Fauquier County Water and Sanitation Authority

7172 Kennedy Road

Warrenton, Virginia 20187

Appendix D – Approved Materials List

June 2026

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GENERAL NOTES

1. Questions or comments regarding the Approved Materials List should be directed to Fauquier County Water and Sanitation Authority (FCWSA) Engineering Department at (540) 349-2092.

2. All standards referenced in the Approved Materials List shall be the latest version of that standard.

3. All pipes, fittings, and fixtures used in public water systems shall comply with NSF 372 *Drinking Water System Components – Lead Content* and conform to the lead content requirements for "lead-free" plumbing as defined in the latest requirements of the Federal Safe Drinking Water Act.

4. All materials considered for use in water and/or sanitary sewer systems must be reviewed and approved by FCWSA prior to being included in the Approved Materials List. In order for FCWSA to review and possibly accept materials, samples must be submitted as well as test results and certification documents from ASTM, AWWA, etc. Further information may be requested to evaluate materials such as shop drawings, design information, terms of warranty, documented history of material performance, and manufacturer/distributor locations and availability.

5. After an item is approved, the manufacturer or representative shall inform FCWSA, in writing, of any modification in design or material. Changes in design or material may require further evaluation and approval of the product.

6. FCWSA may withdraw any approval as a result of design change, field observation, testing, product failure, or other factors which, in FCWSA's opinion, warrant such withdrawal.

7. Any materials delivered to the project site which are deemed to be inferior quality by the FCWSA Inspector shall be removed from the site and replaced with acceptable materials.

1A - DUCTILE IRON PIPE

Ductile Iron Mechanical Joint Pipe

STANDARDS

- ANSI/AWWA C151/A21.51 Ductile Iron Pipe, Centrifugally Cast
- ANSI/AWWA C111/A21.11 Rubber-Gasket Joints for Ductile Iron Pressure Pipe and Fittings
- ANSI/AWWA C104/A21.4 Cement-Mortar Lining for Ductile Iron Pipe and Fittings for Water

DESIGN AND PERFORMANCE REQUIREMENTS

- Thickness class for water and sewer construction shall be minimum Class 52. A greater thickness may be required when conditions so dictate.
- Mark manufacturer, weight, class, and thickness on outside of each pipe.
- Pipe for water service shall be double lined with cement mortar in accordance with ANSI/AWWA C104/A21.4 and compliant with ANSI/NSF Standard 61 for potable water contact.
- All sanitary sewers and force mains shall be lined with Protecto 401 ceramic epoxy.
- An asphaltic coating shall be factory applied to the outside of all pipes in accordance with ANSI/AWWA 151/A21.51.
- For soil types that are highly corrosive to steel, the pipe exterior shall be coated with 200 g/m^2 of metallic zinc in accordance with ISO 8179-1 with finishing layer of factory applied asphaltic topcoat. Markings shall include the word ZINC.
- Polyethylene encasement is required on all ductile iron pipe and fittings for additional corrosion protection. (See Section 1E of this Appendix)

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
American Cast Iron Pipe Company	02/2015	
McWane Ductile	02/2015	
U.S. Pipe	04/2012	

Ductile Iron "Push-On" Joint Pipe

STANDARDS

- ANSI/AWWA C151/A21.51 Ductile Iron Pipe, Centrifugally Cast
- ANSI/AWWA C111/A21.11 Rubber-Gasket Joints for Ductile Iron Pressure Pipe and Fittings
- ANSI/AWWA C104/A21.4 Cement-Mortar Lining for Ductile Iron Pipe and Fittings for Water

DESIGN AND PERFORMANCE REQUIREMENTS

- Thickness class for water and sewer construction shall be minimum Class 52. A greater thickness may be required when conditions so dictate.
- Mark manufacturer, weight, class, and thickness on outside of each pipe.
- Pipe for water service shall be double lined with cement mortar in accordance with ANSI/AWWA C104/A21.4 and compliant with ANSI/NSF Standard 61 for potable water contact.
- All sanitary sewers and force mains shall be lined with Protecto 401 ceramic epoxy.
- An asphaltic coating shall be factory applied to the outside of all pipes in accordance with ANSI/AWWA 151/A21.51.
- For soil types that are highly corrosive to steel, the pipe exterior shall be coated with 200 g/m^2 of metallic zinc in accordance with ISO 8179-1 with finishing layer of factory applied asphaltic topcoat. Markings shall include the word ZINC.
- Polyethylene encasement is required on all ductile iron pipe and fittings for additional corrosion protection (See Section 1E of this Appendix).

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
American Cast Iron Pipe Company	11/2017	Fastite
McWane Ductile	02/2015	Tyton
U.S. Pipe	04/2012	Tyton

Ductile Iron Flanged Pipe

STANDARDS

- ANSI/AWWA C115/A21.15 Flanged Ductile-Iron Pipe with Ductile Iron or Gray-Iron Threaded Flanges
- ANSI/AWWA C151/A21.51 Ductile Iron Pipe, Centrifugally Cast
- ANSI/AWWA C104/A21.4 Cement-Mortar Lining for Ductile Iron Pipe and Fittings for Water
- Threads shall conform to ANSI B1.20.1 National Pipe Thread Taper

DESIGN AND PERFORMANCE REQUIREMENTS

- Flanged joints may be used only in buildings, in vaults, or where specified on construction plans.
- Thickness class shall be a minimum Class 53 with a minimum working pressure rating of 250 psi. A greater thickness may be required when conditions so dictate.
- Bolt circle and holes shall conform to Class 125 standard template in accordance with ANSI B16.1.
- Gaskets 12-inches in diameter and smaller shall be full-faced 1/8-inch thick, and shall conform to the dimensions of Table A1 of AWWA C115 Section A2. For pipe sizes 16-inch and larger, use ring gasket.
- Gaskets shall extend to inside of bolt holes and to the inside diameter of the pipe thereby protecting the threads that join the flange from corrosion.
- Bolts and nuts shall be low-carbon steel, ASTM A307 Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi tensile strength, Grade B.
- Pipe for water service shall be double lined with cement mortar in accordance with ANSI/AWWA C104/A21.4 and compliant with ANSI/NSF Standard 61 for potable water contact.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
American Cast Iron Pipe Company	11/2021	
McWane Ductile	02/2015	
U.S. Pipe	04/2012	

Ductile Iron Restrained Joint Pipe

STANDARDS

- ANSI/AWWA C151/A21.51 Ductile Iron Pipe, Centrifugally Cast
- ANSI/AWWA C111/A21.11 Rubber-Gasket Joints for Ductile Iron Pressure Pipe and Fittings
- ANSI/AWWA C104/A21.4 Cement-Mortar Lining for Ductile Iron Pipe and Fittings for Water

DESIGN AND PERFORMANCE REQUIREMENTS

- Restrained joint piping systems are required for installation through casings or tunnels in conformance with the Steel Casing Detail G-05.
- Restrained joint pipe is required for all pressure pipes constructed in fill.
- Field welding of restraining components is not permitted.
- Thickness class for water and sewer construction shall be minimum Class 52. A greater thickness may be required when conditions so dictate.
- Mark manufacturer, weight, class, and thickness on outside of each pipe.
- Pipe for water service shall be double lined with cement mortar in accordance with ANSI/AWWA C104/A21.4 and compliant with ANSI/NSF Standard 61 for potable water contact.
- All sanitary sewers and force mains shall be lined with Protecto 401 ceramic epoxy.
- An asphaltic coating shall be factory applied to the outside of all pipes in accordance with ANSI/AWWA 151/A21.51.
- For soil types that are highly corrosive to steel, the pipe exterior shall be coated with 200 g/m2 of metallic zinc in accordance with ISO 8179-1 with finishing layer of factory applied asphaltic topcoat. Markings shall include the word ZINC.
- Polyethylene encasement is required on all ductile iron pipe and fittings for additional corrosion protection.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
American Cast Iron Pipe Company	02/2015	Flex-Ring
McWane Ductile	02/2015	TR Flex
U.S. Pipe	04/2012	HDSS

1B - DUCTILE IRON PIPE FITTINGS

Ductile Iron Mechanical Joint Fittings

STANDARDS

- ANSI/AWWA C111/A21.11 Rubber-Gasket Joints for Ductile Iron Pressure Pipe and Fittings
- ANSI/AWWA C153/A21.53 Ductile Iron Compact Fittings
- ANSI/AWWA C104/A21.4 Cement-Mortar Lining for Ductile Iron Pipe and Fittings for Water
- ANSI/AWWA C116/A21.16 Protective Fusion-Bonded Epoxy Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings

DESIGN AND PERFORMANCE REQUIREMENTS

- Minimum working pressure rating of 350 psi.
- Bolts and nuts shall be high-strength, low-alloy steel in accordance with ANSI/AWWA C111/A21.11 (provided with Field Installed Joint Restraints).
- Fitting design shall prevent T-head bolts from rotating.
- Fittings for water service shall be double lined with cement mortar in accordance with ANSI/AWWA C104/A21.4 and compliant with ANSI/NSF Standard 61 for potable water contact.
- All sanitary sewer and force main fittings shall be lined with Protecto 401 ceramic epoxy.
- An asphaltic coating shall be factory applied to the outside of all fittings in accordance with ANSI/AWWA C153/A21.53.
- For soil types that are highly corrosive to steel, the fitting exterior shall be coated with 200 g/m2 of metallic zinc in accordance with ISO 8179-1 with finishing layer of factory applied asphaltic topcoat. Markings shall include the word ZINC. Fusion-bonded epoxy coating (6-8 mils thickness) of exterior and interior surfaces is an acceptable alternative to zinc coating of exterior and cement lining for water service.
- Polyethylene encasement is required on all ductile iron pipe and fittings for additional corrosion protection.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
American Cast Iron Pipe Company	02/2015	
Sigma Corporation	02/2015	
Tyler Union (McWane, Inc.)	02/2015	
U.S. Pipe	04/2012	

Mechanical Joint Restraints

STANDARDS

- Bolts and nuts shall be in accordance with ANSI/AWWA C111/A21.11 Ductile-Iron and Gray-Iron Fittings for Water

DESIGN AND PERFORMANCE REQUIREMENTS

- The devices shall have a working pressure rating of 350 psi for 3-16 inch and 250 psi for 18-48 inch size. Ratings are for water pressure and must include a minimum safety factor of 2 to 1 in all sizes.
- Gland body, wedges and wedge actuating components shall be cast from grade 65-45-12 ductile iron material in accordance with ASTM A536.
- Bolts and nuts shall be high-strength, low-alloy steel in accordance with ANSI/AWWA C111/A21.11

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
EBAA Iron, Inc.	04/2012	MEGALUG Series 1100 Series 1500 (PVC – SEWER)
Ford Meter Box Company (Domestic Only)	02/2015	Uni-Flange UFR1400-DA-xx-U

Restrained Flange Adapters

STANDARDS

- Flange bolt circles compatible with ANSI/AWWA C115/A21.15 Flanged Ductile Iron Pipe with Threaded Flanges
- Bolts and nuts shall be in accordance with ANSI/AWWA C111/A21.11 Ductile-Iron and Gray-Iron Fittings for Water

DESIGN AND PERFORMANCE REQUIREMENTS

- Flange adapters shall be made of ductile iron conforming to ASTM A536.
- Minimum 2 to 1 Safety Factor
- Minimum pressure rating of 250 psi
- Bolts and nuts shall be high-strength, low-alloy steel in accordance with ANSI/AWWA C111/A21.11.
- Adapters listed below are for use in buildings and vaults to enable components such as meters or valves to be removed from the line. Use only where approved to enable the system to be dismantled. Flange adapters may not be substituted for fabricated sections of flanged pipe.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
EBAA Iron, Inc.	04/2012	MEGAFLANGE Series 2100
Ford Meter Box Company (Domestic Only)	02/2015	RFAP-DxxR-U (sizes > 12”)

Bell Restraint Harness

STANDARDS

- Restraint for Ductile Iron Pipe at Push-On Bells meeting ANSI/AWWA C151/A21.51 and ANSI/AWWA C150/A21.50
- Bolts and nuts shall be in accordance with ANSI/AWWA C111/A21.11 Ductile-Iron and Gray-Iron Fittings for Water

DESIGN AND PERFORMANCE REQUIREMENTS

- Minimum working pressure of 350 psi for sizes 3 inch through 16 inch (DIP only)
- Minimum working pressure of 250 psi for sizes 18 inch through 48 inch (DIP only)
- The restraint shall be manufactured of ductile iron conforming to ASTM A536.
- Minimum 2 to 1 Safety Factor
- Bolts and nuts shall be high-strength, low-alloy steel in accordance with ANSI/AWWA C111/A21.11.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
EBAA Iron, Inc.	03/2023	Series 1500 (PVC)
		Series 1700 (DIP)

1C – CASING PIPE

Casing Pipe

STANDARDS

- FCWSA Utility Standards Manual 4.08, 6.10, and Detail G-05 for water and sewer mains
- VDOT Road and Bridge Standards, Section 1400 Utilities (Concrete/Steel Encasement Pipe)
- For casing pipe of service laterals, see **Service Line Tubing and Casings** under *Part 2, Water Construction* of this appendix.

DESIGN AND PERFORMANCE REQUIREMENTS

- Casing shall be smooth wall steel pipe, conforming to ASTM A139, Grade B with a minimum wall thickness of ½ inch, or ASTM A53 Standard Weight Class. Casing shall be exterior prime coated with bituminous asphalt coating and have beveled edges suitable for field welding. Smooth Wall steel pipe shall have weld beads of no more than ¼ inch tall and a minimum radius of curvature of 2 inch. Spiral welded pipe is not permitted.
- Casing pipe shall have a minimum yield strength of 35,000 psi.
- See Detail G-05 for sizing of casing pipe.
- All carrier pipes within the casing to be restrained joint piping system.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Arntzen Steel Pipe	03/2023	
OPS Sales Company	11/2021	
Pittsburgh Pipe	11/2017	

Casing Spacer and End Seals

STANDARDS

- FCWSA Utility Standards Manual 4.08, 6.10, and Detail G-05 for water and sewer mains
- VDOT Road and Bridge Standards, Section 1400 Utilities (Concrete/Steel Encasement Pipe)

DESIGN AND PERFORMANCE REQUIREMENTS

- Casing spacer shall be a two-piece shell per carrier pipe and made from T-304 stainless steel of a minimum 14-gauge thickness.
- Each shell section shall be 8-inch width for 12-inch diameter pipe or smaller and 12-inch width for 16-inch diameter pipe or larger.
- The liner shall be a ribbed PVC extrusion, with a thickness of .090-inch.
- The spacers shall have a combination of 10-gauge risers MIG welded to the bands and 2-inch wide high strength glass filled polymer runners.
- The runners and risers shall be placed in position to properly support the carrier pipe within the casing and maintain a minimum clearance of 1-inch between the casing ID and the spacer OD.
- Minimum of three casing spacers required per pipe length, or more as required by the manufacturer with a maximum separation of 6-ft from centerline.
- All hardware shall be type 304 stainless steel.
- Casing end seals shall be standard pull-on type made of a minimum 1/8” thick neoprene rubber.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Advance Products & Systems, LLC	04/2024	SSI (spacer)
		AC (end seal)
Cascade Waterworks Manufacturing	04/2024	Style CCS (spacer)
		Style CCES (end seal)
The BWM Company	02/2015	BWM-SS (spacer)
		BWM-PO (end seal)

1D – LINE LOCATORS

Line Location Markers

STANDARDS

- FCWSA Utility Standards Manual 4.04 and 7.04
- FCWSA Utility Standards Manual Details SC-08 and SC-09

DESIGN AND PERFORMANCE REQUIREMENTS

- Full-range disc type line markers shall be installed in accordance with the manufacturer's specifications and installation instructions. Markers shall be a minimum of 6" vertical separation above the buried facility at a maximum depth of 6.5-ft below final grade.
- The maximum spacing between markers shall be 40 feet.
- All markers shall be color-coded to APWA standards (i.e. blue for water and green for sanitary sewer) and tuned to a specific frequency for each utility.
- For water construction, the markers are to be placed on top of the pipe, along the pipe route, at each change in direction, tee, corporation stop, and all other fittings.
- On sanitary sewer lines, markers shall be installed on top of the pipe at the tee of each individual service connection, 5 feet from the stub-out end of each service connection, and at each change in direction along the route of the individual service connection.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
3M	04/2012	EMS Full-Range Markers (1252 – water; 1253 – sewer)
Telemark Solutions	02/2015	DiskMark

Marker Tape

STANDARDS

- FCWSA Utility Standards Manual 4.04, 7.04 and Detail G-01
- ASTM D2103 Standard Specification for Polyethylene Film and Sheeting
- ASTM D882 Standard Test Method for Tensile Properties of Thin Plastic Sheeting (Method A)

DESIGN AND PERFORMANCE REQUIREMENTS

- Non-detectable marker tape shall be buried 18 inches above the pipe for the entire length of the pipe.
- Tape shall consist of a 4-mil overall thickness of polyethylene film formulated to resist degradation due to acid and alkaline soils. Tape shall be 6 inches wide.
- Text must be at intervals of 36 inches or less.
- Tape installed with water piping shall have APWA blue background with "CAUTION BURIED WATER LINE" in black letters.
- Tape installed with sanitary sewer shall have APWA green background with "CAUTION BURIED SEWER LINE" in black letters.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Christy's	11/2021	
Harris Industries, Inc.	02/2015	
Presco	11/2021	
Pro-Line Safety Products Co.	02/2015	

Tracer Wire

STANDARDS

- FCWSA Utility Standards Manual Details G-01, SC-13, and WM-01

DESIGN AND PERFORMANCE REQUIREMENTS

- Tracer wire required only with nonmetallic (e.g., PVC, HDPE or PEX) pipeline.
- Wire to be #12 AWG solid copper with high molecular weight polyethylene (HMWPE) insulation of minimum thickness of 45 mils.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Kris-Tech Wire	02/2015	HMWPE
Pro-Line Safety Products Co.	04/2012	Copper PE45

1E – CORROSION PROTECTION

Petrolatum Tape Coating

STANDARDS

- ANSI/AWWA C217 Cold-Applied Petrolatum Tape and Petrolatum Wax Tape Coated for the Exterior of Special Sections, Connections, and Fittings for Buried Steel Water Pipe

DESIGN AND PERFORMANCE REQUIREMENTS

- All mechanical joints and bolts shall be field coated with a petrolatum system (wax and tape), in accordance with manufacturer's recommended installation procedures. The mechanical joints shall be fully coated. The remainder of the fitting need not be wrapped in wax and tape.
- Insulating flanges shall be field coated with a petrolatum system (wax and tape) in accordance with manufacturer's recommended installation procedures.
- To aid in the adhesion, a compatible primer shall be applied prior to application of the wax and tape.
- An outer plastic wrap over the wax tape shall be provided for additional protection from soils and chemicals.
- Products shall be non-toxic and non-carcinogenic. All materials shall be from the same manufacturer.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Denso North America Inc.	04/2019	Densyl Wax and Tape System Denso Poly-Wrap
Superior Corrosion Control (SCC)	03/2027	SCC Wax Wrap 80U SCC Ply-Guard
Trenton Corporation	04/2019	Wax-Tape #1 Coating System Poly-Ply Outerwrap

Polyethylene Encasement Tubing

STANDARDS

- ANSI/AWWA C105/A21.5 Polyethylene Encasement for Ductile Iron Pipe Systems

DESIGN AND PERFORMANCE REQUIREMENTS

- Material shall be 8 mils thick linear low-density co-extruded V-Bio enhanced polyethylene. Seamless flat tube form must comply with the minimum widths based on nominal pipe diameter in accordance with above standard.
- Where polyethylene encasement of pipe is specified, fittings and valve bodies are to be included within the encasement.
- Must be installed in accordance with manufacturer's recommendations. Provide a minimum 2-ft overlap between sections.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
American Cast Iron Pipe Company	04/2019	
McWane Ductile	04/2019	
Sigma	03/2027	
U.S. Pipe	04/2019	

Ductile Iron Pipe Lining (SEWER ONLY)

DESIGN AND PERFORMANCE REQUIREMENTS

- All ductile iron pipe and fittings shall be lined with Protecto 401 ceramic epoxy for all sanitary sewer and force main applications.
- The lining shall be applied by a certified firm with a successful history of applying linings to the interior of ductile iron pipe and fittings.
- The interior of the pipe shall receive 40 mils nominal dry film thickness.
- Lined pipe and fittings must be handled only from the outside of the pipe and fittings. No forks, chains, straps, hooks, etc. shall be placed inside the pipe and fittings for lifting, positioning, or laying. The pipe shall not be dropped or unloaded by rolling.
- Care should be taken not to let the pipe strike sharp objects while swinging or being off loaded. Ductile iron pipe should never be placed on grade by use of hydraulic pressure from an excavator bucket or by banging with heavy hammers.
- Protecto 401 Joint Compound shall be used to seal cut ends and repair field damaged areas of Protecto 401 lined pipes and fittings in accordance with manufacturer's recommendations.
- Pipe must be installed within 1 year of date of lining.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Induron Coatings, Inc.	04/2012	Protecto 401

2A – PIPE

Brass Pipe and Fittings

STANDARDS

- FCWSA Utility Standards Manual Details WD-01 & WD-02, WD-03
- ASTM B43 Standard Specification for Seamless Red Brass Pipe, Standard Sizes
- ASTM B687 Standard Specification for Brass, Copper, and Chromium-Plated Pipe Nipples
- Threads shall conform to ANSI B1.20.1 National Pipe Thread Taper
- NSF/ANSI 372 Drinking Water System Components – Lead Content

DESIGN AND PERFORMANCE REQUIREMENTS

- Pipe sizes shall be 2 inch for blow-offs and air release valves with schedule 40 wall thickness.
- Product must be marked with a lead-free identifier (such as “NL” or “LF”) and with the verifying agency’s mark.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
A.Y. McDonald (fittings)	10/2016	
BMI	10/2016	
Ford Meter Box Company (fittings)	03/2023	
Merit Brass	10/2016	
Mueller (fittings)	03/2023	
Trenton Pipe Nipple Company	10/2016	

Service Line Tubing and Casing

STANDARDS

- FCWSA Utility Standards Manual 4.12 B and Detail WS-01
- AWWA C904 Cross-linked Polyethylene (PEX) Pressure Pipe
- ANSI/AWWA C800 Underground Service Line Valves and Fittings
- NSF/ANSI 372 Drinking Water System Components – Lead Content

DESIGN AND PERFORMANCE REQUIREMENTS

- Applies to standard water service connections up to 2 inch in diameter
- Cross-linked polyethylene tubing shall be CTS O.D., class 200, and SDR-9. Tubing shall be "indent" marked with class, size and NSF-PW rating.
  - Pipe shall have a co-extruded UV shield made from UV-resistant high-density polyethylene, color blue. Pipe shall have a minimum UV exposure time of one (1) year when tested in accordance with ASTM F2657.
- Copper tubing shall be type "K" soft copper, sizes ¾ inch to 2 inch.
- The service line between the main and the meter shall be one continuous piece of pipe. No joints will be permitted.
- Service line casing pipe to be HDPE or SCH 40 PVC

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
REHAU (PEX Tubing)	08/2016	MUNICIPEX
Cambridge Lee Industries (Copper Tubing)	08/2016	
Cerro Flow Products, Inc. (Copper Tubing)	08/2016	
Mueller Industries (Copper Tubing & Fittings)	03/2023	
NIBCO Inc. (Copper Fittings)	06/2026	

2B – VALVES

Automatic Air Release Valve

STANDARDS

- FCWSA Utility Standards Manual 3.06 and Detail WD-03
- AWWA C512 Air Release, Air/Vacuum, and Combination Air Valves for Waterworks Service

DESIGN AND PERFORMANCE REQUIREMENTS

- Device must be combination air release and vacuum breaker.
- Universal type with the orifice the same diameter as the inlet
- Working pressure from 0 to 300 psi
- Stainless steel float and resilient seat
- Valves shall have a 2-inch diameter screwed NPT connection.
- All air release piping shall be brass.
- All working parts shall be constructed of non-corroding material.
- Valves used in potable water service shall be certified to NSF/ANSI 61 Drinking Water System Components.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Cla-Val	02/2015	Series 36
Crispin Multiplex Manufacturing Company	04/2012	UL Series
GA Industries, LLC	02/2015	945-T
Val-Matic	03/2016	Series 202C

Ball Valve

STANDARDS

- FCWSA Utility Standards Manual Detail WD-02
- NSF/ANSI 372 Drinking Water System Components – Lead Content

DESIGN AND PERFORMANCE REQUIREMENTS

- Bronze Ball Valve, Size 'B' with 100% full port configuration
- Valve shall be one-quarter turn operation with handle.
- Ball valve shall be lead-free in accordance with NSF/ANSI 372.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
American Valve	02/2015	
Apollo Valves	02/2015	

Butterfly Valve

STANDARDS

- AWWA C504 Rubber-Seated Butterfly Valve
- NSF/ANSI 372 Drinking Water System Components – Lead Content

DESIGN AND PERFORMANCE REQUIREMENTS

- Minimum size of 16" unless otherwise specified on construction plans
- Epoxy coated inside and outside
- Short body type Class 250B
- All fasteners exposed on the valve's exterior to be T304 stainless steel.
- Ductile iron bodied with rubber-seated, self-adjusted disc seal
- Valve ends shall be mechanical joint or flanged.
- Actuators shall rotate counterclockwise to open.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
DeZURIK	04/2019	BAW
Henry Pratt Company	04/2019	HP250II
M&H Valve Company	04/2019	
Mueller	04/2012	Lineseal

Detector Check Valve

STANDARDS

- ASTM A536 Standard Specifications for Ductile Iron Castings
- NSF/ANSI 372 Drinking Water System Components – Lead Content

DESIGN AND PERFORMANCE REQUIREMENTS

- Main body and access cover shall be epoxy coated ductile iron with flanged end connections.
- The stem shall be stainless steel and the seat disc elastomers shall be EPDM.
- Check valve shall be spring loaded and accessible for maintenance without removing the device from the line.
- Shall include metered by-pass and OS&Y shut-off valve.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Zurn Wilkins	11/2017	310DAOSY

Fire Hydrant Check Valve

STANDARDS

- ASTM A536 Standard Specifications for Ductile Iron Castings
- NSF/ANSI 372 Drinking Water System Components – Lead Content

DESIGN AND PERFORMANCE REQUIREMENTS

- Fire hydrant check valve shall be manufactured to meet all the testing and performance standards of AWWA C508 and AWWA C550. Check valve shall be designed for 250 psi working pressure and tested to 500 psi hydrostatic pressure.
- Check valve shall be ductile iron with NSF approved fusion bonded epoxy coating.
- Check valve shall be lead free, with no exposed lead bearing surfaces.
- Check valve shall have an unobstructed waterway. No reduction of port or redirection of flow will be allowed.
- Check valve shall incorporate integral positive restraint connections that maintain a restrained connection between the fire hydrant and the gate valve.
- All fasteners shall be 304 stainless steel and all interior rubber components shall be EPDM rubber.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Kennedy Valve Company (McWane, Inc.)	11/2017	Patriot
Mueller	11/2017	Super Centurion 250/HS

Swing Check Valve

STANDARDS

- AWWA C508 Swing-Check Valves for Waterworks, 2 inch through 24 inch
- ASTM A536 Standard Specifications for Ductile Iron Castings
- NSF/ANSI 61 Drinking Water System Components

DESIGN AND PERFORMANCE REQUIREMENTS

- Valve body and cover shall be ASTM A536 ductile iron coated and lined with an ANSI/NSF 61 approved fusion bonded epoxy coating. The cover shall be domed to create a flushing action around the disc when valve is open.
- Designed for a minimum of 250 psi working pressure. The preferred closure device is lever and spring.
- The disc shall be raised one-piece stainless steel construction and equipped with a molded resilient seat mounted on the disc with an integral O-ring for drip tight sealing. Both seats shall be secured with stainless steel fasteners and must be field replaceable without removing the valve from the pipeline.
- Valve body shall have full flow equal to the nominal pipe diameter without restrictions.
- Valve to be located at least 10 pipe diameters downstream from any flow disturbance or obstruction (valve, pump, elbow, reducer, etc.).
- Valve shall be installed in a 5-ft diameter, flat top manhole with valve and piping elevated a minimum of 12 inches using stainless steel pipe stands bolted to the manhole bottom. At minimum, a pipe stand shall be located at each flange end of the valve. An approved manhole boot shall be located at the pipe penetrations through the manhole wall.
- Swing check valves located on domestic service lines shall be threaded and in accordance with **Brass Pipe and Fittings** under *Part 2, Water Construction* of this appendix.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Cla-Val	11/2017	Series 585
DeZURIK	11/2017	CVS-250/250A
Valmatic	11/2017	Series 7800

Corporation Stop/Valve

STANDARDS

- FCWSA Utility Standards Manual Detail WD-03, WM-01, and WM-02.
- AWWA C800 Underground Service Line Valves and Fittings
- NSF/ANSI 372 Drinking Water System Components – Lead Content

DESIGN AND PERFORMANCE REQUIREMENTS

- Shall be NSF/ANSI 372 certified and NSF/ANSI 61 compliant for use in potable water systems. The product has the letters "NL" cast into the main body for lead-free identification.
- Rated for 300 PSI water pressure.
- Blow out proof EPDM port seals.
- End piece joint sealed with an EPDM O-ring and thread locker
- Inlet threads shall be AWWA taper thread for all corporation stops used on direct taps.
- Insert stiffeners required on all flexible plastic connections.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
A.Y. McDonald	02/2015	74701B-22 (Water Service)
		73149B (Air Release Valve)
Ford Meter Box Company	04/2012	FB1000-x-NL (Water Service)
		FB1700-7-NL (Air Release Valve)
Mueller	04/2012	P-25008N (Water Service)
		B-20046N (Air Release Valve)

Gate Valve

STANDARDS

- FCWSA Utility Standards Manual Detail G-03
- AWWA C509 Resilient Seated Gate Valves for Water Supply Service
- AWWA C550 Protective Epoxy Interior Coatings for Valves and Hydrants

DESIGN AND PERFORMANCE REQUIREMENTS

- For valves 2 inch to 12 inch
- Shall be resilient wedge gate valves with ductile iron bodied. Valve ends shall be restrained mechanical joint for buried applications. Flanged ends with centering ring shall be used in buildings, in vaults, and where joining to a tapping sleeve.
- Non-rising stem with 2-inch operating nut, counter-clockwise rotation of operator to open for buried applications. Counter-clockwise opening with hand wheel in all buildings and vaults.
- Mechanical joint or flanged ends designed for bubble tight closure at 250 psi working pressure. Screw ends are only acceptable for a 2-inch gate valve in a blow off assembly.
- Bonnet and stuffing box bolts and nuts shall be stainless steel in accordance with ASTM 304.
- Bronze or stainless steel stem with triple O-ring stem seals.
- Valve extensions shall have a 2-inch square wrench nut on top end and socket to fit 2-inch square nut on bottom.
- Shall be NSF/ANSI 61 approved for use in potable water systems.
- All valves shall be wrapped with polyethylene encasement tubing.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Clow Valve Company (McWane, Inc.)	06/2015	2639
Kennedy Valve Company (McWane, Inc.)	04/2012	KS-FW (ductile iron body only)
Mueller	04/2012	A-2362 Series T-2362 Series (Tapping)
U.S. Pipe	06/2026	A-USP2

Ball Valve Curb Stop

STANDARDS

- FCWSA Utility Standards Manual Detail WD-02
- ANSI/AWWA C800 Underground Service Line Valves and Fittings

DESIGN AND PERFORMANCE REQUIREMENTS

- CTS pack joints required for the water line connections.
- Shall be NSF/ANSI 372 certified and NSF/ANSI 61 compliant for use in potable water systems. The product has the letters "NL" cast into the main body for lead-free identification.
- Rated for 300 PSI water pressure.
- Blow out proof EPDM port seals.
- End piece joint sealed with an EPDM O-ring and thread locker

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
A.Y. McDonald	03/2023	76100W-22
Ford Meter Box Company	03/2023	B44-333-NL
Mueller	03/2023	P-25155N

2C – METERS AND SERVICE FITTINGS

Angle Dual Check Valve

STANDARDS

- FCWSA Utility Standards Manual Detail WM-01
- ANSI/AWWA C800 Underground Service Line Valves and Fittings
- ANSI/ASSE 1024 Performance Requirements for Dual Check Backflow Preventers

DESIGN AND PERFORMANCE REQUIREMENTS

- Use cartridge style angled dual check valve.
- CTS pack joints required for the water line connections.
- Shall be NSF/ANSI 372 certified and NSF/ANSI 61 compliant for use in potable water systems. The product has the letters "NL" cast into the main body for lead-free identification.
- Rated for 175 PSI water pressure.
- Yoke lock nut requires an EPDM rubber yoke end gasket prior to assembly.
- Insert stiffeners required on all flexible plastic connections.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Number (Meter Sizes)
A.Y. McDonald	10/2012	7112-3Y2 ($^{5}/_{8}$"x$^{3}/_{4}$" & $^{3}/_{4}$")
		7112-4Y2 (1")
Ford Meter Box Company	04/2012	HHCA94-323-NL ($^{5}/_{8}$"x$^{3}/_{4}$" & $^{3}/_{4}$")
		HHCA94-444-NL (1")
Mueller	10/2012	P-14466-AN

Angle Yoke Ball Valve

STANDARDS

- FCWSA Utility Standards Manual Detail WM-01
- ANSI/AWWA C800 Underground Service Line Valves and Fittings

DESIGN AND PERFORMANCE REQUIREMENTS

- Padlock wings for locking valve in closed position.
- CTS pack joints required for the water line connections.
- Shall be NSF/ANSI 372 certified and NSF/ANSI 61 compliant for use in potable water systems. The product has the letters "NL" cast into the main body for lead-free identification.
- Rated for 300 PSI water pressure.
- End piece joint sealed with an EPDM O-ring and thread locker.
- Yoke lock nut requires an EPDM rubber yoke end gasket prior to assembly.
- Insert stiffeners required on all flexible plastic connections.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Number (Meter Sizes)
A.Y. McDonald	10/2012	74642BY-22
Ford Meter Box Company	04/2012	BA94-323W-NL ($^{5}/_{8}$"x$^{3}/_{4}$" & $^{3}/_{4}$")
		BA94-444W-NL (1")
Mueller	10/2012	P-24273N

Expansion Connector

STANDARDS

- FCWSA Utility Standards Manual Detail WM-01
- ANSI/AWWA C800 Underground Service Line Valves and Fittings

DESIGN AND PERFORMANCE REQUIREMENTS

- Shall be NSF/ANSI 372 certified and NSF/ANSI 61 compliant for use in potable water systems. The product has the letters "NL" cast into the main body for lead-free identification.
- Thimble nose piece requires an EPDM rubber yoke end gasket to seal on yoke valves and fittings.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Number (Meter Sizes)
A.Y. McDonald	10/2012	714-2EHG ($^5/_8$"x$^3/_4$" & $^3/_4$")
		714-4EHG (1")
Ford Meter Box Company	04/2012	EC-23 ($^5/_8$"x$^3/_4$" & $^3/_4$")
		EC-4 (1")
Mueller	10/2012	H-14234N

Y- Branch

STANDARDS

- FCWSA Utility Standards Manual Detail WS-01
- ANSI/AWWA C800 Underground Service Line Valves and Fittings

DESIGN AND PERFORMANCE REQUIREMENTS

- CTS pack joints required for the water line connections.
- Shall be NSF/ANSI 372 certified and NSF/ANSI 61 compliant for use in potable water systems. The product has the letters "NL" cast into the main body for lead-free identification.
- Insert stiffeners required on all flexible plastic connections.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
A.Y. McDonald	10/2012	708YS22
Ford Meter Box Company	04/2012	Y44-xxx-NL
Mueller	10/2012	P-15343N

Water Meter

STANDARDS

- FCWSA Utility Standards Manual 'WM' Details
- AWWA C700-20 Cold-Water Meters – Displacement Type, Metal Alloy Main Case
- AWWA C715-18 Cold-Water Meters – Ultrasonic Type for Revenue Applications

DESIGN AND PERFORMANCE REQUIREMENTS

- The size and type of all water meters shall be determined by the Executive Director based on fixture count and proposed use(s).
- Meters sized 5/8" x 3/4" and full 3/4" will be installed by the FCWSA upon construction approval and payment of appropriate fees.
- All water meters shall be equipped with a Radio Frequency Meter Interface Unit appropriate to the type of meter specified and compatible with the FCWSA's radio read system.
- Meters shall be made of "lead free" alloy as defined by NSF/ANSI 61 and NSF/ANSI 372.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Neptune (meters)	04/2012	T-10® Meter (ProCoder R900i) Sizes: 5/8" - 2"
		MACH 10® R900i Ultrasonic Meter Sizes: greater than 2"

Meter Setting

STANDARDS

- ANSI/AWWA C800 Underground Service Line Valves and Fittings
- FCWSA Utility Standards Manual Detail WM-02

DESIGN AND PERFORMANCE REQUIREMENTS

- Inlet valve and bypass valve shall have padlock wings.
- Constructed with Type K Copper and conforms to ASTM B-88, Copper Alloy #122.
- Castings shall be made of lead free, brass material.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Ford Meter Box Company	04/2012	VBHH77-15BHC-44-77-NL
Mueller	11/2017	B-2423-2N

Meter Yoke

STANDARDS

- ASTM A48 Standard Specification for Gray Iron Castings
- ANSI/AWWA C800 Underground Service Line Valves and Fittings
- FCWSA Utility Standards Manual Detail WM-01

DESIGN AND PERFORMANCE REQUIREMENTS

- Cast iron yoke bar, Class 25, with strong I-beam cross-section and powder coating.
- Cradle positions the meter in line with end connections for one hand installation.
- Prongs inserted into ¾" iron pipe stakes driven into the ground to provide stabilizing support when yoke is attached to Municipex service lines.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Meter Size	Model Name/Number
A.Y. McDonald	02/2015	$^{5}/_{8}$"x$^{3}/_{4}$"	14-2P
		$^{3}/_{4}$"	14-3P
		1"	14-4P
Ford Meter Box Company	04/2012	$^{5}/_{8}$"x$^{3}/_{4}$"	Y502P
		$^{3}/_{4}$"	Y503P
		1"	Y504P
Mueller	02/2015	$^{5}/_{8}$"x$^{3}/_{4}$"	H-5020P
		$^{3}/_{4}$"	H-5030P
		1"	H-5040P

2D – BOXES AND VAULTS

Meter Box

STANDARDS

- FCWSA Utility Standards Manual 'WM' Details

DESIGN AND PERFORMANCE REQUIREMENTS

- Meter boxes to be molded plastic with white interior surface for ease of meter reading.
- Must meet the minimum traffic loading H20 A16.
- Resist heat, cold, and UV.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Bingham & Taylor	11/2017	MMP182230 (18" Dia. x 30" Ht.) MMP2430 (24" Dia. x 30" Ht.) PMP3636 (36" Dia. x 36" Ht.)
Sigma	03/2023	RMP182230-FB (18" Dia. x 30" Ht.) RMP243336-FB (24" Dia. x 36" Ht.) RMP3636-SW (36" Dia. x 36" Ht.)

Meter Box Cover

STANDARDS

- FCWSA Utility Standards Manual 'WM' Details
- ASTM A48 Standard Specification for Gray Iron Castings

DESIGN AND PERFORMANCE REQUIREMENTS

- Frame shall be cast iron per ASTM A48, Class 25 minimum.
- Casting shall be asphalt coated for corrosion protection.
- Locking lid utilize silicon bronze pentagon bolt with copper and HDPE washers.
- Meter box lid shall include oblong single hole for mounting a Radio Frequency Meter Interface Unit appropriate to the type of meter specified and compatible with the FCWSA's radio read system.
- Inner lid shall be recessed to accommodate for the electronic meter reading module.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
A.Y. McDonald	02/2015	74M32CRG (18" Tile I.D.) 74MxxRG (Tile I.D. ≥ 24")
Bingham & Taylor	02/2015	CULFL180-TR
Ford Meter Box Company	04/2012	A32-C-REC463-T (18" Tile I.D.) MC-xxH-REC463-T (Tile I.D. ≥ 24")

Valve Box

STANDARDS

- FCWSA Utility Standards Manual Detail G-03
- ASTM A48 Standard Specification for Gray Iron Castings
- Virginia Department of Transportation Road and Bridge Standards
- AASHTO M 105, Class 35B

DESIGN AND PERFORMANCE REQUIREMENTS

- Valve boxes, base extensions, head and cover shall be of gray iron meeting requirements of ASTM A48, Class 35B and heavily coated with asphalt-based paint.
- Valve box shall be two-piece sliding type with a 5-1/4" shaft. All boxes shall have an outside ledge under the top ring. The top section shall not have a flange at the bottom.
- Stacking of multiple bottom sections or extensions is prohibited. A maximum of one bottom section and one extension is permitted, below the top section.
- Valve boxes shall be of sufficient length to provide for adjustment above and below grade of not less than 6 inches when the pipe is laid to the specified depth.
- For gate valve installation, provide a valve box adapter, made to specific size and manufacture of valve. No adapter is required with butterfly valves.
- Valve boxes shall include a stationary valve rod extension whenever a valve has 10 feet or more of cover.
- The cover and head shall be round and shall have the word "WATER" cast upon it.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Adaptor, Inc.	11/2021	Valve Box Adaptor II
Bingham & Taylor	04/2012	
East Jordan Iron Works	04/2012	
Tyler Union (McWane, Inc.)	04/2012	

Precast Vault

STANDARDS

- FCWSA Utility Standards Manual Detail WM-03
- ASTM C857 Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures
- ASTM C858 Standard Specification for Underground Precast Concrete Utility Structures

DESIGN AND PERFORMANCE REQUIREMENTS

- All vaults shall be installed with top slabs 1" minimum to 6" maximum above grade.
- Concrete to be 5,000 psi minimum compressive strength.
- Provide LINK-SEAL® with stainless steel hardware for all pipe penetrations.
- Floor shall have a minimum slope of ¼ inch per foot directed to a sump pit. Sump pit shall be piped by gravity to daylight or a sump pump provided.
- Vaults shall include factory applied exterior bitumastic waterproofing.
- Design shall meet AASHTO H-20 loading criteria.
- Vaults shall be non-buoyant when installed. Manufacturer to provide buoyancy calculations with assumed water table elevation at the ground surface. Calculations shall not include the weights of the piping or equipment installed and shall be sealed by a Professional Engineer licensed in the Commonwealth of Virginia.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Concrete Pipe & Precast, LLC	02/2015	
Smith-Midland Corporation	02/2015	

Vault Access Door

STANDARDS

- FCWSA Utility Standards Manual Detail WM-03
- ASTM B26 Standard Specification for Aluminum-Alloy Sand Castings

DESIGN AND PERFORMANCE REQUIREMENTS

- Access door shall be a double door hatch cover with locking hasp and a minimum 10 sq. ft. opening area.
- Cover shall be reinforced to support AASHTO H-20 wheel load and shall be ¼-inch aluminum diamond pattern.
- Covers shall be equipped with a hold open arm which automatically lock each cover in the open position.
- All hardware shall be type 316 stainless steel.
- Factory finish shall be mill finish aluminum with bituminous coating applied to the exterior of the frame.
- A ladder extension shall be installed on fixed ladders below hatch cover to assist personnel in getting on and off a ladder. The extension shall retract after use so that the access cover can be closed.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Bilco Company	04/2012	JD-1ALH20 (48” x 30”)
Halliday Products	02/2015	H2C4242 (42” x 42”)

Vault Ladder

STANDARDS

- 29 CFR 1910.27 Fixed Ladders (OSHA)

DESIGN AND PERFORMANCE REQUIREMENTS

- Ladder shall be manufactured of 6000-series aluminum with fully welded construction, including vault connection clips.
- Rungs shall be square or rectangular with a nonslip top surface.
- Ladder shall include continuous side rails from vault floor to top of ladder. Rungs shall be fastened on both ends to side rails.
- Clearance between side rails shall be at least 16 inches.
- Distance between ladder rungs shall not exceed 12 inches. Rungs shall not be higher than 12 inches above the vault floor or lower than 12 inches below top of vault structure.
- Clear distance from vault wall to ladder shall not be less than 7 inches.
- Ladder shall be securely fastened to wall with stainless steel bolts. Stainless steel washers shall be installed between connection clip and vault wall.
- Unit shall be completely fabricated and ready for installation before shipment to the site.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Pennsylvania Insert Corporation	02/2015	
Precision Ladders, LLC	02/2015	FLH

Vault Ladder Safety Post

DESIGN AND PERFORMANCE REQUIREMENTS

- Shall be manufactured of type 304 stainless steel or aluminum construction.
- Tubular post shall lock automatically when fully extended.
- A stainless steel spring balancing mechanism shall be provided to allow smooth, controlled operation when raising and lowering the safety post.
- Release lever shall disengage the post to allow it to be returned to its lowered position.
- A pull up loop shall be provided at the upper end of the post to facilitate raising the post.
- Post shall have adjustable mounting brackets to fit ladder rung spacing up to 14” on center and clamp brackets to accommodate ladder rungs up to 1-3/4” in diameter.
- All mounting hardware shall be type 316 stainless steel.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Bilco Company	04/2012	LU-3 or LU-4

2E – MISCELLANEOUS WATER APPURTENANCES

Fire Hydrant

STANDARDS

- FCWSA Utility Standards Manual Detail WD-04
- AWWA C502 Dry Barrel Fire Hydrants

DESIGN AND PERFORMANCE REQUIREMENTS

- Hydrants shall be of the compression type with main valve openings not less than 5-¼" in diameter, double O-ring seals and safety flange.
- Hydrants shall have a cast iron body with full bronze trim.
- Hydrants shall have a minimum 6" connection base for setting with a minimum of 42" cover on connection pipe. Pipe sections shall be mortar lined Class 52 ductile iron.
- Hydrants shall be equipped with two each 2-½" NST hose connections and one each 4-½" NST pumper connection.
- Shall be operated by a National Standard 1-½" pentagon shaped operating nut, opening counterclockwise. The direction of opening shall be clearly marked by an arrow cast on the outside of the hydrant.
- Hydrants shall be furnished with a breakaway feature that will break cleanly on the underside of the flange upon impact. This shall consist of a break flange with a breakable stem coupling. Breakable bolts will not be accepted.
- Install a blue fire hydrant marker ring with the text, "FOR FIRE DEPARTMENT USE ONLY UNAUTHORIZED USE IS THEFT, VIOLATORS WILL BE PROSECUTED" in white lettering.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Kennedy Valve Company (McWane, Inc.)	04/2012	K-81D Guardian
Mueller	04/2012	Super Centurion 250

Sampling Station

STANDARDS

- FCWSA Utility Standards Manual Detail WD-02

DESIGN AND PERFORMANCE REQUIREMENTS

- Connect to main with ¾-inch tap, service line, and curb stop.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Kupferle Foundry Company	06/2013	Eclipse #88

Tapping Sleeve

STANDARDS

- FCWSA Utility Standards Manual 4.11
- ASTM A536 Standard Specifications for Ductile Iron Castings
- NSF/ANSI 61 Drinking Water System Components
- ANSI/AWWA C111/A21.11 Rubber Gasket Joints for Ductile-Iron Pressure Pipe and Fittings

DESIGN AND PERFORMANCE REQUIREMENTS

- Sleeve shall be made of ductile iron. Mechanical joint ends on all sizes.
- Bolts and nuts shall be stainless steel, ASTM 304 Standard Specification stainless steel bolts and studs, 60,000 psi tensile strength, Grade B.
- Minimum pressure rating of 250 psi
- Diameter of tap may be as large as the pipe being tapped for ductile iron pipe.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
American Flow Control	02/2015	Series 2800-C
Mueller	04/2012	H-615
Tyler Union (McWane, Inc.)	02/2015	

Service Saddle

STANDARDS

- FCWSA Utility Standards Manual 4.12 C and Detail WS-01
- NSF/ANSI 61 Drinking Water System Components
- AWWA C800 Underground Service Line Valves and Fittings
- ASTM A536 Standard Specifications for Ductile Iron Castings

DESIGN AND PERFORMANCE REQUIREMENTS

- Service connections shall be by direct tap (no saddle) on all ductile iron and cast iron pipe mains.
- Body and tapped inserts shall be of ASTM A536 ductile iron. Shall be fusion-bonded epoxy coated for corrosion resistance.
- Gaskets shall be made of a rubber compound resistant to water, oil, and other chemicals.
- Shall withstand a minimum working pressure of 250 psi.
- Service saddles with a single strap shall have a minimum strap width of 2". Double-strap saddles shall have minimum 1.5" flat-faced straps.
- Straps and fasteners shall be constructed of type 304 (18-8) stainless steel.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Ford Meter Box Company	04/2012	FC101 (1" or less service taps) FC202 (> 1" service taps)
Mueller	04/2012	DR1S (1" or less service taps) DR2S (> 1" service taps)
Romac Industries, Inc.	02/2015	101NS (1" or less service taps) 202NS (> 1" service taps)
Smith Blair	02/2015	317

3A – PIPE

Polyvinyl Chloride (PVC) Pipe

STANDARDS

- ANSI/AWWA Standard C900 PVC Pressure Pipe and Fabricated Fittings, 4" through 12"
- ANSI/AWWA Standard C905 PVC Pressure Pipe and Fabricated Fittings, 14" through 48"
- ANSI/AWWA Standard C907 Injection-Molded PVC Pressure Fittings, 4" through 12"

DESIGN AND PERFORMANCE REQUIREMENTS

- See approved construction plans for required dimension ratio (DR).
- Injection molded fittings shall be used in lieu of fabricated fittings wherever commercially available (presently for all applications 12-inch and smaller).
- PVC pipe shall be stored in accordance with manufacturer's recommendations on flat, even surfaces and shall remain racked on the pallets as delivered to the job site until such time as the trench is ready for the placement of the pipe.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Diamond Plastics Corporation	02/2015	
HARCO (Fittings)	04/2019	
IPEX, Inc.	02/2015	
Multi Fittings (Fittings)	04/2019	
National Pipe & Plastics	02/2015	
Sanderson Pipe Corporation	04/2024	
Westlake Pipe & Fittings	02/2015	

High-density polyethylene (HDPE) Pipe

STANDARDS

- AWWA Standard C901 Polyethylene Pressure Pipe and Tubing ½" Through 3" for Water Service

DESIGN AND PERFORMANCE REQUIREMENTS

- Pipe and fittings shall be manufactured from a PE 4710 high density resin compound meeting the specifications of ASTM D3350 with a cell classification 445574C.
- Pipe and accessories shall be 200 psi at 73.4°F meeting requirements of Standard Dimension Ratio (SDR) 11 as a minimum strength.
- 4000 Series (IPS)
- Color combination shall be black with green stripes for sewer with UV protection for outdoor storage or above grade service.
- Used for sewage force mains 2 inch and smaller.
- Polyethylene pipe and fittings shall be joined using electro fusion couplings with zero leakage points. Electro fusion fittings shall have a pressure rating equal to the pipe.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Flying W Plastics, Inc	02/2015	
Integrity Fusion Products (Fittings)	10/2025	
Performance Pipe	04/2019	
WL Plastics	11/2021	

Stainless Steel Pipe Nipples and Fittings

STANDARDS

- FCWSA Utility Standards Manual Detail SC-01
- ASTM A733 Welded and Seamless Carbon Steel and Austenitic Stainless Steel Pipe Nipples
- ASTM A312 Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes
- ASTM A351 Castings, Austenitic, for Pressure-Containing Parts
- Threads shall conform to ANSI B1.20.1 National Pipe Thread Taper

DESIGN AND PERFORMANCE REQUIREMENTS

- Threaded pipe nipples and fittings for air release valves shall be 2 inch in size.
- Pipes nipples and fittings shall be type 316 stainless steel material.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
BMI	10/2016	
Merit Brass	10/2016	
Trenton Pipe Nipple Company	10/2016	

Service Pipe and Fittings

STANDARDS

- FCWSA Utility Standards Manual Details SC-08 & SC-09

DESIGN AND PERFORMANCE REQUIREMENTS

- All new construction of the sanitary sewer main will require the installation of an injection-molded wye fitting for service lateral connections. The wye fitting shall be made of the same pipe material as the sanitary sewer main.

- All sewer service laterals located within public right-of-way shall be PVC conforming to AWWA C900 DR18.

- Beyond the utility easement and public right-of-way, sewer lateral material may transition to PVC schedule 40 and shall be in accordance with the Virginia Uniform Statewide Building Code requirements.

APPROVED MANUFACTURERS AND MODELS

Refer to PART 3 – SEWER CONSTRUCTION for approved manufacturers of polyvinyl chloride (PVC) pipe and fittings.

3B – FORCE MAIN APPURTENANCES

Automatic Air Release Valve

STANDARDS

- ANSI/AWWA C110/A21.10-82 Ductile Iron and Gray Iron Fittings

DESIGN AND PERFORMANCE REQUIREMENTS

- Combination air-vacuum type with a working pressure from 0 to 300 psi.
- T316 stainless steel float and internal trim
- Resilient seating for positive shutoff
- Valves shall include a minimum 1-inch diameter screwed NPT or flanged connection.
- Air release valves shall be attached to the force main by means of a 2-inch stainless steel pipe nipple threaded to a ductile iron mechanical joint tap tee fitting. Air release valves on force mains smaller than 6 inches will require additional support.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Crispin Multiplex Manufacturing Company	04/2012	S/SL
Val-Matic	03/2016	

Ball Valve

STANDARDS

- FCWSA Utility Standards Manual Details SC-01
- FCWSA Utility Standards Manual Details SC-13
- ASTM A351 Castings, Austenitic, for Pressure-Containing Parts
- ASTM F 1970 Special Engineered Fittings, Appurtenances or Valves for use in PVC or CPVC Systems

DESIGN AND PERFORMANCE REQUIREMENTS

- Stainless steel full port ball valve with two-piece body. Type 316 stainless steel investment cast components.
- Schedule 80 PVC full port design
  - Double union/double blocking permits in-line maintenance without disconnecting the pipe.
  - Minimum pressure rating of 150 psi
  - Replaceable PTFE Floating Seat Design with EPDM or FPM O-rings
- Valve shall be one-quarter turn operation with handle.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Apollo Valves (Stainless Steel)	11/2017	76F Series
American Valve (Schedule 80)	11/2021	P200U
Spears Manufacturing Company (Schedule 80)	11/2021	2000 Standard

Check Valve

DESIGN AND PERFORMANCE REQUIREMENTS

- For use in service branch of low pressure wastewater collection systems.
- Minimum pressure rating of 100 psi
- Corrosion resistant PVC body, PVC socket weld, and a Nitrile (Buna-N) Ball.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Flomatic	10/2016	208S

Curb Stop

STANDARDS

- FCWSA Utility Standards Manual Detail SC-12

DESIGN AND PERFORMANCE REQUIREMENTS

- Curb stop shall be ball type, compression fittings with padlock wings.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
A.Y. McDonald	03/2027	76102W-44

Plug Valve

DESIGN AND PERFORMANCE REQUIREMENTS

- Eccentric plug valves shall be suitable for raw sewage, with full port configuration and straight through flow pattern.
- Unless otherwise specified on construction plans, ends shall be mechanical joint for buried applications. Flanged ends shall be used in buildings and vaults.
- Ductile iron valve body with nickel seat permanently welded to the body. The seat thickness shall be a minimum of 1/8" thick. Design working pressure shall be a minimum of 150 psi.
- Plug valve shall include resilient Neoprene covered eccentric plug, replaceable T316 stainless steel permanently lubricated upper and lower journal bearings and externally accessible & replaceable V-ring or U-cup valve shaft seals.
- Underground valves shall be provided with operators with non-corrosive type of construction for input shaft, seals, bushings, and bolting. Fasteners exposed to backfill must be T304 stainless steel.
- The operator shall open the valve on a counterclockwise rotation of the operator wrench.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Clow Valve Company (McWane, Inc.)	03/2016	
DeZURIK	04/2012	
Pratt/Mueller	03/2016	
Val-Matic	03/2016	

Tapping Saddle

STANDARDS

- ASTM A240 Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications

DESIGN AND PERFORMANCE REQUIREMENTS

- Saddle tap shall be sized to match force main.
- Saddle to be type 304 stainless steel band with minimum 19-gauge thickness.
- Nuts and bolts shall be type 304 stainless steel.
- Gasket material made from Nitrile Butadiene Rubber (NBR) in accordance with ASTM D 2000 MBC 610.
- Male thread adapter with compression fitting and gripper
- Saddle tap shall use stainless steel inserts.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Romac	04/2019	Style 306
Smith Blair	04/2019	372 Service Saddle

Valve Box

STANDARDS

- ANSI/AWWA C110/A21.10-82 Ductile Iron and Gray Iron Fittings

DESIGN AND PERFORMANCE REQUIREMENTS

- Valve boxes, base extensions, head and cover shall be cast iron and heavily coated with asphalt-base paint.
- The cover and head shall be round and shall have the word "SEWER" cast upon it.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Bingham & Taylor	04/2012	
East Jordan Iron Works	04/2012	
Tyler Union (McWane, Inc.)	04/2012	

3C – MANHOLE

Manhole - Precast

STANDARDS

- FCWSA Utility Standards Manual 6.06 and 7.07 and Details SC-05 & SC-06
- ASTM C478 Precast Reinforced Concrete Manhole Sections
- ASTM A615 Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

DESIGN AND PERFORMANCE REQUIREMENTS

- Sanitary sewer manholes shall consist of precast reinforced concrete sections, an eccentric conical section, and an expanded base section extending a minimum 4" and a maximum of 8" beyond the outside vertical wall (riser section) of the manhole.
- Concrete to be 4,000 psi minimum compressive strength at 28 days. Each component must be monolithic. No cold joints permitted within a piece. Base must be wet cast.
- Each section shall have no more than two holes for the purpose of handling and setting.
- Joints to be made watertight with a gasket in accordance with ASTM C443.
- Manholes shall be carefully made and shall have no honeycombs or other deteriorated surfaces. All surfaces shall be smooth.
- Pipe penetrations for the required sewer connections shall conform to the actual minimum diameters required to properly seal the connection and include approved boot connectors.
- Base section to be 3 feet high minimum, unless overall height of structure requires use of shorter base. Minimize number of riser sections.
- Precast manholes shall have holes for pipe penetrations separated far enough apart to ensure the structural integrity of the manhole wall and shall be a minimum of 12 inches. Provide a minimum 6 inches between pipe penetrations and manhole joints.
- The invert channels shall be smooth and semi-circular in shape, conforming to the inside of the adjacent sewer section. Changes in direction of flow shall be made with a smooth curve of as large a radius as the size of the manhole will permit. Changes in the size and grade of the channels shall be made gradually.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Concrete Pipe & Precast, LLC	02/2015	

Boot Connector

STANDARDS

- ASTM C-923 Resilient Connectors between Reinforced Concrete Manhole Structures, Pipes, and Laterals

DESIGN AND PERFORMANCE REQUIREMENTS

- A watertight flexible pipe-to-manhole connector shall be employed in the connection of all sanitary sewer pipes to precast manholes or other structures. Installation shall follow manufacturer's instructions.

- All mechanical devices, including castings, bolt assemblies, and adjusters, shall use non-magnetic 304 series stainless steel with no welds or rivets in its assemblies.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
A-LOK Products, Inc. (≥ 18" pipe)	04/2012	A-LOK Premium (≥ 18" pipe)
Press-Seal Gasket Corporation	02/2015	PSX Direct Drive
TrelleBorg	04/2012	Kor-N-Seal I (< 18" pipe) Kor-N-Seal II (≥ 18" pipe)

Chimney Seal

STANDARDS

- FCWSA Utility Standards Manual Details SC-03 & SC-04

DESIGN AND PERFORMANCE REQUIREMENTS

- Seal shall be constructed of corrosion resistant materials and installed per manufacturer's recommendations.
- Chimney seals may not be used to compensate for deficient or damaged masonry or grade rings.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Cretex Specialty Products	04/2012	

Coating

DESIGN AND PERFORMANCE REQUIREMENTS

- The exterior of all precast manhole sections shall be coated with a minimum of 16 mils dft in accordance with the manufacturer's recommendations.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Carboline	04/2012	Bitumastic 300M

Concrete Protective Lining

STANDARDS

- FCWSA Utility Standards Manual 6.06

DESIGN AND PERFORMANCE REQUIREMENTS

- System shall be resistant to deterioration due to hydrogen sulfide (H_2S) and its by-products. System shall include provisions to protect concrete at all discontinuities, including joints, pipe penetrations, seams, and entryways.

- Protective linings to be applied in accordance with manufacturer's recommendations, including surface preparation as specified.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Concrete Pipe & Precast, LLC	02/2015	AGRU Sure-Grip
Raven Lining Systems (for use in rehabilitation of existing structures only)	10/2016	405 Trowel

Frame and Cover

STANDARDS

- ASTM A48, Standard Specifications for Gray Iron Castings
- AASHTO M306, Standard Specification for Drainage Structure Castings

DESIGN AND PERFORMANCE REQUIREMENTS

- Frame and cover shall conform to AASHTO M306 including proof-load test and shall be gray iron meeting the requirements of ASTM A48, Class 35B.
- Castings shall be of best quality, tough, gray iron, free from cold shunts, blow holes, and other imperfections. The castings shall be sound, true to form and thickness, cleaned by shotblasting and neatly finished. The castings on all manholes shall be anchored to the manhole.
- All covers shall have diamond, non-skid surface. The cover shall not rock when rotated to any position in the frame.
- Frame and cover shall receive one coat of black asphalt base paint at the factory.
- All covers shall have "F.C.W.S.A." and "VA" casted in 1-1/4" high letters on the perimeter. For sewer manholes "SANITARY SEWER" shall be casted in 1-inch high letters in the center. For ARV manholes "WATER" shall be casted in 1-1/2" high letters in the center.
- Covers shall be furnished with two closed pick holes and one 1-inch vent hole. Solid cover required when watertight manhole specified.
- Covers for use in easements and remote locations shall be cam-locking type. Cam lock shall be constructed of corrosion resistant material.
- Watertight cover shall include ¼-inch O-ring gasket, bonded to frame; two 5/8-inch recessed hex head stainless steel bolts with rubber gasket and stainless steel washers; and two stainless steel lift bar slots.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
East Jordan Iron Works	04/2012	

Inside Drop Connection

STANDARDS

- FCWSA Utility Standards Manual Detail SC-07A

DESIGN AND PERFORMANCE REQUIREMENTS

- Inside drop connection for use only where specified and approved by FCWSA.
- Bowl size shall be determined by incoming pipe sizes and flow rates.
- The bowl shall be installed as per manufacturer's instructions using adjustable 316 stainless steel clamping brackets and fasteners.
- Shall include the addition of the force line hood attached to the drop bowl.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
RELINER/Duran Inc.	04/2024	Inside Drop Bowl

Joint Rubber Gasket

STANDARDS

- FCWSA Utility Standards Manual Details SC-05 and SC-06
- ASTM C443 Joints for Concrete Pipe and Manholes, using Rubber Gaskets
- ASTM C-361 Reinforced Concrete Low-Head Pressure Pipe

DESIGN AND PERFORMANCE REQUIREMENTS

- Joints shall be of the O-ring rubber gasket type or other jointing system approved by the FCWSA. When assembled the joint shall be uniform and watertight.
- In addition to the O-ring gasket, 301 mastic joint sealer shall be used to assist in sealing the joint from either internal or external hydrostatic pressure. No mortar joints will be permitted.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Press-Seal Gasket Corporation	02/2015	O-ring or Type 4G

Steps

STANDARDS

- FCWSA Utility Standards Manual Details SC-05 and SC-06
- ASTM C478 Precast Reinforced Concrete Manhole Sections, Section 16 Steps and Ladders

DESIGN AND PERFORMANCE REQUIREMENTS

- Steps for manholes shall be securely placed in position in the manhole sections during the manufacturing process and shall be made of minimum 0.5-inch diameter grade 60 steel reinforcing rod encapsulated in a copolymer polypropylene.
- Steps will be set in the manholes as shown in the abovementioned FCWSA Details.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
American Step Company	04/2012	ML-10, ML-11, or I-11
M.A. Industries, Inc.	08/2016	PS1-PF

Waterproof Manhole Insert

STANDARDS

- FCWSA Utility Standards Manual Detail SC-02

DESIGN AND PERFORMANCE REQUIREMENTS

- The manhole insert shall be constructed of non-corrodible materials which will not be damaged by sewer gases. Insert shall be made from corrosion resistant, high strength stainless steel if manhole is located within the public street.
- Both the gas relief and vacuum relief valves shall made of non-corrodible materials.
- A properly fitted rubber gasket shall be installed under the lip of the insert to insure a tight seal between the insert and the manhole frame.
- The insert shall be deep enough to prevent the manhole cover from coming into contact with the valves when the manhole cover is removed or installed.
- The insert shall be designed to restrict inflow to no more than 5 gallons in 24-hrs.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Rainstopper, LLC.	04/2012	Rainstopper

3D – MISCELLANEOUS SEWER APPURTENANCES

Service Saddle for Gravity Collection System

STANDARDS

- ASTM A48 Standard Specification for Gray Iron Castings

DESIGN AND PERFORMANCE REQUIREMENTS

- Used to tap existing gravity sewer main only. All new construction of the sanitary sewer main will require the installation of a prefabricated wye connection.
- The branch inlets shall be configured to accept a branch line at a 90-degree angle to the main line.
- Saddle shall have a cast iron body with watertight gasket sealing to existing main.
- Base casting shall have an alignment flange which protrudes into the tapped hole to assure perfect alignment.
- Base of saddle to be dip-coated in water-based bituminous coating.
- PVC adapter shall be cemented permanently in place with two-part urethane adhesive.
- Straps and fasteners shall be constructed of T304 stainless steel.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
General Engineering Company	04/2024	Sealtite Type “F” Tee

Grease Interceptor

STANDARDS

- ACI 318 Building Code Requirements for Reinforced Concrete
- ASTM A185 Welded Steel Wire Fabric for Concrete Reinforcement
- ASTM A615 Deformed and Plain Billet Steel Bars for Concrete Reinforcement
- ASTM C858 Standard Specification for Underground Precast Concrete Utility Structures
- ASTM C890 Standard Practice for Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water and Wastewater Structures

DESIGN AND PERFORMANCE REQUIREMENTS

- Shop drawings and basis for sizing of each structure must be submitted for review and approval to FCWSA to ensure that it is appropriate for the intended application.
- Design shall meet AASHTO H-20 loading criteria.
- If made of concrete, mix shall provide minimum 4,000 psi compressive strength at 28 days.
- Joints to be interlocking type and made watertight by means of O-ring gasket or butyl rubber. Joints not permitted below liquid level.
- Pipe penetrations must employ approved connectors. Provide a minimum separation of 6 inches between pipe penetrations and joints.
- The interceptor shall be partitioned and piped to provide at least two skimming chambers.
- The interceptor shall be vented to allow air flow through the unit.
- An effluent sampling port of 8-inch diameter shall be provided at the exit pipe of each interceptor where effluent can be collected prior to combining with untreated flows.
- Each compartment must have sufficient access for cleaning and maintenance. Access risers to be of watertight construction and have minimum 24-inch diameter for shallow bury. Where top of unit will have more four feet of cover, access riser to be minimum 36 inches in diameter, with interlocking, watertight joints. Provide cast iron frames and covers labeled “S” or “SEWER”.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Concrete Pipe & Precast, LLC	11/2017	
Containment Solutions	11/2017	
Highland Tank	11/2017	
Zurn Green Turtle	11/2017	Proceptor GMC

Oil/Water Separator

STANDARDS

- ACI 318 Building Code Requirements for Reinforced Concrete
- ASTM A185 Welded Steel Wire Fabric for Concrete Reinforcement
- ASTM A615 Deformed and Plain Billet Steel Bars for Concrete Reinforcement
- ASTM C858 Standard Specification for Underground Precast Concrete Utility Structures
- ASTM C890 Standard Practice for Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water and Wastewater Structures

DESIGN AND PERFORMANCE REQUIREMENTS

- Shop drawings and basis for sizing of each structure must be submitted for review and approval to FCWSA to ensure that it is appropriate for the intended application.
- Oil/water separator design shall incorporate coalescing plates or similar technology. Devices shall be designed and proven to produce effluent with 15 parts per million or less free oil, under normal operating conditions. Normal operating conditions consist of influents containing oils of 0.90 or lighter specific gravity, up to 20 percent (200,000 ppm) oil content in the water, and temperatures of 40° to 140° F.
- Grit collectors shall be designed to remove sand, gravel, cinders, or other heavy solid materials that have specific gravities substantially greater than typical organic solids in wastewater. Grit collectors shall be designed with adequate access for maintenance and cleaning.
- Design shall meet AASHTO H-20 loading criteria.
- If made of concrete, mix shall provide minimum 4,000 psi compressive strength at 28 days.
- If made of steel, provide coating and galvanic protection against corrosion.
- Joints to be interlocking type and made watertight by means of O-ring gasket or butyl rubber. Joints not permitted below liquid level.
- Pipe penetrations must employ approved connectors. Provide a minimum separation of 6 inches between pipe penetrations and joints.

- The oil/water separator shall be vented to allow air flow through the unit.
- An effluent sampling port of 8-inch diameter shall be provided at the exit pipe of each separator where effluent can be collected prior to combining with untreated flows.
- Each compartment must have sufficient access for cleaning and maintenance. Access risers to be of watertight construction and have minimum 24-inch diameter for shallow bury. Where top of unit will have more than four feet of cover, access riser to be minimum 36 inches in diameter, with interlocking, watertight joints. Provide cast iron frames and covers labeled “S” or “SEWER”.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Concrete Pipe & Precast, LLC	11/2017	
Containment Solutions	11/2017	
Striem	11/2021	OS-50, OS-75, or OS-100
Zurn Industries, LLC	11/2017	Proceptor OMC

Grinder Pump (Privately Owned)

DESIGN AND PERFORMANCE REQUIREMENTS

- Private grinder pumps are installed outdoors on lots receiving public gravity sewer service but where topography of the lot requires sewage pumping to reach the gravity sewer. These pumping systems are owned and maintained by the property owner.
- Grinder pumps to be complete water-tight unit ready for connection to inlet and outlet piping as well as electric power supply.
- All components to be corrosion resistant with accessory/wet well to be fiberglass reinforced polyester or high-density polyethylene, double-wall construction.
- Pump shall be removable via a quick disconnect system with head and flow characteristics suitable for the application and a grinder suitable for domestic sewage.
- Inlet shall be for connection to 4 inch or larger PVC pipe.
- Discharge force main shall include a check valve and a ball valve.
- Wet well shall be vented and sized in accordance with the application, but not less than 24 inches in diameter by 36 inches deep.
- Cover shall be fiberglass or polypropylene and shall be secured to the wet well with a locking mechanism or bolts.
- Pump control shall be via floats or pressure switch. Electric wiring between control panel and grinder pump unit shall be installed in conduit. Control panel to have audio and visual warnings activated when liquid level rises above alarm level. Control panel shall be NEMA 4 mounted on the outside of the building. Electrical conduit shall enter the bottom of the panel with a sealed connection.
- Installation shall be in accordance with manufacturer's recommendations and shall include provisions to prevent flotation.

APPROVED MANUFACTURERS AND MODELS

Company	Approval Date	Model Name/Number
Environment One Corporation	04/2012	Extreme Series DH 071, DH151, or DH152