Summary of

State College Borough Water Authority

Public Water Main, Service Connection & Fire Hydrant

Specifications for Developer/Contractor Installation

Adopted January 23, 2002
Revised November 16, 2021

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This summary of water main, service connections and fire hydrant specifications is provided to answer the contractors most frequent questions. This is a summary only and does not include all Authority requirements. We encourage all contractors to meet with Authority personnel prior to starting any project.

Plan Submission/Review Policy

This policy is to insure the plans submitted are reviewed accurately for the benefit of the Developer/Contractor and the Authority.

A. Required Prior to Application Preparation

1. To be provided to Authority

    a. Two (2) sets of municipality approved plans w/signature(s) or letter from the municipality.
        1. Submitted plans must show:
            a. Proposed water main size(s) and location(s)
            b. Proposed water service size(s) and location(s)
            c. Lot number(s)/street address(es) for all locations
            d. Location and depths of Sanitary and Storm Sewers
            e. Location of all electric lines and appurtenances, utility prepared plan acceptable (Main Extensions Only)
            f. Details of water main/service connection & fire hydrant installations
    b. Estimated demand in "Gallons per Day" or the number of Equivalent Dwelling Units (EDU's) as determined by governing sewer authority.
    c. Owner name and mailing address
    d. Total number of units in project

B. Required Prior to Issuance of Water Permits

1. Application(s) signed by Owner and/or Municipality(public fire hydrants)
2. One or more of the following signed by owner
    a. Main Extension Agreement
    b. Escrow Agreement
    c. Fire Suppression Waiver
3. Check(s) to cover Authority expenses and/or Tapping Fee
4. Authority Board approval (main extensions)
6. Letter from municipality of approval for main extension(s)
7. Signed and notarized legal agreement(s) if applicable
8. Payment of Water Main Reimbursement if applicable
9. Signed Residential Sprinkler Acknowledgment Form (single family only)
10. Backflow Review by Authority personnel

C. Required Prior to Installation

1. Road Occupancy Permit(s) if applicable

D. Required Prior to Issuance of Residential Subdivision Water Permits

1. Submit Two (2) sets of "As Built" drawings showing items listed in "Appendix A" under Required Information. Plans to be marked "As Builts" and dated.
2. One (1) digital copy of "As Built" drawings to be supplied on CD per the specifications outlined in Appendix "A".

Section 1

MATERIAL

Ductile Iron Pipe

1. Ductile iron pipe shall be Class 52 (minimum) and must be manufactured in accordance with ANSI/AWWA C150 & C151 standards for ductile iron pipe, centrifugally cast and manufactured in the U.S.A..

2. Joints for ductile iron pipe shall be of a restrained joint type, such as Field-Lok Restrained Joint Gaskets or equal and are required at each joint and shall comply with ANSI/AWWA C111/A2.11 standards.

3. All ductile iron pipe shall be cement lined and coated inside and outside with a bituminous seal coat in accordance with ANSI/AWWA C104 standards. The thickness of the lining shall NOT be less than one-eighth (1/8") inch for four (4") inch thru twelve (12") inch diameter pipe and shall NOT be less then three-sixteenths (3/16") inches for fourteen (14") inch thru twenty-four (24") inch diameter pipe.

Fittings

1. Fittings four (4") thru sixteen (16) inches in diameter shall have a minimum rating of 350 psi and shall be Ductile Iron compact mechanical joint fittings, in accordance with ANSI/AWWA C153/A21.53-88 standards, with mechanical joints conforming to ANSI/AWWA C111 complete with bolts, nuts. All sleeves shall be of the Solid Sleeve Type with accessories and manufactured in the U.S.A.

2. All fittings are to have Ebaa Iron Sales, Inc., Mega-Lug Glands (Series 1100) or equal manufactured to ASTM A536, 60-42-10 ductile iron standards.

3. All nuts/bolts shall be installed with the proper torque according to the manufactures' instructions.

Gate Valves

1. Valves shall be American Flow Control Series 2500 Resilient Wedge Gate Valve **OR** C515 Kennedy KSRW. Valves twelve (12") inches and less, shall be of the iron body, non-rising bronze stem, resilient seated wedge type equal to or exceeding the requirements of AWWA Specification C-515, with a working pressure of 250 psi. All valves shall open "LEFT", and have a two (2") inch square wrench nut for buried service. End connections shall be mechanical joint, conforming to ANSI/AWWA C111 with all necessary accessories. All interior and exterior metal surfaces shall be fully coated with 4 mils, two-part epoxy coating and manufactured in the U.S.A. and be purchased from an authorized American Flow Control or Kennedy distributor.

2. Proof of manufacturer must be provided to the Authority for all gate valves, prior to installation.

3. All valves are to have Ebaa Iron Sales, Inc., Mega-Lug Glands or equal manufactured to ASTM A536, 60-42-10 ductile iron standards.

Valve Boxes

Valve boxes shall be provided and installed for all buried valves. Valve boxes shall be cast iron, two piece, screw adjustable type, five and one-quarter (5-1/4") inch shaft, with locking cover for valves located within the pavement, regular lids are to be used in other areas, both types are to be marked “WATER”. Valve boxes shall be 6850 Screw Type as manufactured by Bingham & Taylor or approved equal and are to be manufactured in the USA. The lengths of the valve boxes shall be screw adjustable for lengths between 39" to 60". Valve boxes shall be hot bituminous coated, inside and outside, with a coal tar or asphaltic compound. All Valve boxes located on designated fire lines, the must have covers marked “FIRE”.

Underground Marking Tape

It shall be bright blue in color of detectable material for locating, continuously printed ribbon tape of not less than six (6") inches wide for all lines including mains, services and fire hydrant laterals installed on the Authority’s system.

Water Service Connections

1. Corporation stops shall have inlet threads which conform to AWWA/CC taper thread and quick joint outlet. Corporation stops shall be ball valve style, Type FB1000 - Q, by Ford Meter Box Co. or Type 300, by Mueller Co. (All 1" connections require the use of Mueller Type 300 Corporations and Mueller Tapping Bits).

2. Curb stops shall have compression joints on both the inlet and outlet side. Curb stops shall be ball valve style, Type B44, by Ford Meter Box Co. or Type 300 by Mueller Co. and manufactured in the U.S.A.

3. A 36" Stationary Stainless Steel Rod for a 2.5" curb box as manufactured by Water Key, Model CBRSS-36 or SLC Meter, LLC 36" Model or Approved Equal shall be installed on all curb stops 1" and smaller for the curb box specified on Page 1 - 3 of these specifications.

4. For all service connections larger than two (2") inches, gate valves are required. Valves twelve (12") inches and less, shall be American Flow Control Series 2500 resilient wedge type or C515 Kennedy KSRW equal to or exceeding the requirements of AWWA Specification C-515, rated for a working pressure of 250 psi. Gate valves shall be NSF Standard 61 certified. All valves shall open

"LEFT", and shall be provided with a two (2") square wrench nut for buried service and manufactured in the U.S.A. For valves over 12" in diameter, contact the Authority for specifications.

5. All valves larger than two (2") inches are to have Ebaa Iron Sales, Inc., Mega-Lug Glands or equal manufactured to ASTM A536, 60-42-10 ductile iron standards and manufactured in the U.S.A.

6. End connections shall be mechanical joint, conforming to ANSI/AWWA C111 with all necessary accessories. Valves shall have a full opening flow way of equal diameter to the connecting pipe. Valve body, bonnet, stuffing box and disk castings shall be manufactured of ASTM A-126 Class B Gray Iron. All interior and exterior metal surfaces shall be fully coated with 4 mils, two-part epoxy coating and manufactured in the U.S.A.

Copper Tubing

1. Shall be Seamless Type "K" copper, soft temper, for underground service, conforming to ASTM B-88 and B-251 for lines two (2") inches and less in diameter and manufactured in the U.S.A.

2. For connections of existing copper to copper service lines use Ford Meter Co. coupling C44 or approved equal for compression connections.

3. For connections of existing copper to iron service lines use Ford Meter Co. coupling C45 or approved equal.

Curb Boxes

1. Curb boxes for three-quarter (3/4") & one (1") inch diameter service connections shall be cast iron, two piece, screw adjustable type, two and one half (2 ½") inch shaft with flush fit cover marked "WATER". Curb boxes shall be Catalog Size No. 94-E (catalog figure 4901) by Bingham & Taylor, or equal and manufactured in the U.S.A. The length of the curb box shall be adjustable from 40" to 60". The cover shall be 2 ½" Flush Fit cover marked WATER as shown in Figure 4109-B in the Bingham & Taylor catalog. Curb boxes shall be hot bituminous coated, inside and outside with coal tar or asphalt compound.

2. A 36" Stationary Rod shall be installed on all curb boxes with services 1" and smaller. See specification on Page 1 - 2 for details.

3. For service connections of one and one-half (1-1/2") inches and larger, a valve box will be required (See Valve Boxes, Page 1 - 2).

Tapping Sleeves and Valves

1. For branch sizes 12" in diameter and less Tapping Sleeves and Valves shall be Stainless Steel. Manufacture shall be 304 ASTM A240, UNS designated S30400, minium working pressure of 200 psi, split type sleeve, GMAW and GTAW welded, fully passivated, stainless steel flange ASTM A240, Type 304, MSS-SP-60 or Ductile Iron flange ASTM A193 with Stainless Steel hex nut ASTM 194, Type 304, stainless steel sidebars GTAW welded to shell in accordance with provisions of AWWA C-223, latest edition.

2. For branch sizes larger than 12" in diameter, please contact the Authority for specifications.

3. Tapping Valve - conform with the Gate Valve of these specifications, AWWA C-515 with flange end ANSI B16.1 CLASS 125 by mechanical joint end AWWA/ANSI C111/A21.11.

Fire Hydrants

1. Hydrants shall be only American Darling fire hydrants, Model B-62-B, Traffic Model as manufactured by American Darling Valve **OR** Kennedy, Model K81-D and be purchased from an authorized American Flow Control or Kennedy distributor.

A. National Standard threads are required on all nozzle connections and must be of a design to allow replacement in the field.

B. Hydrant body must be factory painted using Baked Enamel or Epoxy coating, color YELLOW w/silver 2.5" nozzle caps with chains or Equal.

C. After a fire hydrant has been installed and flow tested by Authority personnel the developer/contractor must procure and install the proper colored bonnet in accordance with the NFPA Hydrant Color Code

D. Proof of manufacturer must be provided to the Authority for all fire hydrants, prior to installation.

2. Fire hydrants, auxiliary valves and valve box shall be in compliance with AWWA C-502. All valves and piping shall be designed for 200 psi working pressure and manufactured in the U.S.A. **Hydrant Springs must be Stainless Steel, Hydrants with carbon steel springs will be rejected.**

All materials installed on the Authority system must be manufactured within the U.S.A.

Section 2

INSTALLATION

All water mains, water service connections and fire hydrants will only be installed per Authority approval and inspection. The Authority project inspector is authorized to require changes during the installation of water mains, service connections, fire hydrants and their appurtenances if it is deemed to be in the best interest of the Authority.

Water Mains

1. **Cover** - Water lines must be installed to a minimum depth of four (4') feet and a maximum depth of five (5') feet below finished grade.

2. **Horizontal Location** - Water mains will be installed approximately nine (9.0') feet off of the property line within the public right-of-way on all streets having fifty (50') foot rights-of-way. On streets having rights-of-way greater than fifty (50') feet, the water main will be installed approximately ten (10') feet off the property line. In all cases, installation shall be between the back of curb and sidewalk, including the water main and all service line appurtenances. The final location of the water main shall be determined at the time of installation by authorized Authority personnel.

3. **Trenching** - Trenches shall provide solid and continuous bearing for all pipe installed. Over excavation shall be backfilled to the proper grade with compacted earth, sand fine gravel or similar material. Piping may not be supported by rocks or blocks at any point. Rocky soil shall be over excavated to a depth equal to one (1) times the pipe diameter or six (6") inches whichever is greater and backfilled to the proper grade with compacted granular material.

4. **Backfill/Bedding** - No rocks, broken concrete, frozen chunks or other rubble can be deposited within the trench. The first layer of backfill over the pipe shall be twenty-four (24") inches of 2A stone, then compacted to a depth of twelve (12") inches after compaction. The remaining trench depth can be backfilled with approved material in layers of eight (8") inches and compacted in place.

a. Ductile Iron pipe - When acceptable to the Authority, native material may be used for backfill after the first layer over the water main which shall consist of twenty-four (24") inches of 2A stone, then compacted to a depth of twelve (12") inches after compaction. Bedding shall be 6" of 2A stone placed so that the pipe shall have contact for the entire length. When the trench conditions are unsuitable, select bedding and backfill materials may be required.

b. Copper - Bedding shall be clean topsoil, non-limestone select granular material or sand, conforming to PennDot Publication 408, Section 703.1, 703.2 or 703.3 respectively. Bedding shall be placed twelve (12") above and six (6") inches below the water line.

c. Where applicable, backfill must meet all local municipal and/or state requirements.

d. Backfilling can not be completed until Authority personnel have inspected and approved the installation including depth. All joints, fittings and fire hydrant connections must be visible to the inspector.

e. Underground Marking Tape as listed on Page 1 - 2 of these specifications is to be placed a minimum of one (1') foot above the installed water line.

5. **Utility Separation** - A minimum of twelve (12") inches of vertical separation must be maintained between the water main and any sanitary/storm sewer crossing with each pipe being installed on a solid ledge. A minimum of five (5') feet horizontal separation must be maintained between the water main and sanitary/storm sewer if they are the same elevation. The horizontal separation between water lines and all other utilities is a minimum of five (5') feet. Minimum three (3') feet horizontal separation from all non-water main appurtenances including but not limited to service lines, curb boxes and fire hydrants.

6. **Installation Layout -** Prior to the installation of any water main extension(s) or water service connection(s) for an approved water main extension, all property corners within the main extension limits shall be surveyed and staked by the developer/contractor. Each stake shall show lot number(s) and finished grades. In the instance where property corners are over seventy-five (75') feet apart, additional survey stakes shall be required at maximum intervals of fifty (50') feet. It will be the responsibility of the contractor to maintain the integrity of the survey stakes during construction. Should questions arise during construction, the Authority reserves the right to stop construction and require that the accuracy of the survey be confirmed at the developer's expense.
If there is an error discovered after completion of the water main extension involving either the water main or curb box placement, including the depth of each, it shall be the responsibility of the developer/owner to relocate the water main and/or curb stop to the location in accordance with the Authority specifications. This must be completed before any water permit can be issued for any lot fronting the water main extension.

7. **Dead End Installations** - All water main extensions shall end with a gate/butterfly valve of the same diameter as the installed water main.

8. **Blow-off-Assemblies** - Shall be required on all dead end lines and shall be as follows:

a. Six (6") inch and smaller mains - Two (2") inch curb stop and blow-off, with a two (2") inch BRASS NIPPLE between the two inch curb stop and cap/plug.

b. Eight (8") inch mains - Four (4") inch valve and blow-off.

c. Twelve (12") inch and larger mains - Six (6") inch valve and blow-off.

9. **Minimum Pipe Length** - No ductile iron pipe shall be installed less than two (2') feet in length without prior approval of the Authority.

10. **Valves/Fittings** - All valves and fittings are to have Mega-Lug Glands or equal manufactured to ASTM A536, 60-42-10 ductile iron standards.

a. All nuts/bolts shall be installed with the proper torque according to the manufactures' instructions.

b. The valve box shall be installed in a manner approved by the Authority.

11. **Trenchless Installation** - Will be acceptable provided that it is done so no settlement above the pipeline or voids around and below the pipeline occur.

12. **Customer Notification** - A minimum of Three (3) days notice in advance of the scheduled work, all affected property owners shall be notified by the contractor that they will be without water service. In the event that water service to any property must be interrupted for longer that eight (8) hours, it is the contractor's responsibility to provide temporary water service to that property.

A minimum Three (3) days notice in advance of the scheduled work, all affected property owners shall be notified by the contractor that access to their property will be interrupted or limited. In the event that access must be interrupted for longer than eight (8) hours, it is the contractor's responsibility to provide temporary access to that property.

13. **Pressure Testing** - shall be in accordance with AWWA C600. Hours for beginning a pressure test are between 8:30 a.m. and 12:30 p.m.

14. **Disinfection** - shall be in accordance with AWWA C651-92.

15. **Bacteriological Test** - When the water in the treated main shall have been proven comparable to that of the source, the main will be charged with source water and allowed to stand for a period of twenty-four (24) hours. After this period a water sample will be collected for a bacteriological test. Bacteriological analysis will be run by a commercial or other laboratory approved by the Authority and paid by the owner/contractor.

Water Service Connections

1. **Corporation Installation** - Service corporations will be installed at the three o'clock or nine o'clock positions only on the water main.

2. **Depth** - All service connections must be installed to a minimum depth of four (4') feet and a maximum depth of six (6') feet below finished grade.

3. **Trenching** - Trenches shall provide solid and continuous bearing for all pipe installed. Over excavation shall be backfilled to the proper grade with compacted earth, sand fine gravel or similar material. Piping may not be supported by rocks or blocks at any point. Rocky soil shall be over excavated to a depth equal to one times the pipe diameter or six (6") inches whichever is greater and backfilled to the proper grade with compacted granular material.

4. **Backfill/Bedding** - All services requiring copper tubing shall be bedded with a minimum of six (6") inches on the bottom and sides, with twelve (12") inches on the top of clay or sand (no limestone sand permitted).

a. Ductile Iron pipe - When acceptable to the Authority, native material may be used for bedding and/or backfill. When the trench conditions are unsuitable, select bedding and backfill materials may be required.

b. Copper - Bedding shall be clean topsoil, non-limestone select granular material or sand, conforming to PennDot Publication 408, Section 703.1, 703.2 or 703.3 respectively. Bedding shall be placed twelve (12") above and six (6") inches below the water line.

c. Prior to the backfilling of an service connection trench, Authority personnel must inspect the installation with the service line under operating pressure. All joints, fittings and valves must be visible to the inspector.

d. All service connections requiring ductile iron pipe shall be bedded in conformance with the specifications listed in Section 3, Paragraph A3 of these specifications.

e. Underground Marking Tape conforming to Section 1, Paragraph G of these specifications is to be placed a minimum of one (1') foot above the installed water line.

5. **Horizontal Location** - All service valves will be installed a minimum of six (6') feet from the property line within the public right-of-way and marked with a stake painted blue. On service connections larger than two (2") inches a Foster Adapter must be installed to allow the direct connection of the gate valve to the tee if necessary to keep the valve within the public right-of-way. No service valves can be installed under sidewalks or pavement. Where necessary, service connections crossing roadways require the installation of a gate valve on the end of the pipe. Where possible the Authority may require more than one service be to installed within a single trench. This shall be determined by authorized Authority personnel either before or any time during installation.

6. **Utility Separation** - A minimum of twelve (12") inches of vertical separation must be maintained between the water main and any sanitary/storm sewer crossing with each pipe being installed on a solid ledge. A minimum of five (5') feet horizontal separation must be maintained between the water main and sanitary/storm sewer if at the same elevation. The horizontal separation between water lines and all other utilities is a minimum of five (5') feet.

7. **Trenchless Installation** - Will be acceptable provided that it is done so no settlement above the pipeline or voids around and below the pipeline occur. There must also be no joints in copper service connections within the bored distance.

8. **Existing Service Connections** - It shall be the Contractors responsibility to physically verify the location and size of all service lines prior to starting excavation. It is also the Contractors responsibility to determine the location of all other utilities within the work area.

9. **Customer Notification** - At least twenty-four (24) hours in advance of the scheduled work, all affected property owners shall be notified by the contractor that they will be without water service. In the event that water service to any property must be interrupted for longer that eight (8) hours, it is the contractor’s responsibility to provide temporary water service to that property.

At least twenty-four (24) hours in advance of the scheduled work, all affected property owners shall be notified by the contractor that access to their property will be interrupted or limited. In the event that access must be interrupted for longer than eight (8) hours, it is the contractor’s responsibility to provide temporary access to that property.

Fire Hydrants

1. All fire hydrants shall be installed with a six (6")inch gate valve between the fire hydrant and the distribution line.

2. Fire hydrants of the proper length are to be installed to meet proposed grade.

3. In situations where an extension is necessary to meet proposed grade, only barrel extensions may be used after receiving Authority approval.

4. Hydrants shall be located as shown on the plans or as directed by the Authority.

5. No concrete thrust block is required on the fire hydrant unless directed by the Authority.

6. After a fire hydrant has been installed and flow tested by Authority personnel the developer/contractor must procure and install the proper colored bonnet in accordance with the NFPA Hydrant Color Code

Violations

The Authority reserves the right to have any developer/contractor correct any violations concerning the installation of water mains, services or fire hydrants at the developers expense discovered during or after the Authority inspection(s) have been completed. The Authority will not provide water service or take possession of the water main until said corrections have been completed and comply with Authority specifications.

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APPENDIX "A"

"As Built" Submission Specifications

The State College Borough Water Authority maintains an Esri compatible Geodatabase of field assets. The Geographic Information System (GIS) data model schematic represents the existing and abandoned field assets including hydrants, mains, fittings, valves, services, pumps, tanks, wells etc.

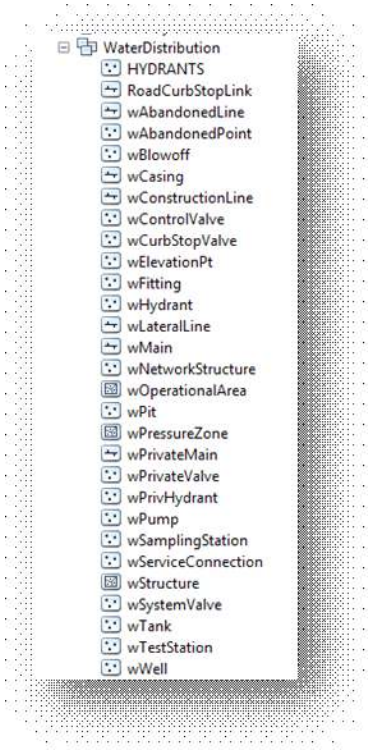

Figure 1: Feature types (layers) that comprise the GIS for SCBWA.

PURPOSE: The SCBWA seeks to have all as-built drawings submitted both in hardcopy (printed) and electronic form. The electronic files will be used for reviewing and approving the submittals as well as populate the GIS with updated information. In order for SCBWA to properly review submitted AutoCAD (DWG) or MicroStation (DGN) drawings, they must be generated with specific features and only those features isolated on a unique Layer in CAD and must be generated using a real world coordinate projection.

Requirements: The layering schema is provided with the CAD electronic seed file. The CAD electronic seed file will be provided upon request. The layers represent the asset types that should be uniquely identified in the electronic files submitted. The page layout can be unique to your organization. Other requirements of the electronic file are as follows:

- ♦ Avoid using splined polylines

- Avoid using 3D polylines
- Provide both a **DWG/DGN and a DXF** for each Referenced CAD drawing. (Water distribution features should be contained in a single file. Other utilities can be provided in separate CAD files).
- The Coordinate project should be

  NAD_1983_StatePlane_Pennsylvania_North_FIPS_3701_Feet

  WKID: 2271 Authority: EPSG

  Projection: Lambert_Conformal_Conic

  False_Easting: 1968500.0

  False_Northing: 0.0

  Central_Meridian: -77.75

  Standard_Parallel_1: 40.88333333333333

  Standard_Parallel_2: 41.95

  Latitude_Of_Origin: 40.16666666666666

  Linear Unit: Foot_US (0.3048006096012192)

  Geographic Coordinate System: GCS_North_American_1983

  Angular Unit: Degree (0.0174532925199433)

  Prime Meridian: Greenwich (0.0)

  Datum: D_North_American_1983

  Spheroid: GRS_1980

  Semimajor Axis: 6378137.0

  REQUIRED INFORMATION ON "AS BUILTS"

  All of the below items are required to be recorded on a GPS unit during installation to record the most accurate data.

  1. Water main and service line sizes/materials

  2. Depth to top of water mains at fifty (50') foot intervals, at intersections and where changes in depth occur

  3. Indicate location and type of fitting used during the installation of the water main and/or service lines

  4. Lengths of pipe/service line(s) installed.