Part 1 General

1.1 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submittals: in accordance with E3 – Shop Drawings.

.2 Shop drawings to show:

- .1 Mounting arrangements.
- .2 Operating and maintenance clearances.

.3 Shop drawings and product data accompanied by:

- .1 Detailed drawings of bases, supports, and anchor bolts.
- .2 Acoustical sound power data, where applicable.
- .3 Points of operation on performance curves.
- .4 Manufacturer to certify current model production.
- .5 Certification of compliance to applicable codes.

.4 Closeout Submittals:

- .1 Provide operation and maintenance data for incorporation into manual specified in E5 - Operation and Maintenance Manuals.
- .2 Operation and maintenance manual approved by, and final copies deposited with, Contract Administrator before final inspection.
- .3 Operation data to include:
  - .1 Control schematics for systems including environmental controls.
  - .2 Description of systems and their controls.
  - .3 Description of operation of systems at various loads together with reset schedules and seasonal variances.
  - .4 Operation instruction for systems and component.
  - .5 Description of actions to be taken in event of equipment failure.
  - .6 Valves schedule and flow diagram.
  - .7 Colour coding chart.
- .4 Maintenance data to include:
  - .1 Servicing, maintenance, operation and trouble-shooting instructions for each item of equipment.
  - .2 Data to include schedules of tasks, frequency, tools required and task time.
- .5 Performance data to include:
  - .1 Equipment manufacturer's performance datasheets with point of operation as left after commissioning is complete.
  - .2 Equipment performance verification test results.
  - .3 Special performance data as specified.
  - .4 Testing, adjusting and balancing reports as specified in Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.

.6 Approvals:

.1 Submit 1 copy of draft Operation and Maintenance Manual to Contract Administrator for approval. Submission of individual data will not be accepted unless directed by Contract Administrator.

.2 Make changes as required and re-submit as directed by Contract Administrator.

.7 Additional data:

.1 Prepare and insert into operation and maintenance manual additional data when need for it becomes apparent during specified demonstrations and instructions.

.8 Site records:

.1 Contract Administrator will provide 1 set of reproducible mechanical drawings. Provide sets of white prints as required for each phase of work. Mark changes as work progresses and as changes occur. Include changes to existing mechanical systems, control systems and low voltage control wiring.

.2 Transfer information weekly to reproducibles, revising reproducibles to show work as actually installed.

.3 Use different colour waterproof ink for each service.

.4 Make available for reference purposes and inspection.

.9 As-built drawings:

.1 Prior to start of Testing, Adjusting and Balancing for HVAC, finalize production of as-built drawings.

.2 Identify each drawing in lower right hand corner in letters at least 12 mm high as follows: - "AS BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW MECHANICAL SYSTEMS AS INSTALLED" (Signature of Mechanical Subcontractor) (Date).

.3 Submit to Contract Administrator for approval and make corrections as directed.

.4 Perform testing, adjusting and balancing for HVAC using as-built drawings.

.5 Submit completed reproducible as-built drawings with Operating and Maintenance Manuals.

.10 Submit copies of as-built drawings for inclusion in final TAB report.

1.2 MAINTENANCE

.1 Furnish spare parts in as follows:

.1 One set of packing for each pump.

.2 One casing joint gasket for each size pump.

.3 One glass for each gauge glass.

.2 Provide one set of special tools required to service equipment as recommended by manufacturers.

Part 2 Products

2.1 (NOT USED)

Part 3 Execution

3.1 PAINTING REPAIRS AND RESTORATION

.1 Prime and touch up marred finished paintwork to match original.

.2 Restore to new condition, finishes which have been damaged.

3.2 CLEANING

.1 Clean interior and exterior of all systems including strainers.

3.3 DEMONSTRATION

.1 Contract Administrator will use equipment and systems for test purposes prior to acceptance. Supply labour, material, and instruments required for testing.

.2 Supply tools, equipment and personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, trouble-shooting and servicing of all systems and equipment during regular work hours, prior to acceptance.

.3 Use operation and maintenance manual, as-built drawings, and audio visual aids as part of instruction materials.

.4 Instruction duration time requirements as specified in appropriate sections.

.5 Contract Administrator may record these demonstrations on video tape for future reference.

3.4 PROTECTION

.1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American National Standards Institute (ANSI)/American Society of Mechanical Engineers International (ASME)

.1 ANSI/ASME B16.15-06, Cast Bronze Threaded Fittings, Classes 125 and 250.

.2 ANSI/ASME B16.18-01, Cast Copper Alloy Solder Joint Pressure Fittings.

.3 ANSI/ASME B16.22-01, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.

.4 ANSI/ASME B16.24-01, Cast Copper Alloy Pipe Flanges and Flanged Fittings, Class 150, 300, 400, 600, 900, 1500 and 2500.

.2 ASTM International Inc.

.1 ASTM A307-07b, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

.2 ASTM A536-84(2004)e1, Standard Specification for Ductile Iron Castings.

.3 ASTM B88M-05, Standard Specification for Seamless Copper Water Tube (Metric).

.3 American National Standards Institute/American Water Works Association (ANSI)/(AWWA)

.1 ANSI/AWWA C111/A21.11-07, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

.4 Canadian Standards Association (CSA International)

.1 CSA B242-05, Groove and Shoulder Type Mechanical Pipe Couplings.

.5 Department of Justice Canada (Jus)

.1 Canadian Environmental Protection Act, 1999, c. 33 (CEPA).

.6 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.7 Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS).

.1 MSS-SP-67-02a, Butterfly Valves.

.2 MSS-SP-70-06, Gray Iron Gate Valves, Flanged and Threaded Ends.

.3 MSS-SP-71-05, Gray Iron Swing Check Valves, Flanged and Threaded Ends.

.4 MSS-SP-80-03, Bronze Gate, Globe, Angle and Check Valves.

.8 National Research Council (NRC)/Institute for Research in Construction

.1 NRCC 38728, National Plumbing Code of Canada (NPC) - 1995.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with E3 – Shop Drawings.

.2 Product Data:

.1 Provide manufacturer's printed product literature and datasheets for insulation and adhesives, and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Closeout Submittals:

.1 Provide maintenance data for incorporation into manual specified in E5 - Operation and Maintenance Manuals.

Part 2 Products

2.1 PIPING

.1 Domestic hot, tempered, cold and recirculation systems, within building.

.1 Above ground: copper tube, hard drawn, type L: to ASTM B88M.

.2 Buried or embedded: copper tube, soft annealed, type K: to ASTM B88M, in long lengths and with no buried joints.

2.2 FITTINGS

.1 Bronze pipe flanges and flanged fittings, Class 150: to ANSI/ASME B16.24.

.2 Cast bronze threaded fittings, Class 125: to ANSI/ASME B16.15.

.3 Cast copper, solder type: to ANSI/ASME B16.18.

.4 Wrought copper and copper alloy, solder type: to ANSI/ASME B16.22.

.5 NPS 2 and larger: ANSI/ASME B16.18 or ANSI/ASME B16.22 roll grooved to CSA B242.

.6 NPS 1 and smaller: wrought copper to ANSI/ASME B16.22 or cast copper to ANSI/ASME B16.18; with stainless steel internal components and EPDM seals. Suitable for operating pressure to 1380 kPa.

2.3 JOINTS

.1 Rubber gaskets, latex-free 1.6 mm thick: to AWWA C111.

.2 Bolts, nuts, hex head and washers: to ASTM A307, heavy series.

.3 Solder: tin copper alloy.

.4 Teflon tape: for threaded joints.

.5 Grooved couplings: designed with angle bolt pads to provide rigid joint, complete with EPDM gasket.

.6 Dielectric connections between dissimilar metals: dielectric fitting, complete with thermoplastic liner.

2.4 SWING CHECK VALVES

.1 To MSS-SP-80, Class 125, 860 kPa, bronze body, bronze swing disc, screw in cap, regrindable seat.

2.5 BALL VALVES

.1 NPS 2 and under, soldered:

.1 To ANSI/ASME B16.18, Class 150.

.2 Bronze body, stainless steel ball, PTFE adjustable packing, brass gland and PTFE seat, steel lever handle.

Part 3 Execution

3.1 APPLICATION

.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

.1 Install in accordance with Canadian Plumbing Code, Provincial Plumbing Code and local authority having jurisdiction.

.2 Install pipe work in accordance with Section 23 05 05 - Installation of Pipework, supplemented as specified herein.

.3 Assemble piping using fittings manufactured to ANSI standards.

.4 Install CWS piping below and away from HWS and HWC and other hot piping so as to maintain temperature of cold water as low as possible.

.5 Connect to fixtures and equipment in accordance with manufacturer's written instructions unless otherwise indicated.

.6 Buried tubing:

.1 Lay in well compacted washed sand in accordance with AWWA Class B bedding.

.2 Bend tubing without crimping or constriction. Minimize use of fittings.

3.3 VALVES

.1 Isolate equipment, fixtures and branches with ball valves.

3.4 PRESSURE TESTS

.1 Test pressure: greater of 1 times maximum system operating pressure or 860 kPa.

3.5 FLUSHING AND CLEANING

.1 Flush entire system for 8 h. Ensure outlets flushed for 2 hours. Let stand for 24 hours, then draw one sample off longest run. Submit to testing laboratory to verify that system is clean. Let system flush for additional 2 hours, then draw off another sample for testing.

3.6 PRE-START-UP INSPECTIONS

.1 Systems to be complete, prior to flushing, testing and start-up.

.2 Verify that system can be completely drained.

.3 Ensure that pressure booster systems are operating properly.

.4 Ensure that air chambers, expansion compensators are installed properly.

3.7 DISINFECTION

.1 Flush out, disinfect and rinse system to requirements of authority having jurisdiction.

.2 Upon completion, provide laboratory test reports on water quality for authority having jurisdiction.

3.8 START-UP

.1 Timing: start up after:

.1 Pressure tests have been completed.

.2 Disinfection procedures have been completed.

.3 Certificate of static completion has been issued.

.4 Water treatment systems operational.

.2 Provide continuous supervision during start-up.

.3 Start-up procedures:

.1 Establish circulation and ensure that air is eliminated.

.2 Check pressurization to ensure proper operation and to prevent water hammer, flashing and/or cavitation.

.3 Bring HWS storage tank up to design temperature slowly.

.4 Monitor piping HWS and HWC piping systems for freedom of movement, pipe expansion as designed.

.5 Check control, limit, safety devices for normal and safe operation.

.4 Rectify start-up deficiencies.

3.9 PERFORMANCE VERIFICATION

.1 Scheduling:

.1 Verify system performance after pressure and leakage tests and disinfection are completed, and Certificate of Completion has been issued by authority having jurisdiction.

.2 Procedures:

.1 Verify that flow rate and pressure meet Design Criteria.

.2 TAB HWC in accordance with Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.

.3 Adjust pressure regulating valves while withdrawal is maximum and inlet pressure is minimum.

.4 Sterilize HWS and HWC systems for Legionella control.

.5 Verify performance of temperature controls.

.6 Verify compliance with safety and health requirements.

.7 Check for proper operation of water hammer arrestors. Run outlet for 10 seconds, then shut of water immediately. If water hammer occurs, replace water hammer arrestor or re-charge air chambers. Repeat for outlets and flush valves.

.8 Confirm water quality consistent with supply standards, and ensure no residuals remain as result of flushing or cleaning.

.3 Reports:

.1 Include certificate of water flow and pressure tests conducted on incoming water service, demonstrating adequacy of flow and pressure.

3.10 OPERATION REQUIREMENTS

.1 Co-ordinate operation and maintenance requirements including, cleaning and maintenance of specified materials and products with Section 23 05 05 - Installation of Pipework.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 ASTM International Inc.

.1 ASTM D2235-04, Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings.

.2 ASTM D2564-04e1, Standard Specification for Solvent Cements for Poly(Vinyl-Chloride) (PVC) Plastic Piping Systems.

.2 Canadian Standards Association (CSA International)

.1 CAN/CSA-Series B1800-06, Thermoplastic Nonpressure Pipe Compendium - B1800 Series.

.3 Green Seal Environmental Standards (GSES)

.1 Standard GS-36-00, Commercial Adhesives.

.4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.5 South Coast Air Quality Management District (SCAQMD), California State

.1 SCAQMD Rule 1168-A2005, Adhesive and Sealant Applications.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with E3 – Shop Drawings.

.2 Product Data:

.1 Provide manufacturer's printed product literature and datasheets for piping and adhesives, and include product characteristics, performance criteria, physical size, finish and limitations.

Part 2 Products

2.1 PIPING AND FITTINGS

.1 Buried and above ground PVC-DWV piping to:

.1 CAN/CSA B1800.

2.2 JOINTS

.1 Solvent weld for PVC: to ASTM D2564.

Part 3 Execution

3.1 APPLICATION

.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

.1 In accordance with Section 23 05 05 - Installation of Pipework.

.2 Install in accordance with Manitoba Plumbing Code and local authority having jurisdiction.

3.3 TESTING

.1 Pressure test buried systems before backfilling.

.2 Hydraulically test to verify grades and freedom from obstructions.

3.4 PERFORMANCE VERIFICATION

.1 Cleanouts:

.1 Ensure accessible and that access doors are correctly located.

.2 Open, cover with linseed oil and re-seal.

.3 Verify cleanout rods can probe as far as the next cleanout, at least.

.2 Test to ensure traps are fully and permanently primed.

.3 Storm water drainage:

.1 Verify domes are secure.

.2 Ensure weirs are correctly sized and installed correctly.

.3 Verify provisions for movement of roof system.

.4 Ensure fixtures are properly anchored, connected to system and effectively vented.

.5 Affix applicable label (storm, sanitary, vent, pump discharge) c/w directional arrows every floor or 4.5 m (whichever is less).

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA B51-03(R2007), Boiler, Pressure Vessel, and Pressure Piping Code.

.2 CAN/CSA C22.2 No.110-94(R2004), Construction and Test of Electric Storage Tank Water Heaters.

.3 CAN/CSA-C191-04, Performance of Electric Storage Tank Water Heaters for Household Service.

.4 CAN/CSA-C309-M90(R2003), Performance Requirements for Glass-Lined Storage Tanks for Household Hot Water Service.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with E3 – Shop Drawings.

.2 Product Data:

.1 Provide manufacturer's printed product literature and datasheets for domestic water heater, and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:

.1 Indicate:

.1 Equipment, including connections, fittings, control assemblies and ancillaries, identifying factory and field assembled.

1.3 CLOSEOUT SUBMITTALS

.1 Provide maintenance and engineering data for incorporation into manual specified in E5 - Operation and Maintenance Manuals.

Part 2 Products

2.1 DOMESTIC HOT WATER TANK (HWT-1)

.1 Electric resistance type heater, 9kW heating capacity, 302 L (80 Gallon) storage capacity.

.2 Tank(s) shall have 10 bar (150 psi) working pressure and be equipped with extruded high density anode. All internal surfaces of the heaters exposed to water shall be glass-lined. Electric heating elements shall be low watt density 25mm screw-in type. Each element shall be controlled by an individually mounted thermostat and high temperature cut-off switch. All internal circuits shall be fused. The outer jacket shall be of baked enamel finish and shall be provided with full size control compartment for performance of service and maintenance through hinged front panel and shall enclose the tank with foam insulation. Electrical junction box with heavy duty terminal block shall be provided. The drain valve shall be located in the front for ease of servicing. Heater tank shall have a

three year limited warranty. Manufacturer shall supply ASME rated temperature and pressure relief valve.

.3 Approvals: cUL Listed, Approved to NSF Standard 5, ASME tank construction, Meets ASHRAE 90.1b-1992 and ASHRAE/IESNA90.1-2004.

.4 Voltage: 600V/3ph/60hz.

.5 Dimensions: 1530mm Height, 648mm Diameter, 32 mm NPT inlet opening, 127 kg Weight.

.6 Acceptable Product: “AO Smith” model DRE-80-9 or approved equivalent in accordance with B7.

Part 3 Execution

3.1 APPLICATION

.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

.1 Install in accordance with manufacturer's installation instructions and authority having jurisdiction.

.2 Provide external low water cut off per requirements of the authority having jurisdiction.

.3 Controls:

.1 Hot water tank shall operate on standalone built-in controls.

3.3 FIELD QUALITY CONTROL

.1 Manufacturer's factory trained, certified technician to start up and commission DHW heaters.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 ASTM International

.1 ASTM A126-04(2009), Standard Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings.

.2 ASTM B62-09, Standard Specification for Composition Bronze or Ounce Metal Castings.

.2 American Water Works Association (AWWA)

.1 ANSI/AWWA C700-09, Standard for Cold Water Meters-Displacement Type, Bronze Main Case.

.2 ANSI/AWWA C701-12, Standard for Cold Water Meters-Turbine Type for Customer Service.

.3 ANSI/AWWA C702-10, Standard for Cold Water Meters-Compound Type.

.3 CSA International

.1 CSA-B64 Series-11, Backflow Preventers and Vacuum Breakers.

.2 CSA B79-08, Commercial and Residential Drains and Cleanouts.

.3 CAN/CSA-B356-10, Water Pressure Reducing Valves for Domestic Water Supply Systems.

.4 Plumbing and Drainage Institute (PDI)

.1 PDI-G101-R2010, Testing and Rating Procedure for Grease Interceptors with Appendix of Installation and Maintenance.

.2 PDI-WH201-R2010, Water Hammer Arresters Standard.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with E3 – Shop Drawings.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for plumbing products and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:

.1 Indicate on drawings to indicate materials, finishes, dimensions, construction and assembly details, and accessories.

1.3 CLOSEOUT SUBMITTALS

.1 Submit in accordance with E5 - Operation and Maintenance Manuals.

.2 Operation and Maintenance Data: submit operation and maintenance data for plumbing specialties and accessories for incorporation into manual.

.1 Description of plumbing specialties and accessories, giving manufacturers name, type, model, year and capacity.

.2 Details of operation, servicing and maintenance.

.3 Recommended spare parts list.

Part 2 Products

2.1 BACK FLOW PREVENTER (BFP-1)

.1 Double check valve assembly, two positive seating check modules with captured springs and rubber seat discs, check module seats and seat discs shall be replaceable, single access cover secured with stainless steel bolts, constructed of lead free cast copper silicon alloy, two resilient seated isolation valves, four top mounted resilient seated test cocks. Meets requirements of CSA B64.5, ASSE 1015 and AWWA C510.

.2 25 mm size. Suitable for supply pressure up to 12 bar. Water temperature: 0.5 °C to 82 °C. (33°F to 180°F), 337 mm length.

.3 Acceptable Product: “Watts” model LF007QT or approved equivalent in accordance with B7.

2.2 BACK FLOW PREVENTER (BFP-2)

.1 Reduced pressure zone assembly. The assembly shall consist of an internal pressure differential relief valve located in a zone between two positive seating check modules with captured springs and silicone seat discs. Seats and seat discs shall be replaceable in both check modules and the relief valve. There shall be no threads or screws in the waterway exposed to line fluids. Service of all internal components shall be through a single access cover secured with stainless steel bolts. Body and shutoffs shall be constructed using lead free cast copper silicon alloy materials. The assembly shall also include two resilient seated isolation valves, four resilient seated test cocks and air gap drain fitting. The assembly shall meet the requirements of: USC, ASSE 1013, AWWA C511, CSA B64.4.

.2 19 mm size. Suitable for supply pressure up to 12 bar. Water temperature: 0.5 °C to 75 °C. (33°F to 180°F), 250 mm length.

.3 Acceptable Product: “Watts” model LF009QT or approved equivalent in accordance with B7.

2.3 BACK FLOW PREVENTER (BFP-3)

.1 Reduced pressure zone assembly. The assembly shall consist of an internal pressure differential relief valve located in a zone between two positive seating check modules with captured springs and silicone seat discs. Seats and seat discs shall be replaceable in both check modules and the relief valve. There shall be no threads or screws in the waterway exposed to line fluids. Service of all internal components shall be through a single access cover secured with stainless steel bolts. Body and shutoffs shall be constructed using lead free cast copper silicon alloy materials. The assembly shall also include two resilient seated isolation valves, four resilient seated test cocks and air gap drain fitting. The assembly shall meet the requirements of: USC, ASSE 1013, AWWA C511, CSA B64.4.

.2 12 mm size. Suitable for supply pressure up to 12 bar. Water temperature: 0.5 °C to 75 °C. (33°F to 180°F), 250 mm length.

.3 Acceptable Product: “Watts” model LF009QT or approved equivalent in accordance with B7.

2.4 DOMESTIC WATER EXPANSION TANK (EXP-1)

.1 Diaphragm expansion tank suitable for use with potable water systems, 8 Litre tank volume, 3 Litre acceptance volume, 19 mm stainless steel system connection, 93°C maximum operating temperature, 1035 kPa maximum working pressure, carbon steel shell, heavy duty butyl diaphragm, 254 mm diameter, 264 mm height, 9.5 kg weight. ASME rated.

.2 Acceptable Product: “Bell & Gossett” model PTA-5 or approved equivalent in accordance with B7.

2.5 CLEANOUTS

.1 Cleanout Plugs: heavy cast iron male ferrule with brass screws and threaded brass or bronze plug. Sealing-caulked lead seat or neoprene gasket.

.2 Access Covers:

.1 Wall Access: face or wall type, polished nickel bronze square cover with flush head securing screws, bevelled edge frame complete with anchoring lugs.

.2 Floor Access: rectangular cast iron body and frame with adjustable secured nickel bronze top and:

.1 Plugs: bolted bronze with neoprene gasket.

.2 Cover for Unfinished Concrete Floors: nickel bronze square, gasket, vandal-proof screws.

.3 Cover for Terrazzo Finish: polished nickel bronze with recessed cover for filling with terrazzo, vandal-proof locking screws.

.4 Cover for Tile and Linoleum Floors: polished nickel bronze with recessed cover for linoleum or tile infill, complete with vandal-proof locking screws.

.5 Cover for Carpeted Floors: polished nickel bronze with deep flange cover for carpet infill, complete with carpet retainer vandal-proof locking screws.

2.6 WATER HAMMER ARRESTORS

.1 Copper construction, piston type: to PDI-WH201.

2.7 TRAP SEAL PRIMERS

.1 Brass, with integral vacuum breaker, NPS 1/2 solder ends, NPS 1/2 drip line connection.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheet.

3.2 INSTALLATION

.1 Install in accordance with Provincial Plumbing Code of Manitoba, and local authority having jurisdiction.

.2 Install in accordance with manufacturer's instructions and as specified.

3.3 CLEANOUTS

.1 Install cleanouts at base of soil and waste stacks, and rainwater leaders, at locations required code, and as indicated.

.2 Bring cleanouts to wall or finished floor unless serviceable from below floor.

.3 Building drain cleanout and stack base cleanouts: line size to maximum NPS 4.

3.4 WATER HAMMER ARRESTORS

.1 Install on branch supplies to fixtures or group of fixtures.

3.5 BACK FLOW PREVENTERS

.1 Install in accordance with CSA-B64 Series, where indicated and elsewhere as required by code.

3.6 HOSE BIBBS AND SEDIMENT FAUCETS

.1 Install at bottom of risers, at low points to drain systems, and as indicated.

3.7 TRAP SEAL PRIMERS

.1 Install for floor drains and elsewhere, as indicated.

.2 Install on cold water supply to nearest frequently used plumbing fixture, in concealed space, to approval of Contract Administrator.

.3 Install soft copper tubing to floor drain.

3.8 STRAINERS

.1 Install with sufficient room to remove basket for maintenance.

3.9 WATER METERS

.1 Install water meter provided by local water authority.

.2 Install water meter as indicated.

3.10 START-UP

.1 Timing: start-up only after:

.1 Pressure tests have been completed.

.2 Disinfection procedures have been completed.

.3 Certificate of static completion has been issued.

.4 Water treatment systems operational.

.2 Provide continuous supervision during start-up.

3.11 TESTING AND ADJUSTING

.1 General:

.1 Test and adjust plumbing specialties and as specified.

.2 Timing:

.1 After start-up deficiencies rectified.

.2 After certificate of completion has been issued by authority having jurisdiction.

.3 Application tolerances:

.1 Pressure at fixtures: +/- 70 kPa.

.2 Flow rate at fixtures: +/- 20%.

.4 Adjustments:

.1 Verify that flow rate and pressure meet design criteria.

.5 Floor drains:

.1 Verify operation of trap seal primer.

.2 Prime, using trap primer. Adjust flow rate to suit site conditions.

.3 Check operations of flushing features.

.4 Check security, accessibility, removability of strainer.

.5 Clean out baskets.

.6 Vacuum breakers, backflow preventers, backwater valves:

.1 Test tightness, accessibility for O&M of cover and of valve.

.2 Simulate reverse flow and back-pressure conditions to test operation of vacuum breakers, backflow preventers.

.3 Verify visibility of discharge from open ports.

.7 Access doors:

.1 Verify size and location relative to items to be accessed.

.8 Cleanouts:

.1 Verify covers are gas-tight, secure, yet readily removable.

.9 Water hammer arrestors:

.1 Verify proper installation of correct type of water hammer arrester.

.10 Wall, ground hydrants:

.1 Verify complete drainage, freeze protection.

.2 Verify operation of vacuum breakers.

.11 Strainers:

.1 Clean out repeatedly until clear.

.2 Verify accessibility of cleanout plug and basket.

.3 Verify that cleanout plug does not leak.

.12 Hose bibbs, sediment faucets:

.1 Verify that flow and pressure meet design criteria.

.2 Check for leaks, replace compression washer if required.

.13 Hydronic system water Make-up Assembly:

.1 Verify flow, pressure, and connection.

.14 Water meters:

.1 Verify location and accessibility.

.2 Test meter reading accuracy.

3.12 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by plumbing specialties and accessories installation.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CAN/CSA-B45 Series-02(R2008), Plumbing Fixtures.

.2 CAN/CSA-B125.3-05, Plumbing Fittings.

.3 CAN/CSA-B651-04, Accessible Design for the Built Environment.

.2 Green Seal Environmental Standards (GSES)

.1 Standard GS-36-00, Commercial Adhesives.

.3 South Coast Air Quality Management District (SCAQMD), California State

.1 SCAQMD Rule 1168-A2005, Adhesive and Sealant Applications.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with E3 – Shop Drawings.

.2 Product Data:

.1 Provide manufacturer's printed product literature and datasheets for washroom fixtures, and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Indicate fixtures and trim:

.1 Dimensions, construction details, roughing-in dimensions.

.2 Factory-set water consumption per flush at recommended pressure.

1.3 CLOSEOUT SUBMITTALS

.1 Provide operation and maintenance data for washroom fixtures, for incorporation into manual specified in E5 - Operation and Maintenance Manuals.

.2 Include:

.1 Description of fixtures and trim, giving manufacturer's name, type, model, year, capacity.

.2 Details of operation, servicing, maintenance.

.3 List of recommended spare parts.

Part 2 Products

2.1 P-1 WATER CLOSET

.1 Tank type, pressure assisted siphon jet action, white, vitreous china, 6.0 LPF, elongated bowl, wall mounted, back-outlet, fully glazed 50 mm trapway, side-mounted chrome trip lever. To meet or exceed ASME A112.19.2. Meets the ADA Act and ANSI A117.1 requirements.

.2 Seat: Elongated, open front toilet seat. Commercial grade.

.3 Dimensions (WxHxD): 495x762x749mm.

.4 Provide tank cover locking device.

.5 Acceptable Product: "American Standard" Glenwall or approved equivalent in accordance with B7.

2.2 P-2 WALL MOUNT LAVATORY

.1 Basin: Wall hung, white, vitreous china, front overflow, "D" shaped bowl, self-draining deck area with contoured back and side splash shields, faucet ledge, faucet holes on 100mm centres. To meet or exceed ASME A112.19.2. Meets the ADA Act and ANSI A117.1 requirements. Dimensions: 521 mm wide x 464 mm deep. 32 mm trap.

.1 Faucet: 5.7 LPM flow rate, solid cast brass fabricated body, single control, 102 mm center set, 149 mm long spout, polished chrome plated finish, ceramic cartridge with limit stop, metal hold-down package, vandal resistant 89mm lever handle, ADA Compliant.

.2 Fixture Carrier: Floor mounted concealed arm lavatory carrier with lacquered, adjustable, ductile iron concealed support arms. Complete with lacquered cast iron invertible and adjustable arm supporting brackets, adjustable steel nipples with locknut and set screws, alignment rod, two lacquered 50 mm x 25 mm x 3 mm thick structural steel uprights with 75 mm x 112 mm welded steel feet and fixture leveling and locking hardware.

.2 Acceptable Products: Basin "American Standard" model Lucerne, Faucet "Delta" DSP-22C501, Fixture Carrier "Mifab" model MC-41 or approved equivalent in accordance with B7.

2.3 P-3 SINGLE SINK

.1 Basin: 18-8 Stainless steel, 20 gauge, two faucet holes on 100mm centres, bright mirror finished rim and satin finished bowl, counter mounted, undercoated, 89 mm basket strainer waste fitting. Dimensions: 200 mm depth x 490 mm width x 430 mm height. CSA Certified.

.2 Faucet: 5.7 LPM flow rate, solid brass cast body, two handles, 1/4 turn handle stops, 100 mm centre set, 104 mm long and 278 mm high spout, 360° spout swing. Rotating cylinder type control mechanism with stainless steel plate. Complies with A112.18.1 and CSA B125.1

.3 Acceptable Products: Basin "Kindred" model QSL1719/8, faucet "Delta" 2172LF-LHP or approved equivalent in accordance with B7.

2.4 P-4 SERVICE SINK

.1 Basin: Wall hung, white, vitreous china, faucet holes on 200mm centres. To meet or exceed ASME A112.19.2. Dimensions: 762 mm wide x 559 deep x 393 mm high. Includes wall hanger.

.2 Faucet: Exposed yoke wall mount utility faucet with cast brass body and metal lever handles. Quarter turn ceramic disc cartridges. Vacuum breaker to prevent backflow. Integral service stops. Spout, top braced to wall, with bucket hook and 19mm threaded

hose end. 12mm female inlets with adjustable centres from 6" to 10". Polished chrome finish. Meets ASME A112.18.1, CSA B125, and ANSI A117.1 requirements.

.3 Acceptable Products: Basin "American Standard" model 9061.193, Faucet "American Standard" model 8354.112or approved equivalent in accordance with B7.

2.5 P-5 SHOWER

.1 Shower Head: Wall mounted fixed head, solid brass with all exposed parts triple chrome-plated or polished stainless steel, 9.5 GPM maximum flow rate, adjustable spray pattern from a course stream to fine mist.

.2 Valves: diverter valve with a tri-lever handle, T/P valve with a tri-lever handle

.3 Wall bar: ADA compliant, two wall stainless steel grab bar

.4 Hand Shower: 1500 mm long stainless steel hose, on/off pushbutton.

.5 Provide the following accessories: Vinyl folding seat

.6 All components shall be ADA compliant.

.7 Acceptable Product: "Acorn Engineering" model 500ADA or approved equivalent in accordance with B7.

2.6 P-6 EMERGENCY EYE/FACE WASH

.1 Wall mounted eye/face wash shall include a stainless steel 279 mm round bowl. Head shall feature inverted directional laminar flow supplied by an integral flow control, chrome-plated brass stay-open ball valve equipped with stainless steel ball and stem, and chrome-plated brass in-line 50 x 50 mesh water strainer. Unit shall also include cast-aluminum chromate protected wall bracket, yellow plastic pop-off dust cover for eyewash head, tailpiece and trap, universal sign, 12mm NPT inlet, and 38 mm NPT waste.

.2 Thermostatic Mixing Valve: Actively suspends hot water flow when cold water supply is lost to protect against scalding, lead free, flow range of 4 to 45 lpm. Adjustable outlet temperature range from 16°C to 32°C. Minimum and maximum allowable hot water temperature range from 49°C to 82°C. 861 kPa maximum operating pressure. 12 mm inlet ports, 19 mm outlet port. Listings: ASSE 1071, CSA B125.3, NSF/ANSI 61, NSF/ANSI 372.

.3 Acceptable Product: Eye/Face Wash: "Haws" model 7360BT-7460BT, Thermostatic Mixing Valve: "Haws" model TWBS.EWE or approved equivalent in accordance with B7.

2.7 P-7 HOSE BIBB

.1 Low lead cast bronze body, lead free, 19 mm NPT inlet connection, 19 mm NPHS outlet connection. 8.6 Bar maximum working pressure, 60°C maximum working water temperature. Meets the requirements of NSF/ANSI 372.

.2 Acceptable Product: "Zurn" model 195XL or approved equivalent in accordance with B7.

2.8 P-8 WALL HYDRANT

.1 Encased, non-freeze, anti-siphon, automatic draining, wall hydrant for flush installation. Complete with integral backflow preventer, copper casing, all bronze interior parts with

1/2 turn ceramic disk cartridge and combination 19 mm female solder and 19 mm male pipe thread inlet. Stainless steel box and hinged cover with operating key lock and "WATER" stamped on cover. Wall opening 81 mm x 216 mm.

.2 Acceptable Product: "Zurn" model Z1320-EZ or approved equivalent in accordance with B7.

1.2 FLOOR DRAIN

.1 Dura-Coated cast iron body with bottom outlet, adjustable "Type B" polished nickel bronze and round strainer. Provide trap seal primer and vandal proof secured top.

.2 Acceptable Product: "Zurn" model ZN-211-B or approved equivalent in accordance with B7.

1.3 TRENCH DRAIN

.1 Trench Drain: 25 mm throat opening, 184 mm wide, 3000 mm long sections, 14 Gauge galvanized steel construction, pre-sloped 12 mm per 3 m section. Sump: 14 gauge body, 115 mm discharge outlet, silt strainer basket, mounting tabs for secure placement of concrete, 6 mm reinforced solid checkerplate lid, Dimensions (WxLxD):450x450x600.

.2 Acceptable Product: "Norstar" model U-Drain or approved equivalent in accordance with B7.

Part 3 Execution

3.1 APPLICATION

.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

.1 Mounting heights:

.1 Standard: to manufacturer's recommendations, measured from finished floor.

.2 Wall-hung fixtures: measured from finished floor.

.3 Barrier free: to most stringent standard (Manitoba Building Code, CAN/CSA B651)

3.3 ADJUSTING

.1 Conform to water conservation requirements specified this section.

.2 Adjustments:

.1 Adjust water flow rate to design flow rates.

.2 Adjust pressure to fixtures to ensure no splashing at maximum pressures.

.3 Adjust flush valves to suit actual site conditions.

.3 Checks:

.1 Water closets: flushing action.

.2 Aerators: operation, cleanliness.

.3 Vacuum breakers, backflow preventers: operation under all conditions.

.4 Thermostatic controls:

.1 Verify temperature settings, operation of control, limit and safety controls.

END OF SECTION