

**Division VII  
Section 7300  
Water Service  
Connection**



**DIVISION VII  
CONSTRUCTION AND MATERIAL SPECIFICATIONS  
SECTION 7300 WATER SERVICE CONNECTION**

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## **WATER SERVICE CONNECTION**

### **7300            SCOPE**

The work to be done under these specifications consists of installing domestic water services as shown on the drawings and as herein specified. The Contractor or Owner shall furnish all materials and labor not provided by the City of Manhattan as specified herein.

### **7301            WATER SERVICE CONNECTIONS**

The City of Manhattan Water and Wastewater Division, Water Distribution Group shall install new water service less than or equal to 2” in diameter. For all installations greater than 2” diameter, the owner shall have the work completed by a responsible contractor.

A typical installation shall include the tap, corporation, copper service line, meter, meter box or vault, valve(s) and fittings. The copper service line shall extend 24” in length from the meter box connection on the Owner side.

The Contractor or Owner is responsible for contacting the City to establish new water service and pay all associated fees per Sections 32-46 and 32-52, respectively, of the City of Manhattan “Code of Ordinances.”

<b>Services</b>	<b>City Department</b>	<b>Phone Number</b>
Schedule Tap and Installation	Finance Department - Customer Service	785-587-2480
Establish Water Service	Fire Department-Code Services	785-587-4506

All water service lines shall be Type K copper or ductile iron as specified hereafter. All water service lines shall be installed to provide a minimum depth of cover between the top of pipe and the finished ground surface of 42”. Upon completion of the work the entire area affected by the installation shall be restored to original grade, seeded and mulched, and left in a clean and neat condition.

#### **7301.1            Submittal Information**

For new water service lines that are 2” in diameter or smaller, and where on contractor shall supply materials to the City for installation, the Contractor shall provide submittals of all materials to the Water and Wastewater Division for approval.

For new water service lines that are greater than 2” in diameter, or when a meter vault is required per this specification, the following submittal information is required:

1. The Contractor or Owner shall furnish Plans to the City of Manhattan, Water and Wastewater Division, or to the Code Services Division for a building permit, showing the

proposed location, service line and size, meter(s), valves, fittings, meter pit or vault, easements, and right of ways.

2. The City of Manhattan, Water and Wastewater Division shall review and make comments. Approval shall be given after all comments have been addressed. After approval, any proposed changes will need to be reviewed and approved by the City of Manhattan Water and Wastewater Division.

#### 7301.2 Maintenance Requirements

The City shall be responsible for maintaining the service from the main to the meter, including the meter, on all City of Manhattan installations. All proposed new City water mains not located in existing City ROW or easements, but on private property, must be contained in easements, and shall be publicly maintained. For Developers building City water infrastructure, a private developer agreement must be approved by the City to ensure that infrastructure is constructed to city standards and delineates whether infrastructure is public and private, and which party is responsible for maintenance.

Where existing meters are located indoors, the City shall maintain the water service line from the main to the property line. The city shall also maintain the meter. The service line from the property line to the meter shall be privately maintained. For apartment buildings or equivalent, public meters in private meter rooms are not permitted. The owner may install a master meter for the apartment building, install private meters in a private meter room, or install public meters in a vault per the specifications contained herein. The City shall maintain master meters and meters in vaults. Private meters shall be privately maintained.

##### 7301.2.1 *Fire Lines*

For properties with dedicated fire protection, domestic and fire lines shall have separate connections to the water main. For all other domestic water service, water service lines may connect to fire lines that serve fire hydrants only. Fire lines serving fire hydrants, not located in existing City ROW or easements, but on private property, must be contained in easements, and shall be privately maintained. All fire lines shall include a flanged gate valve at the connection for isolation purposes. The City shall own and maintain the connection and the valve. Fire lines from the valve to the building sprinkler systems shall be privately maintained.

All fire lines that are connected to the water main with a tapping device shall be subjected to a hydrostatic pressure test of 100 pounds per square inch, which shall be maintained for at least one hour without leakage.

##### 7301.2.2 *Vaults*

The property owner shall be responsible for maintaining the meter vault. The exterior and interior of all vaults shall be maintained in a clean, dry and safe condition. If a vault has water seepage, the owner shall be responsible for maintaining a dry interior via a sump pump or equivalent.

The city of Manhattan shall maintain the meters, ductile iron pipe, valve(s) and fittings contained in the vault.

**7302**            **MATERIAL**

Upon the request of the Assistant Director of Public Works-Water and Wastewater the Contractor or Owner shall provide certified test reports confirming the material conforms to the following specifications. The manufacturer shall perform all tests in accordance with applicable standards. Testing may be witnessed by the Assistant Director of Public Works-Water and Wastewater, his appointed representative(s) appointed representative(s), or an approved independent testing laboratory.

All materials shall be stored to prevent deterioration or intrusion of foreign matter. No deteriorated or damaged material shall be used.

7302.1            Copper Pipe

For water service line installations that are 1” in diameter, Type K Copper coiled pipe shall be used from the main up to and including the meter box. For water service line installations that are 1.5” or 2” in diameter, Type K Copper rigid pipe shall be used from the main up to the meter box. The minimum service line shall be 1” in diameter, unless approved by the Public Works Department.

7302.2            Ductile Iron Pipe

For water service line installations greater than 2” in diameter, 4” diameter (minimum) ductile iron pipe shall be used from the main up to and including the meter box or vault. All ductile iron pipe shall meet City of Manhattan Standard Specifications, Waterlines Division II, Section 2301.1.

7302.3            Conduit

For water service lines crossing under roadways a conduit shall be installed. The conduit shall be a minimum of 4” diameter schedule 40 PVC pipe. The conduit shall be installed at a depth of 40 inches from finished grade and extend a minimum of 2 feet past the curb on the other side of street from water main. After installation, blue PVC caps shall be placed on both ends of the conduit. The conduit ends shall be marked by a 4” by 4” stake painted with blue permanent paint that extends’ above grade. Developer plans shall show the conduits on the Utility Plan of their design plans, and final plats as applicable. Developer shall be responsible for designing and constructing the conduits, including all costs associated with the work.

7302.4            Joints

All joints shall conform to ANSI 21.11.

7302.5 Isolation Valves

Water service lines that are 2” in diameter or larger shall have a by-pass installed with no less than one properly designed valve on the by-pass line. The bypass line and valve may be one size smaller than the meter. Valves shall have the standard operating nut as specified on a City of Manhattan approved gate valve or butterfly valve, per Waterlines Division II, Section 2301.3. There shall be above ground access to all valves.

7302.6 Tapping Sleeve

All tapping sleeves shall be Mueller ductile iron, mechanical joint or equivalent and be pressure tested per manufacturer’s recommendations prior to back filling the location. A representative of the City shall be contacted prior to the test being conducted.

7302.7 Meter Pit

The following table contains specifications for using the correct size meterpit, based on the quantity and size of service meters.

<b>Meter Size (Quantity)</b>	<b>Required Meter Pit</b>
3/4” (1-2) 1” (1)	21” Dia. x 36” Contech A2000
3/4” (2)	21” Dia. x 36” Contech A2000
3/4” (3-4)	36” Dia. Contech A2000 box
1” (2)	2-21” Dia. x 36” Contech A2000 or 1-36” Dia. Contech A2000
1.5” (1) 2” (1)	36” Dia. Contech A2000
1” (3-4) 1.5” (3-4) 2” (3-4)	Multiple 36” Dia. Contech A2000
3/4” (> 4) 1” (> 4) 1.5” (> 4) 2” (> 4)	VAULT REQUIRED - See Section 7302.9

All 36” Dia. Contech A2000 pits shall be field cut to length (depth).

7302.8 Meter Lid and Frame

The frame for all 21” and 36” Dia. Contech A2000 pits shall be an A.Y. McDonald Manufacturing Company frame Catalog No. 74MAF21 or a Ford Meter Company frame Catalog No. A4PR-LB, or approved equal. Frames shall be cast iron per ASTM A48, Class 25 with black e-coat finish, and 4” depth with 11-1/2” lid opening and a minimum of three (3) equally spaced centering lugs.

The lid shall be a locking 11-1/2" diameter lid, black poly propylene-based, ultraviolet resistant, with larger locking bolt and shall permit signals to be easily transmitted.

All 36" Dia. Contech A2000 pits shall also include a Ford Meter Company flange frame Catalog No. FL-36, or approved equal.

#### 7302.9 Meter Vault

All precast vaults shall be designed for the project requirements, be installed with top flush with finished grade, and be in accordance with City of Manhattan Drawing No. 2320. Vault details, including location, dimensions, ladder access, access door, ductile iron piping, meter locations, fittings, and clearances must be submitted to the City of Manhattan Water and Wastewater Division for approval prior to construction. Two inch and larger water service lines shall have a by-pass installed with no less than one properly designed valve on the by-pass line. The by-pass and valve may not be any less than one size smaller than the meter. The vault shall be provided with steps to provide access into the vault. Meter vaults should be located in green space, where possible, to avoid traffic applications and facilitate maintenance access. The meter vault shall be Monarch Products Company Pre-Cast Meter Vault or approved equal. The vault door shall be Bilco aluminum single leaf access door, type JD-2AL for non-traffic applications or JD-2AL H20 for traffic applications, or approved equal, and be located at the center of the vault and placed to the side nearest to the vault stairs. A removable, square key wrench and handle shall be provided to the City of Manhattan. Where required, a dual access door shall be permitted. Round cast iron frames are not permitted.

#### 7302.10 Meters

All City of Manhattan water meters shall be a Badger water meters. All meters shall be of AWWA meter specifications and standards. Meters shall be of the right size type and specifications that it which it is designed. Selection of the type and size of meter shall be based only on the flow requirement (GPM) and the type of application, and not the head pressure loss through the meter. Over sizing the meter to make up for head pressure loss can result in unregistered water during low flow periods.

1. For residential connections, a 3/4" M35 Badger Recordall Meter shall be used, with a positive displacement disc capable of a maximum flow of 35 GPM.
  - a. Note: Normal flows should not be more than approximately one half of the maximum capacity, if long life and meter accuracy is to be achieved.
  - b. Types of use include: residences, small apartments, small business, etc.
  - c. Demand flow rates: 3/8 to 35 GPM. For long meter life, maximum continuous demand shall be no more than 25 GPM.
  
2. 1" M70 Badger Recordall Meter with a positive displacement disc capable of a maximum flow of 70 GPM.
  - a. Types of use include: medium sized apartments, beauty salons, barber shops, filling stations, small businesses, irrigation systems etc.
  - b. Maximum continuous demand to 25 GPM.
  
3. 1 1/2" M120 Badger Recordall Meter with a positive displacement disc capable of a maximum flow of a 120 GPM. The Badger M120 shall have Elliptical Flanges and a 1" test plug so that the meter can be tested in place. This meter shall be installed in a meter setter with a by-pass.
  - a. Types of use include: Medium motels, hotels, large apartments, small industry, small processing plants etc.
  - b. Demand flow rates: 5/8 to 120 GPM. Maximum continuous demand no more than 50GPM.
  
4. 2" M170 Badger Recordall Meter with a positive displacement disc capable of a maximum flow of 170 GPM. The Badger M170 shall have Elliptical flanges and a 1" test plug so that the meter can be tested in place. This meter shall also be installed in a meter setter with a by-pass.
  - a. Types of use include: Larger motels, hotels, large apartments complexes, industrial plants.
  - b. Demand flow rates: 1 1/4 to 170GPM. Maximum continuous demand no more than 80GPM.
  
5. Badger Turbo Meters 2"- 20" – A turbo meter shall be used with a bar screen ahead of it to insure optimum flow conditioning and protection for the turbo measuring element. Turbo meters with strainer require a minimum of five (5) pipe diameters of straight pipe upstream of the meter. Pressure reducing devices and weighted check valves must be located at least five (5) pipe diameters downstream of the meter. Do not install a pressure reducer or a check valve upstream of the meter.
  - a. A turbo meter shall have a test plug or a test tee installed for in-line meter testing.
  - b. Each 2" meter and larger shall have a by-pass installed with no less than one valve on the by-pass line.
  - c. Turbo meters are good for medium size hotels to large hotels, apartment complexes, industrial manufacturing, processing plants, large public buildings, irrigation pump discharge, etc. These meters are used where flow demand is from 200 GPM – 19,800 GPM. Low flow accuracy is reduced with Turbo meters. For example, a 2" Turbo meter is only 98% accurate at a low flow of 4 GPM. Turbo meters are known

for permitting a significant amount of unregistered low flow, so Contractor or Owner must ensure that the Turbo meter is right for the application.

6. Badger Compound Meters 2” – 10” – Hotels, motels, schools, public buildings, apartment buildings, hospitals, special customers needing both high and low flow demands. These meters have a good low flow pickup for the size.
  - a. Any compound 2” meter or larger shall have a strainer installed to insure optimum flow conditioning and protection for the meter measuring element. It shall be installed with a minimum of five (5) pipe diameters of straight pipe upstream of the meter. Pressure reducing devices and check valves shall be five (5) pipe diameters downstream of the meter.
  - b. A compound meter shall have a test plug or a test tee installed for in-line meter testing.
  - c. Each meter 2” and larger shall have a by-pass installed with no less than one valve on the by-pass line.
  - d. These meters are capable of up to 2000 GPM maximum output depending on size, and can measure a low flow of ½ GPM depending on meter size.
  
7. Badger FMUL Approved Fire Series Meter Assembly, 4”- 10”meters. These meters come with a detector check valve hooked to a turbo meter. The check valve is a spring loaded clapper that sends water through a smaller by-pass into a 2” meter to register low flows. When a major flow is required the water pressure shall overcome the spring loaded clapper and push it open, permitting full pipe capacity flow during a fire emergency.
  - a. Typical use is a housing addition that already has water infrastructure in place along with fire hydrants, but needs to connect to a different water system which has to be metered.

7302.11 Taps, Saddles, Fittings and Setters

1. Taps and Saddles: All water service connections shall include a Mueller 300 Ball Corporation Valve (Model B-25008N) with AWWA Taper (Mueller “CC”) inlet thread and Mueller 110 Conductive Compression outlet. The following table contains saddle and corporation valve model numbers for each size of water service line. All saddles shall be Smith-Blair service saddles with double stainless steel straps and CC threaded outlets.

Service Size	Saddle	Corporation
1”	NA – Direct Tap	B-25008N – 1”
1.5”	317 – 1.5”	B-25028N – 1.5”
2”	317 – 2”	B-25028N – 2”

For all water service lines 2.5” in diameter or larger, the tap method and materials shall be approved by the Assistant Director of Public Works-Water and Wastewater, or his appointed representative(s), prior to installation per Section 7301.1 above.

2. Fittings: All fittings for meter sets shall be Mueller brass fittings, as specified below, or approved equal Ford fittings.
  - a. For all 1" meter sets, fitting shall include the following:
    - 1) Meter Inlet: Mueller 300 Ball Angle Meter Valve (B-24258N) with Muller 110 Conductive Compressive Connection inlet and meter swivel nut outlet.
    - 2) Meter Outlet: Mueller quarter bend meter (90-degree) coupling (H-14206N) with meter swivel nut inlet and Muller 110 Conductive Compressive Connection outlet. Customer side shall include approximately three (3) feet of Type K copper rigid pipe outside of the meter box.
  - b. For all 1.5' and 2" meter sets, fitting shall include the following:
    - 1) Meter Setter (Main Side): Mueller Straight Coupling (H-15428N) with Muller 110 Conductive Compressive Connection inlet and M.I.P. threaded outlet.
    - 2) Meter Setter (Customer Side): Mueller Straight Coupling (H-15428N) with MIP threaded inlet and Muller 110 Conductive Compressive Connection outlet. Customer side shall include approximately three (3) feet of Type K copper rigid pipe outside of the meter box.
  - c. Miscellaneous Fittings:
    - 1) Mueller Quarter Bend (90-degree) Union (H-15526N) with Muller 110 Conductive Compressive Connection connections - both ends.
    - 2) Mueller Service Tee (H15381N) with Muller 110 Conductive Compressive Connection connections - all ends.
    - 3) Mueller Straight Coupling (H-1545N) with Muller 110 Conductive Compressive Connection and F.I.P. threaded connections.
    - 4) Mueller Straight Three Part Union (H15403N) with Muller 110 Conductive Compressive Connection connections - both ends.
    - 5) Ford Meter Box FPT Meter Adaptor (A24-NL).
3. Setters: For all 1.5" or 2" positive displacement disc meters, the meter setter shall include a by-pass. All setters shall be Mueller Copper Meter Yoke with horizontal F.I.P. threaded end inlet and outlets. The following table contains setter model numbers for each size of water service line.

Service Size	Setter
1.5"	B-2423N – 1.5"
2"	B-2423N – 2"

7302.12 Meter Register

All City of Manhattan water meters shall be equipped with a Badger HRE-LCD Encoder register wired for the ACLARA™ STAR® fixed network. The register must read in 100 cubic feet. The register shall have bare end wire connections.

7302.13 Meter Transmission Unit

All City of Manhattan meters shall be equipped with an ACLARA™ STAR® 3321-012-DB Meter Transmission Unit (MTU). MTU shall be single-port for all positive displacement disc and turbo meters and dual-port for compound and fire series meters and shall have bare end wire connections. Each MTU shall be installed and programmed by Water and Wastewater Division staff.

7302.14 Concrete

All concrete used in association with water main installation shall be the standard City mix as described in City of Manhattan Standard Specifications, Paving Division II Section 2600 “PAVING” Section 1.2.

7302.15 Plugs

Plugs at the end of water lines shall be push in or mechanical joint type plugs.

**7303 INSTALLATION**

Pipe, fittings, and valves shall be installed according to City of Manhattan Standard Specifications, Waterlines Division II, Section 2300 “INSTALLATION” Section 2.

**7304            INSPECTION AND TESTING**

Pressure and leakage test and water line disinfection procedures shall be completed in accordance with City of Manhattan Standard Specifications, Waterlines Division II, Section 2300 “INSPECTION AND TESTING” Section 3.

**7305            TIES AND RECORDS**

The Contractor shall provide GPS coordinates and address of the new water service to the City of Manhattan, Water and Wastewater Division, upon completion of the installation. The GPS coordinates shall be either in Longitude or Latitude or Northing and Easting, and accurately describe the location of the center of the meter box(s) or vault.