Chapter 4

SANITARY SEWER COLLECTION SYSTEM

4.0 GENERAL

4.0.1 All work performed and materials supplied shall conform to the latest edition of Standard Specification unless otherwise called for in these specifications. Any additional requirements of the Milwaukee Metropolitan Sewerage District (MMSD) shall also apply.

4.0.2 The City requires a full-time inspector on the job site during pipe unloading and on the job site during construction of the sanitary sewer and laterals. The contractor responsible for the construction of the sanitary sewers and laterals is also responsible for notifying the City per the notification policy of the City of Franklin. Contractor shall supply material manufactures and certification sheets prior to construction.

4.0.3 Detectable diggers caution tape shall be placed directly over and along the entire length of all sewer line. This tape shall be placed 24" below finished ground grade and shall be green in color and marked "Caution: Buried Sewer Below" (i.e. Terra Tape "D" Line guard, or equivalent). Tracer wire, coated 10 gauge, shall be placed along the top of main lines and laid along the entire length of all sewer line. Wire shall be taped to the sewer line every 50 feet (approximately three (3) pipe lengths). Wire shall extend to the inside of the manhole for accessibility. The contractor is required to do a conductivity test in the presence of the City of Franklin Water & Sewer Department or the City of Franklin Representative.

4.1 MANHOLES

4.1.1 All manholes shall be built and completed as soon as possible after the sewer main is laid. The chimney shall be a maximum of (one) 1 foot as measured from the base of the casting to the top of the corbel precast section. A minimum of 4 inches of chimney section shall be allowed on manholes.

4.1.2 All manhole steps shall conform to the requirements of Section **8**.40.1 A or B of the Standard Specifications. First step to be set 8 inches below top of corbel (cone) section.

4.1.3 All precast manhole barrel sections shall be rotated to align all manhole steps vertically in the manhole.

4.1.4 All manhole frames and covers supplied by the contractor shall be Neenah R-166**1** or R1661-2001 or equal with machined horizontal bearing surfaces. Manhole frames and covers installed outside of the street right of way or within 100 year flood plain shall be Neenah R 1916-C2 or equal. Stainless steel bolts shall be furnished with this cover. No vent holes will be allowed in the cover, and a rubber tee gasket seal under the cover is required.

4.1.5. All manhole rim elevations shall be finally set after curb and gutter installation to 1/4" below the asphalt binder grade elevation which shall be 2-1/4" lower than the grades as shown on the final paving plans. Ramping of manholes will not be allowed.

4.1.6 All chimney rings shall be Pro Ring (or approved equal) with approved sealant.

All precast manhole barrel joints shall be made with preformed butyl rubber gasket material (i.e. "Easy Stik" or equal). The gasket shall be of the size necessary to fill the annular space of the joint. When temperatures are 50º or less a row of butyl rubber gasket material shall be installed at each of the two horizontal surfaces for each manhole barrel joint.

4.1.7 An external sealing band shall be placed at all joints between precast manhole sections, sealing bands shall be MacWrap by Mar-Mac Manufacturing Co., Inc., **or E-Z-WRAP by Press-Seal Corporation** or an approved equal. Band shall be placed within a formed slot when out drop manholes are required. See Figure No.26. **The manhole wall shall be cleaned and sprayed with an approved adhesive prior to setting the band.**

4.1.8 All sanitary sewer manholes shall be constructed with a frame/chimney joint external adapter seal. The adapter shall be installed prior to the binder course installation. This seal shall conform to Section 3.5.4.1 (c) of the Standard Specifications The seal shall be installed in accordance with the manufacturer's recommendations i.e. Adaptor, Inc. or an approved equal. It is intended that the external portion of this seal extended from the frame to the top of the cone as a single piece. The seal shall be installed prior to placement of the stone base material. An authorized representative of the City of Franklin must be present while the contractor installs each seal. Only in special cases and with the approval of the City Engineer may frame chimney joint internal rubber seals (boot types) be used. Seals and installation shall conform to Section 3.5.4.1 (c) of the Standard Specifications

4.1.9 Reconstructed manhole will require the installation of

an external seal. The existing internal seal **and bands** shall be removed and become property of Sewer and Water Utility.

4.1.10 All backfill material around manholes shall be mechanically compacted in six-inch lifts. **In some cases as required, slurry back fill is to be used.** Flooding of the areas around the manhole will not be permitted.

4.1.11 All bench troughs shall be extended at ninety degree bends or for tees. See Figure No. 31.

4.1.12 Manholes placed inside sidewalks, driveways, etc. shall be set a minimum of 2 1/4" lower than final grade to allow for frost movement. A two inch cast iron (Neenah Foundry) riser ring will be installed at the time of the final surface. This will allow the utility in the future to make adjustment without having to dig up.

4.1.13 Any removal or additions to manhole barrel sections with damaged or non-suitable joints will be backfilled, wrapped, and filled around with 1 bag slurry mixture.

4.2 MAINLINE AND LATERALS

4.2.1 Sanitary sewer pipe materials for mainline and laterals shall be limited to PVC or **lined** concrete, unless specifically approved by the City Engineer in writing. For sewers laid at depths greater than 15 feet, pipe class determination documentation shall be provided to City Engineer. Sanitary sewer pipe test reports must be received and verified prior to the start of any sanitary sewer construction operation. **PVC pipe class for sanitary sewers shall be the following: 6' to 15', SDR 35, 15' to 24', SDR 26, greater than 24' and 6' risers C900.**

4.2.2 All laterals shall be 6" in diameter and installed at a quarter inch per foot gradient unless otherwise noted on the approved plans, but **never** less than one-eighth of an inch per foot. A maple heart shall be installed at the end of all laterals, and the top 12" shall be painted orange upon completion of the lateral installation. All laterals with less than 6.0' of cover material shall be insulated with 2' x 8' x 2" thick planks of Styrofoam plastic foam (Dow Chemical Company "Hydrand" or approved equivalent). Place a 12' maple heart at the end of the lateral extending a minimum of **3 feet** above grade. The top **3 feet** shall be painted orange.

4.2.3 When starting a sewer project, the new incoming line into the existing manhole shall be plugged and braced, and this plug shall remain until sewer is accepted by

the City Engineer. If a new manhole is constructed over an existing line, the pipe shall not be broken out until the project is completed and the manhole vacuum test has been completed on the structure.

4.2.4 Crushed stone chips conforming to 10.11.2 in these specifications shall be used for bedding. Chips shall encase the pipe with 6 inches of bedding and two (2) feet above the top of pipe.

4.2.5 **Traffic bond (1 1/4″) as described in 10.11.3** shall be used to backfill sanitary sewer trenches located in a proposed roadway**s. Also 1 1/4″ TB shall be used to backfill laterals which are below proposed sidewalk. This backfill shall extend from back of curb to right of way limits.**

4.2.6 All trenches located in a roadway shall be compacted to 95% of modified proctor density.

4.2.7 Care shall be taken not to exert undue stress on the pipe during a compaction operation. If the trench is to be mechanically compacted, the initial compacted lift shall be 2'. Each subsequent compacted lift of material shall be 18". The contractor shall use smaller lifts if the required compaction cannot be obtained.

The trench shall be kept free of visible water during any backfilling or compaction work.

4.2.8 **Only** trenches that are located in an off-roadway area **can be** backfill**ed with spoil material. Bedding and backfill shall be as specified above.** The use of frozen spoil materials for trench backfill will not be permitted under any conditions.

4.2.9 Existing manholes that do not have an opening for the new sanitary sewer shall have an opening cored in the existing manhole to accommodate the new sanitary sewer. A trough shall be formed in the existing bench to accept the new pipe.

4.2.10 The material used to backfill sanitary sewer mainline, lateral or forcemain trenches located in an existing roadway shall be **lean concrete mix** backfill conforming to Section 8.43.**9** of the Standard Specifications for Sewer and Water Construction in Wisconsin.

4.3 TESTING

It is the intent of this section to confirm that sewer system has been constructed with a minimum amount of infiltration.

4.3.1 Leakage test of sanitary sewers shall be completed in accordance with Section 3.7.0 of the Standard

Specifications. Sewers must pass a leak test before connection of any lateral.

4.3.2 The City of Franklin shall require the closed circuit television inspection of all sanitary sewer mains. Prior to televising, sewer needs to be completely cleaned and manhole benches poured. Also, sewer mains shall receive enough water that flow is observed in downstream manhole(s). This television inspection will precede the paving of roadways. The contractor shall be required to repair all visible damage and leaks in the sanitary sewer mains. This procedure is in addition to any testing required by the Standard Specification and/or MMSD. The cost of the television inspection shall be paid by the contractor or Developer. A DVD of the televising shall be submitted to the inspection firm for review.

4.3.3 All sanitary manholes shall be tested for leakage by the vacuum testing method. The testing shall conform to the requirements of Standard Specification as amended at the time of the test. Testing shall conform to procedures and table of test times as indicated in Table No.18.

The vacuum testing shall conform to the following:

Isolate the manhole to be tested by plugging the inlet and outlet pipes with an inflatable stopper or other suitable test plugs. The plugs and end stubs shall be securely braced to avoid them from being drawn into the MANHOLE. Plug lift holes with a non-shrink cementitious grout mix.

Vacuum test equipment shall be placed at the top of rim after chimney is built with external seal in place, in accordance with the manufacturer’s recommendations. Inflate the seal to 40 psi to affect a seal between the base and the manhole. Run vacuum pump until a vacuum of 10 inches of mercury is obtained.

With vacuum pump shut off and the valve on the vacuum line of the test head closed, measure the time for the vacuum to drop to 9 inches of mercury. The manhole test is acceptable if the time exceeds the values listed in the table below.

If the test fails after three attempts, contractor must pursue a different corrective measure. The City of Franklin will not accept exterior grouting, but will accept repair or replacement of defective manhole. Retest until an acceptable test is obtained.

TABLE NO. 18				
MINIMUM TEST TIMES IN SECONDS FOR VARIOUS MANHOLE DIAMETERS				
Depth (ft.)	**Diameter (in.)**			
	42	48	60	72
8	17	20	26	33
10	21	25	33	41
12	25	30	39	49
14	30	35	45	57
16	34	40	52	67
18	38	45	59	73
20	42	50	65	81
22	46	55	72	89
24	51	59	78	97
26	55	64	85	105
28	59	69	91	113
30	63	74	98	121

VACUUM TESTING
SANITARY MANHOLE
FRANKLIN ENGINEERING DEPT.