ENGINEERING DESIGN MANUAL

PART IV – WATER & WASTEWATER LINES

Adopted May 13, 2010 Town Ordinance
Revisions adopted October 12, 2023 Town Ordinance 23-1012D

PART IV - WATER AND WASTEWATER LINES

I WATER MAINS

1.01 GENERAL

Water mains shall be placed on the north and east sides of a street, in accordance with the utility assignments in Appendix A. Where applicable, line sizes shall comply with the Town's Water Master Plan or subsequent revisions.

a. Water lines in the Town of Northlake are categorized as:

   1. Distribution Lines – sizes 12-inch and less.

   2. Transmission Mains – sizes greater than 12-inches.

b. Mains shall be minimum 8-inch diameter pipe. For mains in commercial and manufacturing districts, a minimum of 12-inch diameter pipe will be required if the main is over 600 feet in length.

c. Dead end lines are not allowed.

d. Fire hydrant lead lines shall be 6-inch diameter pipe, no greater than 50 feet in length. Any fire hydrant lead line over 20 feet shall be 8-inch diameter pipe.

e. Water lines 12-inches and greater shall be profiled. P.I.s shall be stationed and elevations to 0.01 feet provided for all water lines.

1.02 WATER LINE MATERIAL

a. Water mains 24-inches in diameter and smaller shall be AWWA C900-07 Class 235 (DR 18) PVC, mechanical joint, or a bell and spigot joint. A recession in the bell shall have a single rubber gasket. Ductile iron fittings with polywrap shall be used.

b. Water mains greater than 24 inches in diameter and larger shall be one of the following:

   1. Reinforced Concrete, Pretensioned Cylinder Pipe (RCCP), complying with AWWA C303 (Pressure Class 150 or greater). RCCP pipe shall be provided with Cathodic protection. The Cathodic Protection System shall be designed by a Texas licensed professional engineer.

   2. Ductile Iron Pipe, (DIP) complying with AWWA C151, with bituminous coating outside and mortar-lining inside in accordance with AWWA C104. Mechanical or push-on joints shall be used and shall conform to ASTM C111. The minimum Pressure Class shall be 150 psi. All pipe and fittings shall be encased in polyethylene in conformance with ASTM C105.

c. Water lines shall be minimum pressure Class 150.

d. All water mains outside utility easements which supply fire sprinkler systems shall be minimum 200 PSI working pressure and U.L. listed.

e. Water mains shall be standard sizes that are readily available, such as 8-inch, 12-inch, 16-inch, 18-inch, 20-inch, 24-inch, 30-inch, and 36-inch.

1.03 LOCATION

Water mains shall be constructed with extensions to the development boundary to allow for direct connection by future developments. Water mains shall be located in accordance with Utility Location Requirements for the Town of Northlake. See Appendix “A”.

1.04 WATER VALVES

Valves 16-inches and smaller shall be placed on or near street property lines and shall be spaced at a maximum of 800 feet apart in residential and 500 feet in all other districts. They shall be placed in such a manner as to require preferably two, but not more than three valves to shut down each Town block, or as may be required to prevent shutting off more than one fire hydrant. On cross-feed mains without services, a maximum of four valves shall be used to shut down each block. Also, valves shall be placed at or near the ends of mains in such manner that a shut-down can be made for a future main extension without causing loss of service on the existing main. If valves cannot be located for a shut-down, restrained joints shall be used. The location of valves larger than 16-inches will be as approved by the Director of Engineering and Utilities. Valves 16-inches and under shall be Resilient Seat Gate Valves (RSGV). All valves will be gate valves.

1.05 FIRE HYDRANTS

a. Number and Locations

A sufficient number of fire hydrants shall be installed to provide hose stream protection for every point on the exterior wall of the building. There shall be sufficient hydrants to concentrate the required fire flow, as recommended by the publication "GUIDE FOR DETERMINATION OF REQUIRED FIRE FLOW" published by the Insurance Service Office, around any building with an adequate flow available from the water system to meet this required flow. Fire hydrant markers shall be provided at each hydrant. In addition, the following guidelines shall be met or exceeded:

1. SINGLE FAMILY AND DUPLEX RESIDENTIAL - As the property is developed, fire hydrants shall be located at all intersecting streets and at intermediate locations between intersections at a maximum spacing of 500 feet between fire hydrants as measured along the route that fire hose is laid by a fire vehicle. All buildings shall be within a 500 foot radius of a fire hydrant.

2. MULTIFAMILY RESIDENTIAL - As the property is developed, fire hydrants shall be located at all intersecting streets and at intermediate locations between intersections at a maximum spacing of 400 feet as measured along the length of the center line of the roadway, and the front of any structure at grade and shall be no further than 400 feet from a minimum of two fire hydrants as measured along the route that a fire hose is laid by a fire vehicle. All buildings shall be within a 400 foot radius of a fire hydrant.

3. OTHER DISTRICTS - As the property is developed, fire hydrants shall be located at all intersecting streets and at intermediate locations between intersections at a maximum spacing of 300 feet as measured along the length of the center line of

the roadway, and the front of any structure at grade and shall be no further than 400 feet from a minimum of two fire hydrants as measured along the route that a fire hose is laid by a fire vehicle. All buildings shall be within a 300 foot radius of a fire hydrant.

4. PROTECTED PROPERTIES - Fire hydrants required providing a supplemental water supply for automatic fire protection systems shall be within 100 feet of the fire department connection for such system.

5. Fire hydrants shall be installed along all fire lane areas as follows:

   (a) Non-Residential Property or Use

      (1). within 150 feet of the main entrance.

      (2). within 100 feet of any fire department connection.

      (3). at a maximum intermediate spacing of 300 feet as measured along the length of the fire lane.

   (b) Apartment, Townhouse, or Cluster Residential Property or Use

      (1). within 100 feet of any fire department connection.

      (2). at maximum intermediate spacing of 400 feet as measured along the length of the fire lane.

6. Generally, no fire hydrant shall be located closer than fifty (50') feet to a non-residential building or structure unless approved by the Town.

7. In instances where access between the fire hydrant and the building which it is intended to serve may be blocked, extra fire hydrants shall be provided to improve the fire protection. Railroads, expressways, major thoroughfares and other man-made or natural obstacles are considered as barriers.

8. Along divided arteries fire hydrants shall be installed on both sides of the roadway so as to preclude the need for laying hose across the roadway.

b. Restrictions

1. All required fire hydrants shall be as required by the North Central Texas Council of Governments Specifications, Fifth Edition and Addenda and shall be placed on water mains of no less than six (6") inches in size. Fire hydrants shall be manufactured by one of the following companies, M&H, Mueller Company, or approved equal.

2. Valves shall be placed on all fire hydrant leads.

3. Required fire hydrants shall be installed so the break away point will be no less than three (3") inches, and no greater than five (5") inches above the grade surface.

4. Fire hydrants shall be located a minimum of two (2') feet and a maximum of six (6') feet behind the curb line, depending on the location of the sidewalk. The fire hydrant shall not be in the sidewalk.

5. All required fire hydrants placed on private property shall be adequately protected by either curb stops or concrete filled steel posts or other methods as approved by the Town and shall be in easements. Installation and maintenance of stops or posts to be the responsibility of the landowner on whose property said fire hydrant is placed.

6. All required fire hydrants shall be installed so that the steamer connection will face the fire lane or street, or as directed by the Town.

7. Fire hydrants, when placed at intersections or access drives to parking lots, when practical, shall be placed so that no part of the fire truck will block the intersection or parking lot access when connections to the fire hydrant are made.

8. Fire hydrants, required by this article, and located on private property, shall be accessible to the Fire Department at all times.

9. Fire hydrants shall be located at street or fire lane intersections, when feasible.

10. Fire hydrant bonnet shall be painted according to Standard Details.

1.06 FIRE LINE METERING

Generally, the Town of Northlake will own, operate and maintain all fire lines serving fire hydrants. Such fire lines shall be designed and constructed in accordance with the Town's standards and shall be placed in an easement dedicated to the Town for this purpose. Sprinkler service lines, fire line connections and other fire lines which are not maintained by the Town shall be equipped with either a water meter or a detector check assembly having a capacity equal to the required fire flow. Water meters and detector check assemblies shall be constructed in accordance with Town standards.

1.07 MINIMUM COVER

The minimum cover to the top of the pipe must vary with the valve stem. In general, the minimum cover below the street grade should be as follows: 12-inch and smaller, 4.0 feet. Lines larger than 12-inches shall have 5.0 to 6.0 feet of cover. Water lines with more than 6.0 feet of cover shall be approved by the Town. For water lines to be constructed along county-type roads, which are commonly built with a high crown about the surrounding property, increase the cover as required to allow for future paving grade changes.

1.08 CLEARANCES BETWEEN WATER AND WASTEWATER LINES:

Clearances between water and wastewater lines shall meet TCEQ requirements. The minimum clearances for water and wastewater lines crossing storm drains shall be two (2) feet or one-half (0.5) feet when the water or wastewater line is encased.

1.09 METER BOX AND SERVICE

A service with a meter box is constructed from the main to a point just behind the curb line, usually in advance of paving. The location of the meter box is as shown on the Utility Assignments detail sheets and as shown on the Town of Northlake Details. On multiple apartments and business

properties, the desired size and location is usually specified by the owners. Minimum requirements for water service sizes are:

a. One-inch single water services are required to serve all single-family residential lots. Combination meters with service connections to two residences are not allowed.

b. The size of apartment, condominium, or multi-family services will depend on the number of units served with a minimum of one meter per building.

1.10 SERVICE CONNECTIONS

a. Service connections shall not be allowed to fire hydrant leads.

b. Service connections shall not be allowed to transmission mains.

II. WASTEWATER

2.01 MINIMUM SIZE

The minimum size of wastewater mains in the Town of Northlake shall be 8-inch. 6-inch lines may be used to connect to existing 6-inch mains and then only when approved by the Town. Line sizes shall convey peak flows as shown on the Town's Wastewater Master Plan or subsequent revisions. All wastewater lines shall be one of the following standard sizes such as 8-inch, 10-inch, 12-inch, 15-inch, 18-inch, 21-inch, 24-inch, 30-inch, and 36-inch.

2.02 LOCATION

Wastewater mains shall be placed on the south and west sides of a street, in accordance with the utility assignments in Appendix A. Where applicable, line sizes shall comply with the Town's Wastewater Master Plan or subsequent revisions.

For Planned Developments, ALL necessary sanitary sewer services must be constructed up to the right-of-way. In areas outside of Planned Developments, sanitary sewer stub outs must be provided to allow future developments to connect their services.

2.03 MINIMUM COVER

Minimum cover over all wastewater mains shall be 4.0 feet unless approved by the Town. Approved mains with less than 3.5 feet of cover shall be capped as per the "Cap Detail" on the Wastewater Standard Details. See Town Standard Details.

2.04 WASTEWATER FLOWS, SIZE AND GRADES

Wastewater lines shall be designed to convey flows from all upstream areas based on ultimate development of the sewershed. Wastewater main sizes shall be obtained from the Town's Wastewater Master Plan. Subbasin flow shall be computed in accordance with the following formula:

$$Q = \frac{C^{0.89}}{295}$$

Where:

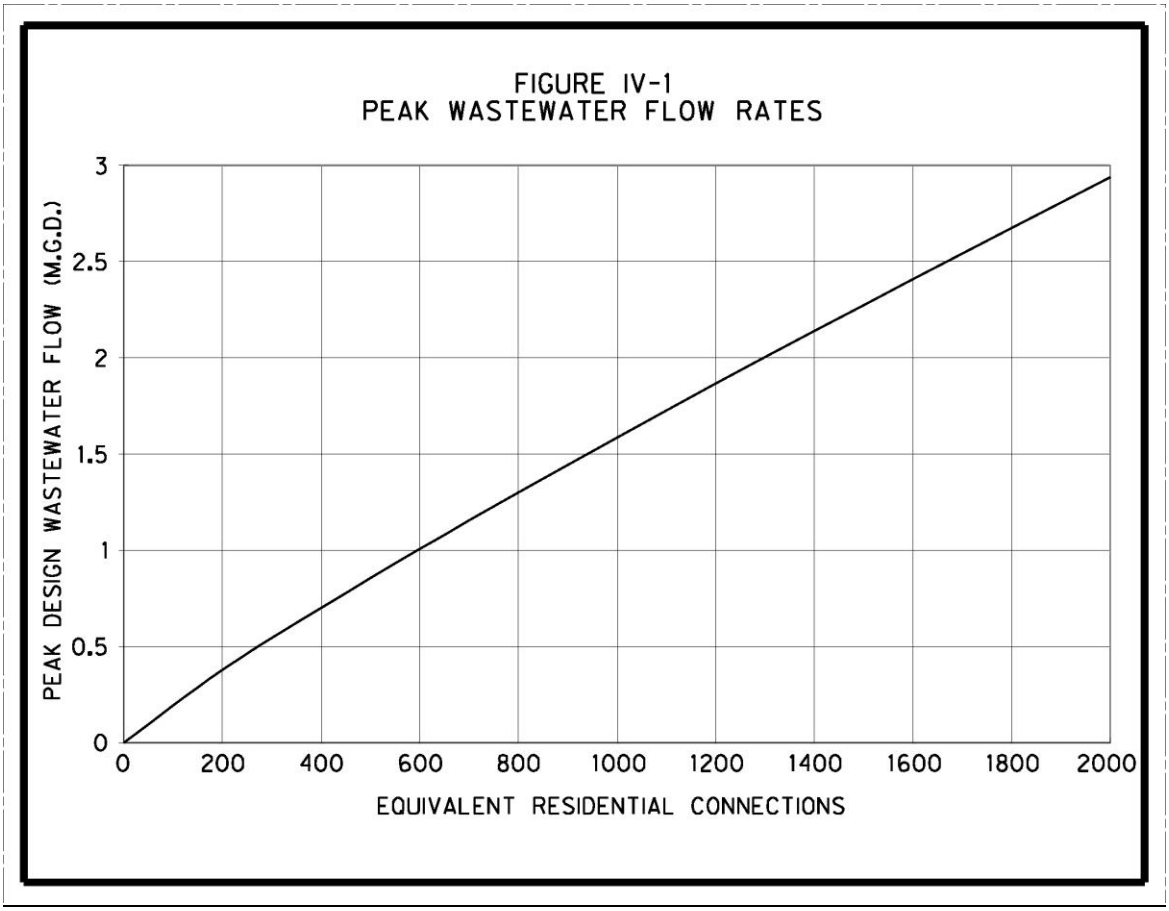
Q = Peak wastewater flow (million gallons per day)
C = Equivalent single family connections

This equation is graphically displayed in Figure IV-1. Equivalent single-family connections are based on a density of 3.1 persons per dwelling unit. Densities for other residential uses shall be determined by the Town. Wastewater flow for non-residential uses shall be evaluated by the design engineer and submitted to the Town for approval.

Pipes should be placed on such a grade that the velocity when flowing full is not less than two feet or more than ten feet per second. Minimum grades shall be as follows:

6" - 0.50%	8" - 0.33%	10" - 0.26%	12 - 0.20%
15" - 0.14%	18" - 0.12%	21" - 0.10%	24" - 0.08%

All grades shall be shown to the nearest 0.01 foot with P.I. stationing. A manhole is required at all pipe slope changes. No vertical curves will be allowed in wastewater lines. Horizontal curves (meeting pipe manufacturer recommendations) to match changes in street direction will be allowed as approved by the Town.



2.05 MANHOLES

The sizes shall be as designated on the Wastewater Standard Details. In general, manholes shall be placed at all four-way connections and three-way connections. The diameter of a manhole constructed over the center of a sewer should vary with the size of the wastewater line. In floodplains, sealed manhole covers shall be used. Drop manholes shall be required when the inflow elevation exceeds the outflow elevation by more than 24 inches. All manholes shall have a minimum 30-inch rim opening.

TABLE IV-1

MINIMUM MANHOLE SIZES

Largest Main Size	Manhole Diameter
8”	4’ 0”
12” – 24”	5’ 0”
Greater than 24”	6’ 0”

Manholes more than 8 feet deep shall be a minimum of 5 foot diameter.

Manholes shall be provided at all points of directional change (vertical and horizontal), “tees”, and change in pipe size. Maximum spacing between manholes 21” and under shall be 500 feet. Maximum spacing for manholes larger than 21” shall be 800 feet.

2.06 LATERALS

For single family dwellings, the lateral size shall be 4" minimum; for multiple units, apartments, local retail and commercial - 6" minimum; for manufacturing and industrial, the size should be determined by the Engineer. House laterals shall be located 10 feet downstream from the center of the lot and shall have a 10-foot lateral separation from the water service. Manholes will be required on 6-inch and larger laterals where they connect to the main line. Laterals will not be connected to sewer mains that are deeper than 12 feet. A minimum of one lateral per building shall be required. Also, a minimum of one lateral per residential lot shall be required. Duplexes shall have a lateral to each unit.

A cleanout shall be installed in each lateral and located at the right-of-way or easement line.

2.07 WASTEWATER LINE MATERIALS

a. All wastewater lines up to 15-inch diameter shall be PVC SDR 35 for depths less than 14 feet and SDR 26 for deeper installation. Allowable pipe types for larger mains shall be as shown on the Wastewater Details.

b. For wastewater lines crossing creeks with a minimum cover of 5 feet or less to the creek flowline, wastewater lines shall be PVC with concrete encasement per the Wastewater Details.

II. UTILITY EASEMENTS

3.01 Requirements

All public utilities shall be in a utility easement. Utility easements shall be granted on plats or by separate instrument if the property is not platted.

No building, wall, or pool shall be located or constructed within a Utility Easement (UE). Only the following facilities may be allowed in a UE with written approval of the Town.

a. A fence (type approved by Town) may be placed in a UE;

b. Facilities transverse to the easement such as roads, streets and private utilities;

c. Parking lots and driveways subject to written approval of the Town.

UEs shall be shown, labeled and described by metes and bounds on the plat or when provided by separate instrument.

UEs shall have the following minimum widths unless approved in writing by the Town Public Works Director.

a. No UE shall be less than 15' width.

b. UEs with a water and wastewater line shall have a minimum width of 25'.

c. When there are more than two utility lines or a line is greater than 12" diameter, then the width of the UE will be determined by the Town. Typical easement width with a single line are: 16" to 20" diameter 20' easement; 24" to 27" 25' easement; and 30" and greater 30' easement.

3.02 LANDSCAPING IN UTILTIY EASEMENTS

Landscaping in utility easements shall be limited to small shrubs and grass. Trees are not permitted in utility easements.