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APPENDIX A

APPROVED MATERIALS

479 Island Highway
Victoria, BC V9B 1H7
Tel: (250) 474-9600
Fax: (250) 474-4012

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All persons utilizing these documents are advised to visit the Capital Regional District website <https://www.crd.bc.ca/service/drinking-water/engineering-specifications> to ensure that all specifications and drawings are the current version.

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Table 1: Revision Table

REVISION	DATE	UPDATES
v05	2021.03.16	1.10.3 item 5 – New approved product 1.16.2 item 4 – New approved product
v06	2022.11.02	1.18.3 item 4 – correction 1.33.3 item 2 – New approved product

1 APPROVED CONSTRUCTION MATERIALS

1.1 GENERAL

This section covers the approved materials for use in the Juan de Fuca Water Distribution System. The list is not intended to be exhaustive, requests for materials to be included must be submitted to CRD Water Services for review and approval. Materials not appearing in this list, or subsequently approved, will not be accepted.

1.2 GATE VALVES - 50MM - 500MM

- 1.2.1 Conform to the latest version of AWWA/ANSI C509.
- 1.2.2 Valves shall be resilient wedge design, Hub X Hub, Hub X Flange, Flange X Flange, M.J. X Flange or M.J. X M.J.
- 1.2.3 50mm Valves to be threaded NPT.
- 1.2.4 Valves shall be coated internally and externally in accordance with AWWA C550-90 and certified to NSF61.
- 1.2.5 Valves intended for use in the CRD Water Services Distribution System shall be Right Hand opening (RHO) or clockwise opening and have a 31mm (1 ¼") square operating nut for buried applications and rising stem (OS&Y) with hand wheels for vault installations. Valves shall be rated for a working pressure of 250psi unless otherwise noted.
- 1.2.6 Approved Gate Valves:
 - .1 Mueller – A-2361 Series
 - .2 Clow - F6100
 - .3 AVK – 45 Series
 - .4 T.C.I.W - 3000 Series

1.3 DUCTILE IRON FITTINGS

- 1.3.1 Conform to the latest version of ANSI/AWWA A21.10/C110 including all bends, tees, reducers, and caps.

1.3.2 Compact Ductile Iron fittings (3" to 48"), including flanged fittings shall conform to the latest version of ANSI/AWWA C153/A21.53.

1.3.3 Fittings may be Hub X Hub, Hub X Flange, M.J. X M.J., M.J. X Flange, or F X F. Hub ends shall have lugs with holes suitable for restraint rods.

1.3.4 Approved Manufacturers:

- .1 Sigma
- .2 Clow
- .3 T.C.I.W
- .4 Tyler Union

1.4 PVC PIPE - 100MM - 250MM

1.4.1 PVC DR18 to the latest version of AWWA C900

1.4.2 Approved PVC pipe manufacturers:

- .1 IPEX
- .2 Royal Plastics

1.5 DUCTILE IRON PIPE – 100MM TO 600MM

1.5.1 Ductile Iron Pressure Class 350 to the latest version of AWWA C151.

1.5.2 Ductile Iron 300mm and larger shall be a fully restrained system, the pressure rating of the joint shall equal the pressure rating of the pipe (Class 350) when deflected to its maximum joint deflection. Restrained push-on joints for in-line pipe joints shall utilize ductile iron locking segments or a mechanical joint (MJ) restraint harness consisting of multiple gripping wedges incorporated into follower glands to AWWA C110. All Ductile Iron bends, elbows, and valves etc. shall be restrained with a mechanical joint (MJ) consisting of multiple gripping wedges incorporated into follower glands to AWWA C110 unless otherwise approved by the CRD.

1.5.3 Approved Manufacturers:

- .1 Canada Pipe
- .2 US Pipe

1.6 HDPE PIPE

- 1.6.1 HDPE DR11 to the latest version of AWWA C906, only on a case by case pre-approval.

1.7 FIRE HYDRANTS

- 1.7.1 Conform to the latest version of AWWA C502 with the following features:

- .1 Compression style.
- .2 Right hand opening (CW).
- .3 2 - 63.5 mm (2 ½") hose nozzles BC standard fire thread and one 100mm (4") Storz nozzle c/w thread-on cap.
- .4 Inlet shall be 150mm hub with lugs.
- .5 Self-Draining.
- .6 Operating nut shall be 41.28mm (1 9/16") pentagon.
- .7 Hydrants shall be rated for a minimum working pressure of 200psi

- 1.7.2 Approved Manufacturers and Models:

- .1 Mueller - Super Centurion 350™, Series A-423
- .2 T.C.I.W - Model C-71P or H105 Heritage
- .3 AVK - Model 2780
- .4 Clow - Model M93 Brigadier

1.8 BOLTED, SLEEVE-TYPE COUPLINGS FOR PLAIN-END PIPE

- 1.8.1 Conform to the latest version of AWWA C219.

- 1.8.2 Approved Manufacturers and Models

- .1 Robar - 1506
- .2 Romac – XR501, Alpha
- .3 Smith Blair – 421
- .4 Hymax – 2, Grip
- .5 Ford

1.9 PRESSURE REDUCING VALVES

1.9.1 Approved manufacturers:

- .1 CLA-VAL
- .2 Singer

1.9.2 All pressure reducing valves shall have speed controls.

1.10 PIPE JOINT RESTRAINT

1.10.1 Restrainers shall have UL and FM approval.

1.10.2 Pressure rating.

- .1 Restraints shall be rated to at least 235 psi for 250mm diameter and smaller pipe.
- .2 Restraints shall be rated to at least 350 psi for 300mm diameter and larger pipe.
- .3 Restraints shall utilize mechanical joint (MJ) at fittings for 250mm diameter and larger pipe to prevent any pressure de-rating.

1.10.3 Installers must follow manufacturer's specifications and ensure that they are using the right restraint for the type of pipe material being installed.

- .1 Ford – Series: 1300, 1350, 1360, 1390
- .2 EBAA Iron – Series 1100, 1500 & 2800 MEGALUG
- .3 Smith Blair – Cam-Lock Model 111 (75mm-1200mm)
- .4 Sigma – PV Lok & One-Lok
- .5 Star Pipe Products – Series 1000, 1100, 3000, 4000,

1.11 RESTRAINING RODS & NUTS

1.11.1 Approved Materials:

- .1 High strength, low alloy, corrosion resistant material. i.e. "Corten".

1.12 CHECK VALVES

1.12.1 Conform to the latest version of AWWA C508 with the following features:

1.12.2 Flange x Flange ends.

1.12.3 Swing check with resilient disc to meet NSF 61.

1.12.4 Stainless steel hinge pin with bronze bushings with “O” ring seal.

1.12.5 Must have outside lever and weight.

1.12.6 Interior coating shall be fusion bonded epoxy certified to NSF 61.

1.12.7 Approved manufacturers and models:

- .1 Mueller - A-2600-6-01 (outside lever and weight)
- .2 T.C.I.W - Model 5110-Rubber disc trim (outside lever and weight)
- .3 Clow - 1106LW (outside lever and weight)

1.13 COMBINATION AIR VALVES

1.13.1 Conform to the latest version of AWWA C512 with the following features:

1.13.2 Stainless steel trim.

1.13.3 Interior and exterior coating shall conform to ANSI/AWWA C550. Interior coating shall be fusion bonded epoxy and certified to NSF 61.

1.13.4 Approved Manufacturers and Models:

	APCO	VALMATIC	G.A. (low profile)	CRISPIN	ARI
12mm (1/2")			945		D040
25mm (1")			945		D040
50mm (2")	145C	202C	945		D040
75mm (3")	147C	203C	945	UL30	D060
100mm (4")	149C	204C	945	UL41.1	D060
150mm (6")	150C	206C	N/A	C61	D060
200mm (8")	151C	208C	N/A	C81	D060

N/A - Not Available

1.14 STAINLESS STEEL REPAIR CLAMPS

1.14.1 Clamps shall be fully passivated 304 stainless steel shell.

1.14.2 Bolts shall be 18-8 stainless steel with rolled NC thread with nylon and stainless steel washers.

1.14.3 Gaskets shall have tapered ends, girded surface, and stainless steel armours.

1.14.4 Approved Manufacturers:

- .1 Robar - 5626
- .2 Canada Pipeline Accessories (1986) Corp. – CR2
- .3 Mueller - 510
- .4 Ford – FS2
- .5 Smith Blair – 261,262,263
- .6 Romac – SS1, SS2, SS3

1.15 VALVE BOXES

1.15.1 Valve boxes shall have square, flat top, with direction of flow clearly shown.

1.15.2 Approved manufacturer and model:

- .1 T.C.I.W – Robar Box

1.16 ADAPTER FLANGES

1.16.1 Adapter flanges shall have UL and FM approval.

1.16.2 Approved manufacturers and models:

- .1 Ford - UniFlange
- .2 EBBA Iron - Series 1000 (75mm - 250mm), Series 2100 MegaFlange, both for ductile iron pipe only.
- .3 Romac - Within rated working pressure of the field flange.
- .4 Star Pipe Products – Series 7200

1.17 UNDERGROUND SERVICE LINE VALVES AND FITTINGS

1.17.1 Conform to the latest version of AWWA C800.

1.18 SERVICES SADDLES

1.18.1 All service saddles for pipe greater than 200mm shall be minimum 18 gauge fully passivated 304 stainless steel full circle. **Outlets shall be FIPT, not CC thread.**

1.18.2 All service saddles for pipe less than 200mm shall be 20 gauge fully passivated 304 stainless steel. **Outlets shall be FIPT, not CC thread.**

1.18.3 Approved Manufacturers and Models:

- .1 Robar - Series 2616;
- .2 Canada Pipeline Accessories – SC-2 (Cold tap only for ductile iron and max 235psi), SC-4 (Not for ductile iron pipe)
- .3 Ford - FS313
- .4 Smith-Blair 370 Series

1.19 CORPORATION STOPS (BALL VALVE STYLE)

1.19.1 Corporation stops shall be rated for minimum 150psi working pressure.

1.19.2 Threads shall be N.P.T.

1.19.3 Approved Manufacturers and Models:

Size	Mueller	McDonald	Cambridge	Ford
12mm (1/2")	H15028 Ball N/A	Ball N/A	Ball N/A	Ball N/A
19mm (3/4")				
MIP X Comp	B-25028	4704BT	201-M3H3	FB1100-3-Q
MIP X FIP	B-20046	3149B	201-M3H3	FB1700-3
MIP X MIP	Ball N/A	3131B	201-M3H3	FB500-3
25mm (1")				
MIP X Comp	B-25028	4704BT	201-M4H4	FB1100-4-Q
MIP X FIP	B-20046	3149B	201-M4H4	FB1700-4
MIP X MIP	Ball N/A	3131B	201-M4H4	FB500-4
38mm (1 1/2")				
MIP X Comp	B-25028	4704BT	201-M6H6	FB1100-6-Q
50mm (2")				
MIP X Comp	B-25028	4704BT	201-M7H7	FB1100-7-Q
MIP X FIP	N/A	3149B	201-M7H7	FB1700-7
MIP X MIP	N/A	3131B	201-M7H7	FB500-7

1.20 COPPER PIPE CONNECTORS

1.20.1 Connectors shall be rated for minimum 150 psi working pressure.

1.20.2 Threads shall be N.P.T.

1.20.3 Approved Manufacturers and Models:

	Mueller	McDonald	Cambridge	Ford
Couplings C X C				
12mm (5/8")	H-15403	N/A	118-H2H2	C44-11-Q
12mm X 19mm (5/8 x 3/4)	H-15403	4758T	118-H3H2	C44-22-Q
19mm (3/4")	H-15403	4758T	118-H3H3	C44-33-Q
25mm (1")	H-15403	4758T	118-H4H4	C44-44-Q
38mm (1 1/2")	H-15403	4758T	118-H6H6	C44-66-Q
50mm (2")	H-15403	4758T	118-H7H7	C44-77-Q
Male Adapter C X MIP				
12mm (5/8")	H-15428	N/A	117-H2M2	C84-12-Q
19mm (3/4")	H-15428	4753T	117-H3M3	THRU
25mm (1")	H-15428	4753T	117-H4M4	C84-77-Q
38mm (1 1/2")	H-15428	4753T	117-H6M6	
50mm (2")	H-15428	4753T	117-H7M7	
Female Adapter C X FIP				
12mm (5/8")	H-15451	4754T	117-H2F2	C14-33-Q
19mm (3/4")	H-15451	4754T	117-H3F3	THRU
25mm (1")	H-15451	4754T	117-H4M4	C14-77-Q
38mm (1 1/2")	H-15451	4754T	117-H6M6	
50mm (2")	H-15451	4754T	117-H7F7	
Tee C X C, CX IP				
12mm (5/8")	H-12941	N/A	N/A	T444-333
19mm X 19mm (3/4")	H-12941	4760T	150-H3H3	THRU
25mm (1")	H-12941	4760T	150-H4H4	T884-444
38mm (1 1/2 X 1 1/2 X 3/4)	H-12941	N/A	N/A	
50mm (2 X 2 X 3/4)	H-12941	N/A	N/A	
50mm (2 X 2 X 1)	H-12941	N/A	N/A	

N/A - Not Available

1.21 CURB VALVES & STOPS (BALL VALVE STYLE)

1.21.1 Curb valves and stops shall be rated for minimum 150 psi working pressure.

1.21.2 Approved Manufacturers and Models:

	Mueller	McDonald	Cambridge	Ford
12mm (1/2") C X C	H-15209	N/A	N/A	N/A
19mm (3/4") C X C	H-15209	6100T	202-H3H3	B44-333-Q
25mm (1") C X C	H-15209	6100T	2020H4H4	B44-444-Q

N/A - Not Available

1.22 ANGLE METER STOPS (BALL VALVE STYLE)

1.22.1 Stops shall be rated for minimum 150 psi working pressure.

1.22.2 Approved Manufacturers and Models:

Size	Mueller	McDonald	Cambridge	Ford
3/4" comp x 3/4" swivel	B-24258	4642BT	210-H3T3	BA43-231W-Q
3/4" comp x 1" swivel	B-24258	4642BT	210-H3T4	BA43-232W-Q
1" comp x 1" swivel	B-24258	4642BT	210-H4T4	BA43-342W-Q
1" comp x 1 1/4" swivel	B-24258	4642BT	210-H4T5	BA43-444W-Q
1 1/2" comp x Mtr Flg	B-24276	4602BT	N/A	BFA43-666W-Q
2" comp x Mtr Flg	B-24276	4602BT	N/A	BFA13-777W-Q
1 1/2" FIPT X Mtr Flg	B-24286	4604B	N/A	BFA13-666W
2" FIPT X Mtr Flg	B-24286	4604B	N/A	BFA13-777W

N/A - Not Available

1.23 STRAIGHT METER STOPS WITH LOCKWING (BALL VALVE STYLE)

1.23.1 Stops shall be rated for minimum 150 psi working pressure.

1.23.2 Approved manufacturers and models:

Size	Mueller	McDonald	Cambridge	Ford
3/4" comp x 3/4" swivel	B24350	6100MWT	212-H3T3	B43-231W-Q
3/4" comp x 1" swivel	B24350	6100MWT	212-H3T4	B43-232W-Q
1" comp x 1 1/4" swivel	B24350	6100MWT	212-H4T5	B43-342W-Q

1.24 BRASS "Y" CONNECTORS 25MM X 19MM X 19MM

1.24.1 Connectors shall be rated for minimum 150 psi working pressure.

1.24.2 Approved Manufacturers and Models:

- .1 Mueller Part #H-14258
- .2 McDonald Part #4768T
- .3 Cambridge Part # 174-H4H3
- .4 Ford "Q" style. Y44-243-Q

1.25 BRONZE GATE VALVES 12MM - 75MM CLASS 125

1.25.1 Valves shall be left hand opening (counter-clockwise), screwed or flanged ends.

1.25.2 Approved manufacturers and models:

- .1 Red and White Figure # 206-A.

1.26 METER BOXES AND LIDS

1.26.1 Meter box and lid to be H20 load rated DFW Plastics Inc, or approved equal.

1.26.2 For 19mm-26mm Water Meters

- .1 DFW486WBC4-12-AF4MF

1.26.3 For 50mm Water Meters

.1 DFWA4CH4-24-AF4MF

1.26.4 For off road flush (50mm-100mm)

.1 DFWA2CNP4-12-AF4M-Water

1.27 VAULT HATCH – OUTSIDE OF ROAD SURFACE

1.27.1 Hatched to be bolt down, surface mount, 6061 Aluminium, comes with locking hold open arm.

1.27.2 Pedestrian load rated for a minimum of 150PSF.

1.27.3 Hatches will require H20 loading for in road use, and will be approved on a case by case basis.

1.27.4 Approved Manufacturers and Models:

.1 USF Fabrication....Hatch SRR-I 36"x36" aluminium w/s.s gas shock, exterior staple. Drawing # 1000097824

.2 MSU Mississauga LTD...MSU CRD bolt down access hatch 895mmx875mm clear opening. Drawing # 895x875CRD

1.28 VAULT LADDER

1.28.1 Vault ladder to be CSA Grade 1, load rated for 300lbs and meet or exceed CSA/ANSI/OSHA.

1.28.2 Rungs to be 32mm in diameter with 305mm center to center spacing. Overall ladder width to be minimum 467mm.

1.28.3 Ladder to be anchored top and bottom and must have a mid-span brace if over 10 feet long.

1.28.4 Ladder must be min of 150mm offset from vault wall and maximum 200mm to allow for the installation of a safety post.

1.28.5 Ladder must have safety post installed.

1.28.6 Approved Manufacturer and Model:

.1 Featherlite Series 4000 Extra Heavy Duty Aluminium Ladder Assembly or approved equal.

1.29 VAULT SAFETY POST

- 1.29.1 Safety post to be constructed from schedule 40 aluminium, with an overall length of 2.29m.
- 1.29.2 Safety post to be mounted to two ladder rungs with stainless steel brackets.
- 1.29.3 Approved Manufacturer and Model:
 - .1 U.S.F Fabrication Inc, retrofit aluminium safety extension for 32mm dia ladder rungs, Drawing 28492 or approved equal.

1.30 50MM METER SETTER

- 1.30.1 50mm Meter setter to be made of copper and brass. Have NPT threaded inlet and outlet. Be equipped with a lockable ball valve shutoff, check valve and lockable bypass.
- 1.30.2 Approved Manufacturers and Models:
 - .1 Cambridge Brass.....6020NL715F7F7UQB
 - .2 Mueller.....B2423-2N112
 - .3 Ford.....VHH77-12B-1177-NL

1.31 ANGLE DUAL CHECK VALVES

- 1.31.1 Valves shall be rated for minimum 150 psi working pressure.
- 1.31.2 Approved manufacturers and models:

Size	Mueller	Ford	McDonald	Cambridge
5/8"	H14244	HHA31-313	12-3HE-33	N/A
3/4"	H14244	HHA31-323	12-3HE-43	500/501-T3-F3*
1"	H14244	HHA31-344	12-3HE-54	N/A
2"	H14244	HHFA31-777	N/A	N/A

* with test port 501-T3-F3

1.32 STRAIGHT DUAL CHECK VALVES

1.32.1 Valves shall be rated for minimum 150 psi working pressure.

1.32.2 Approved manufacturers and models:

Size	Mueller	Ford	McDonald	Cambridge
3/4"	H14242	HHS31-323	113JF-43	511-T3-F3*
1"	H14242	HHS31-344	113JF-54	N/A

* with test port

1.33 PEX SERVICE TUBING (19MM-50MM)

1.33.1 Conform to the latest version of AWWA C904 and CSA B137.5

1.33.2 Cross-linked polyethylene pipe to latest version of AWWA C904 and CSA B137.5, or approved equal. A stainless steel pipe stiffener must be used at each compression joint. Pipe insert to be Mueller water products part number 506141 for 50mm services, 504385 for 25mm services and 504281 for 19mm services or approved equal.

Approved Manufacturers and Models:

- .1 **Rehau Municipex**
- .2 **AquaPure PE-RT tubing**

1.33.3 **Tracer wire to be used on all service lines.** Tracer wire to be 14awg solid copper designed for direct burial. It must be fastened to the service line at regular intervals using zip ties or 3M Linerless rubber splicing tape model 2242. Each bare end of wire to be terminated with underground low voltage waterproof connectors.

Approved Manufacturers and Models:

- .1 Deca Cables - Part number 20-705
- .2 Southwire UL 600v - Part number 54491

1.34 MISCELLANEOUS

1.34.1 BOLTS: Approved materials:

- .1 Minimum grade 2, hot dipped galvanized, NC thread.
- .2 Stainless Steel.

1.34.2 GASKET MATERIAL: Approved materials:

- .1 Neoprene, minimum 3mm in thickness, with double cloth insert.

1.35 THREAD SEALANT

1.35.1 Sealant shall be non-toxic, NSF 61 approved.

1.35.2 Approved material:

- .1 Teflon Tape.
- .2 J.C. Whitlam Seal Unyte Thread & Gasket Sealer.

1.36 PVC GLUE AND PRIMER - ASTM D2564

1.36.1 Joints shall be made in accordance with the pipe manufacturer's recommendations and conform to the recommended practice for making solvent-cemented joints described in ASTM D2855.

1.36.2 Approved manufacturers and types:

- .1 Weld-On.

1.37 ANTI-CORROSION PROTECTIVE TAPE WRAP AND PASTE.

1.37.1 Approved manufacturers:

- .1 DENSO Tape and paste;
- .2 Petro Wrap.

1.38 DETECTABLE REINFORCED UNDERGROUND UTILITY MARKING TAPE

1.38.1 Approved reinforced detectable marking tape shall be installed a minimum of 300mm directly above all water mains.

1.38.2 Tape shall be detectable reinforced marking tape, 150 mm wide, Safety

Precaution Blue, marked "*Caution Water Line Below*".

1.38.3 Shall be 8 mil overall thickness, warp oriented, coated and closed cross woven 10 x 7 count, solid aluminium foil core with permanent printing beneath mylar layer).

1.38.4 Approved manufacturers: Thortec

1.39 COATINGS - APPROVED MATERIALS:

- .1 NSP – Epoxy;
- .2 NSP - 100 Epoxy Concrete Sealer;
- .3 NSP - 122 Epoxy-Phenolic Floor Coating.