



WATER AND SEWER NOTES

The Contractor is responsible for reimbursing the City of Shelbyville Power, Water and Sewerage Systems the cost of inspections.

After completion of the sanitary sewer(s), The Shelbyville Power, Water and Sewerage Systems will direct the televising of the lines prior to final acceptance.

All connections to existing manhole(s) shall be coring and resilient connector methods.

All streets shall be constructed to sub-grade, and all proposed fills shall be made and compacted prior to construction of sanitary sewer.

All pipes under existing paved areas shall be backfilled to the top of sub-grade with crushed stone (#67).

Where sewer lines pass over or within eighteen (18) inches of water mains, the sewer shall be encased in concrete.

All sanitary sewer services lines shall be tee connection and maintain a minimum 1% slope.

Sewer service line cleanout assembly shall be installed according to the specifications of the City of Shelbyville Department of Codes.

All public and private water mains shall comply with NFPA13 and 24.

Reduced pressure backflow preventor (R.P.B.D) or dual check will be required on all tests and fill lines needed for water main construction and must be approved by the Shelbyville Power, Water, and Sewerage System.

Water meters shall be no deeper that twenty-four inches (24") from top of the meter to proposed finished grade.

All water lines shall be ductile iron (See Specifications).

Upon completion of construction of water and/or sewer, the developer shall provide the Shelbyville Power, Water, and Sewer System with a complete set of AS Built Plans, sealed by a licensed professional engineer or a registered land surveyor (RLS) and shall include actual field angles between lines, all actual service lines and tee locations, the distance of the end of the service line to property corners and lines and/or station and offset from the sewer centerline to end of service line. The depth to top of the end of the service line and shall reflect all alignment and grade changes. Water plans shall be scaled the same as the sewer as the sewer and will include offset distance from the roadway centerline of property line right of way (ROW). Line depth, locations of hydrants, valves, reducers, and tees. All drawings must be completed and submitted prior to acceptance of the sewers or water mains into the public system and any connections being made thereto.

Prior backfilling water or sewer mains must first be inspected by the manager or designated inspector by the Shelbyville Power, Water and Sewerage System.

All water and sewer details shall be per Shelbyville Power, Water, and Sewer Specifications.



WATER LINE CONSTRUCTION

- Water line shall be 6" minimum AWWA A21.50-91. Ductile iron grade 60-42-10 pressure class 350
- 9" Topsoil shall be removed prior to drilling outside of roadway for reuse
- No defective pipe exterior or interior will be laid
- All pipe bends shall be properly anchored or braced against movement
- The maximum vertical or horizontal deflection for laying pipe is 3° per pipe section (18" per 18' of pipe)
- There shall be a minimum of 6" of bedding (#67 stone) below the pipe
- 1' of #67 stone shall cover the water line
- In roadway backfill of services and lines shall be full depth #67's
- The minimum depth of water lines shall be 36" outside of the roadway, 42" inside the roadway, roads to be widened by major thoroughfare plan shall be 42", and waterlines in the state right of way is 48" from existing grade
- Trench width shall no be less than 1' - 6" plus the minimal pipe diameter

TESTING

6"	@	200 PSI	for	8 Hours
8"	@	200 PSI	for	8 Hours

_____ Call Dennis Rankin for bacteriological sample

_____ Cost to be borne at the contractor for filling line and all testing



WATER CHLORINATION PROCEDURES

Note contractor shall indicate the type of chlorination method prior to any water line construction

TABLET METHOD: This method is not allowed if the pipes have been wet or dirty. The average chlorine dose is approximately 25 mg/l. There are two applications for this method (granules, tablets)

The placement of the calcium hypochlorite granules shall be placed at the upstream end of the first pipe section and at 500' intervals. The quantity is shown below:

Table 1

Pipe dia.(inches)	Calcium Hypochlorite Granules (oz)
4	0.5
6	1.0
8	2.0
12	4.0
16 and larger	8.0

The placement of tablets shall be 5-g calcium hypochlorite tablets in each section of pipe and also, one such tablet in each hydrant, hydrant branch and appurtenances. The number of 5-g tablets required for each pipe section is $0.00121dA^2$ rounded to the next higher integer, where d is the pipe dia in inches and I is the length of the pipe section, in feet. The table below shows the number of tablets required for commonly used sizes of pipe.

Table 2 Length of pipe section

Pipe Dia	13 or less	18	20	30	40
4	1	1	1	1	1
6	1	1	1	2	2
8	1	2	2	3	4
10	2	3	3	4	5
12	3	4	4	6	7
16	4	6	7	10	13

The tablets are to be attached with food grade adhesive to the inside top of the pipe with a minimum 24 hr. contact time. The main shall be filled slowly not to exceed a flow velocity of



1 ft/sec. Water from the distribution system shall be made to flow at a constant rate into the newly laid water main protecting the existing main with a backflow preventor.

CONTINUOUS-FEED METHOD

This option places granules in the main in the same manner as above in table 1 granules method. The second step is preliminary flushing with a minimum of 2.5 ft/sec and also to remove all air pockets. The following chart shows rates of flow required to produce a velocity of 2.5 ft/sec in various size pipes.

Pipe dia.(in)	Flow req. to produce vel.(gpm)	Number of 2-1/2 hydrant outlets
4	100	1
6	200	1
8	400	1
10	600	1
12	900	2
16	1600	2

Step three is chlorinating the main

Water from the distribution system shall be made to flow at a constant rate into the newly laid water main protecting the existing main with a backflow preventor. At a point 10 feet down stream from the beginning of the new main, water entering the new main shall receive a dose of chlorine fed at a constant rate such that the water will have not less than 25mg/l free chlorine. The following table gives chlorine required for each 100 feet of pipe of various diameters.

Pipe Dia(inches)	100-Percent chlorine (lbs)	1-Percent chlorine solution (gal)
4	0.013	0.16
6	0.030	0.36
8	0.054	0.65
10	0.085	1.02
12	0.120	1.44
16	0.217	2.60

The latter solution requires 1 lb of calcium hypochlorite in 8 gal of water.

The chlorinated water shall have a minimum of 24 hr. contact time in the main. The residual shall not be less than 1.0 mg/l free chlorine. The equipment required for liquid chlorine is a solution feed, vacuum-operated chlorinator and booster pump. Hypochlorite solutions may be applied to the main with a gasoline or electrically powered chemical feed pump designed for feeding chlorine solutions.



SLUG METHOD

Place granules in the main per table one. Second the main shall be flushed with a minimum velocity of 2.5ft/sec. The third step shall not be at a point not more than 10 feet downstream from the beginning of the new main, water entering the new main shall receive a dose of chlorine fed at a rate such that the water will have not less than 1 00mg/l free chlorine for at least three hours. The slug shall be measured as it moves through the main if it drops below 50mg/l the flow shall be stopped. The chlorine feeder shall be moved at the head of the slug and continue feeding water.

CONTRACTOR OBLIGATION FOR BACTERIOLOGICAL TEST

- The contractor shall provide two lot corners staked out in the field on the lowest lying lot adjacent to the water main. This location shall be where the pressure test and the disinfection procedures will begin. The contractor must provide a means of supplying water through a backflow preventor to this location. The contractor must purchase from Shelbyville Power Water and Sewerage company (SPWS) a 1" corporation cock for water supply on an existing water main. The contractor shall supply all copper needed to reach the testing point.
- SPWS shall open all valves on the existing main not the contractor \$ Flushing shall be done by SPWS at the contractor's expense
- All costs shall be borne by the contractor



SEWER CONSTRUCTION

- _____ Building connections may use a WYE or TEE
- _____ All sewer shall be SDR 26 with push-on CIA stromegric gasket
- _____ Pipe length segments 12.5' and/or 20'
- _____ Sewer trench shall be minimum 4' in rock and 28" in dirt for an 8" line
- _____ Fitting and accessories shall have bell and spigot configurations identical to that of SDR 26 pipe
- _____ Pipe bedding depth of 1/8 pipe diameter or six inches whichever is greater
- _____ Bedding 12" above the top of the pipe in rock and 6" in dirt
- _____ Watertight manhole lids 1266D JB&S are required only in the flood plain or flood prone areas All others shall be 1110 JB&S
- _____ At the high-point end of a line on the manhole lids shall have JB&S NO. 1110 with holes
- _____ At the end of a line on the manhole lids shall have JB&S No. 1110 with holes
- _____ All sewer will be inspected prior to backfill
- _____ Vacuum test all manholes to at least 10 inches of mercury for 1 minute
- _____ Line must be pressurized to 4 PSI after 2 minutes the pressure brought to 3.5 PSI and timing will begin with a stopwatch. The time required for a drop on pressure of 1 PSI will be recorded. The minimum allowable time in seconds for this pressure drop to occur shall not exceed the times listed in the table below.
- _____ Sewer lines must be capable of passing a rigid ball or an engineer approved nine-arm mandrel having a diameter equal to ninety five percent of the inside pipe diameter.
- All service lines and lines in the R.O.W must be backfilled with 67 stone to subgrade.

Less Than 500 L.F. of Gravity Sewer Line	Minimum Time Required for 1.0 PSI Pressure Drop (Sec.)
8 – inch	340 (5 min. 40 sec.)
10 – inch	425
12 – inch	510
15 – inch	638
18 – inch	1020
20 – inch	1100
21 – inch	1090
24 – inch	1360

If the time for the 1 PSI pressure drop is less than the calculated value, the line shall be repaired and retested until it passes the test.



Gravity Sewer Pipe Laying, Jointing, and Miscellaneous Construction Details

41.1 SURVEY LINE AND GRADE

The CONTRACTOR shall set Temporary Bench Marks (TBM'S) at a maximum five hundred (500) foot interval. The Contractor shall constantly check line and grade of the pipe by laser beam method. In the event line and grade do not meet specified limits described hereinafter, the WORK shall be immediately stopped, the CITY notified, and the cause remedied before proceeding with the WORK.

41.2 PIPE PREPARATION AND HANDLING

All Pipe and fittings shall be inspected prior to lowering into trench to ensure no cracked, broken, or otherwise defective materials are being used. The CONTRACTOR shall clean ends of pipe thoroughly and remove foreign matter and dirt from inside of pipe and keep clean during and after laying.

Proper implements, tools, and facilities shall be used for the safe and proper protection of the WORK. Pipe shall be lowered into the trench in such a manner as to avoid any physical damage to the pipe. Pipe shall not be dropped or dumped into trenches under any circumstances.

41.3 SEWER PIPE LAYING

Laying of sewer pipe shall be accomplished to line and grade in the trench only after it has been dewatered and the trench has been prepared in accordance with specifications outlined in Division III. Refer to Section 41.4 for additional bedding requirements. Mud, silt, gravel and other foreign materials shall be kept out of the pipe and off the jointing surface. All pipe laid shall be retained in position so as to maintain alignment and joint closure until sufficient backfill has been completed to adequately hold the pipe in place. All pipe shall be laid to conform to the line and grade shown on the PLANS. Variance from established line and grade, at any point along the length of the pipe, shall not be greater than one-thirty second of an inch per inch of pipe diameter and not to exceed one-half (1/2) inch, provided that any such variation does not result in a level or reverse sloping invert.

The sewer pipe, unless otherwise approved by the City, shall be laid up grade from point of connection on the existing sewer or from a designated starting point. **The sewer pipe shall be installed with the bell end forward or upgrade.** When pipe laying is not in progress the open end of the pipe shall be kept tightly closed with an approved temporary plug.

All PVC pipes shall be installed` in accordance with the pipe manufacturer's written instructions.