original copy of a notarized certification from each manufacturer supplying materials to be installed on the job, to include all pipe, manholes, frames and covers, valves, and other appurtenances, that their respective materials have been manufactured, inspected, and tested according to these specifications, and meet all requirements thereof. All materials used in the project shall bear identification or reference numbers for checking compliance with factory test results.

## 2.5 **INSPECTION OF CONSTRUCTION**

2.5.1 All construction of sewerage facilities in the **Authority** shall be subject to inspection by representatives of **Authority** to assure that such

construction is accomplished in accordance with the approved plans and specifications.

- 2.5.2 At least ten (10) days prior to starting construction, the applicant shall notify the **Authority Engineer** of the anticipated starting date of his/her proposed construction and the schedule of operation through completion of the project. At the time of this notification, a meeting shall be arranged between the applicant, his/her construction foreman and representatives of the **Authority Engineer** to completely review all aspects of the construction project, prior to start of construction. The **Contractor** shall furnish to the **Authority Engineer** the names and telephone numbers of key personnel involved in the project, who may respond to **Authority** contact during off-work hours. This meeting is considered extremely important in the interests of both the **Authority** and the **Contractor**. Therefore, this requirement will be strictly enforced and no construction will be permitted without a meeting.
- 2.5.3 The responsibility for inspection of the construction project for the **Authority** will be with the **Authority Engineer**. Direct inspection of the construction will be performed by an inspector working under the direction of the **Authority Engineer** and the **Authority**. The detailed method of operation and coordination between the **Authority Engineer** and its representatives and the **Contractor** will be completely reviewed at the pre-construction meeting referred to above. In general, however, the inspector will be the **Authority's Engineers** representative on the job, inspecting all materials and methods of construction to assure that they comply with the requirements of the approved plans and specifications and will have complete authority to enforce such requirements. It will be expected that the **Contractor** coordinates all construction activities with the inspector and is reasonable in the scheduling of construction during normal working hours. At no time shall the **Contractor** undertake any construction work without the knowledge of the inspector or **Engineer**. If the requirements of the approved plans and specifications are not being met, the inspector can require verbally that the **Contractor** cease operations, which will then be followed with written notice, until compliance with the approved plans and specifications is gained.
- 2.5.4 Should any questions or controversies arise between the **Contractor** and the inspector or **Engineer**, the decision of the **Authority** will be final.
- 2.5.5 Upon completion of the construction work, a detailed final inspection shall be made by the **Authority** and **Authority Engineer** to determine that the completed facilities have been constructed in accordance with the approved plans and specifications. Approval will not be given by the **Authority** until all discrepancies and deficiencies revealed by this final inspection have been satisfactorily corrected.

## 2.6 EXISTING SANITARY SEWERS

- 2.6.1 Existing sanitary sewers in close proximity to the **Contractor's** construction activities shall not be used as a drain for surface or ground water runoff during construction.

## 2.7 MAINTENANCE OF ACCESS

- 2.7.1 Those trenches which are located along or across existing improved surfaces (i.e. State and local roads, berms, driveways, parking areas, etc.) which must be made safe for vehicular traffic as soon as possible, shall be immediately backfilled to full depth of trench above the pipe zone with AASHTO No. 57, 67 (See PennDOT Publication 408, Section 703.2 (c)) or other similar angular graded material approved by the **Authority's** representative. Slag material is prohibited. The materials shall be placed in no greater than six (6) inch lifts (compacted density) and tamped with mechanical tampers or special vibratory equipment for compaction. In any event compaction shall be done in order that no settlement will take place in the trench areas.

- 2.7.2 In areas where trenches are located along or across paved areas, and where the trenching disturbs the existing paved surface, the **Contractor** will be required to complete temporary restoration of said disturbed surface prior to the cessation of his/her construction activities for that day, in the following prescribed manner.

- A. The **Contractor** shall place graded granular material as prescribed in Item 2.5.1 to a point six (6) inches below the base of the existing improved surface. Slag material is prohibited. The **Contractor** shall neatly saw cut the edges of the pavement disturbed by the trench. The **Contractor** shall place

Bituminous base course (weather permitting) or bituminous cold patch from the top of the graded granular material to the top of the existing paved surface.

- 2.7.3 The **Contractor** shall be responsible for maintaining all crossings of improved surface areas until such time that permanent restoration can take place. The above shall include placement of additional graded granular material, bituminous base course (or cold patch) as required, or as directed by the **Authority's** representative.

## 2.8 CREEK CROSSINGS

- 2.8.1 All creek crossings shall be concrete encased in accordance with the concrete encasement detail as shown on the Standard Drawing.

- 2.8.2 A minimum of three (3) feet of cover above the crown of the pipe shall be maintained on all creek crossings, unless the sewer is located in rock. Where the stream crossing is located in rock, a minimum of one (1) foot of cover will be required. At the discretion of the **Authority's** representative, additional cover may be required for crossings of major streams.

## 2.9 **STEEP SLOPES**

- 2.9.1 Sewers constructed on slopes twenty (20%) percent or greater shall be of ductile iron (Class 52) or PVC SDR-21 construction and shall be securely anchored with concrete anchors in accordance with the Standard Drawing. An additional anchor is required on the immediate downstream side of the upper manhole.

## 2.10 **PIPE ZONE BACKFILL MATERIAL**

- 2.10.1 All pipe lines shall be supported on an AASHTO No. 57, 67 (See PennDOT Publication 408, Section 703.2 (c)) or other similar angular graded material approved by the **Authority's** representative, for the full width of the trench from a minimum depth of 0.5 feet below the bottom of the pipe to an elevation of one (1) foot above the top of the pipe in its installed position. See pipe zone detail on the Standard Drawing.
- 2.10.2 For ferrous metal pipe lines or casings, cinders or blast furnace slag type materials shall not be used as backfill material in the pipe zone and where such pipe lines are carried through cinders or blast furnace slag type materials, the **Contractor** shall supply a clay encasement for the entire pipe zone, plus six (6) inches minimum below the invert of the pipe.

## 2.11 **EXCAVATION AND BACKFILL**

- 2.11.1 The depth of trench for sewers, pressure sewers or force mains shall be such that the pipe in its installed position shall have a minimum of four (4) feet cover above the crown of the pipe.
- 2.11.2 In excavation for all sewers, where made in open cut and where space permits, the banks of the trench from the ground surface to a depth not closer than one (1) foot above the top of the pipe may be excavated to non-vertical and non-parallel planes. In no case shall the side walls of the trench in the pipe zone, defined as all that trench area below a point 12" above the top of the pipe in its installed position, be permitted to be other

than vertical and parallel planes equal distant from the pipe centerline. The horizontal distance between the vertical planes shall be no greater than the outside diameter of the pipe plus 24 inches and not less than the outside diameter of the pipe plus 12 inches. If the pipe zone trench widths are exceeded, the **Contractor** shall install the pipe in concrete cradle.

- 2.11.3 Excavation for manholes or similar structures may be performed with non-vertical banks except in paved areas and traveled ways, or where such excavation will undermine adjacent facilities or structures, or where such excavation will violate private property outside the right-of-way established for this work. In paved areas and traveled ways, the **Contractor** shall limit the area of his excavation so that the length and width are a maximum of four (4) feet greater than the greatest length and width of the structure involved.
- 2.11.4 Insofar as is practical, the material excavated from the trench shall be used for backfill above the pipe zone. The **Authority's** representative shall determine whether material is unsuitable and upon notice from the **Authority's** representative unsuitable material shall be disposed of and bank run gravel or other suitable material shall be brought in from an outside source.
- 2.11.5 No frozen or excessively wet material or any other unsuitable material (at the discretion of the **Authority's** representative) will be permitted to be used as trench backfill. Suitable or selected backfill material shall be only materials used as backfill in the trench.
- 2.11.6 **Contractor** will be permitted to open not more than 100 lineal feet of ditch at any one time. Pipeline must be backfilled as soon as practicable after installation to protect installation and ensure public safety.

## 2.12 **CONCRETE CRADLE AND ENCASEMENT**

- 2.12.1 Concrete cradle and/or encasement is required to be furnished and installed at all locations where the required 18" vertical clearance cannot be maintained, and under all sewer pipe within the excavated areas around manholes and other structures wherein the specified trench widths are exceeded. Said cradle and encasement material shall consist of concrete as described in the Cast in Place Concrete Section of these specifications. Care shall be exercised in placing encasement or cradle to provide adequate anchorage for the sewer pipes in order to prevent flotation and/or displacement of the pipe.
- 2.12.2 The **Contractor** shall provide and install all reinforcing steel that may be required to assure adequate strength for the structures.

- 2.12.3 Concrete cradle and encasement shall be in accordance with the Standard Drawing.
- 2.12.4 All sanitary sewers located within areas of storm water retention ponds will be concrete encased.

2.13 **BACKFILL MATERIAL FOR MANHOLE EXCAVATIONS**

- 2.13.1 Where manholes are installed in paved streets, alleys, roads, berms, parking areas, driveways or other improved surface areas, the entire excavated area around the manhole shall be backfilled with a AASHTO No. 57, 67 stone, (see PennDOT Publication 408, Section 703.2 (c)) or other similar angular graded material approved by the **Authority's** representative. Slag material is prohibited. The angular graded material shall be installed completely around the manhole from its base to the bottom of the improved surface area. The angular graded material shall continue out of the manhole-excavated area through and around the inlet and outlet pipe trench area so that its surface forms an approximate 45-degree angle with the top of the manhole.
- 2.13.2 Where manholes are installed in unimproved areas, the entire excavated area around the manhole shall be backfilled with angular graded material from the base to a point 12 inches above the top of the highest pipe entering the manhole.

2.14 **RESTORATION**

- 2.14.1 Should settlements in excess of 1-1/2 inches below the street grade occur within a period of one (1) year, the **Contractor** shall furnish and install additional material to maintain the surface at street grade. Where the **Contractor's** operations destroy permanent type road surfaces, they shall restore the road surface in accordance with the requirements of the governing body (E.g. Township, County, State, etc.)
- 2.14.2 Where excavation is made through planted, cultivated, lawns, or similar areas, the topsoil shall be removed and separately stored per property owners. Backfill material and placement shall be the same as previously specified, except that the backfill shall be carried to within six (6) inches of the final grade. The topsoil salvaged from the excavation (or brought in from an outside source) shall then be placed to approximately one (1) inch above the adjacent grade, rolled with a light roller, and seeded or planted to a condition equivalent to that existing before the commencement of construction. Seeding shall be done in accordance with good local practice and the seed mixture used shall produce a planted, cultivated surface equivalent to that existing before commencement of construction. **Contractor** shall furnish and re-plant

grass, trees, shrubs, etc., which fail to survive within cultivated landscaped areas, for a period of one (1) year following the initial restoration.

- 2.14.3 Trenches, which are located in areas not specified in these specifications to be seeded or sodded, or in which surface settlement is not important in the opinion of the **Authority**, shall be filled above the pipe zone with a compactable material containing rocks or boulders no larger than eight (8) inches in maximum dimension. Mechanical tamping will not be required in this instance, however, the **Contractor** shall place the materials in no greater than 12 inch lifts (compacted density) and shall tamp as required to assure that no excessive voids are present in the backfill.

They shall carry the backfill in this manner to grade. They shall then add backfill neatly rounded over the trench to a sufficient height to allow for settlement to grade after consolidation. Future settlement within a period of one (1) year shall be immediately rectified by adding suitable material to bring the surface to a little above grade.

- 2.14.4 The **Contractor** shall make up all deficiency in backfill material and shall dispose of all excess material.

## 2.15 **JACKING AND BORING**

- 2.15.1 Where jacking is employed, a minimum 1/2 inch thick steel shield at least 24 inches long shall be required to extend beyond the forward end of the liner plate or conduit being jacked. The outside radius of this shield shall not exceed the outside diameter of the pipe by more than one (1) inch. Excavation ahead of the conduit shall not be permitted to progress beyond the end of the shield being used.

- 2.15.2 Where the jacking or boring method is used, the contractor shall be responsible for construction of the completed crossing true to design line and grade. The pipe shall, at all times, follow immediately behind the boring auger at a distance no greater than two (2) feet.

The method of auguring the entire hole and then pushing the pipe through will not be permitted. The pipe shall conform to the paragraph under the heading of "Steel Casing Pipe" of these specifications.

- 2.15.3 Where the boring or jacking method of construction is used, it shall be mandatory to conduct said operation well in advance of any pipe installation, at least one (1) manhole run above or below the boring location in order that the grade of the boring after installation can be met

by adjusting either grade above or below the boring and maintain the proposed pipe grades.

2.15.4 If required by the Authority or other governing body, the entire void space between the carrier pipe and casing pipe shall be filled with sand, or approved concrete aggregate material, placed by an approved method to support and hold the carrier pipe in place. Both ends of the casing pipe shall be sealed with concrete or an approved casing seal.

2.15.5 **STEEL CASING PIPE**

2.15.5.1 Steel casing shall be extra strong pipe and shall be in compliance with ASTM Specification A-120. All joints between sections of casing shall be welded "water tight".

2.15.5.2 Minimum casing wall thickness:

Nominal Diameter of Casing Pipe <u>In Inches</u>	Coated or Cathodically Protected	Uncoated and <u>Unprotected</u>
14 and Under	0.188"	0.251"
14 and 16	0.219"	0.282"
18	0.250"	0.313"
20	0.281"	0.344"
22	0.312"	0.375"
24	0.344"	0.407"
26	0.375"	0.438"
29 and 30	0.406"	0.469"
32	0.438"	0.501"
43 and 36	0.469"	0.532"

2.16 **MANHOLES**

2.16.1 Manholes shall be installed at all changes in grade, size or alignment and at distances not greater than 400 feet for piping of 15" diameter or less, and 500 feet for sewers greater than 15" diameter.

2.16.2 Manholes subject to flooding shall be set at an elevation approximately 18-inches above finished grade and protected with watertight covers.

2.16.3 Manholes shall be located to permit passage of design flows while minimizing flow resistance.



- 2.16.4 The smallest angle as measured between the inlet and outlet lines shall be a minimum of 90 degrees, or greater.
- 2.16.5 Drop type manholes shall be inside drop type, in accordance with Standard Drawing, shall be provided for all locations where the incoming sewer is 2'-0" or more above the manhole invert. Where two or more inside drop lines are necessary, manholes shall be 5 feet diameter.
- 2.16.6 Manholes shall be located such that there are no more than two (2) inlet lines. Service connections direct to manholes are not permitted.
- 2.16.7 Manholes up to twenty-five (25) feet deep shall have an internal diameter of four (4) feet. Manholes greater than twenty-five (25) feet deep shall have an internal diameter of five (5) feet. Manholes greater than twenty-five (25) feet deep shall be equipped with fabricated aluminum gratings every eight (8) vertical feet, in accordance with the Standard Drawing.
- 2.16.8 All manholes for sewer 8" to 18" shall be pre-cast concrete base section manholes in accordance with the Standard Drawing. For sewers 18" and greater, the pre-cast concrete base section manholes shall be 5 feet diameter.
- 2.16.9 The pre-cast concrete base slab and base riser section shall be poured monolithically with the riser section having a minimum height of two (2) feet above the top of the base slab. The base slab shall extend a minimum of six (6) inches beyond the outside diameter of the precast base riser section in accordance with the Standard Drawing.
- 2.16.10 An eight (8) inch deep minimum sub-base of AASHTO No. 57, 67 (see PennDOT Publication 480, Section 703.2 (c)) or other similar angular graded material approved by the **Authority's** representative shall be placed beneath the manhole base. Prior to installing the subbase stone all loose material in the excavated area below the manhole shall be thoroughly removed.
- 2.16.11 New manhole connections shall be through approved flexible watertight sleeves poured into the manhole base at a minimum of four (4) inches above the manhole floor. A minimum of six (6) inches of concrete shall be required between the top of the manhole base section and the crown of the pipe entering or exiting the manhole.
- 2.16.12 Connections to existing pre-cast manholes shall be made by machine cored entry holes and a flexible watertight gasket connection.

- 2.16.13 Manholes shall not be ordered by the **Contractor** from the manufacturers, until complete field layout of the proposed pipeline is established with proper horizontal and vertical alignments of the proposed manholes.
- 2.16.14 Pre-cast concrete grade rings or concrete brick shall be used between the top pre-cast manhole section and the manhole frame to meet existing grades where required, and be anchored with a maximum build-up of twelve (12) inches. High-density polyethylene manhole adjusting rings shall also be permitted as manufactured by Ladtech, or approved equal.
- 2.16.15 Two (2) rings of a one (1) inch diameter flexible butyl rubber manhole joint sealant shall be used between all pre-cast manhole barrel sections and grade rings.
- 2.16.16 All pre-cast concrete manholes shall have an air entraining admixture added to the concrete to produce a  $5\% \pm 1.0\%$  air content. Pre-cast manhole bottoms and barrel sections, which show excessive honeycombing, are subject to rejection at the discretion of the **Authority's** representative.
- 2.16.17 All pre-cast concrete manholes shall have blind lifting lugholes, which shall be filled with non-shrinking grout.
- 2.16.18 Manhole invert channels shall be formed with cast in place concrete, steel trowled, such that there is minimum flow turbulence. A minimum of two (2) inches of fall shall be provided within the manhole between the influent and effluent sleeves. A uniform grade shall be maintained through the manhole when installing the concrete invert. The formed channel shall conform to three-fourths the sectional area of the pipe. Wherever sewers enter manholes such that the invert of the sewer is less than 2'- 0" above the manhole bottom, a channeled concrete fillet shall be constructed to prevent the flow from splashing into the manhole.
- 2.16.19 Frames and covers for all standard manholes shall be fabricated of cast iron and shall conform to the details of the Standard Drawing. Watertight frames and covers, in accordance with the Standard Drawing, shall be installed where noted in these specifications. Manhole covers shall be furnished with lettering; "**MARSHALL SANITARY**" placed as noted on Standard Drawings. Four (4) three-fourths (3/4) inches stainless steel anchor bolts shall be provided for each frame. The final setting of manhole castings shall be such that they conform to the existing or proposed ground slopes and shall be set to exclude surface water.

Where manholes are located along creeks or low areas subject to flooding and in areas where they are subject to being covered, the top elevations shall be set above grade as directed by the **Authority's** representative.

Contact surfaces of frames and covers shall be machined so that covers rest securely in the frames. Two (2) rings of 1/2-inch diameter flexible butyl rubber joint sealant approved by the **Authority** shall be used between the manhole frame and the top precast concrete wall section of the manhole (or grade ring).

All standard manhole frames and covers shall be as manufactured by:

A. Neenah Foundry Company

Pattern R-1753 - frame and cover

B. Approved Equal

All watertight manhole frames and covers shall be as manufactured by:

A. Neenah Foundry Company

Pattern R-1755F2 frame and cover

B. Approved Equal

Watertight frames and covers shall be furnished with machined groove to receive an O-ring seal.

- 2.16.20 Ladder rungs, furnished for manholes and diversion chambers, shall be fabricated of gray iron construction (minimum tensile strength of 40,000 psi), or shall be fabricated of a three-eighths (3/8) inch minimum round steel step encapsulated with copolymer polypropylene plastic. Maximum distance from top of manhole casting to first step shall be no greater than eighteen (18) inches.

Ladder rungs shall meet the design loading requirements of ASTM C-478 specifications at a temperature of 0 degrees F with no structural failure. Ladder rungs shall be evenly spaced vertically on twelve (12) inch centers. Ladder bars shall be grouted into the manhole barrel with non-shrinking grout. Loose and poorly aligned ladder rungs shall be a cause for rejection of manholes at the discretion of the **Authority's** representative.

- 2.16.21 All manholes shall be furnished by the manufacturer with asphalt emulsion coating; spray applied to exterior wall/cone surfaces, as manufactured by FBC Company, or approved equal.

- 2.16.22 Manholes within 1000 lineal feet of the discharge point of a sewage force main; either proposed or existing manholes shall be epoxy coated on the

interior wall surface of the manhole as manufactured by Sauereisen Inc., or approved equal.

## 2.17 **PVC PIPE FOR GRAVITY SEWER SYSTEM**

- 2.17.1 Polyvinyl chloride (PVC) sewer pipe shall have a standard dimension ratio of 35 (SDR 35) and a minimum pipe stiffness of 46 psi. The pipe and fittings shall comply with ASTM 3034 and the joint shall comply with ASTM 3212.
- 2.17.2 The PVC plastic used in the pipe and fittings shall have a cell classification of 12454-B, 12454-C, or 13364-B, with a minimum tensile modulus of 500,000 psi, as defined in ASTM D 1784.
- 2.17.3 All pipes shall be tested for stiffness and deflection. One (1) length per 200 lengths supplied, or at a minimum two (2) lengths per size and strength, shall be tested for compliance with Unibell Specification UNI-B-4-77-A, Section 4.
- 2.17.4 Rubber gaskets shall comply in all respects with the physical requirements of ASTM F-477, D-1869, C-361, or C-443.
- 2.17.5 Pipe installation shall comply with Unibell Specifications UNI-B-5-78.

## 2.18 **DUCTILE IRON PIPE AND FITTINGS FOR GRAVITY SEWER SYSTEMS**

- 2.18.1 Ductile iron pipe shall be designed in accordance with ANSI Standard A-21.50 and manufactured in accordance with ANSI Standard A-21.51. Fittings shall conform to ANSI Standard A-21.10. Buried pipe shall be push-on or mechanical joint conforming to ANSI Standard A-21.11. Exposed pipe shall be a flanged joint conforming to ANSI Standard A-21.15.
- 2.18.2 Pipe shall be double cement lined bituminous coated Class 52. Fittings shall be 250-psi pressure classification minimum.
- 2.18.3 All pipes shall be factory hydrostatically tested to 500 psi. Tensile strength and low temperature impact test shall be performed on at least one (1) pipe per 200 of each size used.
- 2.18.4 Gaskets shall conform to ANSI Standard A-21.11.

## 2.19 **FORCE MAIN DESIGN**

- 2.19.1 All force mains shall be designed for a velocity of 2 fps at design average having a Hazen-Williams“e” factor (roughness) of 100. Force main material shall be PVC pressure pipe, as specified in Section 2.20 of these specifications. Ductile iron piping shall be used where enhanced stability is required and/or at the **Authority's** discretion.
- 2.19.2 Force mains shall be designed to have a minimum of four (4) feet of cover above the crown of the pipe.
- 2.19.3 Automatic combination air/vacuum relief valves installed in access manholes shall be provided at all high spots.
- 2.19.4 The pipe shall be designed for an average trench depth of five (5) feet and installed with a minimum of four (4) feet of cover above the crown of the pipe.
- 2.19.5 Detectable mylar tape shall be installed over the plastic pressure pipe at a depth of no more than one (1) foot above the pipe. The tape shall be tested to insure continuity prior to acceptance of the **Authority's** representative. The tape shall be two (2) inches wide, mylar encased, in aluminum foil-safety color as approved by the **Authority**, with the custom words **CAUTION - SANITARY SEWER FORCE MAIN BURIED BELOW"** clearly visible. In addition, #10 coded locating wire shall run in conjunction with the tape the full length of the force main (pipe) with a monitoring point every 1,000 feet. The wire shall be tested to insure continuity prior to acceptance of the **Authority's** representative. Both transmitter and receiver units compatible with the detection tape and wire shall be furnished by the **Contractor**.

## 2.20 **PVC PIPE FOR FORCE MAINS**

- 2.20.1 PVC pressure pipe shall be designed, manufactured, and tested in accordance with ASTM D-2241, and has a minimum standard dimension ratio of 21 (DR-21) for both barrel and bell dimensions. The pipe shall be pressure rated at 200-psi minimum.
- 2.20.2 Each pipe shall bear the National Sanitation Foundation Seal of approval and comply with the requirements for Type 1, Grade J (PVC 1120) of ASTM D-1874.
- 2.20.3 The joint shall be the push on type with a rubber O-Ring gasket conforming to ASTM D-1869. Joint deflection shall not exceed manufacturer recommendations or 5 degrees whichever is less.

## 2.21 **DUCTILE IRON PIPE AND FITTINGS FOR FORCE MAINS**

- 2.21.1 Ductile iron pipe shall be designed in accordance with ANSI Standard A-21.50 and manufactured in accordance with ANSI Standard A-21.51. Fittings shall conform to ANSI Standard A-21.10. Buried pipe shall be push-on or mechanical joint conforming to ANSI Standard A-21.11. Exposed pipe shall be a flanged joint conforming to ANSI Standard A-21.15.
- 2.21.2 Pipe shall be double cement lined bituminous coated Class 52. Fittings shall be 250-psi pressure classification minimum.
- 2.21.3 For pressure pipe installations (force mains), joint deflection shall not exceed the values presented in "**HANDBOOK - DUCTILE IRON PIPE-CAST IRON PIPE**", Fifth Edition, Section 3, Table 5 and Table 6.
- 2.21.4 All pipes shall be factory hydrostatically tested to 500 psi. Tensile strength and low temperature impact test shall be performed on at least one (1) pipe per 200 of each size used.
- 2.21.5 Gaskets shall conform to ANSI Standard A-21.11.

## 2.22 **FORCE MAIN FITTINGS**

- 2.22.1 Where PVC pressure pipe is used all ductile iron fittings shall be supported on a concrete cradle.
- 2.22.2 Gate Valves: All gate valves shall be solid wedge, bronze mounted iron body valves conforming to AWWA Standard C500, designed for a working pressure of 200 psi with an O-Ring stem seal, non-rising stem, and shall open by turning the stem counter clockwise.
- 2.22.3 Valve Box: All buried valves shall have a three (3) piece construction, cast iron, screw type, 5-1/4 inch diameter, large oval base valve box, adjustable to accommodate a four (4) feet to five (5) feet depth. Valve boxes shall have deep socket type covers with the word "**sewer**" cast on top.
- 2.22.4 Swing Check Valve: All check valves shall be iron body, fully bronze mounted, designed for non-slam, noiseless operation, with external operating lever and spring and, rubber faced disc. Valve working pressure shall be as required for the specific installation.
- 2.22.5 Anchor Blocking: All bends in excess of ten (10) degrees, plugs, caps, tees, and wyes shall be blocked or anchored in accordance with Drawing No. 2-72.

2.22.6 Combination Air/Vacuum Release Valve: Air/Vacuum release valves shall be approved by the **Authority** and Engineer.

## 2.23 PRESSURE SEWER SYSTEM PIPING

### 2.23.1 Piping:

- A. PVC (Polyvinyl Chloride), 1-1/2 inch through 4 inch diameter pipe shall be permanently marked with manufacturer's trademark size and ASTM conformance designation. Pipe design and material requirements shall conform to ASTM D1785 for Schedule 80 PVC.
  - B. Solvent cemented joints are required. Solvent cemented joints shall be made in accordance with manufacturer's recommendations or in accordance with ASTM D2855.
- C. Fitting shall be Class 200 and shall conform to the requirements of SCH 80 PVC piping.

### 2.23.2 Valves and Valve Boxes

- A. Valves shall be manufactured of the same PVC Type 1, Grade 1 molding compound as the fittings to assure compatibility. All valves shall have Teflon or EPT ball seals and Viton or EPT stem and body seals. All valves shall carry a pressure rating of 150 psi at 73<sup>o</sup> F.
  - B. Valve boxes shall be made of cast iron, telescoping type, with 5 inch or greater shaft. Each box shall be provided with a cover with the word "Sewer" cast thereon, as well as valve opening direction.
- C. A standard detail is provided in Appendix 1 for design requirements.

### 2.23.3 Cleanouts

- A. Cleanout assemblies shall be 1-1/2" and 4" in diameter constructed of Schedule 80 PVC ASTM D1785 pipes and fittings, and as per the standard detail. The cleanout assembly shall have a Tee, True Union Ball Valves, and a PVC Ball Valve with a plug. The PVC Ball Valve shall be rated at 150 psi at 73<sup>o</sup> F. attached to the PVC piping with a brass nipple threaded into the valve for connection to a hose for flushing of the line.

### 2.23.4 Sewage Combination Air Valves

- A. Combination air valves shall consist of an air release valve and an air and vacuum valve factory piped into a compact assembly. The

combination assembly shall automatically release air, gas or vapor under system operating pressure and shall also allow air to re-enter the system during draining or when a vacuum occurs. Combination valve designs shall feature long bodies and float stem components so that the operating mechanisms are kept free from contact with sewage during operations.

B. Valve Construction shall be as follows:

1. Valve bodies and covers shall be cast iron, conforming to ASTM A48, Class 35 requirements.
2. Inlet size shall be 2 inches.
3. Air release outlet size shall be ½ inch, NPT.
4. Vacuum discharge/outlet size shall be 2 inches.
5. Air release valve maximum working pressure of 75 psi.
6. Air release valve vent orifice size 5/16 inch.
7. Air release valve discharge orifice seat mechanism and valve stem shall be stainless steel.
8. Air release valve orifice button shall be stainless steel and Buna-N, Nitrile Rubber conforming to ASTM SB800 requirements.
9. Air release valve mechanism lever pins and float shall be made of high strength stainless steel, conforming to ASTM A240 requirements.
10. Air and vacuum valve float stem and guide shall be made of bronze, conforming to ASTM B584 requirements.
11. Air and vacuum valve floats shall be made of stainless steel, conforming to ASTM A240 requirements.
12. Air and vacuum valve orifice seat shall be made of Buna-N, Nitrile Rubber, conforming to ASTM SB800 requirements.
13. Back-flushing and cleaning accessories shall be factory assembled to the combination valves and consist of two inlet shut-off valves, two blow-off valves, two clear water inlet valves, section of rubber hose and quick disconnect couplings.



14. Acceptable manufacturers are Val-Matic and Manufacturing Corporation, Model No. 48 or 49/300; GA Industries; or approved equal.

## 2.24 ACCEPTANCE TESTING MAINS

### 2.24.1 GENERAL

All sanitary sewers, manholes and force mains shall be acceptance tested, as hereinafter specified in the presence of the **Authority's** representative. Acceptance testing shall be performed after backfilling is completed. The **Contractor** shall supply all required testing equipment and personnel to operate said equipment. The **Contractor** shall make any and all repairs required to pass the acceptance test, at no additional cost to the **Authority**. Each section of sewer between manholes shall be cleaned, tested and inspected. All repairs shown to be necessary by the tests are to be made promptly. Broken or cracked pipe shall be replaced and all deposits removed and the sewer left true to line and grade and entirely clean.

### 2.24.2 GRAVITY SEWER TESTING

Every manhole to manhole section of gravity sanitary sewer shall be individually inspected and tested as follows:

- A. Visual Inspection: Each section shall be lamped and shall show a full circle of light from manhole to manhole.
- B. Air Test: All sewers shall be tested for leakage and any section of sewer showing leakage in excess of the amount hereinafter set forth may be rejected.
  1. The **air test** shall be conducted by the **Contractor** under the supervision of the **Authority's** representative and shall be performed with equipment manufactured specifically for air testing of pipe.
  2. The contractor may desire to perform an air test for his/her own purposes prior to backfilling; however, the "acceptance air test" shall be performed a minimum of thirty (30) days after backfilling has been completed.
  3. Each section of sewer being tested shall be temporarily sealed-off by means of suitable plugs. In addition, all wyes, tees, or ends of lateral stubs shall be sealed with suitable removable caps securely fastened to withstand internal test pressures.

4. Air tests shall be held to a minimum of 5-psi pressure (10-psi maximum pressure) for a period of not less than five (5) minutes with no loss of pressure.
  5. All gauge pressures in the test shall be increased by the amount of groundwater pressure at the crown of the pipe, assumed equal to 0.5 psi per foot depth of bury should no water table depths be available at the time of the test.
  6. The pressurizing equipment shall have a safety gauge, which shall limit the loading on the sewer line to ten (10) psi. In addition, the calibrations on all pressure gauges shall be no greater than 0.10 psi.
  7. If the pipe installation fails to meet these requirements, the **Contractor** shall determine at his own expense the source or sources of leakage, and he shall repair or replace all defective materials and workmanship.
- C. Deflection Testing: If determined appropriate by the **Authority**, any or all sections of sewer shall be deflection tested by manually, with no mechanical

assist, pulling a mandrel through the installed pipe. Pipe shall be installed for at least 60 days prior to deflection testing. The allowable deflection shall be 5.0 percent maximum of the pipe base inside diameter as defined in ASTM Specification D-3034.

- D. Closed Circuit Internal Inspection: If determined appropriate by the **Authority**, any of all sections shall be acceptance tested by televising the interior. Any defects discovered by this final testing shall be repaired promptly by the **Contractor** at his/her cost.

#### 2.24.3 MANHOLE TESTING

All new manholes and existing manholes to be tapped into shall be vacuum tested complete with frame in place, using vacuum test equipment. After the vacuum test equipment has been set in place, a vacuum of 10 inches of Hg. shall be drawn and the vacuum pump valved-off at the test plug. The vacuum shall be held for at least ten (10) minutes. The test shall pass if the vacuum remains at 10 inch Hg. after five (5) minutes.

#### 2.24.4 FORCE MAIN AND PRESSURE SEWER SYSTEM TESTING

All force mains *and pressure sewer systems* will be pressure and leakage tested from valve to valve. Testing shall consist of filling the line with water and removing all air. The line shall be pressurized to a test pressure as herein specified and maintained at said test pressure for a period of two (2) hours.

The test pressure, as measured at the point of lowest elevation, shall be 1.5 times the normal working pressure, or 50-psi greater than the normal working pressure, whichever is greater. Measured quantities of water shall be periodically pumped into the test section to maintain the pressure within 5 psi of the test pressure. Allowable total leakage shall not exceed ten (10) gallons/inch diameter/mile length/day. All visible leaks shall be repaired regardless of the results of acceptance testing.

## 2.25 CAST IN-PLACE CONCRETE

2.25.1 Materials: The Component materials of the concrete shall meet the following requirements:

- A. Portland Cement shall conform to the Standard Specifications for Portland Cement of the American Society for Testing Materials, Serial Designation C-150, Type I or Type III.
- B. An air-entraining admixture shall be used. The use of all other admixtures shall require prior approval of the **Authority's** representative.
- C. Water used in mixing and curing concrete shall be fresh, clean, and free from injurious amounts of sewage, oil, acid, alkali, organic matter, or other deleterious substances. Water shall be approved for human consumption.
- D. Concrete aggregate shall conform to the "Specifications for Concrete Aggregate", ASTM Designation C-33.

2.25.2 All concrete shall be ready mix and shall conform to the requirements of ASTM C-94. The concrete shall have a minimum allowable compressive strength on samples taken from the transportation unit at the point of discharge of 4000 psi in 28 days, and the maximum allowable slump as delivered to the site shall be four (4) inches. The concrete shall have an air content of  $5\% \pm 1\%$ .

2.25.3 All concrete shall be placed in accordance with applicable sections of:

- A. ACI Standard 614: "Recommended Practice for Measuring, Mixing, and Placing"

B. ACI Standard 306R: "Recommended Practice for Cold Weather Concreting"

C. ACI Standard 305R: "Recommended Practice for Hot Weather Concreting"

2.25.4 Concrete shall not be placed on frozen, loose, or otherwise unstable ground, or when debris, oil, or water are present. All concrete shall be thoroughly vibrated into place. All concrete surfaces shall be finished by experienced finishers to a smooth finish as soon after placing as conditions permit. No cement, plaster, or cement brush coats will be acceptable.

2.25.5 Concrete shall be protected from freezing or loss of moisture. Protection against loss of moisture from the surface of the concrete shall be accomplished by keeping the surface continuously wet.

One of the following methods shall be used:

A. Surface remaining in contact with the form.

B. Covering with burlap or cotton mats kept continuously wet and covered with polyethylene plastic.

C. Continuous sprinkling of the exposed surface.

2.25.6 If after stripping of forms, any concrete is found to be not formed as shown on the drawings, or is out of alignment or level, or shows a defective surface, it shall be considered as not conforming with the intent of these specifications and shall be removed and replaced by the **Contractor** at his/her expense unless the **Authority** grants permission to patch the defective area

## 2.26 PIPING FOR LARGE DIAMETER SEWER SYSTEMS

All reinforced concrete pipe shall conform to the requirements of ASTM Designation C76-57T, Class III unless otherwise indicated on the Drawings. Sized up to and including 24" diameter shall be bell and spigot. Sized over 24" diameter may be bell and spigot or tongue and groove joints. The pipe shall be absolutely free of honeycomb and shall present a hard dense surface inside and outside. The roughness coefficient of the pipe (Kutters "n") shall not exceed 0.013. The pipe shall be furnished with rubber gaskets conforming to ASTM C443-65. Concrete pipe is typically not used for small diameter laterals.

## 2.27 CLOSED CIRCUIT TELEVISION "CCTV" INSPECTION

- A. All gravity sewers will be subject to a closed circuit television inspection prior to acceptance by the Authority, The television camera used for the inspections shall be one specifically designed and constructed for such inspections. Lighting for the camera shall be sufficient to provide a clear picture of the entire pipe periphery, The camera shall be operative in 100% humidity conditions. The camera, television monitor and other components of the video system shall be capable of producing color picture quality to the satisfaction of the Authority's Engineer.
- B. Self-propelled robotic pan and tilt cameras shall be used for the entire project. If a robotic camera is not possible to be utilized due to site limitations or equipment failures, a winch, cable or other device that does not obstruct the camera view or interfere with observation of the sewer conditions may be used, Push rod type cameras are not acceptable.
- C. The inspection shall be logged in WinCan software, or equal approved by the **Authority Engineer**, using the NASSCO PACP defect coding.
- D. All inspections originating at a manhole shall begin with the camera in the manhole and shall include a visual inspection of the manhole wall, bench area and pipe entrance or exit into the manhole.
- E. The camera operator shall video capture images of all defects, root intrusions, lateral locations and at a minimum provide at least two (2) screen captured images of a typical section of the sewer line per segment. At a minimum, the tape shall show the up and downstream numbers and footage at all times.
- F. In the event that the camera is unable to pass by an obstruction, the sewer segment shall be cleaned and re-inspected.
- H. The importance of accurate distance measurements is emphasized. Measurements for location of defects and any building lateral connections shall be surface distances by means of a line counter or meter device. Accuracy of the meter shall be checked by the use of a walking meter, rolo-a-tape, or other suitable device, and the accuracy shall be satisfactory to the Authority's Engineer.
- I. Each sewer segment shall be logged in WinCan software, and each segment will clearly indicate the plan/subdivision name, the street name at the sewer segment, the MTMSA identification numbers of the upstream and downstream manholes, the MTMSA number of the sewer segment and the direction of camera travel.

- J. The Authority requires that the video be recorded direct to a portable hard disk as an MPEG file, Two(2) copies of the hard disk(s) shall be provided to the Authority upon completion of the CCTV inspection. The contractor shall assist the Authority to insure that the video can be viewed by the owner and that the file naming approach is approved by the Authority.
- K. The Contractor shall remove and relay any rejected pipe as the result of this CCTV inspection, at his expense. The pipe line shall then subject to a new CCTV inspection to verify that no defects exist.

#### 2.28 DUST AND MUD CONTROL ON STREETS AND OTHER TRAVELED WAYS

- A. Dust control palliatives shall be utilized where and when necessary to satisfactorily maintain roads, streets, berms and other traveled ways for vehicular traffic. In addition, the accumulation of mud and/or dirt from the excavation, backfill and trenching operations shall be cleaned off the surfaces to properly maintain the roadway in a condition satisfactory to the Authority and its Engineer.

SECTION 3 - RAW SEWAGE PUMP STATIONS IS UNDER A SEPARATE COVER.

## SECTION 4 - SERVICE SEWERS

- 4.1 SEWER TAPPING - GENERAL
- 4.2 SERVICE SEWER CONSTRUCTION
- 4.3 FRESH AIR VENTS
- 4.4 INSTRUCTIONS FOR SEWER TAPPING

### 4.1 SEWER TAPPING - GENERAL

In cases where a lateral or wye exists in the main sewer line, under no circumstances or conditions is the plug (or cap) which closes the lateral from the main sewer, to be removed, unless it can be presented with all broken particles to a representative of the **Authority** and placed on the side of the trench for inspection. All fragments of the plug or cap must be removed from the line. If it is found that there is no lateral or wye in the main sewer line, this line must not be tapped, or disturbed by anyone but the **Authority's** representative, who has equipment specially suited for tapping the line. (See Paragraphs 4.4 and 4.5 for Instructions for Sewer Tapping). The cost of tapping the **Authority's** transmission line or manhole is determined by the **Authority** at the time the sewer permit is issued. All connections and/or taps to any manhole if collector line, interceptor trunk, or other facility used for transmission purposes must be made by the **Authority's** personnel or their authorized representative.

### 4.2 SERVICE SEWER CONSTRUCTION

- 4.2.1 Materials of construction shall conform with the standards set for under Section 1 and 2 of these specifications. In general, service sewers shall be constructed of PVC Pipe, SDR-35, or ABS Schedule 40, four (4) or six (6) inches in diameter (as applicable).
- 4.2.2 The bottom of all trenches shall be undercut a minimum of six (6) inches below the invert grade of the proposed pipe. The undercut area shall then be filled with sand, granulated slag, or pea gravel conforming to the requirements for "**Small**" concrete aggregate. The cradle material shall be adequately and compactly tamped in place, taking care not to heave, misalign, crack or otherwise injure the pipe or joints.
- 4.2.3 Where muck, quicksand, soft clay, swampy or other material is encountered in the trench bottom, which in the opinion of the **Authority's** representative is unsuitable for foundation sub-grade or backfill, such material shall be removed by undercut to a depth satisfactory to the **Authority's** representative. The trench shall be backfilled to grade with



acceptable material, placed in four (4) inch maximum lifts (compacted density).

- 4.2.4 Pipe shall be laid to grade, with a minimum fall of 0.125 inches per foot (for 6-inch) and 0.25 inches per foot (for 4-inch). No acute turns of less than 45 degrees will be permitted. Bell holes shall be excavated at proper intervals so that the barrel of the pipe will rest for its entire length upon the foundation material, and that the weight of the overburden is on the barrel of the pipe and not on the hub.
- 4.2.5 Should the **Contractor** excavate below the grade, or disturb the foundation materials, either by blasting or in the use of power shovels, or other heavy equipment moved about resulting in loose, shattered, disturbed or spongy areas, said over-breakage, disturbed or spongy areas shall be completely removed to solid ground by the **Contractor** and shall be refilled to sub-grade as directed by the **Authority's** representative.
- 4.2.6 No connections to roof drainage or footer drainage systems shall be permitted. No tees or wyes will be permitted except where specifically authorized.
- 4.2.7 In service sewers, a "Tee" must be placed in the line between the fresh air vent and the **Authority's** transmission line in a manner commonly referred to as a "Tee on its back" defined as the run of the "Tee" being in a horizontal position, the side opening on the "Tee" to be extended three (3) inches above the surface of the ground in a vertical position, and properly capped to prevent the escapement of sewer gas. Clean-outs shall be spaced in conformance with the standard drawing entitled "Building Sewer and Lateral Sewer Detail".
- 4.2.8 For existing houses, connections shall be made between the house and the septic tank. In order to avoid difficulty in securing proper fall, the **Contractor** shall be expected to open a ditch on the house side of the septic tank, exposing the house drain, and also make an opening at the lateral. In this manner there should be no difficulty in determining proper fall.
- 4.2.9 The **Authority** shall be notified when all pipes are installed, including the trap, and prior to any backfilling, so that the entire installation may be inspected. If backfill is placed prior to inspection, it will be necessary for the **Contractor** to re-open all areas that have been backfilled. Notification must be made at least twenty-four (24) hours in advance of the desired inspection date.
- 4.2.10 Fresh air vents must rise to a height of at least 3-1/2" above the ground level adjacent to the vent. Where a service sewer is located in a driveway,

the vent must be placed on either side of the driveway. At the discretion of the **Authority's** representative, and in accordance with the provisions outlined under Item 3.3 of these specifications, fresh air vents may be permitted to be placed in a driveway area or between garage doors. Refer to Item 3.3 for the specific requirements concerning this type of installation.

- 4.2.11 The trap must be filled with water before the job can be considered complete.
- 4.2.12 No job is to be started unless a connection permit has been issued.
- 4.2.13 All traps must be 4" x 4" x 4" or 6" x 6" x 4". If a 6" x 6" x 4" trap is used, an adaptor must be installed from the four (4) inch house line to the six (6) inch opening in the trap.
- 4.2.14 Grease removal systems shall be installed where applicable.

A. Grease Removal Systems

Grease removal system must be installed at the User's expense at all connections to the public sanitary sewer system and facilities when they are deemed necessary by the Authority for the proper handling of liquid wastes.

B. Grease Removal Systems Requirements

Grease Removal System must be installed according to the following specifications:

- (1) Any user required to install a grease removal system must install either (i) grease interceptors, (ii) grease traps, or (iii) grease removal devices.
- (2) Design for grease removal devices will be to accepted industry standards PDI G101, ASME A112.14.3 and ASME A112.14.4. Design of grease removal devices shall be submitted to MTMSA and the Allegheny County Health Department Plumbing Division for approval. The Applicant shall supply supporting documentation and calculations to verify that retention time(s) and the discharge temperature of waste water into the grease removal system meet the requirements of these rules and regulations.
- (3) A suitable location shall be provided for sampling of the discharges from grease removal systems. Any plans for such grease removal systems as required in this Section shall be submitted to the Authority and the Allegheny County Health Department Plumbing Division for

review and approval prior to installation. The Authority must be notified seventy-two (72) hours prior to installation of any grease removal device in order to inspect and oversee the installation. All active interior recovery devices must have built in sampling capability such as Zurn Model 1173 or approved equal.

- (4) The owner(s) shall be responsible for cleaning and maintaining the grease removal systems and shall maintain record of the dates of cleaning and means of disposal, subject to review by the Authority.
  
- (5) Garbage disposal units may only be installed in facilities with properly sized and operational in-ground passive type grease interceptors, which have been properly designed for retention of settleable solids or where a solids separator in advance of grease separation is provided. Garbage disposal units are prohibited in all other commercial or industrial facilities. Garbage disposal waste shall not be discharged directly into active interior recovery devices or semi-automatic grease removal system.
  
- (6) Wastes removed from grease interceptors shall not be discharged into the publicly owned sanitary sewer system. The owner shall be responsible for the proper disposal of such wastes. Any User found disposing of oil or grease in this manner may be held liable for costs associated with any related remedial activities deemed necessary by the Authority in addition to any fines or penalties that may be imposed under the Authority's Rules and Regulations.
  
- (7) No User shall alter, modify, or change from original design specifications a required grease removal system, unless the manufacturer of the system recommends in writing alterations to improve product efficiency. Plans showing any manufacturer proposed alterations and current design specifications shall be submitted to the Authority for prior review. All such recommendations for modifications are subject to approval by the Authority. Any approved alterations/modifications will be performed at the User's expense. The Authority is not to be held liable for a non-compliant condition resulting from modifications made to a system.
  
- (8) No User shall introduce any additives, including but not limited to enzymes or surfactants acting as grease emulsifiers or degradations agents, into any grease removal system, unless prior written approval is obtained from Authority. Any User, if having been granted

approval by the Authority to use any of the methods described above for the abatement of grease, shall continue to maintain the grease removal system in such a manner that conformance to the FOG wastewater discharge limit, as measured from the interceptor outlet or sample box, is consistently achieved.

- 4.2.15 No slip-seal pipe shall be permitted.
- 4.2.16 Where the **Contractor** lays service sewers across, along or through rights-of-way, roadways, streets or alleys, etc., belonging to the State, County or Township, the stipulation and regulations set up and required by those **OWNERS** shall be observed, and all work shall be in conformance with the requirements set forth by those **OWNERS**. Any permits required for opening roadways or streets, shall be obtained by the **Authority** at the **Contractor's** expense unless the rights-of-way are obtained by an **individual** for the specific purpose of installing his/her service sewer through private property. In that event the **individual** desiring the right-of-way must negotiate for and in his behalf and pay all expenses attached thereto. The cost of all inspection (s) required by those said **OWNERS** shall be borne by the **Contractor** or individual, as delineated above.
- 4.2.17 On all streets and roads, unless otherwise permitted, the **Contractor** shall maintain not less than one lane of traffic at all times, and to this end, will be permitted to open not more than 100 lineal feet of ditch along streets and roads. The stipulations regarding traffic control, however, shall conform to the requirements of agency having jurisdiction over the highway in question.
- 4.2.18 The **Contractor** shall be responsible for all damage to utilities, private properties and structures, power lines, gas, oil and water lines, sewers, fences, landscape plantings, etc. that may result from his operation, and shall restore same to their original condition as soon as possible and prior to completion of his/her work.
- 4.2.19 The **Contractor** shall determine where his/her operations may interfere with existing underground utilities, to this end, the **Contractor** shall contact the **OWNERS** of the various utilities in the area, as required under PA ACT NO. 172 of 1986 (which amends previous PA Act No. 287) (HB-2543), prior to starting work, and also during construction, in order to ascertain the exact locations of any structures, mains or services that they may have along the route of his work, so that he may better locate and protect them. The cost of rectifying any damages caused to existing utilities, structures or facilities, shall be borne by the **Contractor**.

#### 4.3 **FRESH AIR VENTS**

4.3.1 Placement of fresh air vents in relation to dwellings, specifically garage doors and driveway areas, is subject to the following stipulations:

- A. The fresh air vent may be placed in front of a pier in the middle of a two car garage, provided two garage doors exist (not one single door), and provided the driveway slopes away from the house or vent and water, rain water, or the like cannot enter the vent in any way.
- B. In the case of a one car garage, or a two car garage having only one door, the fresh air vent will not be permitted to be placed in any portion of the driveway area which is trafficable by vehicle. The fresh air vent must be placed at a minimum distance of one (1) foot from the bottom edge of either side of the garage door, on a horizontal line, and in an area where water, rain water, or the like cannot enter the vent in any way.
- C. Fresh air vents must be encased in concrete where specified by MTMSA field inspectors. If the lateral and vent are four (4) inches in diameter, the encasement must extend six (6) inches below the receiving lateral to which the fresh air vent is attached. If larger pipe is used, the concrete must extend to a point two (2) inches below the receiving lateral to which the fresh air vent is attached. The base of the concrete encasement must be placed on virgin soil, or soil which has been compacted to the satisfaction of the **Authority's** representative. The vertical sides of the concrete encasement must be at least four (4) inches thick as measured from the outside diameter of the fresh air vent to the outside edge of the encasement. The concrete column in which the fresh air vent is encased must have square dimensions in plan and profile view of at least one (1) foot, and be extended approximately three (3) inches above finished grade. If the fresh air vent is larger than four (4) inches in diameter or square section, the concrete encasement of cement must be increased proportionately in order to have sufficient thickness to prevent destruction by fracturing or other related damages to the concrete. Refer to standard drawing entitled "Building Sewer and Lateral Sewer Detail".
- D. All fresh air vents shall extend three and one-half (3-1/2) inches above the finished grade regardless of the surface type (i.e. earth, concrete, bituminous or other material) as it appears at the location of the fresh air vent.
- E. Placement of curbing, channels or gutters which channel the flow of surface water towards the fresh air vent where it may enter the sewer through orifices purposely drilled or placed in the vertical air vent pipe is prohibited.

Implementation of any means or method by which storm water, rain water, or the like can gain entrance into the fresh air vent under any circumstances is prohibited.

#### 4.4 **INSTRUCTIONS FOR SEWER TAPPING**

4.4.1 The ditch must be clean and afford sufficient working space for two men. If fluid of any kind exists, it must be pumped out or removed. The **Contractor** shall at all times provide and maintain in operation, suitable and adequate pumping and/or well point equipment for completely dewatering the excavations in such a manner as to permit the successful installation of the proposed improvements. No pipe shall be permitted to be constructed in a trench in which water flows or in a trench in which water is pooled.

4.4.2 Sheeting, solid shoring and/or bracing shall be utilized in excavations, where necessary or required, to protect existing or proposed structures, pipe lines or other facilities, pedestrian or vehicular traffic, and where necessary or required to prevent injury to construction personnel and other persons and property.

All systems of sheeting, shoring and bracing shall be designed and installed by the **Contractor** for materials and depths encountered and shall be adequate to withstand the loads to be imposed and superimposed. Materials and design for the sheeting, shoring and/or bracing shall be in conformance with the regulations prescribed any Federal, State or local agency having jurisdiction over the work. The **Contractor** shall be fully responsible for the adequacy of the system to withstand all loads thereon and shall save harmless the **Authority** and Engineer from any and all personal and property damages resulting from his failure to properly provide and maintain sufficient sheeting, shoring and bracing.

4.4.3 The main sewer line must be cleaned and exposed eight (8) to twelve (12) inches on all sides in order to properly apply and operate the tap machine.

4.4.4 There must be at least 1/2 cubic yard of granular material, preferably granulated slag, on hand on which to lay the starting sewer pipe sections.

4.4.5 Notice shall be given to the **Authority** at least twenty-four (24) hours in advance of the intended use of the tapping machine.

4.4.6 The **Contractor** is required to have a representative present when the tap is made.

- 4.4.7 In the past on many occasions, the ditch was not ready, slag was not on hand, or a representative of the **Contractor** was not present, which resulted in unnecessary delay of the **Authority's** personnel and equipment. Effective June 6, 1979, in the event all conditions as stipulated in Paragraphs 3.4.1 through 3.4.6, have not been complied with, the tap **WILL NOT BE MADE.** This will result in an additional charge of **Fifty Dollars (\$50.00)** over and above the original tapping machine charge (to be paid in advance), and the service call **MUST BE RESCHEDULED.**
- 4.4.8 These instructions are for the guidance of the **Contractor**. If they are not followed, or are ignored, the responsibilities will be upon the **Contractor**.

#### 4.5 **DEMOLITION OF ABANDONED SERVICE SEWERS**

- 4.5.1 The customer desiring termination of sanitary sewer service shall make written application for the termination of service on a form supplied by the Authority. The Customers shall give the date and time when the capping of the tap will be made and available for inspection by Authority personnel prior to backfilling. No application shall be submitted more than fourteen (14) days prior to the scheduled capping of the sewage line.
- 4.5.2 There is hereby imposed an application and inspection fee of \$25.00 for the termination of sanitary sewage service.
- 4.5.3 The work in general consists of:
- A. The location and excavation of the four (4) inch or six (6) inch sewer lateral connections within three (3) to five (5) feet of the existing eight (8) inch or larger sanitary sewer main.
  - B. Permanently plugging or capping of each location with a suitable and compatible material with the type of pipe existing to prevent inflow or infiltration into the sanitary sewer system.
  - C. The excavation materials must be removed from the site and the trench must be backfilled with AASHTO 2-A limestone and compacted as it is installed to prevent any future settlement.
    1. All locations in roadways and berms are to be backfilled to grade level.
    2. Areas located out of these roadway and road edge areas are to be at least one-half (1/2) of the depth filled with 2-A limestone, again to prevent settlement, and then backfilled with topsoil and reseeded to prevent erosion.

4.5.4 A customer who has capped or plugged a sewer lateral connection after application to do so and in accordance with these Rules and Regulations may reapply for sanitary sewer service for the same premises.



Note: Standard Details, are provided in a separate MTMSA Document.