

4.00 - WATER MAINS

4.1 WATER MAIN DESIGN

Note: Reference Section 1.30 and 1.40 – Submittal Procedures & Plans and Specifications Design shall meet ISO, AWWA, ASTM, MDEQ and other agency's applicable standards.

- A. The applicant shall also submit design computations for residential development based on average daily flow rate plus a fire demand of 1200 gal. per minute with a residual of 20 psi at any point on the system. Designs for fire protection flow for multi-family, commercial and industrial development will be reviewed on individual basis depending on type of building construction used. Pressures at existing mains will be furnished by the Township upon written request.
- B. Arterial or feeder mains, 12" diameter or larger, will be located in accordance with the Township's master water plan, or as required by Handy Township.
- C. Distribution mains shall be 8" minimum diameter.
- D. Depth of cover shall be 5.0 feet minimum. Where a dip must be placed in a main in order to pass under another utility, or ditch, the length of the deeper main shall be kept to a minimum, and 11 ¼ degree bends, with restraint, shall be used to effect the desired offset. (See detail.)
- E. Water mains shall be flushed and cleaned and may require use of a "poly pig", followed by chlorination and bacteria testing.
- F. Main sterilization shall be in accordance with Michigan Department of Environmental Quality (MDEQ) recommendations, and the requirements of the Township.
- G. Hydrostatic tests shall be in accordance with requirements of the Township. In general, test pressure shall be maintained at 150 pounds per square inch for a period of at least two (2) hour, and leakage shall not exceed a rate of 50 gal. per inch dia. of main per mile of pipe per twenty four (24) hour period. Bacteria tests shall not be made until the system has been successfully pressure tested.
- H. Mains shall be located so as to best conform with the layout of existing facilities. In streets where no pattern has been established, mains shall generally be located approximately eight (8) feet from the north or east property line. A minimum horizontal separation of ten (10) feet shall be provided between water mains and sanitary and storm sewers.
- I. Finish grades for all hydrants, hydrant valve boxes, and gate wells shall be shown on the plans.
- J. Dead end mains are generally not recommended.

4.1.1 Fire Hydrant Location

- A.** Generally, fire hydrants shall be spaced such that they will be not more than 250 feet from the farthest corner of any proposed building. Multi-family, commercial, industrial, office and similar buildings will be reviewed on an individual basis.
- B.** Spacing of hydrants around multiple, commercial or manufacturing establishments shall be considered individual cases and shall be determined by consultation with the Township's Engineer and Fire Marshal.
- C.** Hydrants will be located in highly visible and accessible locations. Where street ROW's are 100' or wider, and buildings or residences are facing this ROW, hydrants shall be located alternately on both sides of the street.
- D.** Fire hydrants shall be installed on the end of all dead end mains.
- E.** Fire hydrants shall be located at least 25 feet from exterior walls of any building.
- F.** Hydrants will be installed at all street intersections and at intermediate locations so that in no case will the distance between hydrants exceed 400' via dedicated right-of-way. When near a street intersection, hydrants shall be located 15' in back of the intersecting street ROW.
- G.** Hydrants shall generally be located between the edge of road and sidewalk, a minimum of 3 feet off pavement.

4.1.2 Valves

- A.** In general, gate valves shall be on cross connecting mains located so that no single break requires more than 800 feet to be out of service. On feeders 12" or larger, valves shall be spaced not more than 1200 feet apart. Valves shall be arranged so that any section can be isolated by closing not more than 3 valves. Two valves shall be provided at all tees and three valves at all crosses.
- B.** Gate valves shall generally be located such that they will not be in the sidewalk line or in driveways. Where possible, valves shall be located at street intersections 5' from the intersecting street right-of-way line. Comparable limitations shall apply to non-residential uses.
- C.** All valves over 12" diameter shall be installed in wells and shall be butterfly-type. Valves 12" diameter and less shall be installed with an adjustable valve box.
- D.** Valves shall be placed on all dead-end mains for future extension.
- E.** Plans shall indicate finished grades of all gate well top of castings.
- F.** Connections of new mains to existing mains shall be provided with a tapping sleeve valve and box/well.

4.1.3 Restraint:

Approved mechanical restraint systems shall be provided at all bends of 11¼ degrees or greater, at tee outlets, at hydrant shoes, at plugs or caps, and at any crosses where necessary to prevent lateral movement of the pipe. Thrust blocks shall not be permissible unless approved by the

Township Engineer.

4.1.4 Meters

- A.** All water meters, and associated metering equipment, will be furnished and installed by the Township. Meters larger than 2 inches shall be installed by the user under the supervision of the Township. The user will be required to pay a service charge on the meter equal to the cost of the meter to the Township upon making application for such water service. Ownership of the meter will remain with the Township. Contact the Township Zoning Department for more information.
- B.** Master meters for main line metering of industrial and commercial complexes shall be subject to the approval of the Township. Authorization must be obtained from the Township to allow the use of a master meter in lieu of individual meters. Metering systems shall be reviewed on an individual basis and shall include such auxiliary equipment as deemed necessary by the Township. No meter shall be installed in a vault below grade.

4.1.5 Backflow Prevention:

All lawn sprinkler and irrigation systems shall be equipped with suitable backflow prevention in compliance with the Michigan Dept. of Environmental Quality, when they are connected to the Municipal Water Supply System.

A. Special Requirements for Automatic Sprinkler Fire Protection Systems:

- 1. Sprinkler systems directly connected to public water supply mains only, with no other physical connections to or for any supplemental water supplies, will require backflow prevention.
- 2. Supplemental supplies of non-potable water, shall be isolated from the public water.
- 3. Sprinkler systems directly connected to public water supply mains, which incorporate an elevated storage tank for fire protection only shall be isolated from the public water main by double check valves.

4.1.6 Automatic Lawn Sprinkler Systems:

Lawn sprinkler irrigation systems connected to Township water supply will require review and approval of the Township and Livingston County.

4.2 MATERIALS

4.2.1 Mains - Ductile Iron

Ductile cast iron pipe shall be manufactured in accordance with ANSI A21.51 (AWWA-C151), latest revision thereof. Pipe shall be standard wall thickness Class 52 minimum for pipe diameters of 6" thru 16" inclusive. Special conditions may require a heavier pipe class, casing pipe, or other improvements.

Pipe shall be double cement lined and seal coated with approved bituminous sealcoat in accordance with AWWA Specification C104 (ANSI Standard A21.4), latest revision thereof.

4.2.2 Joints

Joints for ductile iron pipe shall be push-on type conforming to ANSI A21.11 (AWWA-C111) standard specification. Mechanical or flange joints will be allowed for special applications,

subject to the approval of the Township Engineer. Sealing gaskets, retainer glands and lubricants for joints shall meet pipe manufacturer's specifications. All joint material shall be furnished with the pipe.

4.2.3 Fire Hydrants

- A.** Fire hydrants shall be AWWA current standard Mueller A-423 or breakable flange type opening counter-clockwise, with 5¼" valve opening and 6" diameter inlet. All hydrants shall be 5' 6" bury.
- B.** Fire hydrants shall have two 2½ inch diameter hose connections and one 5" pumper connection facing the centerline of the road. The 2½ -inch caps will be nut caps with chains. The pumper outlet will have a 5" Storz coupling and cap integrated onto the hydrant.

Fire hydrant thread sizes:

- 1.** Hose Connections: 2½" inside diameter national standard threads, 3½" outside diameter, 7½ threads per inch.
 - 2.** Pumper Connection: 5" Storz coupling and cap, "Fire Flow Series 2000" – Model 45T50 Nozzle.
- C.** All hydrants shall be constructed with a companion gate valve with an adjustable cast iron valve box.
 - D.** Plans shall indicate the finished grade of all hydrants to USGS datum.
 - E.** Water mains for all hydrants will be 8" diameter minimum in size.

4.2.4 Valves, Wells, and Valve Boxes

- A.** Butterfly valves shall be used for mains greater than 12" in diameter and all tapping valves shall be gate valves. They shall be iron body, fully bronze mounted, double disk, parallel seat valves with non-rising stems opening counter clockwise (left). Valves shall conform to AWWA C-500, latest revision, as manufactured by Mueller.
- B.** All gate wells shall be constructed of concrete, block, or precast reinforced concrete sections. (See Detail)
- C.** Gate well floors shall be precast of 3000 psi reinforced concrete with a minimum floor thickness of 6 inches.
- D.** Gate well covers and frames shall be East Jordan Iron Works #1040 with Type "A" cover, or approved equal. Covers shall have the word "WATER" in raised letters spaced in from the periphery of the cover.
- E.** Valves in gate wells shall be at least 12" above floor of gate well, supported with either brick or formed concrete.
- F.** The valve boxes shall be cast iron, slide type, consisting of the base and the top section. The length shall be adjusted by means of the top sliding over the base sections. A cover shall be furnished marked "Water". The base shall be 5-1/4 inch and have a range of extension of

51-72 inches.

4.2.5 Thrust Blocks

Thrust blocks will not be permissible unless otherwise approved by the Township Engineer.

4.2.6 Meters and Service Lines

- A. All taps and water services 1" diameter and smaller shall be installed by the Developer/Contractor under Township supervision.
- B. House meters shall be purchased from and installed by the Township or its authorized representative.
- C. Contact the Township for fee schedule.

4.2.7 Fittings

Fittings shall conform to ANSI-A21.10 (AWWA-C110) standard specifications for Gray or Ductile Cast Iron Fittings.

4.2.8 Curb Valves & Valve Boxes

The valve boxes shall be cast iron, slide type, consisting of the base and the top section. The length shall be adjusted by means of the top sliding over the base sections. A cover shall be furnished marked "Water". The base shall be 5-1/4 inch and have a range of extension of 51-72 inches.

- A. Curb Valves - Shall be open left with a stop and extension rod for short key.
- B. Curb Box - Shall be ductile iron, slide type, with a cover marked "WATER"

See specification list for approved part information.