

**ORDINANCE NO. 2010- 227**

**BOROUGH OF AVONDALE  
CHESTER COUNTY, PENNSYLVANIA**

**AN ORDINANCE ESTABLISHING REGULATIONS FOR APPLICATIONS FOR AND PERMITTING OF BOROUGH WATER SERVICE, AND FOR CONSTRUCTING, SURVEILLING AND APPROVING WORK ON BOROUGH WATER MAINS AND FACILITIES, EXTENSIONS OF WATER SUPPLY MAINS AND/OR NEW FACILITIES TO BE DEDICATED FOR PUBLIC USE AND PRIVATE SERVICE CONNECTIONS TO THE BOROUGH'S WATER SYSTEM; ESTABLISHING OR PROVIDING FOR APPLICATION, PERMIT, SURVEILLANCE AND OTHER FEES AND CHARGES; REQUIRING CONNECTION TO AND USE OF THE BOROUGH'S WATER SYSTEM; ESTABLISHING REGULATIONS FOR THE USE OF THE BOROUGH'S WATER SYSTEM; ESTABLISHING VIOLATIONS AND PENALTIES; AUTHORIZING THE BOROUGH ENGINEER TO RESOLVE DIFFERENCES IN DESIGN DETAILS AND SPECIFICATIONS BETWEEN THIS ORDINANCE AND THE SUBDIVISION AND LAND DEVELOPMENT ORDINANCE AND REPEALING INCONSISTENT AND CONFLICTING REGULATIONS AND REQUIREMENTS IN ALL OTHER ORDINANCES.**

**AUGUST 4, 2010**

ORDINANCE NO. 2010- 227

BOROUGH OF AVONDALE  
CHESTER COUNTY, PENNSYLVANIA

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The Council of the Borough of Avondale ("Borough"), Chester County, Pennsylvania, hereby ORDAINS as follows:

1. Purpose and Scope

The Borough of Avondale (the "Borough") owns and operates a public water supply system which supplies service within the Borough. The Borough hereby establishes the requirements ("Requirements") described and/or incorporated herein. All subdividers, developers and/or contractors, their contractors, subcontractors, agents and employees (collectively "Developer and/or Contractor"), as well as all Borough water customers and property owners receiving or to receive Borough water service, shall comply with all Requirements with respect to all work, connection to, extensions of and use of the Borough's public water supply system (the "Borough Water System"). These Requirements are intended to cover a Developer's and/or Contractor's activities from the Developer's and/or Contractor's initial plan to subdivide, develop and/or do work in the Borough to the completion of a water system extension and/or connection. Nothing in these Requirements shall be construed to relieve the Developer and/or Contractor and/or property owner of any responsibilities under and/or compliance with any and all other applicable regulations and/or requirements of the Borough and/or any other governmental authority.

2. Preliminary Matters

A. Definitions.

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

**Borough.** Avondale Borough, Chester County, Pennsylvania, or any municipal authority or entity created by the Borough for the purpose of carrying out the provisions of this Ordinance.

**Borough Code Enforcement Officer.** The person or entity appointed by Borough Council to enforce Borough codes and Ordinances.

**Borough Engineer.** The person, corporation, partnership or other legal entity appointed as the Borough Engineer by Borough Council.

**Borough Water System.** The public water supply system, together with all facilities for production and transmission of potable water, which are owned and operated by the Borough.

**Ordinance.** This Ordinance together with any amendments hereto.

**Premises.** A parcel or parcels of land together with any buildings and improvements thereon and easements running with the parcel(s) and/or a leasehold, building and/or dwelling unit and/or principal use which is or is to be connected to or served by the Borough Water System including a subdivision and/or land development.

**Subdivision Ordinance.** The Subdivision and Land Development Ordinance of the Borough of Avondale of 1996, Ordinance No. 171, as amended.

B. The design standards and other Requirements described and/or incorporated herein are applicable to the entire Borough Water System, connections thereto and extensions and use thereof, unless and until a specific written waiver therefrom is granted by the Borough.

C. Borough Engineer. For purposes of this Ordinances and the Regulations, the term "Borough Engineer" shall mean the person, corporation, partnership or other legal entity appointed as such by the Borough. The Borough Engineer may act directly or through other engineers, agents, assistants, inspectors and/or representatives acting under the supervision and direction of the Borough Engineer. The Borough Engineer is authorized by the Borough to observe all activities within the scope of this Ordinance, the Requirements and the Subdivision Ordinance. All persons engaged in activities subject to observation by the Borough Engineer hereunder shall make all work and materials available to the Borough Engineer, for observation, as, when and in such manner as the Borough Engineer shall direct. If the Borough Engineer determines that any work is not and/or is not being done in compliance with these Requirements and all other applicable regulations, the Borough Engineer is authorized, by the Borough, to

order the work to stop and/or be done over and/or replaced, in compliance with all applicable regulations, all at the sole cost and expense of the person or entity responsible therefor.

D. Prior to or concurrent with submission to the Borough of a sketch plan or preliminary plan, pursuant to the Subdivision Ordinance, the Developer and/or Contractor shall file with the Borough a completed "Development Data Sheet." (See Appendix "A" for sample form.) This form, which can be obtained at the Borough Office, shall list proposed construction plans and uses together with projected sanitary sewer and water service needs. The filing of the form with the Borough shall be deemed a request ("Request for Allocation") for sanitary sewer and water allocation for the development. The Borough will review the Development Data Sheet and will approve or deny the requested allocation, or may, if the Borough considers it necessary, approve a portion of the requested allocation. The allocation shall remain in effect for fifteen (15) months after the request was approved; if the approved allocation has not been used within fifteen (15) months, a new Request for Allocation must be filed and approved by the Borough for the continued capacity allocation assignment. Requests for additional or subsequent allocations will not be granted if the Developer and/or Contractor has failed to show significant performance and compliance with the initial allocation.

E. In addition to the filing of the Development Data Sheet, the Borough may request, and the Developer and/or Contractor shall furnish, any additional information concerning the proposed subdivision or development that the Borough considers pertinent or necessary for its review of the Request for Allocation.

F. If the Developer and/or Contractor files a Request for Allocation prior to preliminary plan submission, the Borough may approve the requested allocation with the understanding and condition that the information supplied by the Developer and/or Contractor shall remain unaltered in the preliminary plan submission. Should plan modifications be made, the Borough's original approval of any allocation shall be voidable by the Borough.

G. Appendices Incorporated. All the Appendices are incorporated herein and made a part hereof. Compliance with all relevant designs, details, specifications, materials, dimensions and practices shown and/or described in the Appendices is required for all activities, construction and work regulated hereby.

H. Conflicts and Repealer. If any specification, detail, design and/or construction requirement of this Ordinance conflicts with or is different than the provisions of The Subdivision and Land Development Ordinance of the Borough of Avondale of 1996, Ordinance No. 171, as amended, the Engineer shall determine which provision shall be used. All inconsistent and conflicting provisions, in Ordinances other than Ordinance 171, as amended, are hereby repealed to the extent of the inconsistencies and/or conflict.

I. Violations and penalties. The provisions of this Ordinance are declared to be for the: prevention, abatement, and regulation of water pollution; preservation and enhancement of public and private water supplies; and health, safety and welfare of the citizens of the Borough. Any person violating any provisions of this Ordinance, upon conviction before any District Justice, shall be fined not more than \$1,000 and costs, or in default of payment thereof, by

imprisonment for a term as provided by law for summary offenses. In cases where the violation is with respect to an occupied building or property accessible to the sewer system, which said property or building is or would be subject to a tapping fee, an annual sewer rental, or charge of more than one equivalent dwelling unit, the fine for violation of any provision of this Ordinance shall not be more than \$1,000 for each such unit or fraction thereof and costs. Or in default of payment there of, by imprisonment for a term as provided by law for summary offenses. Each thirty day period during which such violation of such provisions shall continue shall be deemed to be a separate offense. Each occupied building, or each living unit in a multiple unit building, whether or not the owners thereof shall be permitted to connect two or more buildings or units by a single common connection to a lateral of the sewer system or shall be required to make separate connection for each occupied building or unit, shall constitute a separate and distinct unit under the provision of this Ordinance, and the persons owning occupied buildings, consisting of multiple units contained in the same structure, who violate any of the provisions of this Ordinance shall be subject to the above fines for each and every one of such occupied buildings or units which are in violation of the provisions of this Ordinance.

J. Effective Date. This Ordinance shall be effective five days from the date of enactment.

K. Severability. If any of the provisions, sections, sentences, clauses, or parts of this Ordinance or the application of any provision hereof shall be held invalid, such invalidity shall not affect or impair any of the remainder of this Ordinance, it being the intention of the Borough Council that such remainder shall be and remain in full force and effect.

3. Developer's Agreement for Cost Reimbursement

A. Prior to or concurrent with submission to the Borough of a sketch or preliminary plan, the Developer and/or Contractor shall enter into an agreement with the Borough, agreeing to pay all engineering, legal and administrative fees and costs associated with the review of the subdivision plan, sewer and/or water systems and/or the Request for Allocation, and/or to reimburse the Borough for any and all such costs already incurred as apart of such subdivision review. The Developer and/or Contractor shall also agree to pay for the costs of engineering and surveillance during the construction phase of the sewer and/or water system installation, which shall consist principally of full time project representation (field surveillance) of the water system installation and construction. The engineering cost of the full time project representation (field surveillance) will also be computed on the basis of 5% of the construction cost estimate. The Developer and/or Contractor shall furnish a detailed construction cost estimates.

B. Plan approval and/or commitment of a sanitary sewer and water allocation will be withheld or rescinded by the Borough if the Developer and/or Contractor fails to promptly pay engineering, legal and administrative costs, upon receipt of the Borough's bill for such costs.

4. Subdivision and Land Development Plan Review

A. The Borough will not review or approve an application for water service if the Developer and/or Contractor has not properly filed a Development Data Sheet or has not executed a Developer's Agreement for Cost Reimbursement, as required by Section 2 of these Guidelines.

B. The Borough will review the preliminary plan to determine sanitary sewer and water system design and compliance with the Borough requirements and to evaluate capacity needs. Review by the Borough shall not constitute a commitment for water and/or sewer allocation. Allocation of water or sewer capacity is separate and distinct from review and approval of water system design or sanitary sewer system design.

C. The Borough will review the preliminary plan as part of the Request for Allocation only to the extent required to address the sanitary sewer and water capacity issues. In reviewing such plans, pursuant to applications under the Subdivision Ordinance, the Borough will consider the standards set forth in Sections 5 and 6 of these Requirements as well as the design standards of the Subdivision Ordinance. (The Requirements also apply to work which is not a subdivision or a land development.)

E. Final plan(s), under the Subdivision Ordinance, shall be useable as sanitary sewer and water system construction drawings. Separate sanitary sewer and water system construction drawings shall be submitted to the Borough. It is the Borough's intent that all drawings shall be suitable for incorporation into the Borough's electronic mapping system for sanitary sewers and water lines. Electronic copies of such plans shall be provided, together with sealed paper copies.

5. Water System Design Standards for Borough Water System

A. Internal subdivision system adequacy and reliability. The minimum pipe size shall be eight inches (8"); however the Borough reserves the right to require a larger pipe size if a larger pipe size is deemed necessary by the Borough, in its sole discretion. All pipe intersections shall be valved, with two valves at each tee and three valves at each cross. Fire hydrants shall be provided generally at 500 to 600 foot intervals. Fire hydrants shall have a valved branch line. Fire hydrant number, location and spacing must be approved by the Borough and Fire Marshal; if hydrants are not installed as part of the initial work, then tees, plugged valves and valve boxes shall be provided at these spacing. The location of such tees shall be carefully recorded for future installation of the hydrant.

B. Service Connections. Each dwelling unit to be served by the water distribution system shall be provided with a separate service connection from the distribution main. Minimum service connection size shall be three-quarter inches (3/4"). Service connections shall be installed perpendicular to the water distribution main. Curb stops and curb stop boxes shall be installed off of any paved areas, a distance of 2 feet from street right-of-way (topographical building) line and shall be protected from vehicular traffic. The water meter location(s) and positioning shall be reviewed and approved by the Borough.

C. Adequacy of connection to the existing water distribution system. The subdivision water system should be connected to the existing water system at least at two different locations. In addition, a large diameter main extension from the existing system may be necessary to provide adequate water supply to the subdivision

D. Design review will include effects of subdivision on the general service area and methods to remedy any negative impact, including the need to upgrade and improve the existing system.

E. System layout and specifications. The Developer and/or Contractor shall incorporate any design requirements and/or design modifications into the final plan(s).

F. Rights-of-Way. When feasible, water mains shall be installed within existing opened Borough streets or streets to be dedicated to the Borough upon completion. Mains crossing private property should be avoided wherever possible. If mains crossing private property cannot be avoided, a suitable right-of-way must be provided, to the Borough, for the main. The minimum right-of-way width shall be twenty feet (20'), unless a greater width is necessary to access the main without shoring.

6. Performance Guarantees

Before the Borough approves any Final Plan(s) and as a prerequisite for said approval, the developer shall deliver to the Borough a performance guarantee as required by the Subdivision Ordinance.

7. Opening and Closing Water Valves

No water valves shall be opened or closed unless approval has been granted by the Borough. If water customers will be temporarily out of water as a result of construction, such service interruptions shall be kept to an absolute minimum, and the Contractor shall notify affected customers and Borough or water system owner/operator in writing of the schedule service interruption 48 hours in advance.

8. Construction Water Usage

All water used during water line construction shall be paid for at prevailing rates based upon metered usage. The Borough will furnish meter(s) in its service area, in accordance with the Borough's rules and regulations and in accordance with the Borough's current schedule of rates and charges.

9. Construction Specifications

All water main installation shall adhere strictly to the Borough specifications in Appendix B "Water Main Specifications and Standard Details, which are appended hereto and incorporated herein.

10. Construction Surveillance

The Borough will conduct surveillance, either full-time or periodic as warranted, of the water main installation. The costs of Borough or Pennsylvania Department of Transportation inspection shall be paid from the Developer's and/or Contractor's Improvements Security Account, which shall be provided to the Borough prior to the recording of any subdivision or land development plan and prior to starting any construction. All construction shall be coordinated with the Borough Engineer. No pipe trench shall be backfilled until it has been observed and approved by the Borough Engineer.

11. Final Inspection and Testing

Upon completion of the water line installation, as shown on the construction drawings or final plans, a final inspection shall be conducted by the Borough and a final test shall be performed in accordance with the Requirements (Appendix B) at no expense to the Borough. The final test shall be witnessed and approved by the Borough Engineer. A test certification may be required by the Borough for a water system test within an existing service area in the Borough.

12. Interim Use of Water Lines

A. The Borough, at its discretion, may permit or require customer water and sewer service if water and sewer line installation is substantially complete. Such interim use shall not relieve the Developer and/or Contractor of any responsibilities under any approved plans, Subdivision Improvement Agreements and/or Development Agreements with the Borough.

B. No customer water service, involving an undedicated water line or facility, shall be permitted without the Borough's specific prior written approval.

C. Prior to connecting individual customers to any undedicated water line, the customer or the customer's representative (e.g., developer, contractor, etc.) shall submit a water service application form to the Borough. Such forms are available from and shall be filed with the Borough Secretary at the Borough Office, during normal business hours. The water service request shall be accompanied by the required Borough fees payable to the "Borough of Avondale."

D. Partial Utilization. In the event the Borough permits water line installation in stages, a manhole or a valve, as applicable, shall be installed in the line at the end of the portion to be utilized to permit separate testing and utilization.

13. Water Line and Facilities Transfer to Borough.

A. Upon complete observation and approval, by the Borough Engineer, of the installation, water lines shall be offered for dedication to the Borough by delivery, to the Borough Secretary, of deeds of dedication approved by the Borough Solicitor and executed by

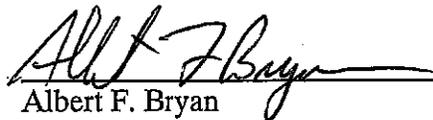
the party who or which can convey good and marketable title. The Borough may require title insurance for such conveyance.

B. Request for transfer of water lines to the Borough shall be accompanied by sealed and dated accurate record plans showing all manholes, invert elevations, mains, valves, hydrants and service laterals as installed; measurements to all valves and manholes to facilitate their surveyed location, and contain all other information as required by the Borough. The as-built plan(s) shall be furnished in clearly legible reproducible form and in Borough approved electronic format and shall clearly indicate that such plan(s) is/are an "as-built" plan(s). All such plans shall be sealed by a professional land surveyor registered as such in Pennsylvania.

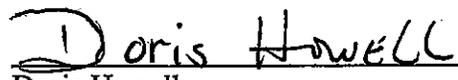
C. If rights-of-way are necessary and/or show on approved plans, the Developer and/or Contractor shall submit to the Borough an accurate surveyed and sealed right-of-way plan and legal description, in a form satisfactory to the Borough Solicitor and Engineer. A minimum 20 foot wide permanent right-of-way is required. Pipes shall beat the center line of the right-of-way. Such right-of-way plan and legal description will then be included in a Deed of Easement to be executed by the Developer.

D. Maintenance Guarantee. Before the Borough will accept any dedication of any water mains and/or facilities, the Developer and/or Contractor shall deliver to the Borough a maintenance guarantee as required by the Subdivision Ordinance.

Passed by Borough Council, this 17 day of August, 2010.

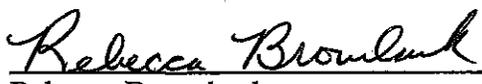
  
Albert F. Bryan  
President, Borough Council

Approved by the Mayor, this 17 day of August, 2010.

  
Doris Howell  
Mayor

Enacted, this 17 day of August, 2010.

BOROUGH OF AVONDALE

  
Rebecca Brownback  
Borough Secretary

08/03/2010

**ORDINANCE NO. 2010-**  
**BOROUGH OF AVONDALE**  
**CHESTER COUNTY, PENNSYLVANIA**

**APPENDIX A**

**SUBDIVISION DATA SHEET**

APPENDIX "A"  
BOROUGH OF AVONDALE  
SUBDIVISION DATA SHEET AND WATER ALLOCATION REQUEST

The Borough of Avondale is currently soliciting and evaluating requests from subdividers on record, for Water Allocations for the year \_\_\_\_\_. In accordance with Borough Policy, all Water allocations granted to subdividers expire on December 31 of each year, and must be requested again for each ensuing year, until the water system has been installed completely. Please make changes from your previous data sheet, if necessary, and return one (1) completed copy of this form to the Borough Hall, P.O. Box 247, Avondale, PA 19311.

General Information

1. Subdivision Name: \_\_\_\_\_
2. Section No.: \_\_\_\_\_ (if applicable)
3. Location: \_\_\_\_\_  
\_\_\_\_\_
- 4a. Subdivider: \_\_\_\_\_ 4b. Owner: \_\_\_\_\_  
Address: \_\_\_\_\_ Address: \_\_\_\_\_  
Telephone: \_\_\_\_\_ Telephone: \_\_\_\_\_
5. Date Final Plan approved by Borough Council: \_\_\_\_\_

Water System Information

6. Water service area: \_\_\_\_\_
7. Has water surveyor approved water system and given water allocation: \_\_\_\_\_
8. Remarks: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Date Form Completed: \_\_\_\_\_

By: \_\_\_\_\_

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**APPENDIX B**

**WATER MAIN SPECIFICATIONS**  
**AND**  
**STANDARD DETAILS**

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## **SPECIFICATIONS FOR WATERLINE REPLACEMENT CONSTRUCTION**

### **SECTION I – SPECIAL PROVISIONS**

#### **Act 287**

The contractor's attention is directed to the provisions of Pa Act 287, of 1974 as amended by PA Act 181 of 2006, 73 P.S. 176 et, seq., which specifies the contractor's responsibilities in regard to public health and safety during excavation and demolition operations in areas of underground utilities.

In order to comply with Pa Act 287, of 1974 as amended by PA Act 181 of 2006, 73 P.S. 176 et, seq., the contractor shall call-1- 800-242-1776 which is a one number calling system in direct contact with many utilities within the Commonwealth of Pennsylvania.

#### **Maintenance and Protection of Traffic During Construction**

The contractor shall provide, place, and maintain all signs, sign mounts, flashers, steady burn lights, barricades, temporary lighting and all other associated traffic maintenance devices in order to adequately and effectively protect and save the public from harm for the duration of the sewer construction project.

When permission for detouring traffic is granted the contractor shall post signs and maintain all detour routes to the satisfaction of the governing Authority. No State Highway shall be closed to traffic and no work performed on a State Highway without first obtaining approval for such closure of work from the Pennsylvania Department of Transportation. On a State Highway all warning signs for construction and detouring must be in accordance with Penn DOT's most recent standards.

During the construction process at no time shall any materials, spills, rocks, or other debris impede the flow of traffic through the job site. Any debris that has entered the traffic lanes shall be immediately cleaned up and removed. The contractor shall make every effort to protect traffic, both pedestrian and vehicular, against any possible injury or damage.

The contractor shall construct and maintain bridges over excavated areas as may be necessary or as directed by the Borough and said bridges must have sufficient structural integrity to accommodate its constructed purpose that being vehicular and/or pedestrian traffic. The proposed bridge shall be approved by the Borough Engineer.

All fire hydrants, water valves, gas valves, fire alarm boxes and mailboxes shall be left uncovered and readily accessible for use.

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### **Erosion and Sedimentation Control Practices**

Erosion and Sedimentation Control Practices shall be carried out in strict accordance with the construction drawings and the Erosion and Sediment Control Program Narrative Report. In the event that no narrative report has been established and notes concerning same are not specifically addressed on the construction drawings guidelines for the mitigation of erosion and sediment control shall be carried out in accordance with the guidelines of "Soil Erosion and Sedimentation Control Manual" prepared by the Pennsylvania Department of Environmental Protection including the most recent additions thereto. Also any measures undertaken must meet the current practices of Chester County Conservation District and are subject to the approval of the Borough Engineer.

The Contractor shall also conform to the following Erosion and Sedimentation Control Practices.

1. Reduce by the greatest extent practicable the area and duration of exposure of readily erodible soils.
2. Protect the soils by use of temporary vegetation or seeding and mulch, or by accelerating the establishment of permanent vegetation. Complete and protect segments of work as rapidly as is consistent with construction schedules.
3. Retard the rate of runoff from the construction site and control disposal of runoff.
4. Trap sediment resulting from construction in temporary or permanent silt holding basins. This includes pump discharges resulting from dewatering operations.
5. Sprinkle or apply dust suppressors or otherwise keep dust within tolerable limits on haul roads and at the site.
6. Use temporary bridges or culverts where fording of streams is objectionable. Borrow areas should be at a location where pollution from the operation can be minimized. Locations should be avoided where pollution would be inevitable.
7. Should construction operations be suspended for any appreciable length of time, temporary measures for the control of erosion must be utilized.
8. Provision must be made for protection against discharge of pollutants such as chemicals, fuel, lubricants, sewage, etc., into any stream.
9. All operations shall be conducted in such a manner to minimize turbidity in any stream at and below the site of the structure.

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10. The Contractor shall, at all times, keep the premises free from accumulation of waste material or rubbish caused by his employees or work.

### **Protection of Property**

The Contractor shall be responsible to protect from direct or indirect damage, all buildings, inlets, manholes, conduits, pipes, poles, tracks, walls, real property, personal property, and other structures whether above or below ground in the area of work. The Contractor shall at all times take every precaution possible by which damage to property can be prevented, for example by having on hand a sufficient quantity of materials available by which unforeseen occurrences can be mitigated such as, fencing and having sheeting for excavations and for sustaining and supporting any structures that are uncovered, underdrained, endangered, threatened or weakened. Also the contractor shall replace any drain pipe that has been encountered and removed through excavation even though the pipe may appear not to be in use or damaged.

### **Obstructions and Maintaining Utilities**

The Contractor shall be responsible for notifying each respective utility of the need for the relocation, adjustment or, protection and restoration of their facilities that will be required as part of the construction project. The Contractor shall also be responsible for uncovering and supporting said utility structures located within or crossing the limits of his/her trench.

All utilities services shall be maintained at all times by providing for a continuous flow in all existing conduits, electric, gas, sewer, telephone, and water lines, petroleum products or any other structure encounter above or below the ground during the construction process.

The Contractor shall be responsible for any and all expenses resulting from a track crossing including the maintenance of rail service, and vehicular and pedestrian traffic.

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## **SECTION II - EXCAVATION AND BACKFILL**

### **Excavation in General**

The Contractor shall furnish all labor, tools, materials and equipment necessary in order to accomplish all work, including but not limited to the clearing and grubbing of areas of work, removal of existing paving, excavation of trenches to the depth shown on plans, support of all utility lines where the proposed sewer line crosses, and the maintenance of all excavated areas and trenches including sheeting and shoring, the removal of all water, and the disposal of excess fill including all incidental work thereto in order to complete the project in a first class workmanlike manner as shown on the drawings and/or as specified and directed by the Borough.

Excavation shall include all materials excavated regardless of character, including rock excavation. Excavation shall be in open cut, unless written permission is granted by the Borough to excavate by other methods and/or other methods are specified on the construction drawings. The Borough shall be empowered to require that hand excavation be employed by the Contractor where deemed necessary for proper construction.

All openings to be made within State Highway shall be made in accordance with the most recent standards and specifications prescribed by the Pennsylvania Department of Transportation including any provisions established as conditions of approval for a Penn DOT State Highway Occupancy Permit.

All openings to be made in Local roads or streets shall be made in accordance with the permit issued by the Borough.

### **Rock Excavation**

All excavation shall be considered unclassified. No additional compensation shall be made for Rock or unstabilized soils.

### **Blasting**

Where blasting will be required and only when permitted by the Borough, blasting shall be performed by experienced and approved blasters. All blasts shall be carried out in strict accordance with the ordinances of the State, County and/or Borough governing same and also all Federal Blasting regulations relating thereto. Explosives shall be only of such character and magnitude as may be safely handled and detonated in the area of work and for the specific task intended, that being to aid in the excavation process, provided such explosives are permitted to be used under all Federal, State and local regulations pertaining thereto. Blasts shall be fired at

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such times as may be directed by the Borough and subject to approval by the fire marshal. The Municipality shall also have the right, if it becomes necessary, to regulate the number and size of charges. At all times the contractor and his/her sureties shall be solely liable for any damage that arises as a result of the blasting operations.

### **Excavation in General**

A permit must be secured from the Pennsylvania Fish Commission if blasting is to be done in or along a stream. All materials shall be unclassified. The contractor shall include the cost of rock excavation in the Item Prices for sewers, manholes and other items concerned. No additional compensation will be made for rock excavation.

### **Rock Excavation-Procedure**

Boulders where encountered shall not be returned to the trench without first being broken up in small pieces. The trench shall be excavated into the rock for a depth of six inches (6") below the bottom of the bell, and the bottom backfilled to grade with fine, well compacted earth, sand, granular material, etc.

### **Blasting**

#### **Compliance with Laws**

Where blasting will be required for excavation, the Contractor must comply with all Federal and State Laws and other regulations relating thereto. Explosives shall be only of such character and strength as may be permitted by such laws and regulations. The Contractor shall provide at his expense, magazines and magazine houses for the storage of explosives in such locations as may be approved by the local authorities having jurisdiction over such work. The magazine and magazine houses shall be plainly marked with large red letters "**EXPLOSIVES-DANGEROUS**" and shall be kept under lock, the key to which shall be in possession of the Superintendent or other trustworthy person.

#### **Quantity to be Stored**

No larger quantity of explosives shall be kept on the site of the work than will be necessary for the twelve (12) hours of work next ensuing. The caps and exploders shall not be kept in the same place as dynamite or other explosives.

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### **Time of Blasting**

Blasting shall be done only at such times as the Consulting Engineer shall approve, and before blasting, the Contractor shall notify all persons having interest therein of his intention to do blasting work. If required, in special cases, ordinary blasting powder in small charges may be used. The Contractor and his sureties shall be solely liable for any damage done during blasting operations.

### **Lengths of Trench to be Opened**

The Borough Engineer shall have the right to limit the length of trench to be left opened in advance of work. The Borough may at anytime be empowered to require the contractor to backfill open trenches over completed lines and, in some instances to backfill open trenches where pipe has yet to be laid if such trench is being left opened for an unreasonable period of time and/or only overnight, if it is deemed necessary by the Borough to be in the best interest of the health, safety and welfare of the public to have the trenches backfilled. Such backfilling shall be performed by the contractor even if the contractor must stop other work in order to backfill the trenches. The contractor shall not again open said trench until he is prepared to complete the structure therein. If the contractor refuses to backfill same the Borough shall be authorized to do so and expenditures for said work shall be the sole responsibility of the contractor. Excavation of all trenches fully completed unless authorized for otherwise shall not exceed twenty (20) feet in advance of pipe laying.

### **Width and Depth of Trenches**

The trenches shall be at a width and depth shown on the construction drawings, and specified herein or as directed by the Engineer in order to provide for the intended grade. Side of trenches shall be kept as vertical as possible. The width of trench shall be taken as the nominal diameter of the pipe at the bell plus an additional one (1) foot on either side. Where sheeting is used this trench width shall be taken as the measured distance between interior faces of sheeting. In no case shall stringers and waling strips be placed in such a way as to interfere with the proper compaction of earth and/or granular material around the pipe.

Where the proposed foundation for the pipe, as determined by the Borough Engineer, is to be situated on a suitable earth material for bedding purposes, the contractor shall excavate the trench along the grade to receive the pipe with the bottom around the bell being excavated in such a way as to insure the pipe's bedding throughout the pipe's length and to provide room for properly making the joint connections. This may be done without the use of a granular or coarse aggregate foundation, except that when P.V.C. pipe is being used a six (6) inches minimum coarse aggregate foundation shall be provided for its entire length. Where trenches have been excavated below proper grade (over excavated) the contractor shall be required to bring the bedding to its

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proper grade by the use of a coarse aggregate foundation unless other suitable material is found to be acceptable by the Engineer. Trenches that have been over-excavated and subsequently filled to proper grade with suitable material shall be properly and thoroughly compacted prior to pipe installation. The adequacy of the tamped trench to receive the pipe will be determined at the direction of the Engineer.

### **Relocation of Guide and Alignment of Trenches**

The Borough reserves the right to change the alignment and grade of the proposed pipe installation as shown on the construction drawings. These changes may be due to the presence of obstructions or other conditions that make the realignment and/or grade adjust necessary, more desirable or advantageous to the Borough. Such changes will not entitle the contractor to additional compensation over the agreed cost for installation. Also the contractor shall not be entitled to claim damages from the Borough as a result of these changes, even if these changes require the contractor to abandon trenches already excavated. These excavated trenches, however, shall be backfilled at the Contractor's expense.

### **Trench Foundation Preparation**

Irregularities and cavities occurring in all earth or rock excavation, at trench bottoms or tunnels, shall be filled to the required elevation with clean earth, or other approved suitable material and firmly compacted before the installation of pipe lines. It should be noted, however, that if in the opinion of the Engineer, the proper grade for pipe installation has been encountered and the soil condition composed of unsuitable foundation material, the bottom of the trench shall be excavated to an additional depth. This additional depth shall be filled with gravel and/or crushed aggregate placed and properly compacted to the proposed grade as directed by the Engineer.

### **Tunnelling**

Only when permission is granted by the Borough shall tunnelling operations be used as a method for pipe installation unless specifically called for in the specifications or noted on the construction drawings.

When tunnelling operations are undertaken sufficient openings shall be provided to allow for the joining of pipe sections, placement of sleeves, and proper backfilling and compaction around the pipe or pipe structure. Tunnels shall make use of timber or steel sheeting and shall be constructed by approved construction standards and are subject to the approval of the Borough and/or the Borough Engineer.

### **Removal of Water from Excavation**

The contractor is responsible for keeping all excavations free of water during the construction process at his/her sole expense. The contractor shall at all times during construction have ample equipment and means available on the construction site by which he/her may de-water the excavated areas or trenches. The equipment and means shall include but is not limited to pumps, power source, labor, and other tools by which the contractor can bail or otherwise promptly remove and properly dispose of water and/or sewage found in or entering the areas of excavation and/or trenches within the work area. Well points are an acceptable means by which dewatering may be propagated and shall be utilized wherever necessary in order to maintain dry conditions by which pipe installation can continue.

Any methods proposed by the contractor as a means to de-water excavated areas are subject to the approval of the Engineer.

### **Clearing and Grubbing and Storage of Materials**

The contractor shall clear and grub the surface over the proposed trench line in accordance to Section 200 of the Pennsylvania Department of Transportation Specifications including the most recent revisions thereto. Curbs, Sidewalks, gutters, flagstones, and paving material which may be removed including excavation from trenches shall be stored at the locations approved and/or designated by the Engineer. Any curbs, sidewalks, gutters, flagstones, paving material, or suitable trench backfill that become damaged or loss thereof through the careless removal, wasteful storage, neglect, disposal, or use shall be the responsibility of the contractor.

The Contractor shall be responsible for permanently restoring, repaving and replacing any and all areas that are disturbed as a result of excavating trenches for a greater width than is necessary, or excavation outside the limits of work, or disturbing areas through negligence.

### **Miscellaneous Excavation**

The contractor shall do miscellaneous excavating work as may be necessary and directed by the Borough. All miscellaneous excavation shall be subject to the same conditions and requirements specified herein for trench excavation.

Miscellaneous excavation shall include additional excavation for any special structures, outside the scope of trench excavation that may have been omitted from the construction drawings or specifications, where such excavation is performed at the direction of the Borough.

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### **Condition of Excavation**

The contractor shall be solely responsible for the conditions of all his/her excavations including the maintenance thereof. Any slides or cave-ins shall be promptly removed.

Regardless of whether or not the use of bracing or sheeting and shoring has been mandated by the Borough the contractor shall be solely responsible for the condition of his/her excavations. Failure or refusal of the Borough to give orders or direction concerning the size of timber sections, or sheet piling, and/or the methods of placement of piling, sheeting, bracing and shoring shall not relieve the Contractor of any responsibility for the condition of the excavation or obligations under the contract. Any delay that requires keeping an excavation open longer than would otherwise have been necessary, shall not relieve the contractor from his obligation to properly and adequately protect the excavation from slides cave-ins, or slipping. Also the contractor shall still be obligated under the contract to save from harm any injury to persons or personal and real property.

### **Test Pits**

Test pits ordered in advance of work by the Borough shall be made by the Contractor along the line and site of work in order to determine the composition of subsurface materials and/or the exact location of utility lines.

These test pits shall be considered incidental to their work.

### **BACKFILLING**

#### **Backfill in State Highways**

Backfilling in all State Highways shall be done in strict accordance with Penn DOT regulations and requirements.

#### **Backfill in Existing Borough Roads and Streets**

Backfilling in all existing Borough roads and streets shall be done in strict accordance with the Borough Road and Street Specifications.

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### **Backfill in Proposed Roads and Streets and Other Areas**

The Contractor shall backfill all excavations as rapidly as practicable, following the inspection and approval of work by the Borough.

No part of a pipe line or other structure that needs to be tested, located or measured, shall be filled over or around until required tests and measurements have been made by the Borough and their permission so given to backfill. Any backfilling done without authorization shall be uncovered by the Contractor.

### **Material**

No ashes, putrescible refuse, large stones, or other material of an unsatisfactory character shall be used in backfilling. All suitable excess material from trenches and other excavations on the contract shall be used for backfill.

### **Method**

The space between pipe and side of trench shall be backfilled by hand and thoroughly tamped with a light tamper in layers not to exceed four (4) inches in thickness to a depth of at least one (1) foot above top of pipe.

The method of backfilling above one (1) foot over top of pipe to grade or bottom of paving shall then be filled and compacted by tamping or rolling. The backfill material shall be evenly spread in built up layers not exceeding eight (8) inches before tamping or power rolling, subject to approval of the Engineer. No stone will be allowed in refilling until earth of selected backfill has been placed at least one (1) foot above pipe or structure as directed above. Backfill material placed above earth or selected backfill may contain some rock but in no case shall it exceed more than twenty (20) percent by volume.

### **Disposal of Material**

After completion of backfill, all material not used therein, shall be removed and disposed of by the Contractor in such a manner and at such point or points he may select, subject to the approval of the Borough. All roads, sidewalks, and other places on line of work shall be left free, clean and in good order.

All removal and cleaning-up shall be the responsibility of the Contractor. If the contractor fails to do such work within a reasonable time, after receipt of notice, the work can be performed by the Borough and the cost charged to the Contractor.

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### **Maintenance of Trenches**

The Contractor shall maintain all backfilled excavation in proper conditions as specified. All depressions appearing in backfilling excavation shall be promptly repaired by the Contractor. If the Contractor fails to make repairs within forty eight (48) hours after receipt of written notice from the Borough, the Borough may backfill said depression and its cost charged to the Contractor. In an emergency, the Borough may backfill or protect any dangerous depression wherever necessary without giving previous notice to the Contractor and the cost charged to the Contractor.

### **Compaction of Backfill**

The Contractor shall be required to compact all backfill materials to a minimum of 95% of the materials maximum dry density as determined by A.S.T.M. D-698-64T (STANDARD PROCTOR).

### **Testing**

During or after the backfill operations the Borough may order the Contractor to take soils compactions tests in conformance with A.S.T.M. Standard Procedures or other available methods. If determined by the Borough that any lift does not meet 95% of the maximum dry density the Contractor shall be required to dig test holes, as directed by the Borough at various levels, throughout the backfill at the Contractors expense, so that additional tests may be taken. If these test indicate unsatisfactory compaction the Contractor shall remove all unsatisfactory backfill and recompact same to the required standards at his/her expense.

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## **SECTION III - SHEETING AND SHORING**

### **General**

The Contractor shall support the sides and ends of all excavation and/or structure wherever necessary or directed, with braces, sheeting, shores, or stringers of the quality and character hereinafter specified. All timbering under pinning or sheet piling shall be put in place or driven by men skilled in such work and shall be so arranged that it may be withdrawn as backfilling proceeds, without injury to the structures or property. If, in the opinion of the Borough Engineer, the material furnished for timbering excavations is not of proper quality or sufficient size, or not properly placed to insure the safety of the work or of adjacent structures or property, the Contractor shall, upon notice, procure and place satisfactory timbering or place said timbering in a satisfactory manner. If contractor fails to do so, the work may be ordered stopped until said notice shall have been complied with.

### **Materials**

All timber used for sheeting, bracing, shoring forming, or in foundations, shall be of approved quality and of required dimensions. Except where allowable for temporary work, it shall be sound, straight, and free from cracks, shakes and large or loose knots. Where conditions require it, sheeting shall be tongued and grooved or grooved and splined or steel sheet piling.

### **Sheeting Left in Place**

All timbering in excavation shall be withdrawn as the refilling is being done except where, and to such extent, as the Engineer shall order, in writing, that said timbering be left in place. The Contractor shall cut off any sheeting left in place, wherever ordered, and shall remove the materials cut off without compensation therefore. However said sheeting shall be cut off at least twelve (12) inches below finished grade.

Wherever necessary in quicksand, or in soft ground, or for the protection of any structure or property, sheeting shall be driven without extra compensation to such a depth below the bottom of the trench as may be required or directed by the Engineer.

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## **SECTION IV - PIPE, MATERIALS AND INSTALLATION METHODS - WATERLINE**

### **MATERIALS AND TESTS**

#### **GENERAL**

Unless otherwise specified, all materials used in the work under this contract shall conform and shall be tested in accordance with the requirements of the Specifications of the American Society for Testing and Materials (ASTM), the American Water Works Association (AWWA), the American National Standards Institute (ANSI) including latest revisions and the National Fire Protection Association (NFPA) including latest revisions where applicable.

No material shall be used until it has been inspected and approved on the job site. When required by the engineer, any or all materials entering into the construction of any work shall be tested by an approved testing laboratory. Such inspection shall not relieve the contractor from any obligations in this respect, and any defective material or workmanship which may have been passed by the engineer shall be at all times subject to rejection when discovered, until completion of the maintenance period as required by the Agreement between the contractor and the borough.

The materials listed in this Section are for reference and only materials called for on the drawings or specified in these specifications will be permitted. Installation of the materials described in this section is detailed in later sections of these specifications. Where the name of a manufacturer is used in these specifications, it is used to designate a standard of quality. The use of said name does not eliminate equipment and materials of other manufacturers equal in quality.

#### **CONCRETE AND CONCRETE WORK**

All concrete and concrete work shall conform with all the requirements of ACI 301, "Specifications for Structural Concrete for Buildings", and as specified and designated hereinafter. References to items, sections and chapters are to those of the ACI 301. The standards of The American Society for Testing and Materials (ASTM) and The American Concrete Institute (ACI) are declared to be a part of this specification the same as if fully set forth herein.

The specified ultimate compressive strength,  $f'c$ , of the concrete shall be 3000 psi after 28 days of curing. The cement shall conform with the requirements of ASTM C 150, Type I. All concrete shall be air-entrained and the total air content shall be five (5) percent ( $\pm 1\%$ ) by volume. The air entraining admixture shall conform with ASTM C 260.

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A water reducing admixture, conforming to ASTM C 494, shall be used, and shall be either "WRDA" with Hycol, a product of W. R. Grace Co., or "Pozzolith", a product of Master Builders, or approved equal. The quantity to be added, the controlling temperatures, and the method of mixing shall conform with the written recommendations of the manufacturer. A copy of the proposed concrete mix shall be submitted to the ENGINEER before proceeding with the concrete work.

All reinforcing bars shall conform with the requirements of "Specification of Deformed Billet-Steel Bars for Concrete Reinforcement", ASTM A 615, Grade 40. Welded wire fabric shall conform with the requirements of "Specification for Welded Steel Wire Fabric for Concrete Reinforcement", ASTM A 185.

All exposed vertical surfaces shall receive a smooth rubbed finish per item 10.3.19 (ACI 301). All exposed flat surfaces and exterior slabs shall receive a floated finish per item 11.7.2 (ACI 301).

Loose material or backfill used to support fresh concrete shall be compacted sufficiently to maintain settlement within the dimensional requirements of ACI 347.

The engineer reserves the right to have tests performed in accordance with Section 16.3 (ACI 301) to insure that the concrete as furnished meets the requirements of these specifications. If the strength tests fail to meet the requirements of Section 17.2 (ACI 301), then the engineer may require in-place and/or core tests in accordance with Section 17.3 (ACI 301). All tests shall be at the expense of the contractor, or developer.

The basis of acceptance of the concrete work shall be as set forth in Chapter 18 (ACI 301). Concrete work which fails to meet the specification requirements, or which is not brought into compliance, may be rejected, in which case it shall be removed and replaced at the expense of the contractor.

### **MASONRY UNITS**

Brick intended for use in water works structures and appurtenances such as manholes and blocking shall conform to the requirements of ASTM C 32 Grade MA. Lugged paving brick, cored brick or brick having recesses or openings extending through the body of the brick shall not be used.

### **MORTAR**

The mortar for masonry shall be either a prepared mortar conforming with the requirements of ASTM C91, Type II, or shall be made of one (1) part cement, one (1) part

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lime and five (5) parts sand in a damp loose condition. The cement shall conform with the requirements of ASTM C150, Type I. The lime shall be hydrated lime conforming with the requirements of ASTM C207, Type S. The sand shall conform with the requirements of ASTM C144.

### **GROUT**

The grout mix shall be one (1) part cement to two (2) parts sand, plus the minimum amount of water necessary for proper placement, which shall not exceed a water to cement ratio of 0.49 by weight. When permitted to stand until setting takes place, the grout should neither bleed nor segregate. Cement shall conform with the requirements of ASTM C 150, Type I, and the sand shall conform with the requirements of ASTM C 144. Immediately before placing the grout, the area to be grouted shall be thoroughly cleaned and moisture applied. The grout shall be carefully placed to completely fill all voids. Exposed edges of the grout should be kept moist and at temperatures above 40°F for at least three (3) days after placement.

### **PRECAST CONCRETE CHAMBERS**

#### **Precast Sections -**

Special chambers and vaults shall be made of precast, reinforced concrete sections conforming with ASTM C-478 "Precast Reinforced Concrete Manhole Sections". If Precast bases are used, the base shall include an integral wall of sufficient height so that there is a minimum of two (2) inches of inside wall height below all wall openings, and a minimum of eight (8) inches of inside wall height above all wall openings. If poured in place bases are used, they shall conform with Concrete section. The construction joint between the precast section and the poured in place base shall be sealed on the inside with a three-eighths (3/8) inch fillet of "B/C Rubber Caulking Compound", as manufactured by Admixtures, Inc. of Shillington, Pennsylvania, Nervaseal TS as manufactured by Rubber and Plastics Compound Co., Inc., or approved equal, applied in strict accordance with the printed instructions of the manufacturer.

#### **Manhole Steps -**

Manhole steps shall be polypropylene plastic or fiberglass coated steel Stock No. PS-1 as manufactured by M. A. Industries, Inc. of Peachtree City, Georgia or Perma-Step 100-2 as manufactured by Utility Products, Inc. of San Antonio, Texas; aluminum alloy Part No. 30105, with suitable protective coating on

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portions embedded in concrete, as manufactured by Aluminum Company of America; or approved equal.

#### Frames and Covers -

Castings for frames and covers shall be Neenah Foundry Company Cat. R-1642-C or R-6050-C; E. L. LeBaron Foundry Company Cat. No. LC 268-1 or LS-264; Washington Street Brass and Iron Foundry or approved equal, and shall conform with the requirements of ASTM A 48, Class 20. Covers shall be self-sealing.

Where located in streets or subject to traffic loads, castings shall be capable of safely supporting an H-20 loading, in accordance with AASHTO Specifications, with due allowance for impact included in the design.

Castings shall be true to pattern in form and thickness, free from cracks, gas holes, flaws, excessive shrinkage, sound, cleaned by means of sand blast and neatly finished. Runners, fins, risers and other cast-on pieces shall be removed. All castings shall be thoroughly coated at the factory with one coat of black asphaltum paint or other impervious preparation approved by the ENGINEER.

Castings shall have metal bearing areas machine ground and finished to insure satisfactory seating so that it will be impossible to rock the cover after it has been seated in the proper position in the frame. Covers shall include a flexible gasket installed into a machined groove in the seating area of the casting. Pick holes shall not extend completely through the cover.

All covers shall have the word "WATER" cast in raised letters, which shall have a height of not less than two (2) inches.

#### DUCTILE IRON PIPE

All ductile iron pipe shall be manufactured in accordance with ANSI A21.51 (AWWA C151) American Standard for Ductile Iron Pipe, Centrifugally Cast in Metal Molds or Sand Lined Molds, for Water or Other Liquids.

All ductile iron pipe shall be the Push-On Joint type, which employs a single rubber gasket to effect the joint seal. The joint shall be in full accordance with ANSI A21.11 (AWWA C111) American Standard for Ductile Iron Pressure Pipe and Fittings.

Thickness class of the pipe shall be in accordance with ANSI A21.51 (AWWA C 151). The diameter shall be as shown on the DRAWINGS.

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All ductile iron pipe and fittings shall be cement lined and coated outside with a bituminous seal coat in accordance with ANSI A21.4 (AWWA C104).

The fittings shall be mechanical joint fittings, except where detailed otherwise on the DRAWINGS and shall conform to ANSI A21.10 (AWWA C110) and ANSI A21.11 (AWWA C111).

### **POLYVINYL CHLORIDE PIPE**

Polyvinyl chloride (PVC) pipe shall be manufactured in accordance with AWWA C-900 and shall be pressure class 200 (DR 14) with cast iron pipe equivalent OD, and shall be equal to the "Blue Brute" pipe as manufactured by Johns-Manville or approved equal.

All joints between PVC pipe and between pipe and fittings shall be effected by a rubber ring gasket type coupling approved by the engineer. The pipe may be manufactured with an integral bell or with a gasketed bell solvent welded to plain sections. In the latter case the bell must be solvent welded to the pipe and hydro-tested in the plant of the manufacturer.

All fittings shall be mechanical joint type conforming with ANSI A21.10 (AWWA C110) and ANSI A21.11 (AWWA C111) unless detailed otherwise on the drawings.

All fittings shall be cement lined and coated outside with a bituminous seal coat in accordance with ANSI A21.4 (AWWA C104).

All non-metallic pipe shall be installed with a suitable magnetic metal tracer tape, subject to approval by the borough, to permit the location of the buried pipe with conventional pipe locating equipment.

### **VALVES AND VALVE BOXES**

Gate valves shall be the diameter shown on the drawings and shall be manufactured in accordance with the requirements of AWWA C-900 and shall be suitable for use with 200 psi working pressure.

All valves shall be iron body, bronze mounted, double disc, parallel seat, non-rising stem, with wedge and bronze stem nut operating independently of the gates. Wedging surfaces shall be bronze to bronze. Pins and bolts in the wedging mechanism shall be made of bronze. The valves shall have a two inch (2") square operating nut. The valve stem shall have "O" Ring Seals.

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The valves shall be mounted vertically. All valves shall open by turning counterclockwise and shall have mechanical joint ends.

The valves shall be as manufactured by Darling Valve and Manufacturing Company; U.S. Pipe and Foundry Company, Smith Valve and Hydrant Division; Mueller Company; or approved equal.

All buried valves shall be furnished with a suitable cast iron valve box. Valve boxes shall be three piece, screw type installed over the bonnet and operating nut and of sufficient length to reach the surface of the ground, but not extend above the ground surface. The word "WATER" shall be cast in the cover of the valve box cover.

### **TAPPING SLEEVES AND VALVES**

Tapping valves shall be mounted vertically and shall be of the same construction and type as specified in Valves and Valve Boxes.

Inlet ends of tapping valves shall have an inlet flange Class 125 for attaching to the sleeve; the outlet of the valve shall have a mechanical joint end.

The tapping sleeves shall have an outlet flange Class 125. The tapping sleeves shall be made in two halves and shall be designed for 200 psi working pressure. The sleeves shall be either the caulked type or mechanical joint type. The O.D. of the pipe upon which the tapping sleeves are to be placed shall be verified in the field by inspection by the CONTRACTOR prior to their installation. If required, the caulking shall be pure lead.

### **SPECIAL VALVES**

Where noted on the drawings, special valves shall be provided for air release or vacuum relief, as shown on Drawings. Vent and vacuum valves shall be as manufactured by Val-Matic Valve and Manufacturing Co., Darling Valve and Manufacturing Co., or approved equal.

### **COPPER SERVICE TUBING**

Copper service tubing shall conform with the requirements of ASTM B 88, Type K, heavy wall, soft temper. All services shall be installed using copper service tubing; the diameter shall be as required by the borough.

### **SERVICE CONNECTION APPURTENANCES**

Each service connection will be made by use of a corporation stop of the size directed by the ENGINEER and of the type indicated on the Drawings for the pipe material and size being tapped. Each service connection will terminate at a curb stop with curb stop box of the size and type shown on the Drawings. Service tubing shall be continuous from corporation stop to curb stop and of the material noted. Saddles, subject to approval by the BOROUGH, shall be used when tapping PVC pipe.

### **FIRE HYDRANTS**

All fire hydrants furnished shall be manufactured in accordance with AWWA C-502 and shall be of the compression type with the hydrant valve opening against the pressure and closing with the pressure.

Inlet size and type shall be 6" mechanical joint with mechanical joint accessories. Valve opening shall be five and one-quarter (5-1/4) inches.

Hydrants shall be equipped with two (2) 2-1/2" Hose Nozzles, and one (1) 4-1/2" Steamer Nozzle. The threads on the Hose and Steamer Nozzles shall be national standard unless otherwise required by the local fire company. All nozzles shall have a nozzle cap individually attached to the standpipe with kink-proof chain. Operating nozzle cap nuts shall be AWWA standard unless otherwise specified.

All hydrants shall open counter-clockwise. All internal parts shall be removable without digging or removing the barrel.

Hydrants shall be provided with an "O" ring type seal plate. The "O" ring seal plate shall be so constructed that a moisture-proof grease chamber integral with the seal plate shall be provided which shall enclose the operating threads, thereby automatically lubricating the operating threads and friction surfaces each time the hydrant is operated. The seal plate shall be fitted with at least two (2) "O" rings, the lower "O" ring shall serve as a pressure seal and the upper "O" ring as a combined dirt and moisture seal to prevent foreign matter and moisture from entering the grease chamber.

The standpipe sections shall be connected at the ground line by a two-part safety flange. Depth of bury shall be four (4) feet unless otherwise shown on the drawings.

A six inch (6") mechanical joint shut-off valve with roadway box as specified shall be furnished and installed at each hydrant lateral in accordance with Standard Details.

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The hydrant standpipe below grade, together with all internal ferrous surfaces, shall be given two (2) coats of black asphaltum varnish. The exposed surfaces above grade, including nozzle caps and bonnet, shall be given two (2) coats of an oil base paint, color as selected by the Fire Marshal and approved by the engineer.

The hydrant, with shut-off valves, shall be manufactured by the Darling Valve Manufacturing Company; U.S. Pipe and Foundry Company, Smith Valve and Hydrant Division; Mueller Company; Waterous Company; or approved equal. All hydrants shall be approved by the Borough of Avondale Fire Marshal.

### **CERTIFICATION**

The CONTRACTOR shall submit to the engineer prior to installation of the pipe, valves, hydrants, fittings and other appurtenances, a notarized certificate in quadruplicate certifying that the above item were manufactured and tested in accordance with the appropriate Sections of this specification.

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## INSTALLATION - WATER SYSTEMS

### GENERAL

The CONTRACTOR shall install all water mains, service connections, and appurtenances of the size and type specified in accordance with this specification and pertinent recommendations of the manufacturer.

### MATERIALS

Water mains shall be ductile iron, polyvinyl chloride pipe, or in special cases other materials of the diameters and with jointing materials shown on the drawings or specified and conforming to the requirements of these specifications. Other components of the water system shall be as shown on the drawings and specified.

### LAYING WATER MAINS

Water mains and service connections shall be laid in accordance with AWWA C600 (Ductile Iron Pipe), C900 (Polyvinyl Chloride Pipe), and recommendations of the manufacturer for storage, handling and installation.

#### Handling

Pipe and accessories shall be distributed at the project site and at all times carefully handled to avoid damage. All pipe shall be rolled or lifted, care being taken not to bump or drop pipe or fittings. The interior and machined ends of all pipe shall be kept free from dirt and foreign matter. Valves and hydrants shall be protected from damage and dirt and kept drained of water which could cause damage during freezing weather.

#### Trench Preparation

The trench shall be excavated in accordance with these specifications. The trench bottom may be excavated level transversely. Holes shall be dug to accommodate bells or couplings so that the entire length of pipe shall have uniform bearing. Great care shall be exercised in providing a smooth finished trench free of stones or clods which could cause undue stresses in the pipe. Where rock is encountered in the excavation, or the subgrade is unstable, bedding shall be as described.

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### Alignment and Grade

All pipe shall be laid and maintained to the lines shown on the drawings with a minimum cover over the top of pipe of three and one-half (3.5') feet. Fittings, valves, and hydrants shall be located where shown on the drawings. All valve and hydrant stems shall be plumb.

### Installation of Pipe

Pipe shall be carefully lowered into the prepared trench. The engineer will inspect each length of pipe prior to installation. Rejected pipe or fittings will be promptly removed from the job site. In the case of bell and spigot pipe, work shall proceed with bells facing the direction of laying. On slopes greater than ten (10) percent, the pipe laying will proceed upgrade. The ends of pipe to be joined shall be carefully cleaned and gasket lubricant placed in accordance with the recommendations of the pipe manufacturer.

The spigot end or length of pipe to be placed shall be set into the socket for coupling in place, care being taken to avoid contact with the ground, centered and pushed into place with a jack or other device approved by the engineer.

Field fabrication of make-up pieces shall be completed in accordance with recommendations of the manufacturer and full use shall be made of specialties of the manufacturer for this purpose.

Particular care shall be taken in installing PVC pipe during hot weather in regards to expansion of the pipe. Continuous, suitable magnetic metal tracer tape, subject to approval by the Borough, shall be installed with all non-metallic pipe to permit the location of the buried pipe with conventional pipe locating equipment.

Every precaution should be used to protect the pipe against the entrance of foreign material before the pipe is placed in the new line. At times when pipe laying is not in progress, the open ends of pipe shall be closed by a watertight plug or other means approved by the engineer.

After laying of pipe and installation of all appurtenances, the pipe shall be completely backfilled in accordance with these specifications.

### INSTALLATION OF VALVES

Valves of the sizes and at the locations shown on the drawings shall be set in accordance with Standard Details. All valves will have mechanical joint ends and the

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connecting pipe shall be adapted, if necessary, to suit the mechanical joint fitting with at least one short make-up piece. The valve shall be uniformly bedded, and support brick masonry installed for support of the valve box base. The valve stem and valve box shall be set plumb and the box shall be centered over the operating nut.

Valves shall include: valve, valve box, masonry support, connection adaptors, excavation, and backfill.

### **INSTALLATION OF FIRE HYDRANTS**

Fire hydrants shall be installed at the locations shown on the drawings and shall be installed in accordance the Drawings. Unless otherwise noted, hydrant installation will be through a tee with six (6") inch branch, with a six (6") inch shut-off valve and six (6") inch piping. Hydrant and shut-off valve shall be set plumb, and thrust blocking and drainage bed shall be constructed as shown on the drawings.

Hydrants shall include the tee, valve and box, piping, hydrant, thrust blocking, drainage bed, excavation and backfill.

### **THRUST BLOCKING**

Concrete thrust blocking or anchors shall be provided on all lines at bends, tees, capped or valved end fittings and where directed by the engineer. Blocking or anchors shall be poured against undisturbed earth and shall be in accordance with the Drawings. Soil bearing values used shall be as designated by the engineer.

Thrust blocking and anchors, including straps and reinforcement, as required, shall be considered incidental to the installation of the waterline.

### **INSTALLATION OF BLOW-OFFS**

Blow-offs shall be provided at the locations and of the size shown on the drawings and shall be in accordance with Standard Details. The discharge from the blow-off shall be to the surface as shown on Standard Detail or to drainage courses as directed by the engineer.

Blow-offs shall include all fittings, valve, valve box, pipe, thrust blocking, drainage bed, excavation and backfill.

### **LAYING SERVICE CONNECTIONS**

Service connections shall be installed at locations and of the sizes directed by the engineer. Service connections shall consist of a corporation stop, curb stop and box with interconnecting service tubing. The connecting ends of corporation stops and curb stops shall be consistent with the size and material of mains and service tubing in accordance with Standard Details.

Corporation stops shall be placed in the upper half of the water main and a double wrap of three (3) mil Teflon tape or approved equal shall be placed on each corporation stop. Service tubing shall be loosely laid without kinking to the curb stop in a single length without the use of intermediate couplings.

The curb box shall be set plumb over the curb stop. The consumer side of the curb stop shall be suitable for receiving copper tubing unless instructed otherwise by the engineer. All excavation and backfill for service connections will be in accordance with the specifications.

### **INTERRUPTION OF WATER SERVICE**

During the course of the work, it may be necessary or advantageous to temporarily interrupt service to a customer or group of customers. If the contractor wishes to interrupt service, approval of the engineer shall be obtained at least forty-eight (48) hours prior to such interruption of service; and it shall be the responsibility of the contractor to notify all customers in accordance with all applicable rules and regulations, whose service will be interrupted, at least twenty-four (24) hours prior to such interruption of service. In all instances, the duration of interruption of service shall be kept to a minimum.

### **SPECIAL CROSSINGS**

The WORK under this Section includes furnishing all labor, materials, equipment, and services required for the installation of carrier pipe and casing conduit at railroad, highway and stream crossings as shown on the drawings. The work shall include all excavation, backfill, carrier pipe, and casing conduit, complete in place as shown on the drawings.

Railroad and highway crossings include the complete installation of casing conduit, brick work, concrete encasement, cast iron or ductile iron carrier pipe, and the transition, if required, from the cast iron or ductile iron pipe to other pipe material in the system, but not including any manholes or valves on either side of the crossing.

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Stream crossings include the complete installation of the pipe, fittings, valves, concrete encasement, stream diversion, and restoration.

It shall be the responsibility of the contractor to provide, at no expense to the Borough, any additional insurance coverage which may be required by the Railroad Company for the railroad crossings, and reimburse the Borough for any inspection costs or other services in conjunction with highway and railroad crossings at time of construction.

The method of installing the casing conduit or carrier pipe for water or sewer service shall meet with the approval of the engineer and Railroad Company or companies, Pennsylvania Department of Transportation, Pennsylvania Department of Environmental Resources, or other governmental agencies having jurisdiction. The casing conduit shall be installed with even bearing throughout its entire length. The ends of the casing conduit shall be suitably sealed with brick and a cement grout mix, as shown on the plans.

### **CASING CONDUITS**

Casing conduits shall be provided for encasing water pipe at the railroad and highway crossings in the locations as indicated on the drawings. The casing conduit shall be of the diameter as shown on the drawings; however, the contractor may install a casing conduit of larger diameter providing that all clearances under highways, railroad tracks and other structures are maintained.

Casing conduit shall conform to the following:

#### **Steel Pipe**

Steel casing shall conform to ASTM A139, Grade B, shall be coated, both inside and outside, with a bituminous seal coat to a thickness of 0.05 inches and shall have wall thicknesses as follows:

<b><u>Water Main Diameter</u></b>	<b><u>Minimum Casing Diameter</u></b>	<b><u>Minimum Casing Thickness</u></b>
Less than 6"	12" ID	0.250"
6", 8" and 10"	18" OD	0.312"
12" and 14"	24" OD	0.375"
16" and 18"	30" OD	0.500"
20" and 24"	36" OD	0.500"

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### Tunnel Liner Plate

The contractor may install tunnel liner plate, with the approval of the engineer, as an acceptable casing conduit. The thickness of metal for tunnel liner shall not be less than U.S. Standard Gauge No. 8. The tunnel liner plate shall be factory coated on both surfaces with a bituminous seal coat to a thickness of 0.05 inches and shall be fabricated from smooth plate to form a circular cross-section.

### Reinforced Concrete Pipe

The contractor may install reinforced concrete pipe, with the approval of the engineer, as an acceptable casing conduit. The pipe shall be tongue and groove pipe conforming to ASTM C76 and shall not be less than Class V.

Where the specified thickness or specified strength of the casing conduit must be increased to meet additional requirements of the companies or bodies granting permits, the contractor shall furnish and install the casing conduit as required.

### CARRIER PIPES

All carrier pipe shall be of the material and diameter as shown on the drawings and the specification.

Each length of water piping or force main shall be blocked at each end at three (3) points equidistant around the perimeter of the pipe, in a manner acceptable to the engineer, to prevent excessive movement of, and to center the pipe within the casing conduit.

### BORED WATER SERVICE CONNECTIONS

Where specifically called for on the drawings or as approved by the Engineer, water service connections shall be placed in bored holes under highways or railroads. These crossings need not be cased but shall be a continuous piece of pipe.

### OPEN TRENCHING

In the event the contractor wishes to trench in lieu of tunneling or jacking, written permission shall be obtained from the Permittee to do so and the work schedule shall be arranged to coordinate with the operation of the governing bodies.

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The trench shall be excavated, shored and backfilled to satisfy the requirements of the Permittee.

The contractor shall be responsible for the payment of all work done by the Railroad in conjunction with the work, including, but not limited to, inspection and signaling costs; track removal, replacement and realignment; and the removal and replacement of the roadbed.

If the contractor is permitted to employ open trench excavation, casing conduit may not be required; however, the pipe installed shall meet the strength requirements of the governing bodies.

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## **SECTION V - RESTORATION AND CLEAN UP**

### **GENERAL**

The contractor shall maintain the surface of all trenches and shall repair all depressions, settlements, washouts or other potential hazards, as determined by the engineer, until such time as the contractor is notified by the engineer in writing that the trench surfaces are satisfactory for permanent repaving or restoration.

The contractor shall replace all guiderails or fences, sidewalks, curbs and gutters, driveways, or other items as directed by the engineer, which have been damaged or removed in the course of the work. They shall conform in size and shape, and be equal in quality of material and workmanship to the original structures prior to being disturbed.

All materials specified in this Section shall be as described in the specifications of the Pennsylvania Department of Transportation (Penn DOT) Pub. 408.

Maintenance, temporary and permanent repaving, and restoration of trenches in State Highways and Municipal Roads shall be in accordance with the specifications of Penn DOT Pub. 408 and 67 PA Code, Chapter 459, latest revisions.

### **TEMPORARY REPAVING**

In streets, highways, alleys, driveways, or sidewalks, after the trench has been backfilled and properly compacted to the depths below the street or pavement grade hereinafter described, temporary repaving shall be installed as follows:

#### **Sidewalks**

Trenches shall be temporarily restored by placing and compacting eight (8) inches of 2A Subbase aggregate.

#### **Paved and Unpaved Shoulders in State Highways**

Trenches shall be temporarily restored by placing and compacting eighteen (18) inches of 2A Subbase aggregate in layers not to exceed four (4) inches. See Plans for Details.

#### **State Highways**

Temporary restoration of trenches on flexible and concrete base state highways shall be in accordance with the specifications of Penn DOT Pub. 408 and 67 PA Code, Chapter 459, latest revisions.

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### Unpaved Shoulders

Trenches shall be temporarily restored by placing and compacting eight (8) inches of 2A Subbase aggregate, and as shown on the Plans where applicable.

### Municipal Paved Streets

Trenches shall be temporarily restored by placing and compacting twelve (12) inches of 2A Subbase aggregate followed by 2" Hot laid asphalt. Cold patch shall not be used without approval of the Engineer.

## **PERMANENT REPAVING**

### Sidewalks

Unless otherwise ordered by the engineer, or required by local regulations, the contractor shall remove or compact the top four (4) inches of aggregate and a concrete sidewalk four (4) inches thick shall be constructed to replace sidewalk removed as a result of the work. Sidewalk width shall be the same as the width of sidewalk replaced unless shown otherwise on the drawings. All concrete shall conform to the specification, shall be air entrained and the total air content shall be six (6%) percent (+1%) by volume. The air-entraining admixture shall conform to ASTM C 260.

### Unpaved Shoulders in State Highways

Permanent restoration of unpaved shoulders in State Highways shall be in accordance with the specifications of Penn DOT Pub. 408 and 67 PA Code, Chapter 459, latest revisions.

### Paved Shoulder in State Highway

Permanent restoration of paved shoulders in State Highways shall be in accordance with the specifications of Penn DOT Pub. 408 and 67 PA Code, Chapter 459, latest revisions and shall be made with materials equal to or greater than the quality and thickness of those existing prior to start of construction.

### State Highways - Plain or Reinforced Cement Concrete Pavement

Prior to replacement of the base, one (1) foot from each edge of the trench shall be sawed or cut, in a neat straight line, to a depth of at least three (3) inches, and the detached material shall be removed. Drilling shall not be permitted where sawing or cutting is required. The replacement base shall consist of high early strength

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concrete equal in depth to the original concrete pavement. On existing reinforced cement concrete pavements, reinforcing steel and expansion tie bolts shall be placed in accordance with Roadway Construction Detail RC-26. The surface shall be cured in accordance with Section 501.3(n), Pub. 408. After surface corrections have been completed and just before the concrete becomes non-plastic, the surface shall be given a textured finish in accordance with Section 501.3(m)4, Pub. 408.

If the trench excavation exceeds four (4) ft. in width, #6 reinforcing bars placed at six (6) inch center to center with two (2) inch clear on each end and three (3) inch clear on the bottom must be installed in the concrete base course.

State Highways - Plain or Reinforced Cement Concrete Pavement with Bituminous Overlay

Prior to replacement of the base, one (1) foot from each edge of the trench shall be sawed and the detached material shall be removed. Drilling shall not be permitted. The base shall be replaced with a minimum of eight (8) inches of high early strength concrete to the elevation of the existing bituminous surface course(s). The high early strength concrete shall then be cured in accordance, with Section 501.3(n), Form 408. If a trench exceeds four (4) feet in width, No. 6 reinforcing bars shall be installed in the concrete base, placed at six (6) inch centers measured longitudinally in the direction of the trench, with a two (2) inch clearance on each end and a three (3) inch clearance on the bottom. Following the concrete curing, a tack coat of E-1 bituminous material or SR tack coat shall be applied in accordance with Section 460, Pub. 408. After the tack coat has cured, the bituminous binder and/or wearing course shall be placed to conform to the existing type of road binder and wearing courses.

State Highways - Flexible Base Pavement

Base and surface restoration of flexible base pavements shall be done in accordance with one of the two methods listed below, as specified in the permit.

High Early Strength Concrete Restoration Method

Prior to replacement of the base course, one (1) foot from each edge of the trench shall be sawed or cut, in a neat straight line, to the bottom elevation of the existing base course, and the detached material shall be removed. Drilling shall not be permitted. The base course shall be replaced with a minimum of eight (8) inches of high early strength concrete to the elevation of the existing crushed aggregate base course. The high early strength concrete shall then be cured in accordance with Section 501.3(n),

Form 408. If a trench exceeds four (4) feet in width, No. 6 reinforcing bars shall be installed in the concrete base course, placed at six (6) inch centers measured longitudinally in the direction of the trench, with a two (2) inch clearance on each end and a three (3) inch clearance on the bottom. Following the concrete curing, a tack coat of E-1 bituminous material or SR tack coat shall be applied in accordance with Section 460, Pub. 408. After the tack coat has cured, the bituminous binder and/or wearing course shall be placed so as to conform to the existing type of road binder and wearing courses.

#### 90 Day Temporary Restoration Method

Prior to making the permanent restoration, one (1) foot from each edge of the trench shall be sawed or cut, in a neat straight line, to the bottom elevation of the existing base course, and the detached material shall be removed. Drilling shall not be permitted. Temporary restoration shall be made and kept in place for a minimum of 90 days. The base material shall consist of either a minimum eight (8) inch stone base, a minimum five (5) inch aggregate bituminous base, a minimum five (5) inch aggregate lime pozzolan or a minimum (4) inch bituminous concrete, with a surface of two (2) inch bituminous material. Where the existing pavement structure includes a course of subbase material, it shall be replaced to a depth equal to the existing course depth with material meeting the requirements of Section 350, Pub. 408. After the minimum 90 day period, but before 210 days, the temporary restoration shall be removed and permanent restoration made. The permanent base course shall consist of bituminous concrete meeting the requirements of Section 305, Pub. 408 and having a minimum depth of five (5) inches or a depth equal to the existing base course, whichever is greater. The permanent binder and surface course shall be placed in accordance with the depths of the existing bituminous surface, but in no case shall the HMA binder course be less than one and one-half (1-1/2) inches and the HMA wearing course be less than one (1) inch.

#### State Highways - Additional Restoration

All disturbed portions of the highway, including all appurtenances and structures such as guide rail or drain pipes, shall be restored to a condition equal to that which existed before the start of any work authorized by the contract. If the contractor opens the highway pavement, whether to install a new facility or to modify an existing facility or for any other reason, and the wearing course is less than five (5) years old, the contractor shall, in addition to the minimum

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restoration conditions outlined above, overlay the highway pavement in accordance with the following conditions:

When a longitudinal opening longer than ten (10) feet and wider than three (3) feet is made in the highway pavement, the contractor shall overlay the traffic lane(s) in which the opening was made, for the entire length of highway that was opened.

When two (2) or more transverse trench openings are made in the highway pavement less than 100 feet apart, the contractor shall overlay all traffic lanes in which the openings were made, for the entire length of highway between such openings.

Regardless of the age of the wearing course, when both longitudinal and transverse trench openings are made in the highway pavement, the Department of Transportation may require the contractor to overlay all traffic lanes in which such openings were made, for the entire length of highway that was opened, if the Department of Transportation determines that the present serviceability index of the highway has been impaired by the openings.

#### Unpaved Shoulders

Permanent restoration of unpaved municipal streets and shoulders shall be a minimum of eight (8) inches thick of PennDOT 2A Subbase crushed aggregate, well rolled and compacted.

#### Municipal Streets - Rigid Concrete Pavement

Permanent restoration of municipal concrete streets shall be the same as described in paragraph above under State Highways High Early Strength Concrete Restoration Method

#### Municipal Streets - Flexible Base Pavement

The temporary restoration shall be removed to the depths required and the existing paving shall be cut, sawed, or removed in such a manner as to provide a clean cut in the cartway surface and base without undue disturbance to subgrade or fragmentation of surrounding areas for a distance of twelve (12) inches on both sides of trench area. Prior to the placement of permanent materials, the area shall be thoroughly rolled and compacted. Permanent restoration shall consist of a six (6) inch thick HMA bituminous concrete base course (Section 305 -Form 408), and a two (2) inch thick HMA bituminous concrete wearing course. See Plan Details.

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### Bituminous Sealer

When the wearing course is placed adjacent to curbs to form a bituminous gutter, upon existing bituminous material, or adjacent to structures, utilities, etc., it shall be sealed with AC-20 for a distance of twelve inches (12") from curbs, structures, utilities, etc., or six inches (6") on both sides of a bituminous joint in order to prevent accelerated deterioration caused by natural elements. On concrete surfaces, all joints between existing and new construction shall be sealed with AC-20.

## TOPSOIL, SEEDING AND LANDSCAPING

### Temporary Seeding

All areas shown on the DRAWINGS, all disturbed areas where construction activity has or will cease, and where otherwise directed by the ENGINEER shall be seeded with the following, according to season, at a rate of one (1) lb. per one thousand (1,000) sq. ft.

- a. Annual Rye grass - March 1 to June 15
- b. Sudangrass- May 15 to August 15
- c. Winter rye- September 15 to October 15

All seed shall be labeled, dated and of quality consistent with paragraph 10:04.2.

### Permanent Seeding and Landscaping

Whenever the surface of the ground has been disturbed in the course of work under this contract, the final grade surface shall be stabilized by seeding, sodding, planting or other methods approved by the engineer to prevent erosion.

A minimum of four (4) inches of topsoil shall be spread over areas to be seeded. Topsoil shall be free of stones, sticks, waste material and similar debris. Frozen ground shall not be spread as topsoil, and topsoil shall not be spread on frozen ground. Topsoil shall be spread only when the contractor is prepared to follow up with fertilizing and seeding. Fine grading to finished lines, grades and contours, fertilizing and seeding shall be done at such times as approved by the engineer.

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After spreading and raking the topsoil, the following shall be spread and worked in to depths of three (3) to four (4) inches:

- a. Hydrated lime or Agricultural ground limestone -90 to 100 lbs. per 1000 sq. ft.
- b. 0-20-20 Fertilizer - 50 to 75 lbs. per 1000 sq. ft.

Seeding shall be done during periods from April 15th to June 1st and from August 15th to October 1st, unless otherwise directed by the ENGINEER.

Grass seed shall not be planted after a heavy rain or watering and not sooner than one (1) week after applying lime and fertilizer, as described above.

Immediately before seeding, the following shall be spread and worked in to a depth of one (1) inch:

- a. 10-10-10 Fertilizer - 10 to 12 lbs. per 1000 sq. ft.

All seed used shall be labeled in accordance with the U.S. Department of Agriculture Rules and Regulations under the Federal Seed Act in effect at the time of purchase, which shall be later than the date of this CONTRACT. Seed which has become wet, moldy, or otherwise damaged in transit or in storage will not be acceptable. Seed shall not be more than two (2) years old and shall be re-tested for germination rate no more than ninety (90) days prior to use.

Seeding and planting shall be as follows:

- a. Sloped Areas Less Than 3H:1V

<u>Seed</u>	<u>Parts</u>	<u>Purity</u> <u>Percentage</u>	<u>Spreading</u> <u>Rate/1000 SF</u>
Kentucky 31 Fescue	100	100	8 lbs.
Or			
Kentucky blue grass	100	100	2.5 lbs.

b. Sloped Areas Greater 3H:1V

<u>Seed</u>	<u>Purity Parts</u>	<u>Percentage</u>
Penngift Crown Vetch	25	99
Kentucky tall fescue	75	95

Spreading rate - 3.0 lbs. per 1,000 sq. ft.

The contractor shall maintain the seeded and planted areas until all of the work under the contract has been completed and accepted by the engineer and the owner.

The maintenance shall consist of refilling rain-washed gullies, reseeding, replanting, mowing, and watering during periods of drought and removal of large and obnoxious weeds, all as directed by the engineer.

Mulching

After temporary or permanent seeding, the contractor shall furnish, place, anchor and maintain mulch at the locations shown on the drawings, and as directed by the ENGINEER. Mulching material shall be either hay or straw, or a combination of both, free from any seed-bearing stalks and roots of noxious weeds. Mulch shall be placed within forty-eight (48) hours after seeding and shall be applied at a rate of seventy-five (75) to one hundred (100) pounds per one thousand (1,000) square feet.

Erosion Control Blanket

Erosion Control Blanket shall be placed as shown on the drawings or as otherwise directed by the engineer. Erosion control blanket shall be a machine-produced mat of 100% agricultural straw. The blanket shall be of consistent thickness with the straw evenly distributed over the entire area of the mat. The blanket shall be covered on the top and bottom sides with lightweight photodegradable polypropylene netting having an approximate 1/2 inch (1.3 cm) x 1/2 inch (1.3 cm) mesh. The blanket shall be sewn together on 1.5 inch (3.8 cm) centers with degradable thread.

It shall be furnished in rolls not less than forty-eight (48) inches wide. After soil areas have been prepared and seeded, the erosion control blanket shall be unrolled parallel to the direction of flow without stretching and be anchored as described

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below with No. 8 gage steel wire staples, bent U-shaped with a throat width of one (1) to two (2) inches, and with an effective driving depth of not less than six (6) inches. The erosion control blanket shall be spread evenly and smoothly and be in contact with the soil or mulch at all points. The up channel end of each roll or section shall be buried a minimum depth of six (6) inches in a vertical slot, which shall be backfilled and tamped, and shall be overlapped twelve (12) inches by any subsequent up channel sections.

Where two or more widths of erosion control blanket are placed side by side, the upper mat shall overlap the lower by not less than four (4) inches, and shall be stapled along the overlap at three (3) foot intervals. The unlapped edges of all matting shall be stapled at six (6) foot intervals.

The contractor shall maintain the erosion control blanket until all the work has been completed and accepted by the engineer and the owner.

#### **MAINTENANCE AND RESTORATION**

In paved and unpaved highways, streets, alleys, sidewalks and shoulders, temporary repaving shall be maintained for a minimum of ninety (90) days, or as otherwise directed by the engineer, before permanent paving is installed. During this period, any sinking or other deterioration of the trench shall be repaired in accordance with the requirements of the specifications. No dirt or loose material will be allowed on the trench.

Along private rights-of-way, trenches shall be maintained for a minimum of ninety (90) days after backfilling, or as otherwise directed by the engineer before permanent restoration is made. During this period, any sinking of the trench shall be repaired by constructing to grade with clean, approved fill material.

Trenches shall be restored to the condition existing prior to start of work; and shall include, but not be limited to, reseeding or re-sodding lawns, replacing trees and shrubbery damaged by the contractor, and replacement of curbing, driveways, walkways, guide rails or fences.

The contractor shall repair any sinking or defective trench, in a manner approved by the engineer, occurring during the maintenance period as required by the Agreement between the contractor and borough.

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**Clean-Up**

During the progress of the work and until the completion and final acceptance thereof, all pipe lines and their appurtenances shall be kept thoroughly clean throughout. Obstructions or deposits, at any time discovered, shall be removed at once by the Contractor without extra compensation. After completion of work and prior to testing of pipe lines, all pipe lines and their appurtenances shall be left clean, free, and in good order.

On or before the completion of the work, the Contractor shall, without charge therefore, tear down and remove all trailers, temporary buildings and other structures built by him, shall remove all rubbish and debris of all kinds from any grounds which he has occupied and shall leave the line of the work in a clean and neat condition.

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## **SECTION VI – TESTING AND DISINFECTION**

### **General**

The Borough may order tests to be made on all mains built under this contract. The Contractor shall cooperate and furnish all equipment, labor and assistance necessary to perform the tests as specified herein and as directed by the Borough. Before being tested mains shall be backfilled to a safe level and carefully plugged. Where directed pipe lines shall be thoroughly flushed to remove all foreign material which may have entered the mains during construction. All water for flushing and testing shall be furnished by the Contractor.

The testing of newly constructed lines is considered incidental to the construction of the project and as such no additional compensation will be made by the Borough to the Contractor for the testing of pipelines.

### **HYDROSTATIC PRESSURE TEST**

All water lines shall be tested in the field, in the presence of the engineer or an authorized assistant together with a representative of the contractor in the manner prescribed. The contractor shall diligently follow an approved testing program, in order that approval and acceptance of completed lines may be given. In the event the contractor fails to conform to an approved testing program, such failure shall be considered by the engineer as non-completion of construction.

After the pipe has been laid and partially backfilled between joints, and all service connections and fire hydrants have been installed, each section of pipe between valves or temporary plugs shall receive the following hydrostatic tests:

The pipe shall be slowly filled with water and tested at a pressure fifty (50) percent above normal working pressure, as determined by the engineer, but in no case less than one hundred fifty (150) psi, based on the elevation of the lowest point of the line or section under test. The pressure shall be applied by means of a pump connected to the pipe in a manner satisfactory to the engineer. A meter to measure make-up water shall also be installed. The pump, pipe connections, taps into the pipe and all necessary apparatus shall be furnished by the contractor. Before applying the specified test pressure, all air shall be expelled from the pipe.

All exposed pipes, fittings, valves, and joints shall be carefully examined during the open-trench test. Any cracked or defective pipes, fittings or valves discovered in consequence of this pressure test shall be removed and replaced by the contractor with sound material and the test shall be repeated until satisfactory to the engineer. Should the contractor elect to backfill the entire trench, or any portion thereof, prior to testing, the contractor shall locate and repair any leaks which occur during this test.

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While the test pressure is being maintained, all exposed pipes, fittings, valves and joints shall be inspected for leaks. Leakage shall not exceed ten (10) gallons per day per inch of pipe diameter per mile of pipe. The test pressure shall be maintained for a period of not less than one (1) hour if joints are exposed and four (4) hours when joints are covered.

A hydrostatic pressure test similar to the test described above, shall be conducted on all water lines installed above ground or inside buildings or structures, except that no leakage will be permitted.

### **COST OF TESTING**

Payment for all laboratory tests, mill inspection, and tests conducted by the Testing Laboratory or agency at the shops or mills of the manufacturers shall be made by the contractor. In addition, the contractor shall furnish all necessary labor, equipment, and materials for field tests.

### **DISINFECTION**

#### **General -**

All new water lines shall be disinfected, as herein defined, before water is used for domestic consumption. However, prior to disinfection, all new water lines shall be flushed, as thoroughly as possible, with the water pressure and outlets available. Outlets should be large enough to develop a velocity in the main of two and one-half (2.5) feet per second. The procedure to be used shall be in accordance with AWWA Standard C601. One of the following methods of procedure may be used to accomplish disinfection:

#### **Recommended Procedures**

By introducing a chlorine gas-water mixture by means of a solution feed chlorinating device; or, if approved by the engineer, the gas shall be fed directly from a chlorine cylinder equipped with proper regulating device.

By introducing a mixture of calcium hypochlorite comparable to commercial products, known as HTH or Perchloron, and water. Either of these powders contains approximately seventy (70%) per cent available chlorine. A five (5%) per cent solution of calcium hypochlorite made by mixing five (5%) per cent of the powder with ninety-five (95%) percent of the water, by weight, shall first be made into a paste, and then thinned to a slurry by the addition of water and introduced into the newly laid pipe.

By placing in the joints of the newly laid pipe as it is being laid, a predetermined amount of dry calcium hypochlorite.

Point of Application

For a chlorine gas-water mixture, direct gas application or a calcium hypochlorite solution, the preferable point of application is at the beginning of the water main extension or any valved section of it. Application may be through a corporation stop.

When applied as a dry powder, the powder should be placed at each joint starting with the first and progressing as each additional section is laid.

Rate of Dosage

Water for filling the lines shall be furnished by the contractor from the supply system of the Borough or other approved source. The contractor shall furnish and install all bulkheads, pipes, valves, taps, plugs, and provide all labor and other equipment required to sterilize the lines.

Water for filling mains or storage units should be introduced slowly and the quantity of chemical applied proportionately to the rate of water introduced. This proportion should be equivalent to one (1) pound of available chlorine to each 4800 gallons of water, if chlorine gas is used, or one (1) pound of calcium hypochlorite to each 3120 gallons of water. This is equivalent to a dosage of twenty-five (25) ppm of chlorine.

For each one hundred (100) feet of pipe, when gas or calcium hypochlorite is used, or for each eighteen (18) foot section when tablets are used, the following quantities of chemical should be applied for the respective pipe sizes noted:

Size, Inches	2	3	4	6	8	10	12	16
Lbs., Cl <sub>2</sub> gas	0.04	0.08	0.013	0.031	0.054	0.085	0.120	0.217
Oz., Granular Ca(OCl) <sub>2</sub>	0.03	0.06	0.10	0.20	0.40	0.60	0.80	1.60
No., Ca(OCl) <sub>2</sub> Tablets	1	1	1	1	2	3	4	6

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Testing

After chlorine has been in contact with the mains for three (3) hours or longer, samples collected from the extremities of the mains should indicate a residual chlorine content of five (5) ppm or more. If less than five (5) ppm residual chlorine is indicated, the system shall be drained and the disinfection treatment repeated.

If the samples collected at the extremities indicate a residual chlorine of five (5) ppm or more, the system shall be thoroughly flushed at its extremities until the replacement water throughout its length shall, upon test, be proved comparable in quality to the water served the public from the approved water supply source and approved by the Public Health Authority having jurisdiction. This satisfactory quality of water delivered by the new mains should continue for a period of at least two (2) days as demonstrated by laboratory examination of samples taken from taps free from outside contamination.

The disposal of water used in testing and disinfection shall be the responsibility of the contractor in a manner approved by State, Local and Federal guidelines

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**SECTION VII - CONFORMANCE TO REQUIRED RULES & REGULATIONS**

Prior to proceeding with any work the Contractor (Builder, Developer, etc.) shall secure the necessary permits from all of the governing regulatory agencies and municipal bodies.

The contractor prior to proceeding with any work shall provide 3 VHS Video Tape copies of the project area and any areas that it may effect to the Borough of Avondale for there review and record.

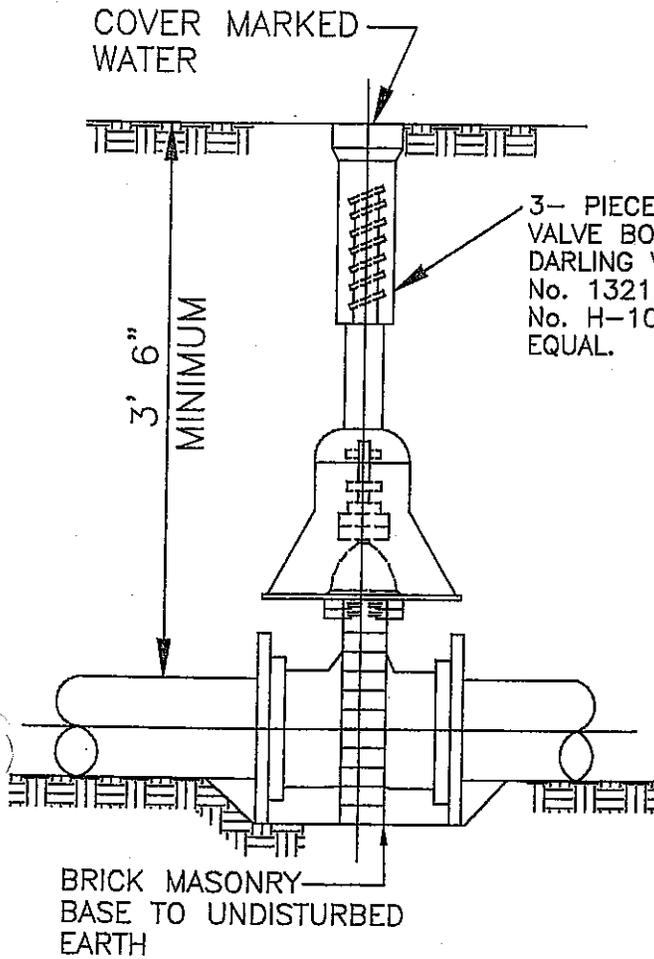
The contractor upon completion of this project shall provide 3 additional VHS Video Tape copies of the completed project area along with any areas disturbed by their construction to the Borough of Avondale.

During the execution of the work the Contractor (Builder, Developer, etc.) shall comply with all applicable rules and regulations of the governing regulatory agencies and municipal bodies including, but not limited to OSHA, DEP, EPA, Penn DOT and the Municipality.

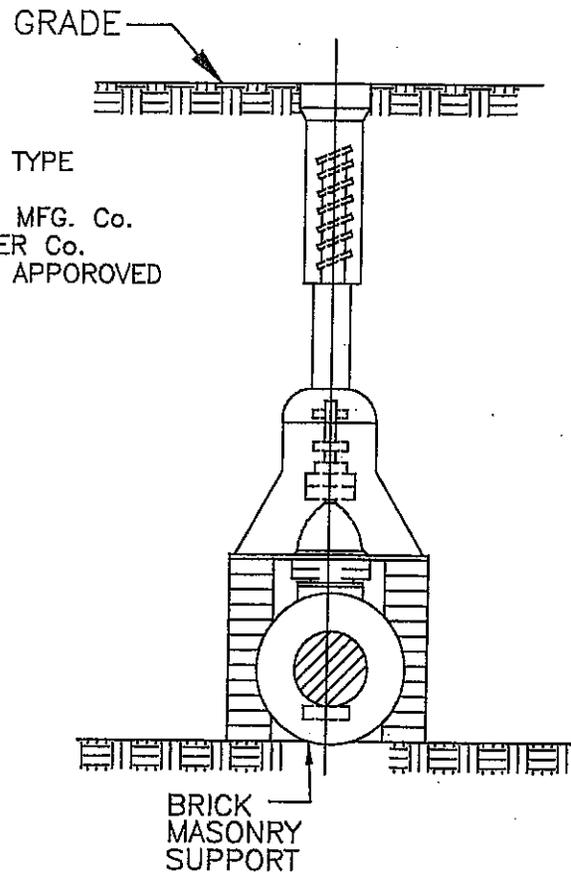
In accordance with the provisions of Pennsylvania Act 287, of 1974 as amended by PA Act 181 of 2006, 73 P.S. 176 et, seq., which specifies the contractor's responsibilities in regard to public health and safety during excavation and demolition operations in areas of underground utilities, the Contractor shall be responsible for verifying the location of all existing underground utility installations within the project area. Owners of the respective utilities involved shall be notified by the Contractor at least 72 hours in advance of the commencement of any excavation by the Contractor in the project area.

08/03/10

**STANDARD DETAILS  
FOR  
PUBLIC WATER SYSTEMS**



ELEVATION



SECTION A-A

NOTE: VALVE BOX BASES TO BE:  
 No. 4 ROUND - VALVES 4" AND SMALLER  
 No. 6 ROUND - 6" AND 8" VALVES  
 No. 140 DOME - 10" TO 24" VALVES

GATE VALVE INSTALLATION

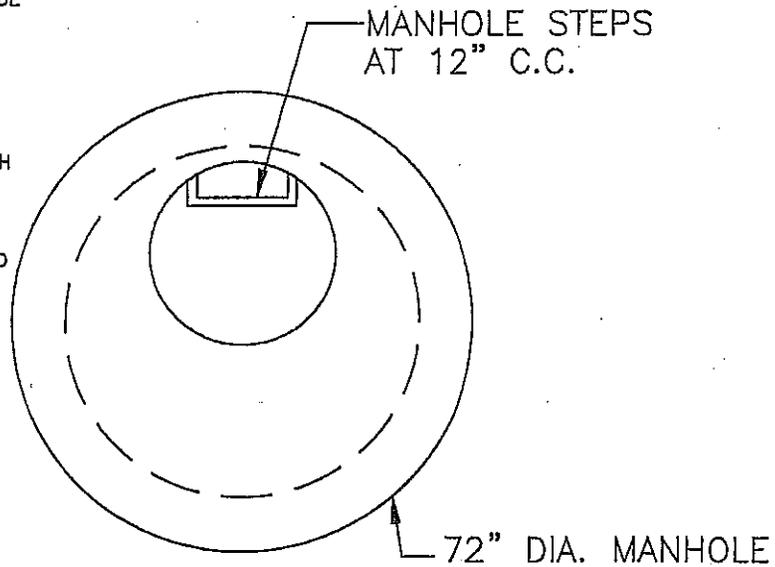
DATE  
7/28/06

AVONDALE BOROUGH

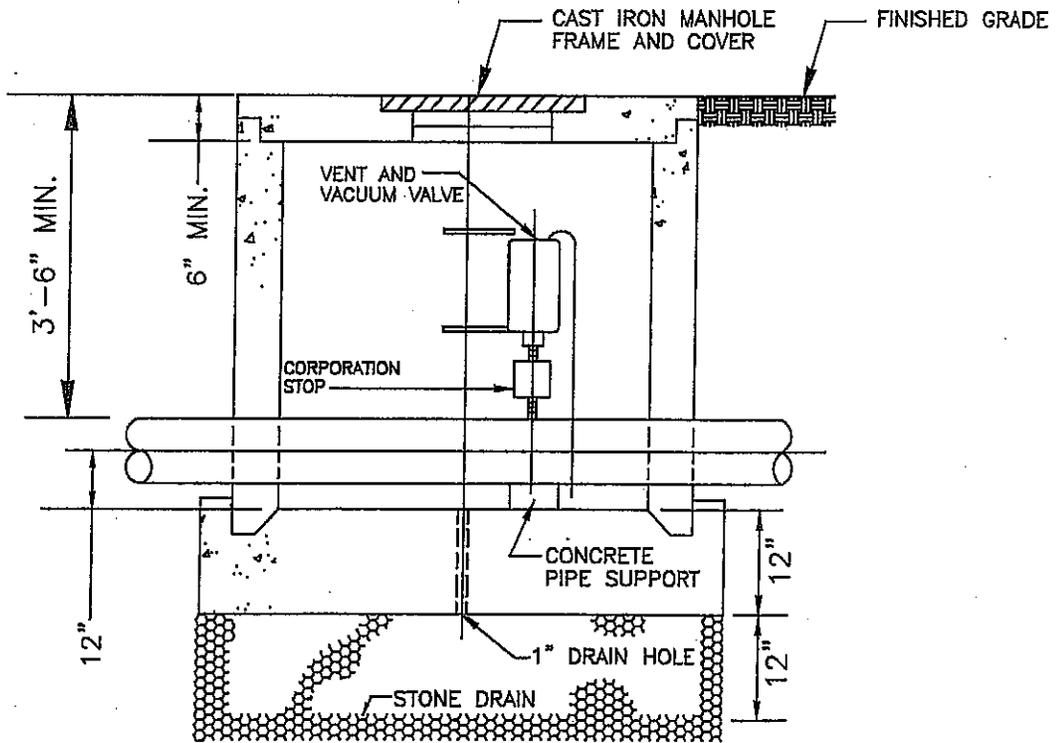
DRAWING #  
AB-W-01

NOTES:

1. MANHOLE SECTIONS SHALL BE TONGUE AND GROOVE WITH MORTAR JOINTS OR APPROVED RUBBER RING GASKETS.
2. AFTER MANHOLE IS SET, THE ENTIRE OUTER SURFACE SHALL BE COATED WITH BITUMASTIC.
3. WATER MAIN SHALL BE ENCASED WITH CONCRETE FOR A MINIMUM OF FIVE (5) FEET BEYOND CHAMBER OR UNTIL THE SPECIFIED TRENCH WIDTH IS REACHED.
4. SEE STANDARD DETAILS S-W-10 AND S-W-11 FOR SADDLE REQUIREMENTS.



PLAN VIEW



SECTION VIEW

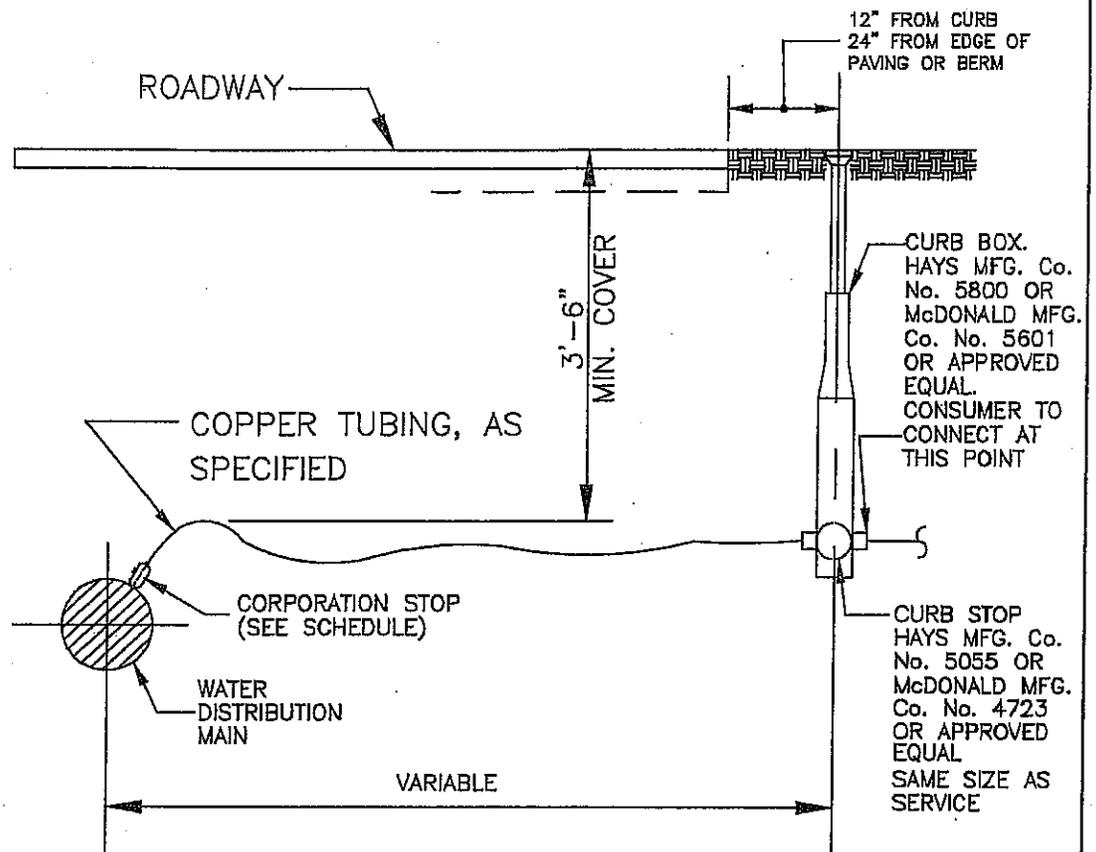
ALL CONCRETE TO BE 3,000 P.S.I. MIN.

VENT AND VACUUM VALVE

DATE  
7/28/06

AVONDALE BOROUGH

DRAWING #  
AB-W-02



## ELEVATION

### CORPORATION STOP SCHEDULE

#### DISTRIBUTION MAIN

D.I.P.

P.V.C.

#### CONNECTION

HAYS MFG. Co., No. 5200, McDONALD MFG. Co. 4701

HAYS MFG. Co., No. 4201, WITH APPROVED SADDLE.

#### NOTES:

- 1.) SERVICE CONNECTION ITEMS AS MANUFACTURED BY MUELLER Co. ARE CONSIDERED AN APPROVED EQUAL.

SERVICE CONNECTIONS

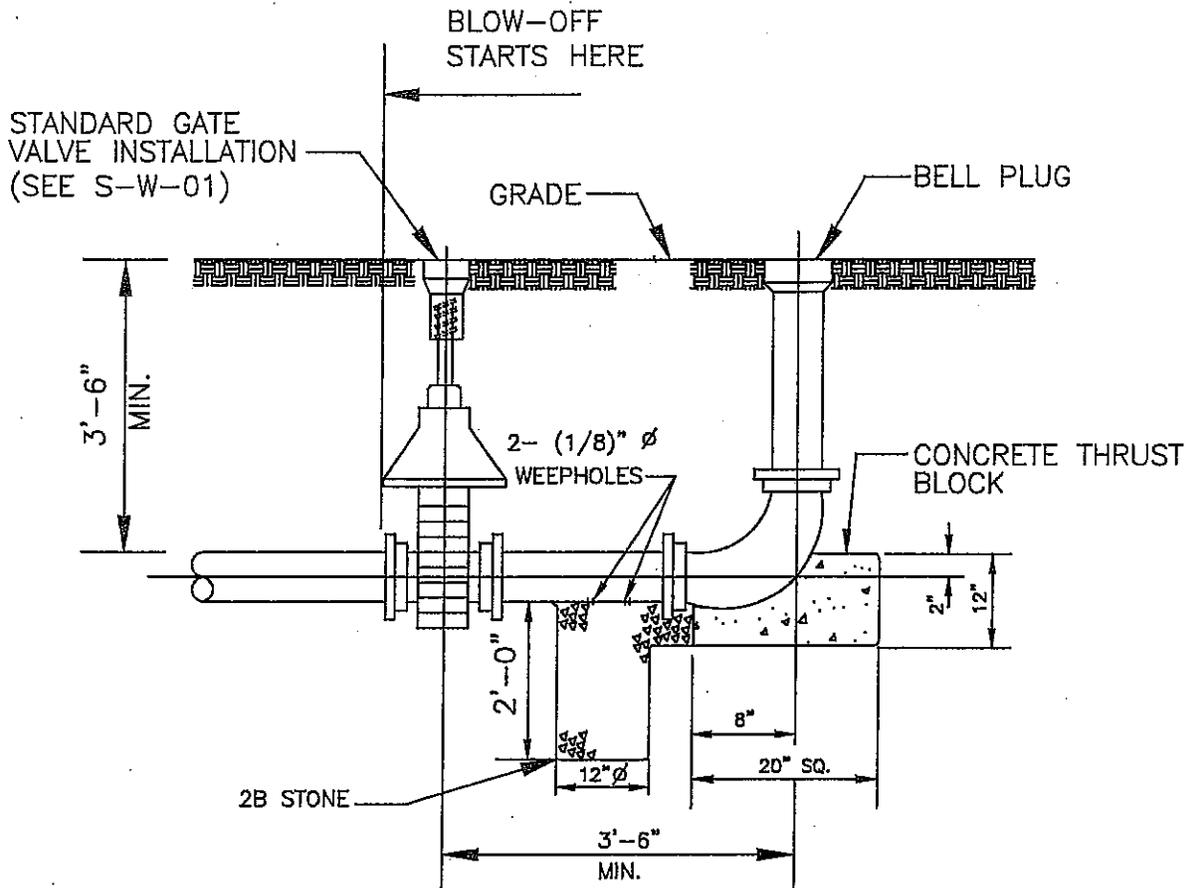
DATE

7/28/06

AVONDALE BOROUGH

DRAWING #

AB-W-03



**ELEVATION**  
ALL CONCRETE TO BE 3,000 P.S.I. MIN.

**NOTES:**

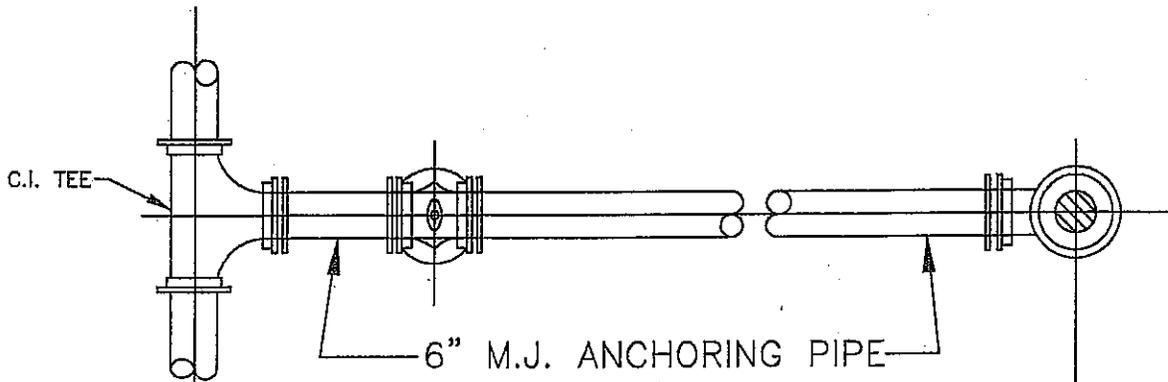
- (1) PIPE AND VALVE SIZE INDICATED ON DRAWINGS.
- (2) WHERE POSSIBLE BLOW-OFFS SHALL BE LOCATED SO THAT DISCHARGE WILL BE TO EXISTING DRAINAGE DITCHES OR STRUCTURES AS DIRECTED BY THE ENGINEER

BLOW-OFF

DATE  
7/28/06

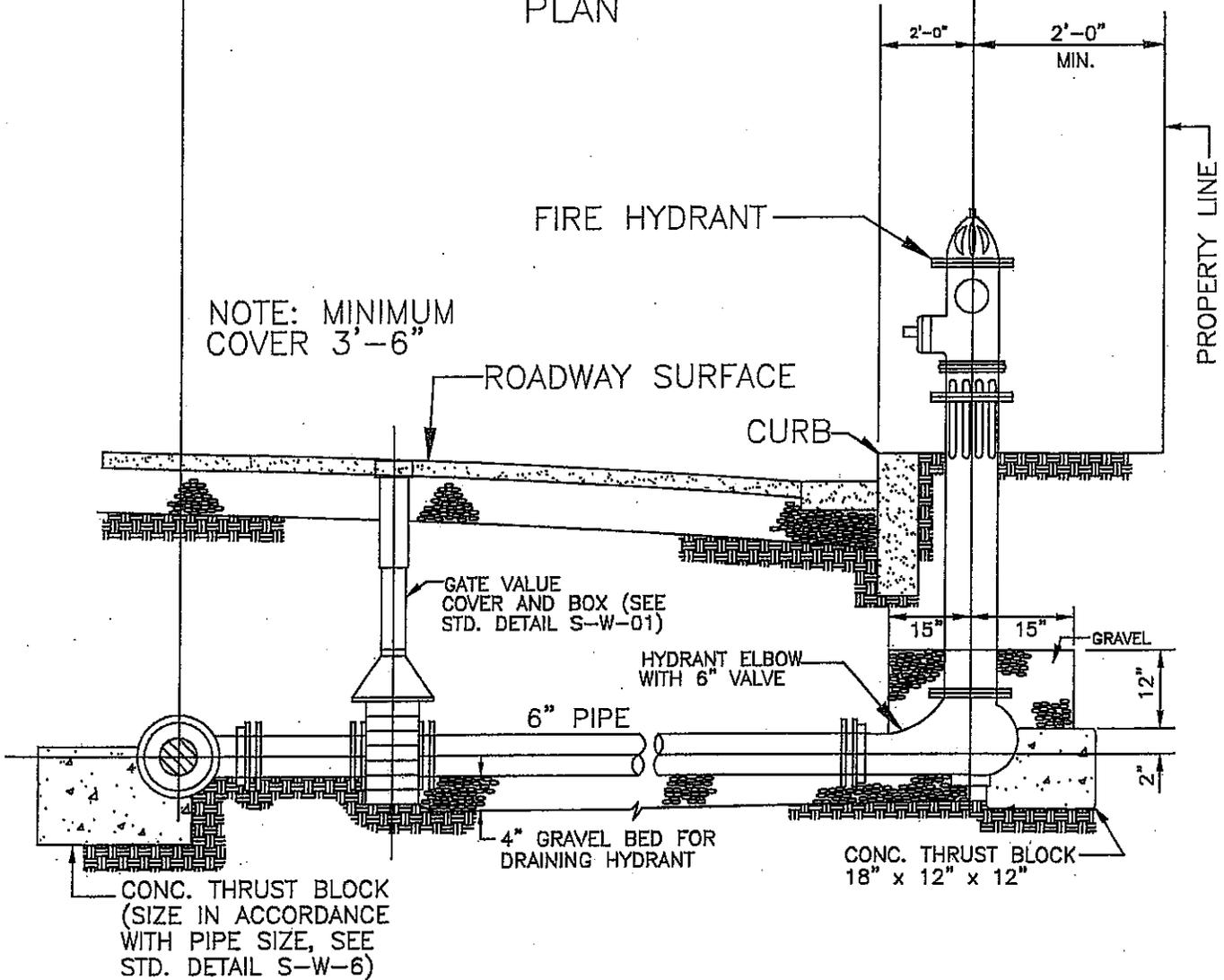
AVONDALE BOROUGH

DRAWING #  
AB-W-04



PLAN

NOTE: MINIMUM COVER 3'-6"



ELEVATION

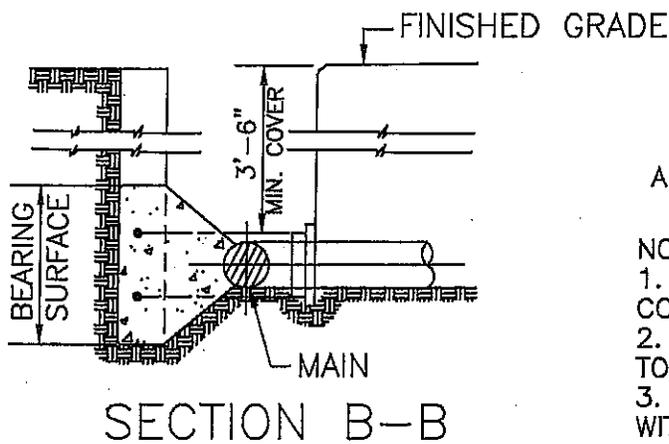
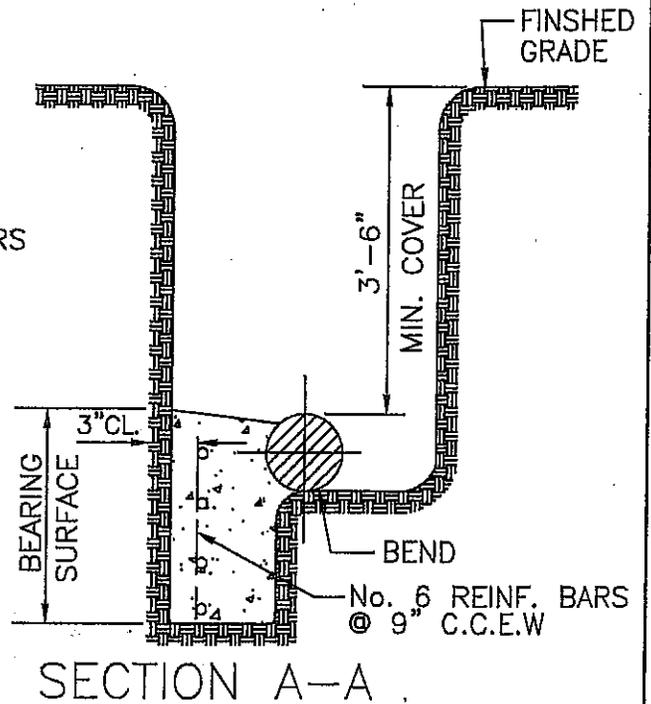
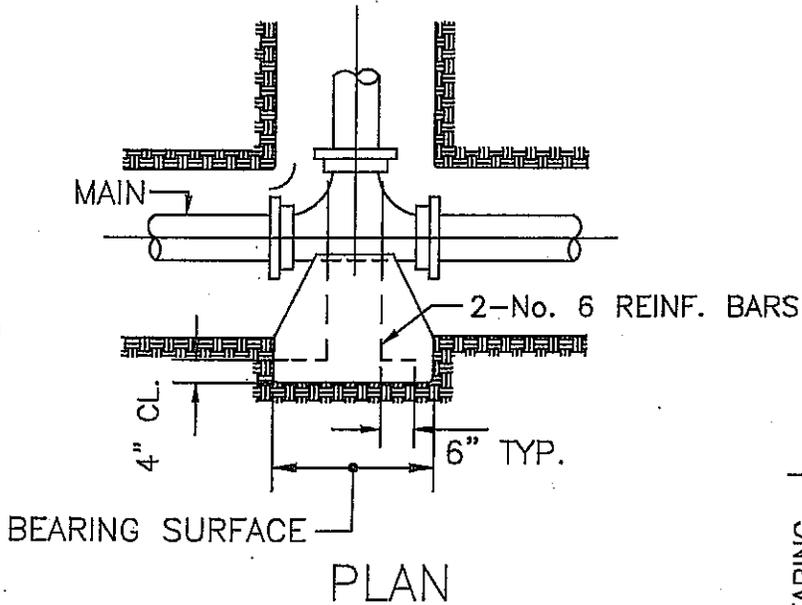
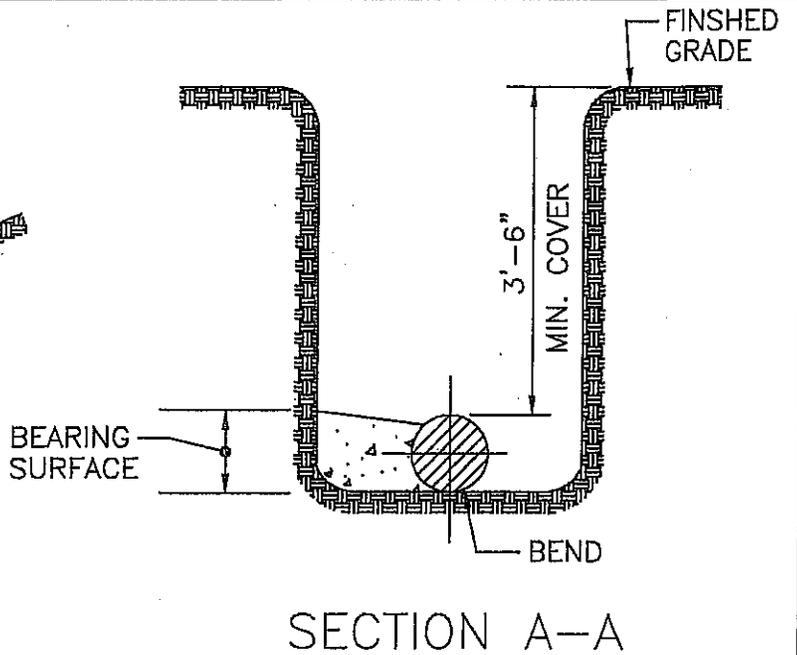
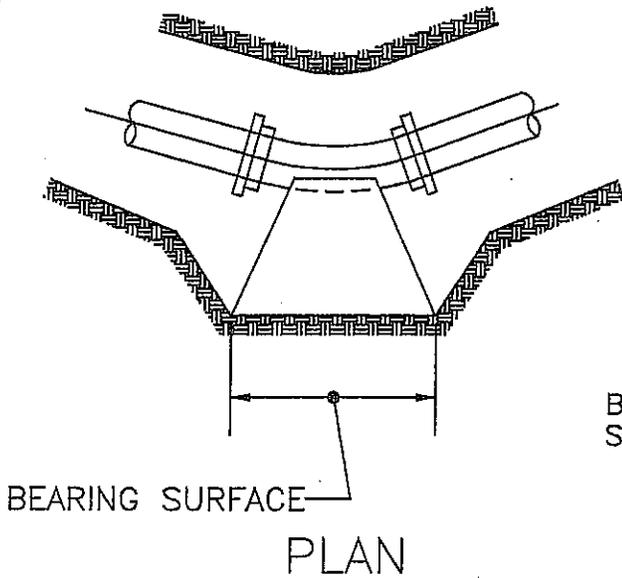
ALL CONCRETE TO BE 3,000 P.S.I. MIN.

FIRE HYDRANT INSTALLATION  
(WITH ANCHORING PIPE)

DATE  
7/28/06

AVONDALE BOROUGH

DRAWING #  
AB-W-05



ADDITIONAL BEARING AS REQUIRED

NOTES:

1. NO COUPLING OR JOINTS SHALL BE COVERED WITH CONCRETE
2. REINFORCED BAR STRAPS TO BE SHAPED TO PIPE CURVATURE
3. ALL EXPOSED STEEL TO BE PAINTED WITH TWO COATS ASPHALTIC PAINT

TYPICAL BLOCKING FOR HORIZONTAL & VERTICAL  
DOWNWARD THRUSTS UP TO 150 PSI WORKING PRESSURE

DATE  
7/28/06

AVONDALE BOROUGH

DRAWING #  
AB-W-06

BEARING AREA REQUIRED, SQUARE FEET

TYPE OF BEARING MATERIAL AND ALLOWABLE LOADS, PSF	4" AND LESS DEGREE BEND				6" AND 8" DEGREE BEND				10" AND 12" DEGREE BEND			
	11¼	22½	45	90	11¼	22½	45	90	11¼	22½	45	90
LOOSE SAND OR MEDIUM CLAY - 2,000	1.0	2.0	2.7	4.0	1.5	3.0	6.0	10.0	3.0	6.2	12.0	22.0
PACKED GRAVEL AND SAND - 4,000	1.0	1.0	1.5	2.0	1.0	1.5	3.0	5.0	1.5	3.1	6.0	11.0
ROCK - 10,000	1.0	1.0	1.0	1.0	1.0	1.0	1.2	2.0	1.0	1.3	2.4	4.4

BEARING AREA REQUIRED, SQUARE FEET

TYPE OF BEARING MATERIAL AND ALLOWABLE LOADS, PSF	14" AND 16" DEGREE BEND OR DEFLECTION				18" AND 20" DEGREE BEND OR DEFLECTION			
	11¼	22½	45	90	11¼	22½	45	90
LOOSE SAND OR MEDIUM CLAY - 2,000	6.0	12.0	22.5	40.0	9.5	19.0	37.0	67.0
PACKED GRAVEL AND SAND - 4,000	3.0	6.0	11.3	20.0	4.8	9.5	18.5	33.5
ROCK - 10,000	1.2	2.4	4.5	8.0	2.0	3.8	7.4	13.5

NOTE: THRUST BLOCKING FOR TEES SHALL HAVE THE SAME BEARING AREA AS 90° BENDS OF THE PIPE SIZE OF THE OUTLET. DEAD ENDS SHALL HAVE THE SAME BEARING AREA AS 90° BENDS.

SCHEDULE OF DIMENSIONS

DATE  
7/28/06

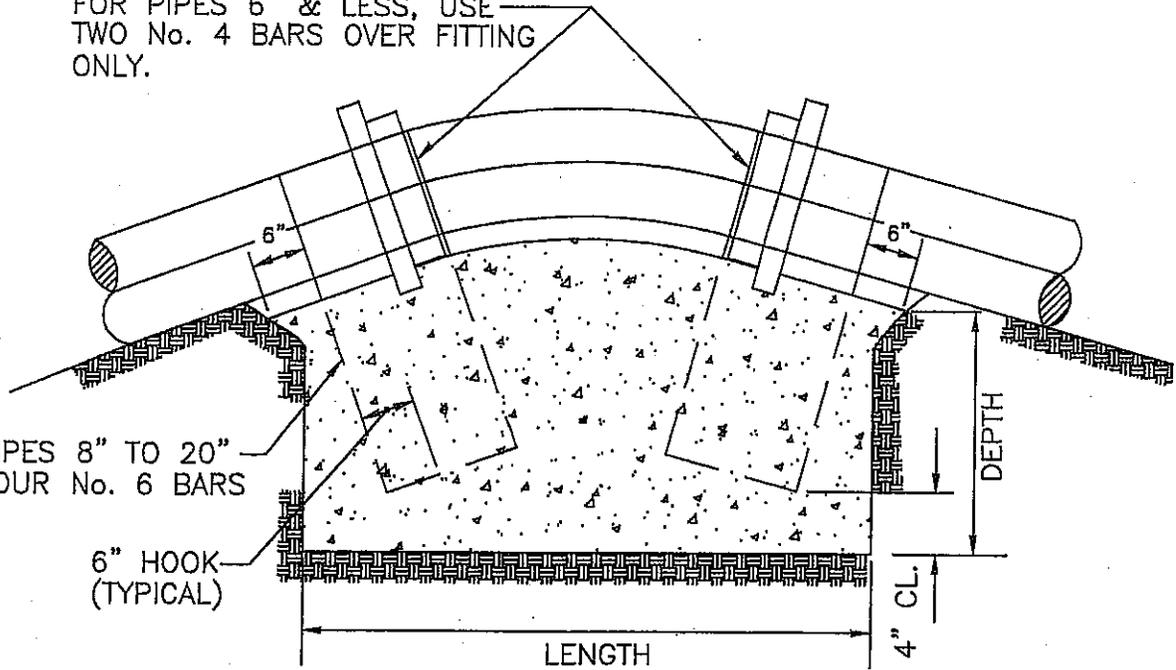
AVONDALE BOROUGH

DRAWING #  
AB-W-07

FOR PIPES 6" & LESS, USE  
TWO No. 4 BARS OVER FITTING  
ONLY.

FOR PIPES 8" TO 20"  
USE FOUR No. 6 BARS

6" HOOK  
(TYPICAL)



### TYPICAL SECTION

ALL CONCRETE TO BE 3,000 P.S.I. MIN.

PIPE SIZES (INCHES)	DIMENSIONS OF CONCRETE BLOCKING								
	LENGTH			WIDTH			DEPTH		
	11 1/4°	22 1/2°	45°	11 1/4°	22 1/2°	45°	11 1/4°	22 1/2°	45°
4 & SMALLER	2'	4'	4'	1.5'	3'	3'	1'	2'	3'
6 & 8	3'	4'	6'	3'	3'	3'	2'	3'	4'
10 & 12	4.5'	6'	8'	3'	3'	4'	3'	4.5'	5'
14 & 16	6'	8'	11'	3.5'	3.5'	5'	3.5'	5'	5'
18 & 20	7'	9'	13'	4'	5'	5.5'	4'	5'	6'

NOTES:

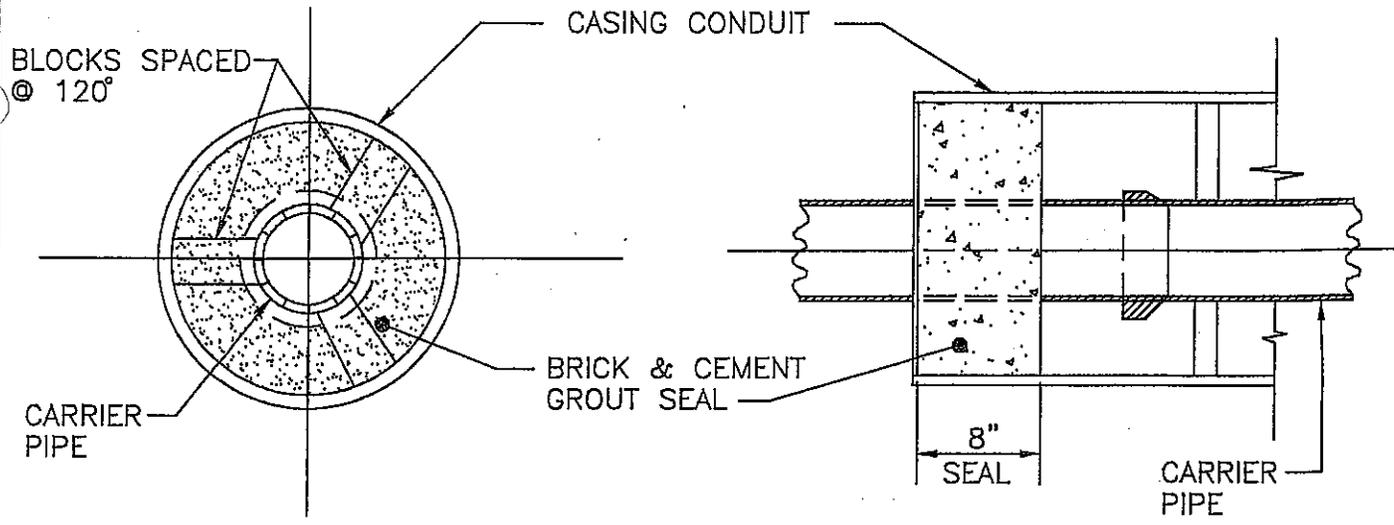
1. NO COUPLING OR JOINTS SHALL BE COVERED WITH CONCRETE.
2. REINFORCED BAR STRAPS TO BE SHAPED TO PIPE CURVATURE.
3. ALL EXPOSED STEEL TO BE PAINTED WITH TWO COATS ASPHALTIC PAINT.

VERTICAL THRUSTS UPWARD  
UP TO 150 PSI WORKING PRESSURE

DATE  
7/28/06

AVONDALE BOROUGH

DRAWING #  
AB-W-08

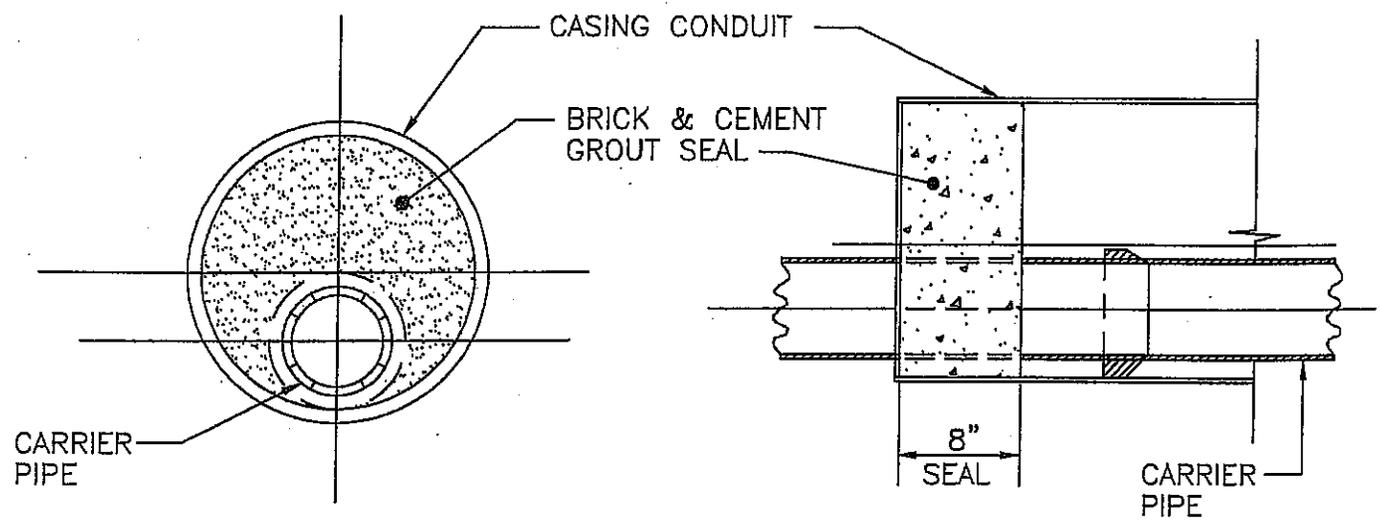


END SECTION

SECTION B-B

WATER OR FORCE MAIN

NOTES:  
 FOR CASTING CONDUIT  
 REQUIREMENTS, SEE  
 SPECIFICATION  
 SECTION IX, ITEM 9:02  
 AND DRAWINGS



END SECTION

SECTION A-A

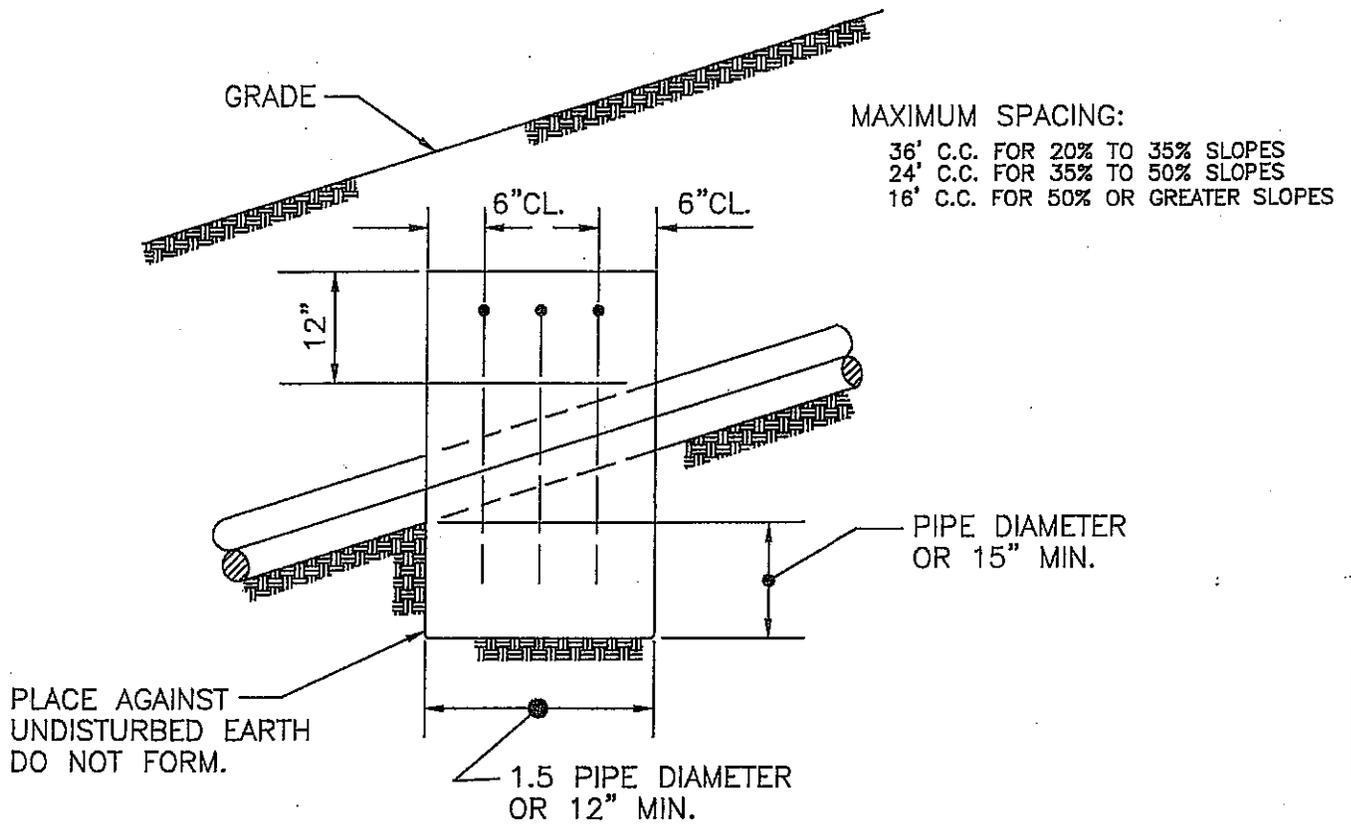
GRAVITY SEWER

CARRIER PIPE AND CASTING CONDUIT

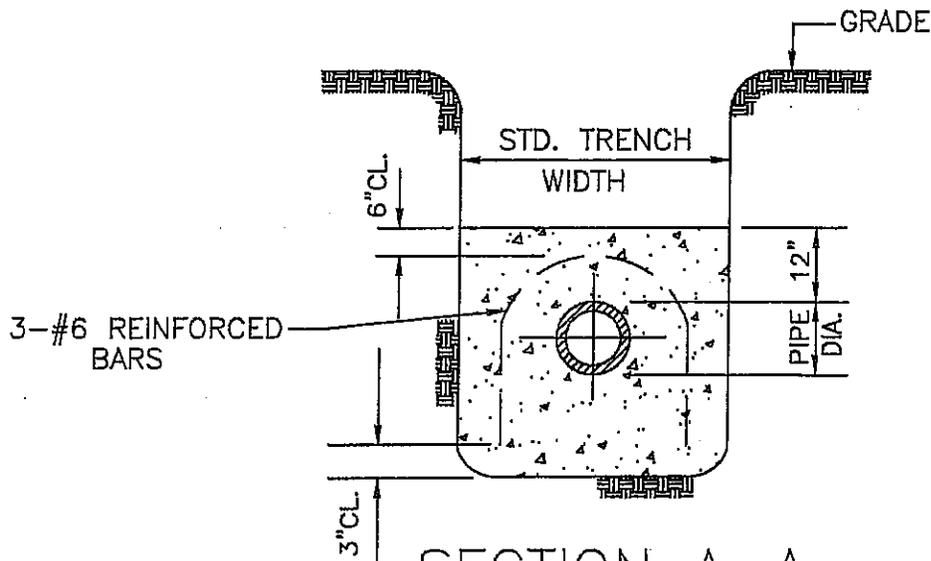
DATE  
 7/28/06

AVONDALE BOROUGH

DRAWING #  
 AB-W-09



ELEVATION



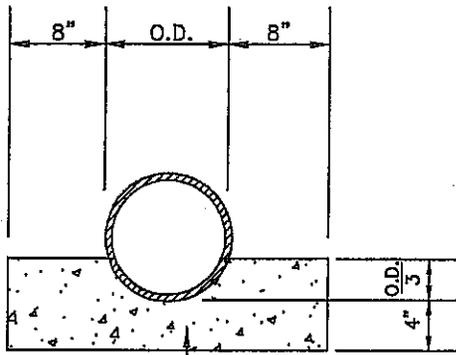
ALL CONCRETE TO BE 3,000 P.S.I. MIN.

REINFORCED CONCRETE SLOPE ANCHORS  
 FOR UTILITY LINES

DATE  
 7/28/06

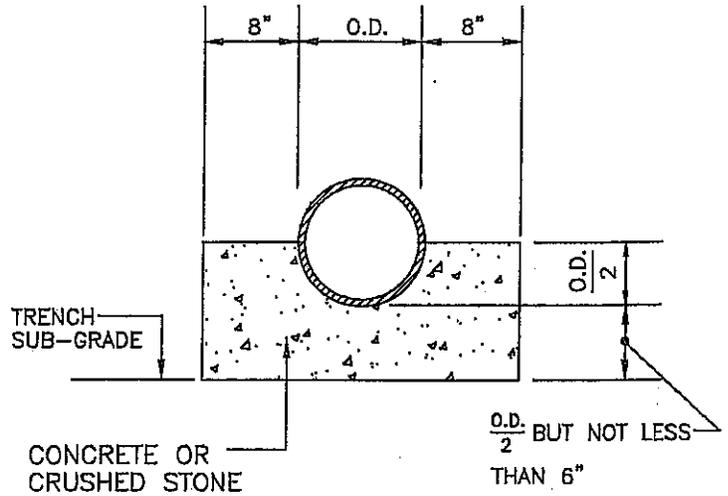
AVONDALE BOROUGH

DRAWING #  
 AB-W-10



CONCRETE OR  
CRUSHED STONE

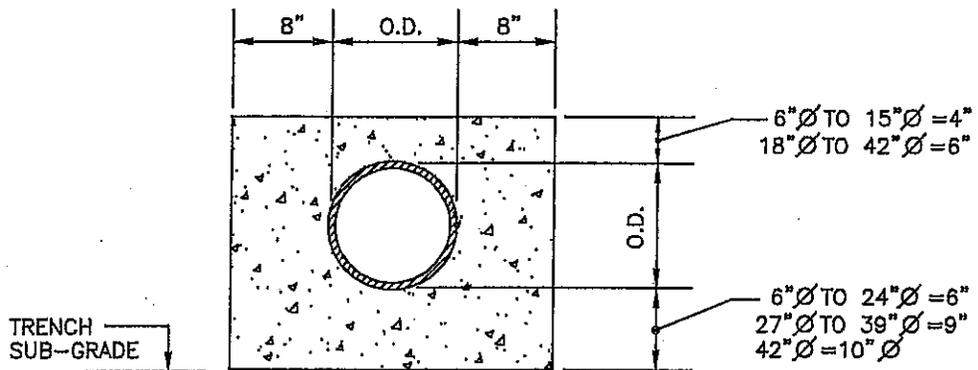
WATER MAINS, STORM SEWERS  
AND FORCE MAINS



CONCRETE OR  
CRUSHED STONE

GRAVITY SANITARY SEWERS

BEDDING DETAILS



CONCRETE ENCASEMENT DETAIL

ALL CONCRETE TO BE 3,000 P.S.I. MIN.

NOTE:

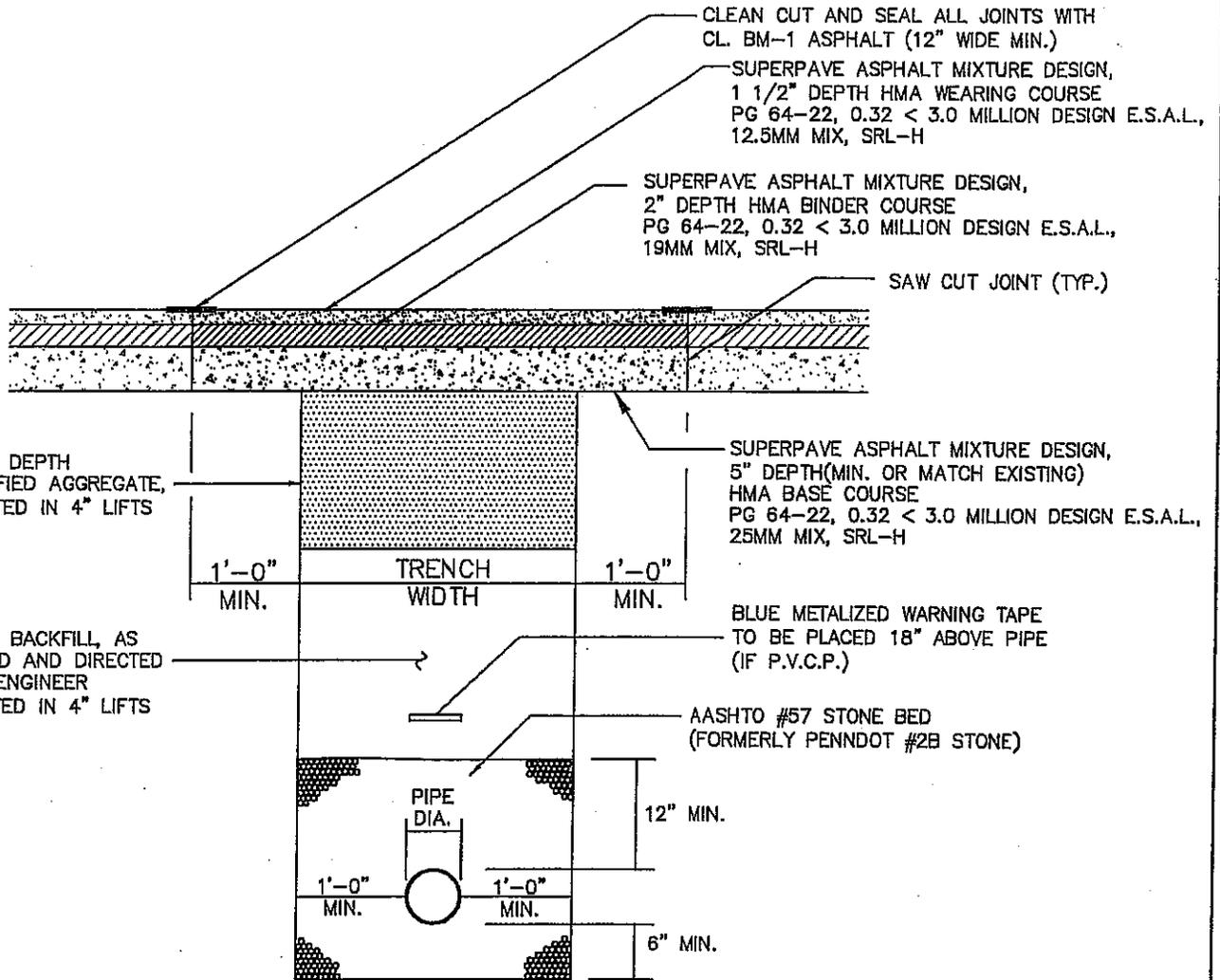
CONCRETE BEDDING OR  
ENCASEMENT SHALL  
NOT BE USED WITH  
TRUSS PIPE

CONCRETE AND CRUSHED STONE  
BEDDING & ENCASEMENT OF PIPE

DATE  
7/28/06

AVONDALE BOROUGH

DRAWING #  
AB-W-11



PAVEMENT RESTORATION DETAIL

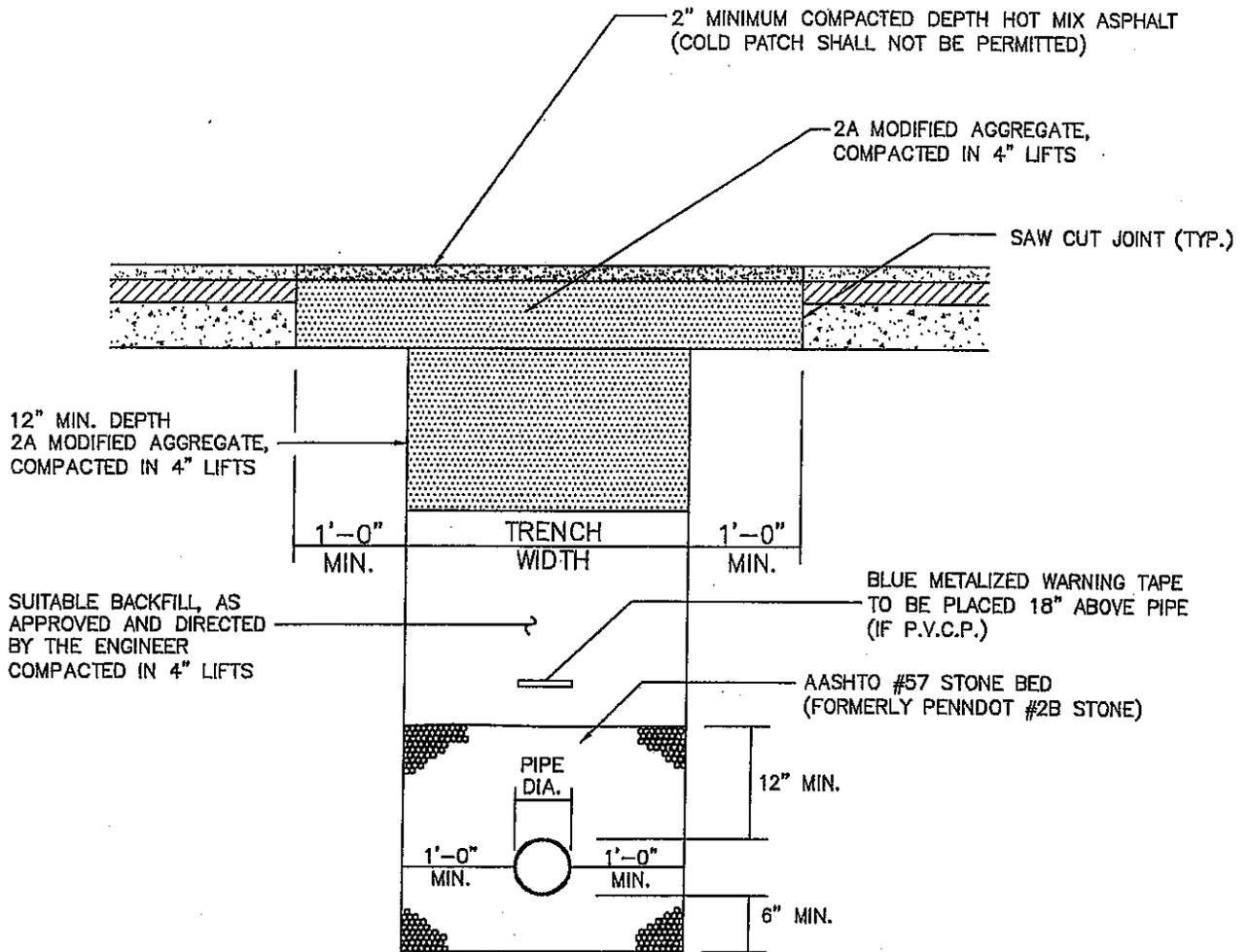
(LOCAL HIGHWAY)  
N.T.S.

PERMANENT PAVEMENT REPLACEMENT — LOCAL ROAD

DATE  
7/28/06

AVONDALE BOROUGH

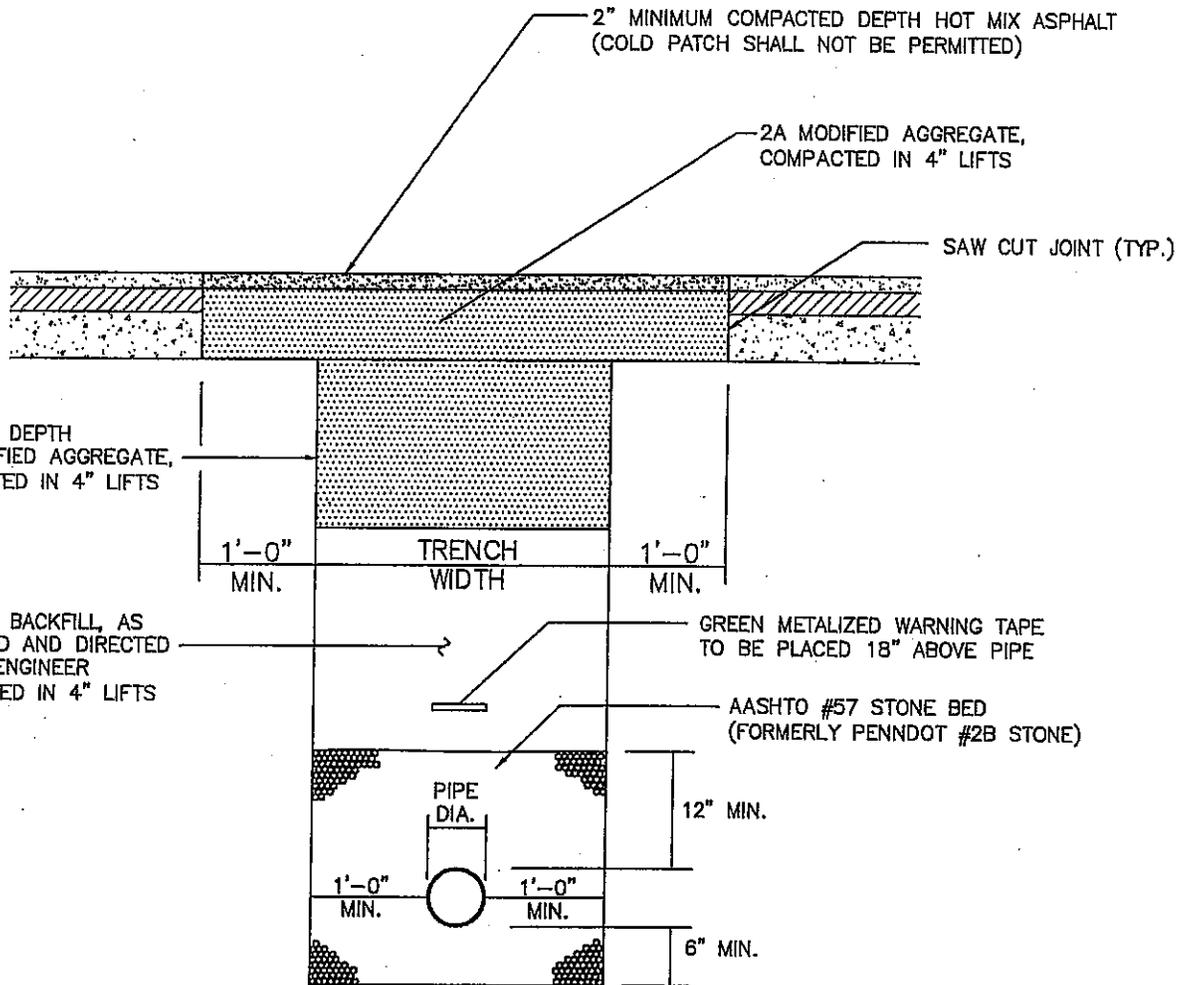
DRAWING #  
AB-W-12



PAVEMENT RESTORATION DETAIL

(LOCAL HIGHWAY)  
N.T.S.

<p>TEMPORARY PAVEMENT RESTORATION - LOCAL ROAD</p>	<p>DATE 7/28/06</p>
<p>AVONDALE BOROUGH</p>	<p>DRAWING # AB-W-13</p>



PAVEMENT RESTORATION DETAIL

(LOCAL HIGHWAY)  
N.T.S.

TEMPORARY PAVEMENT RESTORATION — LOCAL ROAD

DATE  
7/28/06

AVONDALE BOROUGH

DRAWING #  
AB-W-13