

**DECATUR COUNTY
CONSTRUCTION & DEVELOPMENT
STANDARDS MANUAL**

**SECTION 02740
FORCE MAINS**

Table of Contents

<u>Section</u>	<u>Subject</u>	<u>Page</u>
1.00	General	2
1.01	Description	2
1.02	Related Work Described Elsewhere	2
2.00	Material	2
2.01	Pipe	2
2.02	Joints	2
2.03	Certificates	2
2.04	Certificates	2
3.00	Execution	2
3.01	Pipe Installation (Trenchless)	2
3.02	PVC Pipe Installation (Open-Cut)	4
3.03	Excavation Backfill	4
3.04	Tracer Wire	4
3.05	Limit of Open Trenches	4
3.06	Restoration	5
3.07	New and Existing Mains and Other Buried Utilities	5
3.08	Hydrostatic Testing	5

LIST OF DRAWINGS

<u>Title</u>	<u>Drawing No.</u>
Force Main Bedding	FM-1
Force Main Discharge	FM-2

FORCE MAINS SECTION 02740

1.00 General

1.01 Description

A. The work under this section shall consist of the construction of all Force mains, piping and appurtenances in every detail as shown on the plans and approved.

1.02 Related Work Described Elsewhere

A.	Earthwork for Utilities	Section 02220
B.	Sanitary Sewers	Section 02730
C.	Landscaping for Utilities	Section 02902
D.	Cast-In-Place Concrete	Section 03300

2.00 Material

2.01 Pipe

- A. Polyvinyl Chloride (PVC), ASTM 1784, ASTM D 2241-96b (SDR 21).
- B. High Density Polyethylene (HDPE), DR 17, ASTM F714.

2.02 Joints

- A. Joints for PVC pipe shall be in compliance with the requirements for ASTM D-3139.
- B. Joint for HDPE pipe shall be butt-fused in compliance with industry standards by a person who is a manufacturer's certified thermojointer.
- C. Joints between HDPE and PVC pipe shall be made using restrained mechanical joints, HDPE water stop anchors with concrete blocking and restraining clamps as recommended by the pipe manufacturer.

2.03 Certificates

A. Manufacturer's certification, certifying that the material was manufactured and tested in accordance with this specification shall be provided.

3.00 Execution

3.01 Pipe Installation (Trenchless)

- A. HDPE pipe shall be installed in accordance with standard practice for directional boring and as recommended by the pipe manufacturer and in accordance with this section.
- B. The directional drilling system to be used shall have the following features:

1. The system shall be remotely controlled and permit electronic monitoring of tunnel depth and location. This system shall be able to control the depth and direction of the pipe and must be accurate to within 6 inches.
2. The system shall be capable of turning 90 degrees in a 40-foot radius.
3. The system will utilize a fluid-cutting process, using a liquid clay such as bentonite. This clay shall be totally inert and contain no risk to the environment.
4. The liquid clay shall remain in the tunnel to increase the stability of the tunnel and to provide a lubricant to reduce directional drag when the pipe is installed.
5. The spoils shall be recovered by use of a vacuum system mounted on a vehicle for removal of the spoils. Spoils are not to be discharged into sewer or storm drains. The Contractor is responsible for disposal of all spoil and excess excavated material.
6. Equipment shall be fitted with a permanent alarm system capable of detecting an electrical current. This system will have an audible alarm to warn the operator when the drill head nears electrified cables within a safe operating distance.
7. At the completion of the pilot hole drilling, the Contractor shall provide a tabulation of coordinates referenced to the drilled entry point, which accurately describes the location of the pilot hole.

C. The Contractor shall demonstrate experience and expertise in trenchless excavation methods by providing a list of at least five (5) utility references for which similar work has been performed prior to commencing any work. These references shall include a name and telephone number to contact and verify references.

D. Mechanical, pneumatic or water-jetting methods shall not be acceptable due to the risk of surface settlement and possible damage.

E. Upon Completion of boring and pipe installation, the Contractor shall remove all spoils from all boring and receiving (termination) pits. The pits shall be restored to their original condition.

F. The quality of all materials, the process of manufacture and the finished products shall be subject to inspection and approval by the receiving wastewater utility. Such inspection may be made at the place of manufacture or on the work site after delivery or at both places. Products shall be subject to rejection at any time on account of failure to meet any of the specification requirements even though sample products may have been accepted as satisfactory at the place of manufacture.

G. In all cases minimum bury shall be 48 inches. Extreme drilling depths shall not be allowed without permission from the receiving wastewater utility.

H. The interior of every pipe, fitting and valve shall be cleaned of all debris, dirt and other foreign material before being laid and shall be kept clean until accepted in the completed work.

I. Lay and maintain pipe to the lines shown on the plans, except as specified herein. Lay and maintain pipe to the grade shown or to the minimum depth specified in this specification. Install fitting and valves in the locations shown on the plans.

J. Where the piping shall be constructed parallel to and close to existing buried utility, the exact location of which is unknown, adjust the alignment of the piping to least interfere with the utilities, unless otherwise shown or specified.

- K. The Contractor is responsible for transporting and storing any water required for drilling and hydrostatic testing at no additional cost.

3.02 PVC Pipe Installation (Open Cut)

- A. Clean and remove all foreign material from the inside of the bell, and from the spigot end of the pipe.
- B. Force mains shall be laid and maintained to an invert grade 48 inches plus diameter of pipe (48" + Diameter) below finished ground line. Alignment shall follow location shown on plans. Whenever obstructions not shown on plans are encountered during progress of work and interfere to such extent that alteration in plan is required, adjust the alignment of the piping to least interfere with the utility, unless otherwise shown or directed.
- C. Trench bottom shall be smooth and free from rocks or any other hard objects. Trench shall be excavated to depth 6" below invert grade and backfilled to invert grade with compacted "B" Borrow bedding material.
- D. Cutting of pipe for inserting valves, fittings or closure pieces shall be done in a neat and workmanlike manner without damage to the pipe or lining. Wherever necessary to deflect pipe from straight line, either in vertical or horizontal plane to avoid obstructions, to plumb stems, or for other reasons, degree of deflection shall be within permissible limitations as defined by pipe manufacturer.
- E. Plugs, caps, tees and bends shall be provided with a concrete thrust block. Concrete shall be filled between pipe and solid undisturbed ground. Blocking shall be in places that pipe and fitting joints will be accessible for repair.

3.03 Excavation and Backfill

- A. Except as otherwise specified, all excavation shall be as specified in Section 02222.
- B. Included in this work shall be, removal of existing pavement, sidewalks, curbs, fences and miscellaneous items as is necessary to construct the line. All pavements, sidewalks and curbs shall be saw cut and removed to straight neat lines.
- C. Trenches cut in paved roads, streets and drives shall be backfilled with compacted "B" Borrow Special backfill and restored as specified in Section 02502.

3.04 Tracer Wire

- A. All non-metallic pipe shall have a 10 gauge copper tracer wire placed on top of pipe before backfilling. Green plastic warning tape shall be placed in trench 18" above pipe.
- B. The wire shall be installed along the pipe, fastened to the pipe at 20 ft. intervals and terminating above ground with the lead taped around each structure.

3.05 Limits on Open Trenches

- A. The contractor shall not open or leave open any trench that cannot be backfilled before the end of that working day.

B. All trenches shall be completely barricaded with the use of sufficient lights, barricades, danger signals, signs and other control to protect both the work and the public.

3.06 Restoration

A. Included as part of the work under this section the CONTRACTOR shall fully replace and/or restore all streets, yards, parking lots, sidewalks, curbs, driveways, fences and miscellaneous items to a condition equal to or exceeding that which was disturbed.

3.07 New and Existing Mains and Other Buried Utilities

A. Location of existing mains and pipelines as shown on plans are only approximate. In order to determine details of connections between existing and new lines, it will be necessary to locate existing pipes both vertically and horizontally. Contractor shall make necessary investigations promptly to allow ample time for details to be worked out and obtain necessary fittings for making the connections.

B. Where pressure mains are to be constructed parallel to and close to existing water lines, sewers, drains, gas lines, petroleum lines, electric, telephone and signal cables, and other underground structures, the exact location of which is unknown or not shown on plans, then a field adjustment of alignment or change in location of new main will be made so as to least interfere with existing utilities or structures. Contractor shall locate buried utilities and structures prior to start of construction of new mains.

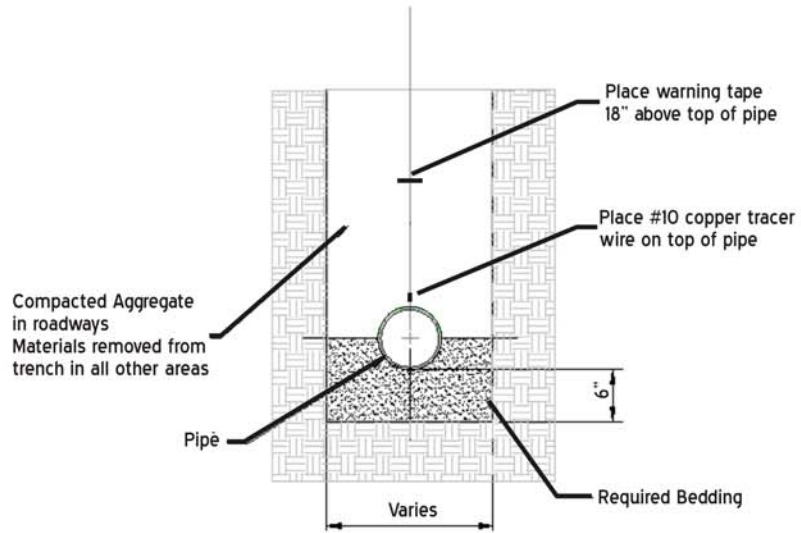
3.08 Hydrostatic Testing

A. After pipelines have been laid and backfilled, all newly laid pipe or any valved section of it shall be subjected to hydrostatic pressure at least 50% above normal operating pressure, unless otherwise specified. Duration of each pressure test shall be at least two hours. Results of test shall be certified by design Engineer to the receiving wastewater utility.

B. Each valved section of pipe shall be slowly filled with water and specified test pressure shall be applied by means of a pump connected to pipe in satisfactory manner. Contractor shall furnish pump, pipe, connection and all necessary apparatus including gages and meter for test, and shall make all taps into pipe. Before applying specified test pressure, all air shall be expelled from pipe. To accomplish this, taps shall be made, if necessary, at points of highest elevation and afterwards tightly plugged.

C. Allowable leakage shall be based on AWWA Standard C605-94. Suitable means shall be provided by Contractor for determining quantity of water lost by leakage under normal operating pressure. No pipe installation will be accepted until or unless this leakage, evaluated on a pressure basis of 150 % of working pressure, is within a tolerance of 25 gallons per 24 hours per mile of pipe per inch nominal diameter of pipe.

END OF SECTION 15220



EXCAVATED TRENCH

Decatur County

DWG #FF-1



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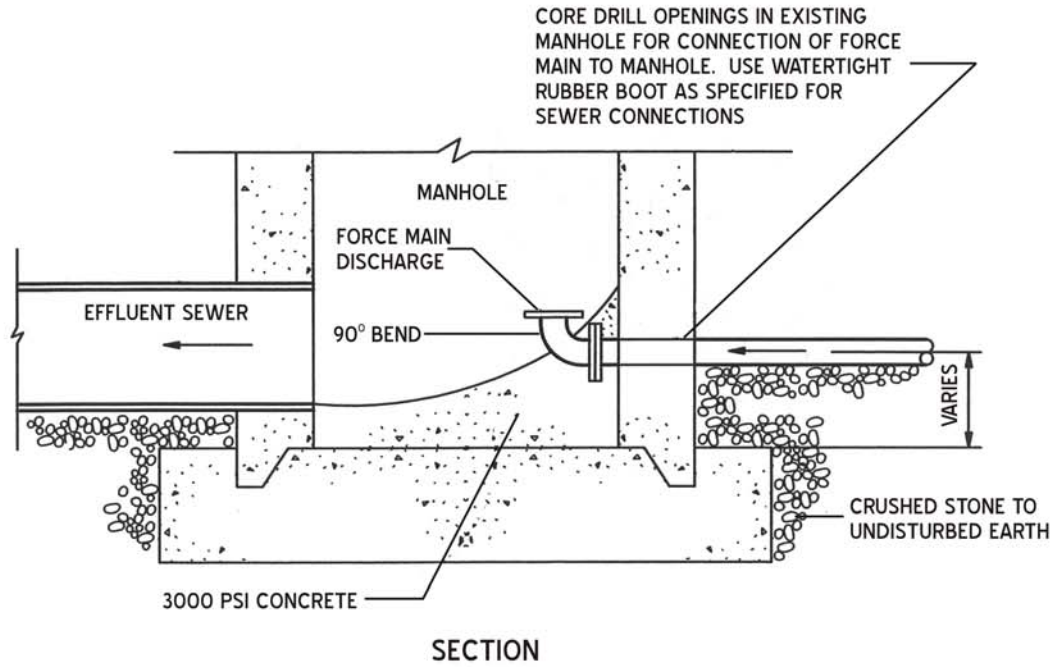
**FORCE MAIN
BEDDING DETAIL**



Decatur County, Indiana

Construction Standards

DCAP Adopted - 01/07



Decatur County

DWG #FM-2



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**FORCE MAIN
FORCE MAIN
DISCHARGE DETAIL**



Decatur County, Indiana

Construction Standards

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