85356

F.A.U. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
5012	02-00098-00-FP	BOONE	30	29

GENERAL SPECIFICATIONS FOR WATER AND SEWER CONSTRUCTION

No substitutions to the following specifications and details shall be allowed without City approval prior to letting. The City maintains an inventory of repair materials specifically for these items.

WATER

The Standard Specifications for Water and Sewer Construction in Illinois latest revised edition has been adopted as the City's standard. The following articles are in addition to the above referenced standards and, in case of conflict, shall prevail.
Note: All materials shall be American made!

1. VALVE BOX: Valve boxes(Trench Adaptor) or vaults shall be provided for all buried valves. Provide boxes in pavement areas and vaults in lawn areas. Provide vaults when main is adjacent to vacant land and may be extended. Provide Neenah R1772B or East Jordan 1022 castings on all vaults. See detail sheet #2 for box(trench adaptor) requirements.

Valve boxes shall be one complete assembled unit composed of the valve box and extension stem. All moving parts of the extension stem shall be enclosed in a housing to prevent contact with the soil. Valve box assembly shall be adjustable to accomodate variable trench depths.

The entire assembly shall be made of heavy wall high-density polyethylene. All exterior components shall be joined with stainless steel screws. The valve box top section shall be adaptable to fit inside a valve box upper section.

The stem assembly shall be of a telescoping design that allows for variable adjustment length. The stem material shall be of plated steel square tubing. The stem assembly shall have built in device that keeps the stem assembly from disengaging at its fully extended length. The extension stem must be torque tested to 1000 foot-pounds. Valve box shall be American Flow Control's Trench Adaptor.

2. VALVES: All valves in the City system for 4" and larger shall be MJ Resilient seat valves, rated at 250 psi. Valve body, bonnet and wedge shall be constructed of ductile iron. The exterior of the ductile iron wedge shall be encapsulated with nitrile rubber (2"-12" sizes) or SBR rubber (14"-30" sizes) and have ACE/EL guides. The wedge shall be symmetrical and seal equally well with flow in either direction. There shall be no exposed metal seams, edges or screws within the waterway. The stem shall be bronze in full compliance with Section 4.7 of AWWA C515. Wrench operating nut shall be constructed of ductile iron. Wrench nut shall have four flats at stem connection to assure even distribution of operating input torque to the stem. The words "DI" or "Ductile Iron" shall be cast on the valve or stamped on a permanently attached corrosion resistant metal tag.

All bonnet-to-bonnet and bonnet-to-cover seals shall be O-rings. Flat gaskets shall not be allowed. Stem shall be sealed by three O-rings. The top two O-rings shall be replaceable with valve fully open and while subject to full rated working pressure. O-rings set in a cartridge shall not be allowed.

Valve shall have thrust washers located above and below thrust collar to assure easy operation of the valve. All internal and external ferrous surfaces of the valve body and bonnet shall have a fusion-bonded epoxy coating, complying with ANSI/AWWA C550, applied electrostatically prior to assembly.

250# raised face flanges shall be provided when required.

Valves shall be equal to American Flow Control's Series 2500 Ductile Iron Resilient Wedge Gate Valve.

3. CUTTING-IN VALVES & SLEEVES: Cutting-in valves shall be manufactured to conform to AWWA C515 Standard for resilient seated gate valves. Bodies and bonnets to be cast iron. Wedge to be constructed of ductile iron, fully encapsulated on the exterior by synthetic rubber edge shall seat against seating surfaces arranged symmetrically about the centerline of the operating stem, so that seating is equally effective regardless of direction of pressure unbalanced across the wedge. Rubber seat shall be bonded to the ductile wedge without the use of screws, rivets or similar fasteners. Valve shall have one end standard mechanical joint and the other end shall be able to accept oversized pit cast iron pipe. The oversized end shall be of a different color than rest of valve for identification. Valve shall be American Flow Control's Series 2500 Cutting-In Valve and Cutting-In Sleeve.

4. RETAINER GLANDS: Mechanical joint restraint shall be incorporated in the design of the follower gland. The restraint mechanism shall consist of plurality of individually activated gripping surfaces to maximize restraint capability. Glands shall be manufactured of ductile iron conforming to ASTM A536-80. Dimensions of the gland shall be such that it can be used with the standardized mechanical joint bell and tee-head bolts conforming to ANSI/AWWA A211.11 and ANSI/AWWA A21.53/C153 latest revision. Twist-off nuts, sized same as tee-head bolts, shall be used to insure proper actuating restraining devices. The mechanical joint restraint shall be working pressure of at least 100 psi with a minimum safety factor of 2:1 and shall be EBAA Iron Incorporated MEGALUG or equal.

5. WATERMAIN/DUCTILE IRON FITTINGS: All watermains in the City system shall be at least AWWA C151, class #52 (pressure class 150) ductile iron push pipe, or C909 plastic pipe. Pipe crossing under a major arterial roadway shall be minimum class #56 ductile iron! All service connections for PVC shall be saddled (single strap bronze type). Pipe must be buried 6 feet deep. Fittings shall be available in 4 through 24-inch sizes and shall be cast from Ductile Iron in accordance with ANSI/AWWA C153/A21.53 with mechanical joint bells. Glands, bolts, nuts and gaskets shall be in accordance with requirements of ANSI/AWWA C153/A21.53. Fittings shall be listed by an approved certifying agency as conforming to the requirements of ANSI/NSF 61. The working pressure rating shall be 350 psi.

6. FIRE HYDRANTS: Fire hydrants shall meet or exceed AWWA C502, latest revision. Rated working pressure shall be 250 psi and hydrants hydrants shall include the following specific design criteria: Hydrants shall be American Flow Control's Waterous Pacer, model WB-67-250 with vented caps. Alternates not allowed. The nozzle section, upper and lower standpipes and hydrant base shall be ductile iron. Nozzle shall be mechanically attached. Nozzles pinned or screwed in will not be allowed. The main valve closure shall be compression type, opening against the pressure and closing with the pressure. Nozzle section to be designed for easy 360-degree rotation by the loosening of no more than four bolts. The seat diameter shall be 5 ¼", hydrant must be designed so that removal of all working parts can be accomplished without excavating. The bronze seat to be threaded into mating threads of bronze for easy field repair. Hydrant shall have factory installed 304 stainless steel bolting between barrel and shoe. The draining system of the hydrant will be bronze and be positively activated by the main operating rod. Hydrant to be furnished with a sliding bronze drain valve. Sliding drain valves made of rubber, plastic or leather will not be allowed. Hydrant must have an internal travel stop nut located in the top-housing hydrant. Hydrant must have a double oil reservoir so that operating threads are oil lubricated and be O-ring sealed from water, moisture and foreign matter. Hydrant must have a traffic flange design allowing for quick and economical repair of damage resulting from a vehicle's impact. The rod coupling must be two pieces bolted on by two stainless steel studs and four brass lock nuts. Pins, standard nuts and bolts not allowed.

Coating System Performance Requirements for Exterior Surfaces Above Grade

1. All ferrous metal parts of the hydrant shall be coated to meet the minimum requirements of Section 4.2, *Painting*, in American Water Works Association Standard ANSI/AWWA C502-94 *Dry Barrel Fire Hydrants*.
2. Primer: Primer shall be used on all surfaces and shall be cross-linked two-part liquid epoxy. Epoxy primer shall be applied using an electrostatic spray process.
3. Topcoat: Surfaces shall be top coated with high-gloss two-part liquid urethane that uses an aliphatic isocyanate catalyst to produce a cross-linked cure. Topcoat shall be applied using and electrostatic spray process.

The hydrant base shall be coated with fusion-bonded epoxy on interior and exterior surfaces using materials and coating application procedures that meet or exceed the requirements of AWWA C550-01 *Standard for Protective Epoxy Interior Coatings for Valves and Hydrants*.

Valves shall be directly connected to the hydrant as approved. Fire hydrants used where space is limited will use a Hydrant Tee (Clow F1224 MJ Hydrant tee with anchoring on the tee or its equivalent).

Hydrants will have a minimum of 2 ft. of A-stone from the shoe base up the barrell and a minimum of 2 feet on either side of hydrant barrel and covered with 25 mil plastic over all stone surrounding the hydrant to allow for drainage of hydrant. Hydrant blocking must be with concrete blocking only, set against the back of the shoe and against undisturbed earth.

7. BACKFLOW PREVENTERS: Backflow preventers are required for all domestic and fire lines. Contact the Meter Division for more details. All locations must be approved and assemblies will be purchased from the Water Department.

Backflow preventers shall be placed inside at the meter location (see City Detail sheet). Reduced pressure zone devices shall have piped drain lines to a sump pit or floor drain (drain lines shall not be reduced).

For all commercial outside installations, the contractor shall provide engineer's drawings showing location, type and size, and protections for City approval. All locations and installations must be approved by the Water Department. All underground sprinkler systems must be installed per CITY SPECIFICATIONS. Backflow preventers shall be tested and tagged. Reports must be submitted before the system can be used. Failure to comply with all requirements could result in termination of service.

All single service commercial (including multi-family) and industrial water services shall have a redundant backflow preventor and bypass as shown in the detail drawings. The second (redundant) backflow preventer may be 1/2 the approved metered service size. These requirements are in addition to any State and Local plumbing codes that may apply.

8. SERVICE PIPE: Copper used in the City system must be of type K. No plastic water service lines will be accepted by the City.

9. SERVICE FITTINGS: Brass fittings used must be only A.Y. MacDonald or Ford. No substitutes are to be used and must be compression type only.

10. CURB BOXES: Water curb boxes must be A.Y. MacDonald or Ford cast iron extension type with arch pattern base and plug cap, using stationary rod and placed 6" behind the property line, unless approved otherwise. When a curb box is to be placed in concrete or blacktop, a curb box sleeve must be used (see spec sheet curb box) and shall be marked in the curb near the top by means of an imprint "W" at least 3" x 3" in size, in the concrete curb.

11. WATER METERS: Only Senses meters shall be used in the City system and must be purchased from the City.

A. There shall be a separate service connection with a separate curb stop and curb box located six feet from the property line for each building served by the city water supply. Buildings requiring more than one metered service, but less than four metered services, may be served by a single service line with a master curb stop and curb box followed by a maximum of four additional separate service lines with curb stops and curb boxes on each service.

B. Any building requiring more than four metered services shall be allowed only one master service connection with a separate curb stop and curb box located six feet from the property line and

1. A single master meter for the entire building or
2. Multiple meters for each unit within the building.

a. Before any installation begins, it must be approved as to which option you intend to use.
b. All single meters shall be placed no less than 12" above the floor and 12" away from the wall.

In either case, the following criteria must be met to allow access and servicing of the meters:

A common utility/meter room must be provided in which all meters are located (see city ordinance for specific dimensions). The room must have lockable, permanent outside access doorway at least 32" wide x 6'8" high. This room must be accessible to the Belvidere Water Department at all times and two keys for entry must be furnished to the Department prior to final inspection. The room shall have exterior grade switches and receptacles and light sockets. There must be a minimum of one light located overhead at the meter locations. The light switch must be located inside the doorway immediately adjacent to the door. The room must be heated to maintain a temperature of at least 50 degrees Fahrenheit to prevent freezing and must have a floor drain. All meters in the room shall have lockable ¼ turn ball valves located before and after the meter up to 2". In addition, a lockable ¼ turn master valve must be installed on the main service line up to 2". All others shall be Rising Stem Resistant Wedge American Flow Control Series 500. All valves must be permanently tagged identifying the unit within the building it serves. Each meter must also have a permanent ridged ½" diameter conduit run from the meter head to the outside wall. Each conduit will be permanently labeled outside above the conduit indicating what unit is so served.

Note: Contractors must supply a detailed drawing for the meter area to the City for approval.

C. Shop drawings showing the size, location, material type and configuration of all manifolds must be furnished and approved by the Department of Public Works prior to installation. Manifolds must be no less than 12" or more than 48" above the floor of the utility/meter room.

D. All meters require a remote reader for reading outside the building. For meters not within 20 feet of an outside wall, a 3/4" conduit must be installed from the meter installation to the outside wall closet to a walk or drive located near the front of the building.

E. All residential meters installed must have a backflow preventor. Type, depends on hazard involved, determined by the Water Department.

F. All single service meters (including commercial, multi-family and industrial) must have a bypass at least 1/2 the size of the metered service. All service lines must have two shut-off valves, one before and one after the meter and must be gate valves or ball valves with lockable handles.

G. For all water connections 3/4" and larger, where a meter cannot be placed in a building and a meter cannot be used for each service, the meter must be installed in a meter house with backflow protection above ground. See attached meter house example sheet.

H. All service pipe on City side of the meter shall be below grade, including interior locations.

SEWER

1. SEWER MAIN: Sanitary sewer lines may be PVC solid wall or Vylon Pipe (ASTM F-794, UNI-B-9) for 8" and larger pipe with proper trench backfill as required by the city (See Bedding Detail and Material List for specifications). Any main exceeding 11' deep must be approved by Public Works prior to submittal of construction plans. Forcemain may be PVC solid wall or DIP.

2. SEWER LATERALS: Materials shall be SDR 26, Watermain Quality CL 52 ductile iron. Laterals shall be leakage tested under the same specifications as sewer mains.

A. All laterals shall extend to the property line plus 6', with a 4" diameter clean out located 6" behind the property line. Laterals shall be a maximum 9' deep, and not less than 8', at the property line in accordance with the detail. The clean out cap shall be 8" below the top of the ground and protected by a cast sleeve and lid marked "Sewer" (see City Spec.). If they are not connected to the buildings when installed, they must be marked at the end of the unconnected stub with a 2" x 4" treated post protruding a minimum of 14" above the ground. Service shall be marked on the curb (near the top) by means of an imprint of an "S" at least 3" x 3".

B. All lateral sewer connections that are made to existing sanitary sewer mains shall be saddled and cuts in pipe shall be circular.

3. MANHOLES:

A. All manholes shall be a minimum 4 foot diameter precast; all shall have Wrapid Seal or approved equivalent rubber seal at the connection of the manhole barrel to form a watertight connection. All joints shall be sealed with mastic.

B. All manhole inverts must be pre-poured and pipe connections sealed with an approved watertight connection.

C. All sewer manhole lids shall be of the pickless type, extra heavy regardless of locations, stamped SEWER.

D. All castings shall be of the extra heavy lid and lids shall be of the pickless and self-sealing type.

E. SEWER METERS: Monitoring for sewer only charges - see Meter Department equipment types.

F. SANITARY SEWER CROSSING OVER WATER: SDR 26 watermain class pipe shall be used in place of casement pipe.

G. WATERMAIN TEST REPORTS: All watermains upon completion shall be Bacteria, Leakage and Pressure tested. Test reports must be filed with the Water Department. No connections or Building Permits will be permitted until acceptable reports are received by the City.

H. SANITARY SEWER MAIN TEST REPORTS: All Sanitary Sewer Mains upon completion will be leakage tested by low pressure air and a portion deflection tested, all in accordance with the Illinois Recommended Standards for Sewage Works. Deflection testing shall be performed on the first 1200 feet and 10% of the remainder with a minimum of 25% of the entire project. Test reports shall be filed with the Water and Sewer Department. No connections or Building Permits will be permitted until acceptable reports are received by the City.

All reports shall be sent to Belvidere Water and Sewer Department. Attention Water and Sewer Superintendent, 210 Whitney Blvd, Belvidere, IL 61008.

I. SANITARY MANHOLE TEST REPORTS: All Sanitary Manholes shall be leakage tested by vacuum test in accordance with ASTM C1244 and the Illinois Recommended Standards for Sewage Works. Test reports shall be filed with the Water and Sewer Department. No connections or Building Permits will be permitted until acceptable reports are received by the City.

All reports shall be sent to Belvidere Water and Sewer Department. Attention Water and Sewer Superintendent, 210 Whitney Blvd, Belvidere, IL 61008.

MATERIAL SUMMARY LIST

(The City of Belvidere only accepts American made products)
All materials shall be approved by City of Belvidere Water and Sewer Department prior to installation.

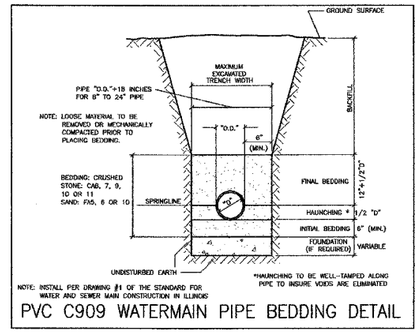
A. WATER
I. Service
a. Type K Copper 1" only.
Note: The City of Belvidere will only accept AY McDonald or Ford Brass.
b. Corporation stop, AY McDonald 4701BT only or Ford Brass equal.
c. Curb stop, AY McDonald #6100T only, with 36" rod or Ford Brass equal.
d. Curb box, AY McDonald #5602 with 5607 lid only or Ford Brass equal.
e. Bronze single strap service saddle for C909 pipe.
Notes: Mueller brass will no longer be accepted!
If valve is located in concrete or blacktop a cast iron cleanout lid (by Valvco) must be installed!

II. Mains
a. C909 PVC or class 52 ductile iron. Under major arterials, class 56 ductile iron only.
b. Valves, American Flow Control Services 2500 only! No substitutes will be allowed!
c. Hydrants, 5¼"-6' (Only! No substitutes will be allowed) bury with steamer nozzle and valve attached. American Flow Control Waterous Pacer, WB-67-250.
d. With limited space for hydrants use hydrant tee (Clow F1224 MJ or equal).
e. Valves in road must use American Flow Trench Adaptor Box.
f. All fittings must be of ductile iron (American made).
g. Restraints for PVC and ductile pipe will be mega lugs or equal and will be used on all mechanical joints (American made).
Note: Mueller valves, hydrants, or fittings shall not be accepted.

B. SEWER
I. Pipe
a. Mains SDR 35 ASTM D3034 PVC. Pipe buried over 15 feet must use SDR 26 PVC.
b. Laterals shall be of PVC ASTM D2241 SDR 26, Watermain Quality pipe.
c. Forcemains shall be AWWA C905 or C909 DR26 minimum pipe.

C. MANHOLES AND VAULTS
I. Castings
a. Water: EJIW 1022Z1 frame with 1020 lid.
b. Sewer: EJIW 1022Z1 manhole frame with 1020 Gasket Seal lid.
c. All manholes must use a manhole encapsulation system (for sewer only) and it must be approved by the city.
d. Label lids per detail.

D. All water meters and backflows must be purchased from the City of Belvidere Water Department.



PVC C909 WATERMAIN PIPE BEDDING DETAIL

ADDITIONAL WATER/SEWER REQUIREMENTS

1. Watermains

a. Watermain mechanical joints shall be restrained by restraining rings "Mega-Lug" or equal (the type to be compliant with the pipe used).

b. Directional drilling methods and materials shall be approved by the City on a project basis.

2. Watermain flushing

Contractors must use dechlorinization methods approved by the EPA and recognized by the City, for flushing the watermains.

3. Watermain completion tests

Contractors must sign and complete a form with copies for the Water Dept. Before watermain charging, disinfection, pressure testing and flushing, Contractors will contact the Water Dept. 48 hours in advance of each requested step. Signatures from a representative, from the Contractor and City Water Dept., must appear on each form following completion of each step.

4. Underground locating services

The Contractor shall install an omni ball directly over all new watermains, forcemains and sewer services; this is a device used for underground location of plastic pipes. There are omni balls for water and sewer; each has a distinct color. These devices are to be purchased direct from the manufacturer; ~~the Water Dept. may make advanced purchases for the Contractor, provided prepayment is made to the City before any order can be placed.~~ The Contractor shall place the omni ball in accordance with the following schedule:

a. At no less than 250' intervals over all watermains and forcemains, regardless of fittings or valves.

b. At all fittings on watermain.

c. At the low points over the watermain when over 6' deep.

d. At all sewer services, placed 6' from property line.

e. At a depth no deeper than 3' below finish grade.

5. Surface locating services

a. The contractor shall stamp a 3" high "S" and/or "W" in the curb face at the location where water and sanitary services cross under the curb line.

b. The contractor shall install blue pavement reflector in the center of the nearest drive lane at each fire hydrant.

~~6. Provide standard Sample Station Hydrant as directed by the City. Minimum one per subdivision.~~

7. Final Inspection

a. Hydrant coatings shall not be disturbed. Any scratches, chips or other defects in surface coatings shall be repaired per manufacturer requirements prior to acceptance of the project.

SANITARY SEWER AND WATER DETAILS

CITY OF BELVIDERE	
BY: J. GRIMES	DATE: 09/20/2002
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REV: 03/23/2005	

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