CITY OF LETHBRIDGE

Sewer & Water
2020 EDITION
Detailed Engineering
Material Standards

CITY OF LETHBRIDGE

INFRASTRUCTURE SERVICES

Material Specifications and Detailed Standard Drawings for
Water Distribution, Wastewater Collection, Storm Drainage Systems

2020 EDITION

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WATER DISTRIBUTION SYSTEM MATERIAL SPECIFICATIONS

1.1 PIPE

.1 General

.1 All pipe to have ends sealed by Manufacturer prior to shipping.

.2 Polyvinyl Chloride (PVC) Pressure Pipe

.1 For pipe sizes 150 mm to 300 mm in diameter, all pipe and joints shall be to the latest revision AWWA C900, CSA certified as meeting latest revision CSA B137.3, SDR 18, working pressure rating 235 psi.

.2 For pipe sizes 350 mm to 900 mm in diameter, all pipe and joints shall be to the latest revision AWWA C905, CSA certified as meeting latest revision CSA B137.3, SDR 25, working pressure rating 165 psi.

.3 For pipe sizes 1050mm & 1200mm in diameter, all pipe and joints shall be to the latest revision AWWA C905, CSA certified as meeting latest revision CSA B137.3, SDR 25, working pressure rating 165 psi.

.4 For pipe sizes 1350mm & 1500mm in diameter, all pipe and joints shall be to the latest revision AWWA C905, CSA certified as meeting latest revision CSA B137.3, SDR 32.5 & SDR 41 respectively, working pressure rating 125 psi and 100 psi.

.5 All PVC pipe to be cast iron outside diameter, bell end, c/w SBR, EPDM or NBR gaskets of a pressure actuated seal design.

.6 All PVC pipe to be marked with 2 insertion marks, with one mark visible with proper insertion

.7 All PVC pipe for installation in industrial areas, new gas station sites or other potential risk locations shall be supplied with Nitrile (NBR) gaskets.

.8 All PVC pipe to be capable of deflecting a minimum of 2 degrees at joint for 150mm – 300mm and a minimum of 1 degrees at joint for 350mm – 1500mm

.9 All pipe shall be supplied with integral wall thickened bell ends and continuous gaskets.

.10 Pipe showing evidence of severe UV degradation with a production date of more than twenty four (24) months previous shall be considered unacceptable. Manufacturers may request re-certification of pipe based on submittal of QC re-testing acceptable to the Engineer.

.11 Pipe interior to be smooth and glossy

.12 All PVC Pipe shall come with a factory installed end cap not to be removed until installation.

.13 **Approved Manufacturers**

- IPEX
- NAPCO/Royal

1.2 FITTINGS

.1 Polyvinyl Chloride (PVC) Fittings

.1 For main sizes 300 mm and smaller, PVC Fittings to the latest revision AWWA C-907, CSA certified as meeting latest revision CSA 3-B137.2, SDR 18, pressure class 150, bell ends, c/w 1 MPa elastomeric gasket push –on joint.

.2 For main sizes larger than 300mm, PVC Fittings to be latest revision AWWA & CSA.

.2 Stainless Steel Couplings

.1 Stainless Steel couplings are supplied in the two following configurations:

- Standard Couplings are designed for joining plain end pipes of equal outside diameter. To be flexible, all-stainless steel construction. All welded stainless steel to be “passivated” after welding to eliminate sensitizing of the stainless steel.
- Multi Range Couplings are used to make a non restrained connection between two pipes of the same nominal size but with

same or different outside diameters. One range fits pipe outside diameters from IPS PVC to rough barrel AC.

.2 Shell, Sidebars, Nuts and Bolts to be Type 304 fully passivated stainless steel. Gasket to be continuous ringed S.B.R. rubber conforming to latest revision AWWA C-111 / ANSI A21.11.

.3 **Approved Products:**

- Robar 1606 Style 2 – for sizes 100 mm to 350 mm
- Robar 1606 Style 3 – for sizes 400 mm to 600 mm
- Canpac CR Series CS2 – for sizes 100 mm to 350 mm
- Canpac CR Series CS3 – for sizes 400mm to 600mm
- Robar 1736-AS – for sizes 100mm to 300mm
- Robar 1696-2B – for sizes 100mm to 300mm

.3 Epoxy Coated Couplings

.1 To be cathodically fitted and protected by cap type anodes. Anodes to be 300 gram zinc alloy caps meeting latest revision ASTM B418, Type 1, threaded onto the coupling bolts. Electrical continuity between bolts and end plates to be achieved by removing the epoxy coating from the end plates, under the nut bearing area or with a factory installed anode strap.

.2 Epoxy Coated couplings are supplied in the four following configurations:

- Standard Couplings: designed for joining plain end pipes of equal outside diameter
- Transition couplings: designed for connecting pipes of the same nominal size, which have great differences in outside diameter. Transition to be made by “stepped down” centre ring, c/w special end plate.
- Reducing Couplings: designed for connecting pipes of different nominal sizes, Reduction to be made by “Stepped – down” center ring, c/w special end plate.
- Multi Range Coupling: Straight and transition couplings are used to make a non-restrained connection between two pipes of the same nominal size but with same or different outside diameters. One range fits all pipes outside diameters, IPS PVC to rough barrel AC.

.3 Centre ring to be case ductile iron to latest revision ASTM A536, factory coated with corrosion protective epoxy. Coating thickness to be 0.30 mm (12 mils) minimum, 0.50 mm (20 mils) maximum.

.4 End plates to be heat treated cast ductile iron to latest revision ASTM A536, factory coated with corrosion protective epoxy. Coating thickness to be 0.30 mm (12 mils) minimum, 0.50 mm (20 mils) maximum. End plates shall be provided with one 6 mm (1/4") SAE J429 Grade 5, NC cadmium plated set screw to provide electrical conductivity between the end plates and the sleeves.

.5 Gaskets to be SBR or NBR rubber conforming to latest revision AWWA C-111 / ANSI A21.11.

.6 Bolts to be 15.875 mm (5/8") NC trackhead, c/w heavy duty hex nuts. Material to be low alloy steel conforming to latest revision AWWAC-111 / ANSI A21.11. All bolts (except threaded area) to be factory coated with corrosion protective epoxy. Coating thickness to be 0.30 mm (912 mils) minimum, 0.50 mm (20 mils) maximum.

.7 Coupling components to be marked as follows:

- Centre Ring: Nominal size and manufacturers' name.
- End – Plate: O.D. range and manufacturers' name.
- Gaskets: O.D. range and manufacturers' name.

.8 **Approved Coupling Products:**

- Robar 1506
- Romac 501
- Robar 1596
- Romac Alpha Series
- Hymax Grip Restraint & Flange Adapter
- PowerSeal 3501
- Ford Meter Box Co. FC2W Ultra Flex Coupling
- TPS Hymax 2000
- Romac Macro 2 Bolt
- Smith-Blair 421

.9 **Approved Anode Products:**

- "Protecto-Caps" 300 P60W

.4 Tapping Sleeves

.1 To be split body type designed to allow tightening of the sleeve bolts from opposite side of the flange outlet.

.2 To be constructed of stainless steel or corrosion protected mild steel material. Corrosion protected sleeves shall be epoxy coated and lined. All welded stainless steel to be “passivated” after welding to eliminate sensitizing of the stainless steel.

.3 Sleeves to include a 19 mm (3/4”) NPT test plug for pressure testing of sleeve and installed tapping valve.

.4 Sleeves to have permanent identification marking to identify the manufacturer’s name, nominal size, and O.D. range. All sleeves to be packaged and delivered as a complete unit (i.e. sleeves, gaskets, nuts, and bolts).

.5 Sleeves to have Class D flanges conforming to the latest revision of AWWA C207, 150 lb drilling. Flanges to be fixed, not floating.

.6 Flange materials for stainless steel tapping sleeves to be stainless steel. Flange materials for epoxy coated tapping sleeves to be cast ductile iron.

.7 Gasket materials as follows:

-Flange	Virgin SBR compounded for water service use
-Ring Seal	Buna N or virgin SBR compounded for water service use
-Liner	3.18 mm (1/8”) Neoprene, or virgin SBR compounded for water service use

.8 Bolts to be 19 mm (3/4”) NC stainless steel c/w heavy hex nuts and washers, lubricated to prevent galling.

.9 **Approved Products:**

Stainless Steel:	Epoxy Coated Mild Steel:
-Robar 6606	-Robar
-Romac “SST”	-Smith Blair 622
-Ford FTSS	-Romac FTS 420
-Smith Blair 663	- JCM 412
-PowerSeal 3490AS	

1.3 VALVES AND VALVE BOXES

.1 Resilient Wedge Gate Valves

.1 100 mm diameter valves are not permitted.

.2 Valves sized 150 to 300 mm diameter shall be resilient wedge gate valves, conforming to latest revision AWWA C509, and c/w fully rubber encapsulated solid wedge, non-rising stem, suitable for direct bury.

.3 Valves to open counter clockwise (Turn left to open).

.4 Valve body to be constructed of cast iron, in accordance with ASTM A126, Class “B”. All nuts, bolts, and washers to be stainless steel.

.5 Interior and exterior of valve to be epoxy coated, as per latest revision AWWA C550.

.6 Bronze or stainless steel valve stem to be operated by a 50 x 50 mm square operating nut. The valve stem (stuffing box) shall contain a double “O” ring seal.

.7 Valve ends to be push-on “Tyton Joint” conforming to latest revision of AWWA C111-85/ANSI A21.11.

.8 **Approved Products:**

- Mueller A-2360 Resilient Wedge Gate Valve
- Clow F-6112 Resilient Wedge Gate Valve
- American AVK Co. Resilient Wedge Gate Valve
- East Jordan Iron Works Flowmaster Gate Valve
- American Flow Series 2500 Resilient Gate Valve
- Terminal City Resilient Gate Valve

.2 Resilient Wedge Tapping Gate Valves

.1 100 mm diameter valves are not permitted.

.2 Valves sized 150 to 300 mm diameter shall be resilient wedge gate valves, conforming to latest revision AWWA C509, c/w fully rubber encapsulated solid wedge, non-rising stem, suitable for direct bury.

.3 Valves to open counter clockwise. (Turn left to open).

.4 Valve body to be constructed of cast iron, in accordance with ASTM A126, Class “B”. All nuts, bolts and washers to be stainless steel.

.5 Interior and exterior of valve to be epoxy coated, as per latest revision AWWA C550.

.6 Bronze or stainless steel valve stem to be operated by a 50 x 50 mm square operating nut. The valve stem (stuffing box) shall contain a double “O” ring seal.

.7 Valve ends to be push-on “Tyton Joint” by flange, or mechanical joint by flange. Push-on and mechanical joints shall conform to latest revision of AWWA C111/ ANSI A21.11. Flanged valve ends shall meet the requirements of ANSI B16.1, Class 125. Bolts, nuts, washers to be stainless steel.

.8 **Approved Products:**

- Clow F-6115 Resilient Wedge Tapping Gate Valve: flange x push on for sizes 150 and 200 mm diameter
- Mueller A-2360 Resilient Wedge Tapping Gate Valve: flange x push on for sizes 150 and 200 mm diameter

.3 Butterfly Valves

.1 Valves sized 350mm and larger shall be butterfly valves conforming to latest revision AWWA C504. They shall be short body design, Class 150B, c/w adjustable rubber seats, suitable for direct bury. All nuts, bolts and washers to be stainless steel.

.2 Valves to open counter clockwise. (Turn left to open).

.3 Valve must be rated at 1034 KPa (150 psi) working pressure and must be able to pass a hydrostatic test at 2068 KPa (300 psi) with the valve partially open.

.4 Valves to be operated by 50 x 50 mm square operating nut connected to a totally enclosed gear actuator.

.5 Valve ends to confirm to the following patterns:

- Mechanical Joint: shall meet the requirements of the latest revision AWWA C111 / ANSI A21.11. Bolts to be stainless steel.
- Flanged End: shall meet the requirements of ANSI B16.1, Class 125. Bolts to be stainless steel.

.6 Exterior of valve to be epoxy coated at factory. Interior of valve to be epoxy coated, as per latest revision AWWA C550.

.7 **Approved Products:**

- Jenkins Fig. 2544
- Pratt Groundhog
- Clow M&H 4500
- Pratt Groundhog
- Mueller Lineseal III

.4 Air and Vacuum Relief Valves

.1 Air and Vacuum relief valves to be heavy duty combination air release type employing direct acting kinetic principle.

.2 Valves to expel air at high rate during filling, at low rate during operating and to admit air while line is being drained.

.3 Valves to be fabricated of cast iron body and cover, with stainless steel trim.

.4 Floats to be stainless steel with shock-proof synthetic seat suitable for 2 MPa working pressure.

.5 Valves to be complete with surge check unit.

.6 Valve inlets and outlets to be threaded.

.7 **Approved Products:**

- ARI
- Apco
- Val-Matic
- Crispin

.5 Cast Iron Valve Boxes

.1 To be completely bituminous coated sliding type, adjustable over a minimum of 450 mm. Bottom casing to be large round type with minimum inside diameter of 240 mm. All castings shall clearly have the manufacturer's identification cast on them.

.2 Depth of bury to be 1.83 m (6') to 2.44 m (8').

.3 Valve operating extension spindle to be 25 x 25 square. Spindle length shall be such that the operating nut will not be more than 300 mm below the cover when set on the valve operating nut.

.4 Bottom of spindle to fit 50 x 50 mm square valve operating nut and shall be riveted to spindle.

.5 Top of spindle shall be removable 50 x 50 mm square operating nut c/w stone catcher flange.

.6 Top casing to fit over 133 mm (5.25") inside diameter bottom casing.

.7 Lids to be 11.35 kg (25 lbs) minimum, marked "WATER". For dimensions see Detailed Engineering Standard W-12A.

.8 **Approved Products:**

- Norwood “Type A”
- Trojan Industries “Type A”
- Sovereign Castings Ltd. “Type A” modified to City of Lethbridge specification.
- Westview Sales Ltd. ‘Type A’
- American Flow

1.4 SERVICE CONNECTIONS

.1 General

.1 For service connection sizes 20 mm to 50 mm diameter, pipe to be Copper Tubing, Municipex or IPEX Blue 904 Pex.

.2 For service connection sizes 100 mm to 300 mm diameter, pipe to be Polyvinyl Chloride (PVC) Pressure Pipe as specified in Section 1.1, Pipe.

.3 Fittings for service connection sizes 100 mm to 300 mm diameter to be as specified in Section 1.2, Pipe Joints and Fittings.

.4 Valves and Valve Boxes for service connection sizes 100 mm to 300 mm diameter to be as specified in Section 1.3, Valves and Valve Boxes.

.2 Water Service Pipe

.1 For services 20 mm to 50 mm diameter, copper tubing conforming to latest revision ASTM B88M, type K, annealed. (As described in AWWA C-800 – Appendix – Collected Standards for Service Line Materials).

.2 For services 20 mm to 50 mm diameter, cross-linked polyethylene pipe shall be manufactured in accordance with CSA B137.5 and ASTM F876 and shall comply with NSF 14 & 61 (PW). The degree of cross linking for Pex pipe shall not be less than 70% when tested in accordance to ASTM D2765 Method B. Pex pipe shall have CSA / NSF approved pressure rating of:

160 psi @ 23 degree C/73.4 degree F

100 psi @ 82 degree C/180 degree F

80 psi @ 93 degree C/200 degree F

- The outside diameter of the pipe shall be copper tube size (CTS) and shall have a standard dimension ratio (SDR) 9. Pex pipe shall be manufactured in natural color or in sky Blue (RAL 5015).
- The pipe shall carry the following marks every 5 feet minimum: manufacturer's name, nominal size, ASTM, CSA 7 NSF designations, SDR (standard dimension ratio), pressure/temperature rating, potable tubing, manufacturing date & machine number and footage mark. The pipe shall have consecutive footage marks every 5 feet (minimum starting with 0 at the beginning of each coil).
- The pipe shall be shipped in protective cardboard boxes marked with the product name and size.

.3 **Approved Products**

- Municipex Pipe
- IPEX Blue 904

.4 When connecting Municipex or Blue 904 to main cocks and service valves, stainless steel inserts shall be used.

.5 **Approved Products**

Ford, Mueller, A.Y. McDonald or approved equal.

Tracing wire shall be installed on all services.

.3 Water Service Tubing Couplings

.1 Compression type suitable for 1 MPa working pressure. Couplings shall be supplied **without** internal pipe stop.

.2 **Approved Products:**

- Ford “Pack Joint” couplings
- Ford “Grip Joint” couplings
- Mueller “Oriseal” couplings
- Emco/Cambridge Brass “Successor” couplings
- A.Y. McDonald Mfg. “Q” Compression couplings for sizes 20 & 25 mm diameter.

.4 Universal Transition Couplings

.1 To be used to join any type of water service connection pipe in sizes 20 mm to 50 mm.

.2 **Approved Products**

- PHILMAC Universal Transition Standard Couplings
- PHILMAC Universal Transition Reducing Couplings
- PHILMAC Universal Transition Elbow, Tees & Adaptors.
- Cambridge Brass Universal coupling Model No. 119

.5 Corporation (Main) Stops

.1 Corporation stops to be brass ball valve construction with or without Teflon coating. The body to be red brass compression type outlet fitting & inlet having AWWA threads conforming to latest revision AWWA Standard C-800. Valves to be full round port, reduced port not permitted. All brass fittings and valves shall be certified by a NSF or ANSI accredited test lab per NSF/ANSI 61 and NSF/ANSI 372. Proof of certification is required. Brass components in contact with potable water must be made from either CDA/UNS Brass Alloys C89520 or C89833 with a maximum lead content of 0.25% by weight. These fittings may also be referred to as lead free.

.2 **Approved Products**

- Cambridge Brass c/w Successor outlet for sizes 20, 25, 38 and 50mm diameter.
- A.Y. McDonald Mfg. “Q” Compression outlet for sizes 20, 25, 37 and 50mm diameter.
- Mueller B-25008 c/w “110 compression” outlet for sizes 20, 25, 37 and 50mm diameter. C
- Ford FB1000 “ballcorp” c/w “pack joint” outlet for sizes 20, 25, 37 and 50mm diameter.

.6 Curb Stops

.1 Curb Stops to be of ball valve construction. Balls to be Teflon coated brass or industrial chrome plated stainless steel c/w Teflon seats. Body to be red brass without drain. Inlets and outlets to be compression type fittings suitable for copper and municipex pipe. Valve to be full port, reduced port not permitted. All brass fittings and valves shall be certified by a NSF or ANSI accredited test lab per NSF/ANSI 61 and NSF/ANSI 372. Proof of certification is required. Brass components in contact with potable water must be made from either CDA/UNS Brass Alloys C89520 or C89833 with a maximum lead content of 0.25% by weight. These fittings may also be referred to as lead free.

.2 **Approved Products**

- Cambridge Brass c/w Successor outlet for sizes 20, 25, 38 and 50mm diameter.
- A.Y. McDonald Mfg. “Q” Compression outlet for sizes 20, 25, 38 and 50mm diameter.
- Ford B44 c/w “pack joint” outlet for sizes 20, 25, 37 and 50mm diameter.

.7 Curb stands (Service Boxes)

.1 Curb stands shall conform to Detailed Engineering Standard W-03-A.

.2 Depth of bury to be 1.83 m (6’) to 2.44 m (8’).

.3 Curb stand sliders shall be 31.75 mm (1-1/4") O.D., galvanized Standard Schedule 40, wrought iron pipe conforming to latest revision AWWA C800. Distance from top of cap to bottom of slider to be 610 mm minimum, 1000 mm maximum.

.4 Casing shall be 25 mm O.D. (1"), galvanized Standard Schedule 40, wrought iron pipe conforming to latest revision AWWA C800-84.

.5 Cap to be cast-iron, ribbed, marked "WATER" c/w 32 mm pentagonal head brass plug. The exterior of the cap is to be bituminous coated.

.6 Bottom box to be 127 mm (5") I.D., cast or ductile iron. The exterior and interior of the bottom box shall be epoxy coated.

.7 The operating rod shall be 15.875 mm (5/8") supplied as a single unit comprised of a solid AISI Type 304 stainless steel pinned to a stainless steel clevis with a stainless steel rivet.

.8 The operating rod shall be manufactured with a "W" centering bend (standard pig tail).

.9 A ¼" stainless steel set screw designed for access to tracer wire on the underside of the lid

.10 The manufacturer's name shall be embossed onto the clevis, and cast into the bottom boot to the satisfaction of the Engineer.

.11 The manufacturer shall supply and insert the brass cotter pin into the clevis

.12 **Approved Products:**

- Trojan
- Westview Sales Ltd

.8 <u>Fabricated Stainless Steel Repair Clamps or Service Saddle (Boss Clamp)</u>

.1 Repair clamps, fabricated all T304 stainless steel construction, fully passivated, with double bolt closure (fasteners) minimum.

.2 Outlet to be 20 mm to 50 mm AWWA Tapered thread.

.3 Fasteners to be 15.88 mm (5/8”) NC thread T304 stainless steel Hex nuts and washers to be T304 stainless steel, lubricated to prevent galling.

.4 Gaskets to be continuous ring, waffle pattern S.B.R. rubber conforming to latest revisions of ASTM D2000 and AWWA C-111 / ANSI A21.11.

.5 **Approved Products: (Replaces Robar 2706)**

- Robar 5616 TB* for main sizes 75mm to 300mm
- Robar 5626 TB* for main size 75 mm to 350 mm
- Canada Pipeline CR2/CRB2 for main sizes 100 mm to 300 mm
- Robar 5636 for main sizes 250 mm to 600 mm
- Canada Pipeline CR3 for main sizes 300 mm to 900 mm
- TPS EZ MAX 4000 for main sizes 75mm to 300mm
- Romac Style SS2 for main sizes 100mm to 350mm
- Romac Style SS3 for main sizes 400mm to 675mm
- Cambridge Brass – 425 Series
- Cambridge Brass – Single Piece Saddle (8403/8405/8407 series) for main sizes 100mm to 300mm
- Cambridge Brass – Two Piece Saddle (8403/8407 series) for main sizes 300mm and larger
- Ford FS313 – for main sizes 100mm to 300mm

*Denotes Double or Triple Bolt Closure

1.5 FIRE HYDRANTS

.1 Hydrants to be dry barrel, compression type, conforming to latest revision AWWA C502 designed for working pressure of 1,035 kPa (150 psi). Hydrants to close with pressure.

.2 The pumper and hose nozzles shall be located a minimum of 460 mm above the ground flange. Nozzle threads to conform to the Alberta Mutual Aid Standard. No chains are required to secure the hydrant caps to the hydrant body. Nozzles sizes to be:

- Pumper Nozzle: 1-114 mm diameter.
- Hose Nozzles: 2-65 mm diameter (at 90° to pumper nozzle).

.3 Hydrant valve opening to be 133 mm. Both the valve seat and the valve body to be of bronze construction.

.4 Hydrant inlet to be 150 mm diameter push-on “Tyton Joint” c/w elastomeric gasket conforming to latest revision of AWWA C111 / ANSI A21.11.

.5 Hydrants shall be opened by turning the hydrant operating nut left (counter clockwise). The operating nut and nozzle caps to be three-sided, 38 mm on each side.

.6 Minimum length of barrel to be 2.44 m (8’).

.7 Hydrant branch to be 150 mm diameter PVC pipe conforming to Section 1.1.2 of this specification, c/w 150 mm connection at main.

.8 Hydrant bodies and bonnets to be painted with exterior enamel. After installation, paint pumper and hose nozzle caps using exterior enamel in accordance with following colour code:

Watermain Diameter	Colour
100mm	Red
150mm	Yellow
200mm and larger	Black

.9 Hydrants to be constructed with Break-a-way Flange, complete with a safety stem (spindle). Coupling is to be located at ground level.

.10 All nuts, bolts and washers to be stainless steel.

.11 Light blue painted hydrants are for flushing purposes only. (not for firefighting).

.12 All approved hydrant manufacturers must maintain an adequate supply of hydrant parts at a Lethbridge distribution center. Failure to comply with this requirement will result in removal from the hydrant approval list.

.13 **Approved Products:**

- Mueller Modern Centurion
- Mueller Super Centurion
- Clow Canada “Brigadier” M-67
- Clow Canada “Heritage” M-67
- AVK Series 2700
- Terminal City Iron Works Ltd. C71P
- East Jordan Iron works Watermaster CD250
- American Flow B-84-B-5

1.6 CORROSION PROTECTIVE TAPES OR WRAPS

.1 Field installed corrosion protective coatings to be two part paste & tape systems.

.2 Approved Products:

- Polyken 900 system:
- No. 930 Joint Wrap Tape
- No. 931 Filler Tape.

- Denso of Canada Ltd.:
- Denso Paste
- Denso Tape

- Canada Pipeline Accessories Corp.:
- Petro Wrap Primer Paste
- PetroWrap LT Tape
- PetroWrap Overwrap
- PetroWrap filler Mastic
- Polyguard Products Inc.
- Polyguard 600 Primer
- Polyguard 600 Series Coating Tape
- Polyguard 606 Filler System
- The Trenton Corporation
- Trenton Tec-Tape Primer
- Trenton Tec-Tape Wrapper
- Trenton Glas-Wrap
- Trenton Fill-Putty
- Bren Technologies
- Petro Coatings System LT Tape
- Petro Coatings System Paste & Mastics
- Advanced Corrosion Solutions Inc.
- PetroGuard Tape LT
- PetroGuard Paste ST
- PetroGuard Mastic

1.7 CASING SPACERS & INSULATORS

.1 Casing Spacers used to center water and sewer pipe in casings.

.2 Casing Insulators are used to support and electrically insulate a cathodically protected pipeline from a casing pipe it must pass through.

.3 **Approved Products**

- APS Stainless steel or steel band casing spacers & insulators
- PSI Ranger II MIDI for sizes 100 mm to 375 mm.

1.8 TRACER WIRE

.1 Tracer wire is required for all piping that bends horizontally between valves and all trenchless installations.

.2 Tracer wire shall be installed in a continuous run for the full length of the installation and not connected to any metallic fittings along the route

.3 Tracer wire shall be taped to the top center of the pipe at 6m intervals and before and after any valve or fitting. Tape shall run the full circumference of the pipe.

.4 All wire dead end locations will require termination with a 6lbs anode.

.5 Tracer wire must only come to the surface in an approved test box and/or service box.

.6 A Conductivity Test will be required after the final connection but prior to the installation of the subbase. The Contractor shall demonstrate the integrity of the wire by applying a 512 Hz signal to the wire. The signal must be detectable for a minimum distance of 300 m from either side of the signal connection point.

.2 Wire

.1 Open Trench

.1 Wire shall be blue in colour (B), High Strength (HS), 12 gauge (AWG), Copper Clad Steel Wire (CCS).
.2 Minimum break load of 450lbs
.3 30 mil HDPE insulation rated for direct bury application

.2 Trenchless Construction

.1 Wire shall be blue in colour (B), Extra High Strength (EHS), 12 gauge (AWG), Copper Clad Steel (CCS).
.2 Minimum break load of 1150lbs
.3 45 mil HDPE insulation rated for directional drill application

.3 Connectors

.1 All connectors shall be filled with waterproof dielectric silicone and rated for direct bury application

.2 All connections and splices require a direct bury connector (Do not twist wires together and wrap with electrical tape)

.3 EHS wire requires an appropriate pipe burst connector

.4 Approved Manufacturers

.1 Copperhead

.2 Agave Wire

1.9 SACRIFICIAL ANODES

.1 General

- Anode lead wires shall be a minimum of 4 m in length and shall consist of #12/7 stranded copper wire with type RWU-90 insulation. Magnesium anodes are to be supplied with a blue lead wire. Zinc anodes are to be supplied with a white lead wire. The lead wire shall be connected to the core with silver solder or an approved equal. The connection shall be insulated by filling the recess and any voids in the lead wire core connection with an electrical potting compound. The anode shall be packaged in a water permeable cardboard tube containing a backfill mixture of the following composition:

Ground Gypsum $CaSO_4.2H_20$	75%
Powdered Bentonite $Al_4Si_80_{20}(OH)_4.NH_20$	20%
Anhydrous Sodium Sulfate Na_2S0_4	5%

- Anode-fill shall have a grain size so that 100 percent is capable of passing through a #20 (850 um) screen and 50 percent will be retained by a #100 (150 um) screen. The mixture shall be firmly packaged around the anode within the cardboard tube by means of adequate vibration. Cardboard tube size and back-fill material volume shall be sufficient to provide a minimum thickness of 25 mm of back-fill between all parts of the anode and the anode packaging.
- All anodes shall carry a label identifying the Manufacturer's name, type of anode, and the net weight of the anode. Cardboard tubes used to package anodes shall have sufficient strength to permit normal shipping and handling without failure.
- Manufacturers of sacrificial anodes shall have their anode chemical composition, current efficiency and back-fill material tested on a regular basis by an independent testing laboratory to

ensure compliance to these Specifications. The Manufacturer shall furnish, when requested by the Engineer, an “Affidavit of Compliance”, and test results prepared by an independent testing laboratory verifying compliance to these Specifications. The anode-fill material shall be analyzed using the X-ray diffraction technique for mineral identification or as other approved.

.2 Magnesium Anodes

- Magnesium anodes shall conform to ASTM B843 B 843 Grade M1C (latest edition). Anodes shall have a minimum open circuit potential of -1.70 volts referenced to Cu/CuS04. Minimum acceptable current efficiency is 48%. Testing of these properties shall be in accordance with ASTM G97. These anodes shall be cast with a perforated galvanized steel core. The weight of the core shall not exceed 0.15 kg per meter. One end of the anode shall be recessed so that the core is accessible for the lead wire connection.
- Magnesium anodes shall conform to the following composition (limits are given as maximum weight percent unless shown as a range):

Aluminium	0.01
Manganese	0.50 to 1.3
Silicon	0.05
Copper	0.02
Nickel	0.001
Iron	0.03
Other metallic impurities, each	0.05
Magnesium	Remainder

.3 Zinc Anodes

- Zinc anodes shall conform to ASTM. B418 Type II (latest edition). All anodes shall have a minimum open circuit potential of -1.10 volts referenced to Cu/CuS04. Zinc anodes shall have the following composition:

Aluminium	0.005% max
Cadmium	0.003% max
Iron	0.0014% max
Lead	0.003% max
Copper	0.002% max

Zinc	Remainder

- Independent testing laboratory to ensure compliance to these Specifications. The Manufacturer shall furnish, when requested by the Engineer, an “Affidavit of Compliance”, and test results prepared by an independent testing laboratory verifying compliance to these Specifications. The back-fill material shall be analyzed using the X-ray diffraction technique for mineral identification or as other approved.

Section 2
Storm Drainage System
Material Specifications

STORM DRAINAGE SYSTEM MATERIAL SPECIFICATIONS

2.1 GENERAL 3
2.2 PIPE 3
.1 Reinforced Circular Concrete Pipe 3
.2 Smooth Wall – PolyVinyl Chloride Pipe (PVC) 3
.3 Profile Wall – PolyVinyl Chloride Pipe (PVC) 4
2.3 SERVICE CONNECTIONS 4
.1 PolyVinyl Chloride Pipe (PVC) and Fittings 4
.2 PolyVinyl Chloride (PVC) Fittings 4
.3 Flexible Rubber Couplings 5
.4 Connections to Manholes 5
2.4 TRACER WIRE 5
.2 Wire 6
.3 Connectors 6
.4 Approved Manufacturers 7

2 STORM DRAINAGE SYSTEM MATERIAL SPECIFICATIONS

2.1 GENERAL

.1 Rubber gasket joints are required for all pipes. See parts 2.1 Pipe, and 2.2 Service Connections for details.

.2 All Cement used in the manufacture of concrete pipe to be Type 50, Sulphate Resistant, Portland Cement, CSA certified as meeting CAN/CSA-A5-M.

.3 All pipeline installation, regardless of the pipeline material being installed, shall incorporate a ZERO tolerance of the design and invert elevation where the design calls for a slope of 0.5 percent or less.

2.2 PIPE

.1 Reinforced Circular Concrete Pipe

.1 For pipe sizes 300 mm to 3660 mm in diameter all pipe, pipe joints, pipe fittings shall be to the latest revision of ASTM C76M, CSA certified as meeting CAN/CSA-A257 Series-M. All joints to have flexible rubber gaskets to the latest revision of ASTM C443M and CSA certified as meeting CAN/CSA-A257.3-M.

.2 Smooth Wall – PolyVinyl Chloride Pipe (PVC)

.1 For pipe sizing 200 mm to 375 mm diameter, all pipe to be PVC gravity sewer pipe to latest revision ASTM D3034, SDR35, CSA certified as meeting latest revision CSA B182.2, c/w integral locked-in gasket bell and spigot systems.

.2 For pipe sizing 450 mm to 1500 mm diameter, pipe to be PVC gravity sewer pipe to the latest revision ASTM F679, SDR 35, CSA certified as meeting latest revision CSA B182.2, c/2 integral locked-in gasket bell and spigot systems.

.3 All PVC pipe to be capable of deflecting a minimum of 5 degrees at the joint for 200mm – 300mm a minimum of 3 degrees at the joint for 375mm – 600mm and 1 degree at the joint for 675mm – 1500mm

.4 Pipe interior to be smooth and glossy

.5 **Approved Manufacturers**

- IPEX
- Royal

.3 Profile Wall – PolyVinyl Chloride Pipe (PVC)

.1 For pipe sizing 200 mm to 900 mm diameter, pipe to be Profile Wall PVC gravity sewer pipe to latest revision ASTM F-794, CSA certified as meeting latest revision CSA B182.4, c/w bell and spigot gasket system.

.2 **Approved Manufacturers**

- IPEX
- Royal

2.3 SERVICE CONNECTIONS

.1 PolyVinyl Chloride Pipe (PVC) and Fittings

.1 For PVC service connections 150 mm in diameter, all pipe and fittings to be to latest revision ASTM D3034, CSA certified as meeting CSA B182.1-M, SDR 28, integral locked-in gasket bell and spigot joints.

.2 PolyVinyl Chloride (PVC) Fittings

.1 PVC Tee Saddle c/w Rubber Gasket Joint: Saddles to be manufactured with integral centering ring or teeth to align saddle opening with hole in pipe. Saddle to be fastened to main by adjustable stainless steel straps. Screw mechanism on straps to be completely stainless steel.

.2 PVC Insert Type Fittings: Insert type fittings (Insert-Tee) to be PVC PSM gasket joint stubs, c/w molded rubber sleeve and adjustable stainless steel strap. Screw mechanism on straps to be completely stainless steel.

.3 **Approved Fitting Products:**

- Multi Fittings

- Le-Ron Plastics Inc.
- Vassallo
- Johns Manville
- G.P.K.
- Inserta-Tee
- EZ-Tee

.3 Flexible Rubber Couplings

.1 Flexible rubber couplings to be elastomeric PVC construction c/w stainless steel straps.

.2 **Approved Products:**

- Fernco, #1056 Series
- Clow, Super Seal
- Mission Rubber Co. – Flex-Seal
- Pipeconx

.4 Connections to Manholes

.1 PVC connections to manholes must be made with either a gasketed outlet or “grout adapter” made by coating a stub of pipe with a sand, epoxy, cement mortar mixture.

.2 Gasketed outlets to comply with ASTM C923-18

.3 Approved Products:

- Galaxy Plastics Ltd. For sizes 100mm to 250mm
- A-Lok
- Trelleborg Kor-N-Seal
- KwikSeal
- Press-Seal

2.4 TRACER WIRE

.1 Tracer wire is required for all piping that bends horizontally between manholes and all trenchless installations.

.2 Tracer wire shall be installed in a continuous run for the full length of the installation and not connected to any metallic fittings along the route

.3 Tracer wire shall be taped to the top center of the pipe at 6m intervals and before and after any valve or fitting. Tape shall run the full circumference of the pipe.

.4 All wire dead end locations will require termination with a 6lbs anode.

.5 Tracer wire must only come to the surface in an approved test box and/or service box.

.6 A Conductivity Test will be required after the final connection but prior to the installation of the subbase. The Contractor shall demonstrate the integrity of the wire by applying a 512 Hz signal to the wire. The signal must be detectable for a minimum distance of 3 m from either side of the signal connection point.

.2 Wire

.1 Open Trench

- .1 Wire shall be green in colour (G), High Strength (HS), 12 gauge (AWG), Copper Clad Steel Wire (CCS).
- .2 Minimum break load of 450lbs
- .3 30 mil HDPE insulation rated for direct bury application

.2 Trenchless Construction

- .1 Wire shall be blue in colour (B), Extra High Strength (EHS), 12 gauge (AWG), Copper Clad Steel (CCS).
- .2 Minimum break load of 1150lbs
- .3 45 mil HDPE insulation rated for directional drill application

.3 Connectors

.1 All connectors shall be filled with waterproof dielectric silicone and rated for direct bury application

.2 All connections and splices require a direct bury connector (Do not twist wires together and wrap with electrical tape)

.3 EHS wire requires an appropriate pipe burst connector

.4 Approved Manufacturers

.1 Copperhead

.2 Agave Wire

Section 3
Foundation Drainage Collector
Material Specifications

FOUNDATION DRAINAGE COLLECTOR MATERIAL SPECIFICATIONS

3.1 GENERAL 3
3.2 SERVICE CONNECTIONS 3
.1 Polyethylene (PE) Pipe 3
.2 Thermoplastic Compression Fittings 3

3 FOUNDATION DRAINAGE COLLECTOR MATERIAL SPECIFICATIONS

3.1 GENERAL

.1 Foundation drainage collection to be pumped only.

3.2 SERVICE CONNECTIONS

.1 Polyethylene (PE) Pipe

.1 For pumped foundation drainage service connections, pipe to be 38 mm diameter, CTS (Copper Tube Size), Series 160, Polyethylene Pipe, CSA certified to latest revision CSA B137.1.

.2 Thermoplastic Compression Fittings

.1 Compression fittings to be constructed of engineering grade thermoplastic suitable for cold water applications, CSA certified to latest revision CSA B137.1. Inserts and spit collets to be colour coded for easy identification.

.2 **Approved Products:**

- Philmac
- Cepex

Section 4
Manhole and Catch Basin
Material Specifications

MANHOLE AND CATCH BASIN MATERIAL SPECIFICATIONS

4.1 GENERAL 3
.1 Concrete 3
.2 Metal Castings 3
4.2 MANHOLES 5
.1 Precast Manholes 5
.2 Ladder Rungs 6
.3 Manhole Frames and Covers 6
.4 Watertight Manhole Inserts 7
.5 Expanded Polystyrene Elevation Adjustment Units 8
4.3 CATCH BASINS 10
.1 Precast Catch Basins 10
.2 Catch Basin Frames and Grates 10
.3 Inlet Control Devices 10

4 MANHOLE AND CATCH BASIN MATERIAL SPECIFICATIONS

4.1 GENERAL

.1 Concrete

.1 All Cement for Cast-In Place or Precast concrete to be Sulphate resistant cement type HS (Type 50) in accordance with CSA 3001 or Type V in accordance with ASTM C150.

.2 All Concrete for Cast-In-Place or Precast to meet CAN/CSA-A23.1-M90 “Concrete Materials and Methods of Concrete Construction”.

.3 Concrete mix design for Cast-In-Place or Precast to produce a minimum compressive strength of 30 MPa at 28 days, containing 25 mm maximum course aggregate, air entrainment 6% (percent) +/- 1%, 75 mm slump at time of deposit at work site.

.4 All pipeline installation, regardless of the pipeline material being installed, shall incorporate a ZERO tolerance of the design and invert elevation where the design calls for a lope of 0.5 percent or less.

.5 All concrete structures shall be designed for CL-800 truck loading as per CSA-S6-00 (Canadian Highway Bridge Design Code).

.6 All reinforced precast manhole sections and catch basins to be certified to CSA 8083-05 (Reinforced Circular Manhole Sections and Catch Basins) and bear the CSA certification mark.

.7 Any manhole or catch basin that requires the contractor to add additional inverts, must have the concrete ‘saw cut’ or ‘cored’.

.2 Metal Castings

.1 Castings to conform to the AASHTO M 306-10 specification.

.2 Production Facilities

.1 All casting production facilities, regardless of location, shall be ISO 9001 certified and listed.

.2 Production facilities in North America shall adhere to the inspection procedures under AASHTO M 306-10, Sections 8.1.1 and 8.1.2.

.3 Where the Production facility is not located in North America, the Manufacturer shall adhere to the Inspection procedure under AASHTO M 306-10, Sections 8.1.1 and 8.1.3.

.3 Roles and Responsibilities

.1 "Manufacturer, Supplier, Purchaser" shall be used to indicate the Foundry of origin, approved Distributor and the City of Lethbridge respectively.

.2 Suppliers shall engage a third party Engineering Consultant registered with APEGA to provide inspection, documentation and certification of the Manufacturer where manufacturing takes place outside of North America.

.3 The Engineering Consultant shall document and endorse the following as part of the Supplier Certificate of Compliance:

.1 Perform an initial qualification inspection of the proposed Manufacturer facility

.2 Verify compliance to ISO 9001-15 QC procedures

.3 Review and verify Manufacturers sample testing facility and test result records for compliance to AASHTO M 306-10 Section 8.1.3.

.4 Certify that the Manufacturers production drawings are in compliance with the City of Lethbridge standard drawings. Any subsequent change in production details or design from this certified drawing shall require re-certification from the Engineering Consulant.

.5 Review, approve and append the producing foundry document and certification required in AASHTO M 306-10, Section 9.1, including all Production facility test results associated with the product to be distributed for each shipment.

.4 The Supplier Certificate of Compliance will be signed and stamped by the Consultant Engineer for presentation to the City of Lethbridge annually by March 1. The Certificate is valid for one year from the date of signature and stamping provided the Supplier continues to use the specific facility certified and that the facilities ISO 9001-15 certification remains in good standing.

.5 **The Supplier is obligated to notify the City of Lethbridge of any circumstance that may require re-certification of their Manufacturer.**

.6 The Engineering Consultant will also:

.1 Arrange to perform and certify any additional Quality Verification load tests, test bar preparation and testing of same, at the discretion of the City of Lethbridge upon receipt of new product at the Supplier's yard.

.2 The work will be performed in Alberta, unless otherwise approved, in an approved Materials testing facility at no cost to the City of Lethbridge, and the results included in a report signed and stamped by the Consultant Engineer.

.4 Castings to be grey Iron to latest revision ASTM A48, minimum strength class 30B. Castings shall be true to pattern and free of cracks, gas holes, flaws and excessive shrinkage.

.5 Castings to be sand blasted or cleaned and ground to eliminate surface imperfections. Surfaces of castings to be free of burnt on sand and shall be cast reasonably smooth. Runners, risers, fins and other cast on pieces shall be removed.

4.2 MANHOLES

.1 Precast Manholes

.1 Precast manhole sections (barrels, bases, slab tops, adapter and risers) shall be certified to CSA 8083-05 and conform to CSA 257.4 (Precast Reinforced Circular Concrete Manhole Sections, Catch Basins and Fittings). Barrels to be 1220 mm minimum inside diameter (I.D.).

.2 All manholes to have flat slab tops with opening offset for vertical ladder installation.

.3 Precast monolithic bases to be approved by Engineer prior to installation.

.4 Adjusting Rings (collars), only 50 mm, 100 mm, 150 mm, and 200 mm thick collars permitted. A maximum of two (2) adjusting rings (collars) are permitted in any one manhole.

.5 Manholes to be c/w ladder rungs 400 mm o/c vertically. For manholes with pipe greater than 450 mm in diameter, rungs to be at 90 degrees to channel. For manholes with pipe less than 450 mm in diameter, steps to be in line with channel.

.6 All joints to be made watertight using flexible butyl resin sealant or Tylox Superseal Pre Lubricated gasket or an approved equal.

.7 All mortar to use aggregate meeting the latest revision CSA A82.56-M, cement CSA certified as meeting CAN/CSA3-A8-M, Type 50, Sulphate Resistant.

.8 Precast manholes to come with preinstalled with gaskets at each invert. See Section 5.2.3 for approved products.

.2 Ladder Rungs

.1 All ladder rungs to be drop step type, to latest revision ASTM C478M. Rungs to be minimum 250 mm wide. Material of rungs to be:

- Coated Aluminum Rungs: to be 20 mm (3/4”) O.D. aluminum tubing coated with low density polyethylene, 3 mm (1/8”) thickness. Coating to have integral slip resistant pattern.

.2 All rungs to be fastened to concrete with low density polyethylene anchor sleeves.

.3 Manhole Frames and Covers

.1 Manhole frames and covers to dimensions as shown on Detailed Engineering Standard S-10. A frame with cover shall constitute one unit.

.2 Manhole covers shall bear evenly on the frames.

.3 Manhole frames and covers to have a minimum weight of 158.9 kg. (350 lbs) per set (cover=61kg, frame=98kg). Cover to be cast without perforation, complete with two 25 mm diameter lifting holes.

.4 Adjustable manhole frames and adjustable rings to dimensions and materials as shown on Detailed Engineering Standards S-10-C, S-10-D and S-10-E.

.5 Approved Products:

- Trojan Industries
  - TF-67C City of Lethbridge standard cover with logo
  - TF-67 F City of Lethbridge standard frame to be used with TF-67C and TF-67CL
  - TF-67 CL City of Lethbridge locking cover with logo
  - Adjustable manhole frames and rings.
- Sovereign Castings Ltd. - frame S-67F, cover S-67C
- Westview Sales Ltd. – frame RB67F, cover RB67C
- -RB67CL City of Lethbridge locking cover with logo

.4 Watertight Manhole Inserts

.1 Watertight manhole inserts to be comprised of insert body, basket, gas relief valve and handle. Insert components to be manufactured from materials resistant to corrosion caused by hydrogen sulfide and dilute sulfuric acid contaminated atmospheres.

.2 Insert body to be 304 Stainless Steel with a minimum thickness of 0.80 mm. Depth of insert to be 140 mm to accommodate manhole lids. Inserts to have a “straightside” design to allow a loose fit into ring for easy removal. Manufacturer to provide load test verification indicated a load test failure resistance in excess of 5.34 kN (1200 lbf).

.3 Insert gasket to be EPDM Rubber, envelope style design, ribbed on one side to insure a positive seal. Gasket to be factory installed by Manufacturer.

.4 Gas relief valve shall be designed to open at a pressure of 3.48 to 10.34 kPa (0.5 to 1.5 psi) and have a water leak down rate no greater than 18.93 litres per 24 hours (5 US gal. per 24 hours). The valve shall be manufactured from Nitrite and installed in the insert

.5 by means of a hole tapped in the insert by the manufacturer and secured to prevent being knocked out by lid rotation.

.6 The handle shall be of 25 mm wide nylon web strapping fastened to the insert body with two #6 high grade stainless steel rivets and washers. The handle is to be installed on the insert in such a way that it does not interfere with the installation of the manhole lid. The handle shall be able to withstand a 2.22 kN (500lbf) pulling force before it fails or separates from the insert body.

.7 **Approved Products:**

- "Rainstopper" manufactured by Southwestern Packing & Seals, Inc. of Shreveport, Louisiana.

.5 Expanded Polystyrene Elevation Adjustment Units

.1 Units are to be manufactured from high density expanded polystyrene material

.2 Material will be;

.1 a stabilized, closed cell structure
.2 insoluble, non-hygroscopic and fully resistant to water ingress
.3 physically inert and will not expand or contract
.4 chemically inert and will not off gas or leachate
.5 non nutritive, non absorptive
.6 non toxic and non irritant

.3 Adjustment units must have a minimum flexural strength of 896 kpa, shear strength of 551 kpa, and tensile strength of 896 kpa

.4 Units will be constructed using a moisture curing, polyether, high bonding structural adhesive approved by the manufacturer of the elevation adjustment units.

.5 **Approved Products:**

- strataWORKS EPS Elevation Adjustment Unit
- CHEM LINK M-1 Adhesive

4.3 CATCH BASINS

.1 Precast Catch Basins

.1 Precast catch basin sections to be certified to CSA 8083-05 and bear the CSA certification mark. Barrels to be 920 mm inside diameter c/w flat top.

.2 Catch Basin Frames and Grates

.1 Catch basin frames and grates to dimensions as shown on Detailed Engineering Standard S-11, S-12, and S-13. A frame with cover shall constitute one unit.

.2 Catch basin grates shall bear evenly on the frames.

.3 **Approved Products**:

- Standard Curb Type:
  - Pattern B101-B104
  - Trojan Industries – TF-70 Frame, Grate & Locking Side Inlet
  - Westview Sales Ltd – RB70 Frame, Grate & Locking Side Inlet
- Round Type:
  - Trojan Industries TF-68CBF Catch Basin Frame, TF-68G Grate
  - Westview Sales Ltd RB68F&G Frame & Grate
- Rolled Curb Type
  - Trojan Industries TYPE K-7 Double & Single Frame & Grate
  - Sovereign Castings Ltd. Single Frame S-K7FS, Single Grate S-K7G, Double Frame S-K7FD
  - Westview Sales Ltd. RB7 Double & Single Frame & Grate

.3 Inlet Control Devices

.1 All catch basins shall be equipped with an outlet flow control orifice (Inlet Control Device) sized to accommodate the 1 in 5 year flow generated by that catch basin's tributary area.

.2 Orifice shape to conform to:

- University of Ottawa, Department of Civil Engineering Design.

- City of Calgary “Catch Basin Inlet Control Assembly for Plate Type Control”.

.3 **Approved Products**

- IPEX PVC Inlet Control Devices.
- Lafarge Construction Materials Inlet Control Devices.

Note: ICD’s custom manufactured to the City of Calgary Standard must be approved by Infrastructure Services prior to installation.

Section 5
Wastewater Collection System
Material Specifications

WASTEWATER COLLECTION SYSTEM MATERIAL SPECIFICATIONS

5.1 GENERAL 3
5.2 PIPE 3
.1 Reinforced Circular Concrete Pipe 3
.2 “Smooth Wall” PolyVinyl Chloride (PVC) Pipe 3
5.3 SERVICE CONNECTIONS 4
.1 “Smooth Wall” PolyVinyl Chloride (PVC) Pipe 4
.2 PolyVinyl Chloride (PVC) Fittings 4
.3 ABS Pipe 5
.4 Flexible Rubber Couplings 5
.5 Connections to Manholes 4
.6 HDPE Pipe 6
5.4 TRACER WIRE 6
.2 Wire 6
.3 Connectors 7
.4 Approved Manufacturers 7

5 WASTEWATER COLLECTION SYSTEM MATERIAL SPECIFICATIONS

5.1 GENERAL

.1 Rubber gasket joints are required for all pipe; See parts 5.2 Pipe, and 5.3 Service Connections for details.

.2 All Cement used in the manufacture of concrete pipe to be Type 50, Sulphate Resistant, Portland cement, CSA certified as meeting CAN/SCA-A5.

.3 All pipeline installation, regardless of the pipeline material being installed, shall incorporate a ZERO tolerance of the design and invert elevation where the design calls for a slope of 0.5 percent or less.

5.2 PIPE

.1 Reinforced Circular Concrete Pipe

.1 For pipe sizes 1500 mm to 3660 mm in diameter all pipe, pipe joints, pipe fittings shall be to the latest revision of ASTM C76M, CSA certified as meeting latest revision CAN/CSA-A257 Series-M. All joints to have flexible rubber gaskets to the latest revision of ASTM C443M, and CSA certified as meeting latest revision CAN/CSA-A257.3.

.2 "Smooth Wall" PolyVinyl Chloride (PVC) Pipe

.1 For Pipe sizing 200 mm to 375 mm diameter, all pipe to be PVC gravity sewer pipe to latest revision ASTM D3034, SDR35, CSA certified as meeting latest revision CSA B182.2-M, integral locked-in gasket bell and spigot system.

.2 For pipe sizing 450mm to 1500mm diameter, all pipe to be PVC gravity sewer pipe to the latest revision STM F679, SDR 35, CSA certified as meeting latest revision CSA B182.2-M, integral locked-in gasket bell and spigot systems.

.3 All PVC pipe to be capable of deflecting a minimum of 5 degrees at the joint for 200mm – 300mm a minimum of 3 degrees at the joint for 375mm – 600mm and 1 degree at the joint for 675mm – 1500mm

.4 Interior of pipe to be smooth and glossy

.5 **Approved Manufacturers**

- IPEX
- Royal

.3 Connections to Manholes

.1 PVC connections to manholes must be made with either a gasketed outlet or "grout adapter" made by coating a stub of pipe with a sand, epoxy, cement mortar mixture.

.2 Gasketed outlets to comply with ASTM C923-18

.3 If using a gasket for the connection, non-shrink grout is required at the bottom half of the gasket to match the benching.

.4 Approved Products:

- Galaxy Plastics Ltd. For sizes 100mm to 250mm
- A-Lok
- Trelleborg Kor-N-Seal
- KwikSeal
- Press-Seal

5.3 SERVICE CONNECTIONS

.1 "Smooth Wall" PolyVinyl Chloride (PVC) Pipe

.1 For PVC service connections 100mm to 150mm in diameter, all pipe to be to latest revision ASTM D3034, CSA certified as meeting latest revision CSA B182.1-M, SDR 28, integral locked-in gasket bell and spigot joints.

.2 For PVC service connections 200 mm and larger, all pipe to be as specified in 1.2.2; PolyVinyl Chloride Pipe.

.2 PolyVinyl Chloride (PVC) Fittings

.1 For PVC service connections 100mm to 150mm in diameter, all fittings to be to latest revision ASTM D3034, CSA certified as meeting latest revision CSA B182.1-M, SDR 28, integral locked-in gasket bell and spigot joints.

.2 Connecting to Mains:

.1 PVC Tee Saddle c/w Rubber Gasket Joint: Saddles to be manufactured with integral centering ring or teeth to align saddle opening with hole in pipe. Saddle to be fastened to main by adjustable stainless steel straps. Screw mechanism on straps to be completely stainless steel.

.2 PVC Insert Type Fittings: Insert type fittings ("Inserta-Tee") to be PVC PSM gasket joint stubs, C/W molded rubber sleeve and adjustable stainless steel strap. Screw mechanism on straps to be completely stainless steel.

.3 **Approved Products**

- Multi Fittings
- Le-Ron Fittings
- Vassallo
- G.P.K
- Inserta Tee
- EZ-Tee

.3 ABS Pipe

.1 For renewal of existing "No-Corrode" Orangeburg Sewer services only

.2 Pipe to be ABS-DWV (Acrylonitrile Butadiene Styrene – Drain Waste Vent) pipe, CSA certified to latest revision of CSA B181.1.

.4 Flexible Rubber Couplings

.1 Flexible rubber couplings to be elastromeric PVC construction c/w stainless steel straps.

.2 Approved Products:

- Fernco, #1056 Series
- Clow, "Super-Seal"

- Mission Rubber Co. – “Flex Seal”
- Pipeconx

.5 HDPE Pipe

.1 For renewal of service leads only using pipe bursting. HDPE material for pipe and fittings shall come from a single compound manufacturer and conform to ASTM D3350.

5.4 TRACER WIRE

.1 Tracer wire is required for all piping that bends horizontally between manholes and all trenchless installations.

.2 Tracer wire shall be installed in a continuous run for the full length of the installation and not connected to any metallic fittings along the route

.3 Tracer wire shall be taped to the top center of the pipe at 6m intervals and before and after any valve or fitting. Tape shall run the full circumference of the pipe.

.4 All wire dead end locations will require termination with a 6lbs anode.

.5 Tracer wire must only come to the surface in an approved test box and/or service box.

.6 A Conductivity Test will be required after the final connection but prior to the installation of the subbase. The Contractor shall demonstrate the integrity of the wire by applying a 512 Hz signal to the wire. The signal must be detectable for a minimum distance of 3 m from either side of the signal connection point.

.2 Wire

.1 Open Trench

.1 Wire shall be green in colour (G), High Strength (HS), 12 gauge (AWG), Copper Clad Steel Wire (CCS).
.2 Minimum break load of 450lbs
.3 30 mil HDPE insulation rated for direct bury application

.2 Trenchless Construction

.1 Wire shall be blue in colour (B), Extra High Strength (EHS), 12 gauge (AWG), Copper Clad Steel (CCS).
.2 Minimum break load of 1150lbs
.3 45 mil HDPE insulation rated for directional drill application

.3 Connectors

.1 All connectors shall be filled with waterproof dielectric silicone and rated for direct bury application

.2 All connections and splices require a direct bury connector (Do not twist wires together and wrap with electrical tape)

.3 EHS wire requires an appropriate pipe burst connector

.4 Approved Manufacturers

.1 Copperhead

.2 Agave Wire

PRODUCT APPROVALS

The City of Lethbridge requires that all products which are to be used on the water distribution system, wastewater collection system and the storm drainage system are approved by the Infrastructure Services Water & Wastewater Product Approval Committee prior to use. Any approvals will be issued by the Committee in writing to the respective supplier.

The materials listed in this specification have been approved by the City of Lethbridge upon meeting various standards (AWWA, CSA, ASTM, etc.), and based upon product testing conducted by the City, of samples furnished by the Manufacturers.

Any subsequent design changes by the Manufacturer to any approved product could result in the City withdrawing approval of the product. If the Manufacturer changes the design or specifications of any approved product, they must reapply for approval.

The City of Lethbridge reserves the right to withdraw the approval of any product, if in our opinion the product does not perform satisfactorily.

Manufacturers whose products conforming to these specifications that do not currently have approval are encouraged to submit to the City a written request for product approval together with detailed product specifications and sufficient samples to conduct field evaluations. The product evaluation process will take a minimum of one (1) year.

If you find an error or omission in our specification, we want to know. Your input helps us ensure that our specs are accurate and fair.

Appendix "A"

DETAILED ENGINEERING STANDARDS – WASTEWATER COLLECTION AND STORM DRAINAGE SYSTEMS

S-01	Standard Precast Manhole – Type 1
S-02	T-Riser Manhole
S-03	Standard Manhole With Vault – Type 3 (Cast in Place)
S-03A	Standard Precast Vaults
S-04	Standard Manhole with Exterior Drop – Type 4
S-05	Test Manhole for Commercial Sanitary Sewer Services
S-06	Service Connection Detail, Sanitary Manhole in Cul-De-Sac
S-07	Typical Benching in Sanitary Manholes
S-08	PVC Sewer Service Connection for Mains less than 3.7 m Deep
S-09	PVC Sewer Service Riser Connection for Mains 3.7m to 5.5m Deep
S-10	Standard Manhole Frame and Cover
S-10A	Standard Logo Cover
S-10B	Double lock manhole frame and cover
S-10C	Adjustable Frame Installation
S-10D	Adjustable Frame
S-10E	Adjustable Frame Foundation Ring
S-10F	Adjustable Manhole Frame & Cover – Standard Detail Drawings
S-10G	T67 Platen Manhole Lid
S-11	Single Catch Basin Frame Rolled Curb Type
S-11A	Double Catch Basin Frame Rolled Curb Type
S-11B	Catch Basin Grate – Rolled Curb Type
S-12	Standard Curb Type Catch Basin Frame and Grate
S-12A	Standard Curb Type Catch Basin Frame, Grate and Locking Side Inlet
S-13	Standard Catch Basin Frame and Grate, Round Type
S-14	Type 1 Catch Basin, Rolled Curb
S-15	Type 2 Catch Basin, Standard Curb
S-16	Type 3 Catch Basin, Round Top
S-19	Standard for Frost Shield for Mains and Services
S-21	Class "C" Bedding (Rigid Pipe)
S-22	Class "B" Bedding (Rigid Pipe)
S-23	Class "A" Bedding (Rigid Pipe)
S-24	Bedding and Backfilling PVC Pipe
S-29	Standard for Pumped Foundation Drainage Service
S-30	Infill Serviced Lots Only
S-30A	Single Family Lot Servicing

Appendix “B”

DETAILED ENGINEERING STANDARDS – WATER DISTRIBUTION SYSTEM

W-01	Standard for Fire Hydrant Installation
W-02	Standard for 25 mm Diameter Water Service
W-02A	Standard for 20 mm and 25 mm Diameter Water Service (RENEWAL)
W-03	Standard for 37 mm and 50 mm Diameter Water Service
W-03A	Curb Stand Detail (Service Box)
W-03B	Curb Stand Operating Rod Detail
W-04	Standard Water Service Connections for 150 mm & 200 mm Diameter Services
W-05	Horizontal Thrust Blocking
W-06	Vertical Thrust Blocking
W-07	Standard Gate Valve Installation
W-08	Standard Butterfly Valve Installation
W-09	Standard for 75 mm Diameter Irrigation Service Riser
W-10	Standard for 25 mm, 38 mm, and 50 mm Diameter Irrigation Service Riser
W-11	Standard Vacuum & Air Relief Valve Installation for PVC Pipe
W-12	Valve Box Riser
W-12A	Valve box cap
W-13	Chlorination Point Detail for Chlorinating and Flushing Water mains
W-14	300 mm Valve Box Riser
W-15	Typical Installation of 50 mm Water Meter