1. GENERAL

1.1 Section Scope

.1 Replace existing water supply piping in existing Pool tank trench.

.2 Cut out the existing main drains and replace with two new ANSI 16 compliant drains. Clean out existing main drain suction pipe and connect to new drains with even flow through each. This will require cutting the floor of the dive tank out to expose enough of the suction pipe to make new connections to the new main drains. Floor cutting by others (not by Div. 22).

.3 New to have hydrostatic relief plugs on new drains.

.4 All other work specified in AME Tender drawings. [Drawings to be released by May 15th, 2026]

.5 Provide a separate price for a reduced plumbing scope to only clean out and resurface existing main drains sumps and to provide new and anti entrapment drain covers in compliance ANSI 16 to be installed over the existing main drain sumps.

1.2 Related Sections

.1 This section of the Specification forms part of the Contract Documents and shall be read, interpreted, and coordinated with all other parts.

.2 RJC Specifications:

- .1 Section 01 10 01 General Requirements
- .2 Section 01 25 13 Alternatives
- .3 Section 01 33 00 Submittals
- .4 Section 01 77 00 Contract Close-outs
- .5 Section 01 78 23 Maintenance and Renewal Manual
- .6 Section 01 78 39 Warranties and Bonds
- .7 Section 01 78 39 Project Record Drawings

.3 Section 22 51 13 –SWIMMIG POOL PIPING

.4 BC Pool Design Guidelines

END OF SECTION

1. GENERAL

1.1 Summary

.1 Section Includes:

.1 The installation of pool piping, valves and accessories.

.2 Installation of valves and accessories.

.2 Related sections

.1 Read in conjunction with all RJC front-end documents and RFP Specifications.

.2 22 05 00 – Common Work Results Plumbing

1.2 References

.1 American Society for Testing and Materials International, (ASTM).

.1 ASTM D 1784, Rigid Poly(Vinyl-Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.

.2 ASTM D 2564, Solvent Cement for Poly(Vinyl-Chloride) (PVC) Plastic Piping Systems.

.2 Canadian Standards Association (CSA International).

.1 CSA-B137.3, Rigid PVC Pipe for Pressure Applications.

.2 CSA-B137.6, CPVC Pipe, Tube & Fittings.

.3 CSA B137.4 HDPE High Density Poly-ethylene

1.3 Maintenance

.1 Extra Materials:

.1 Furnish following spare parts:

.1 Butterfly Valves: one per size installed.

.2 Ball Valves: One per size installed.

.3 Valve handles: two of each size.

.4 Gaskets for flanges: one for every ten flanges.

2. PRODUCTS

2.1 Piping Material

.1 All pool piping, and fittings shall have a flame spread rating of 25 and a smoke development classification of 50.

.2 Pool Piping and fittings (including hydro-air piping)

.1 Below Pool Slab – Concrete Encased to slab, PVC Schedule 40 to CSA-B137.3.; PP-R to CSA B137.11

.2 Above Grade - PVC Schedule 80 to CSA-B137.3.; PP-R to CSA B137.11

.3 Alternate Price : Delete PVC Schedule 80 and replace it with PVC Schedule 40 except for the By-pass piping through UV Generator.

.3 CPVC Custom Fabricated Headers

.1 Custom factory constructed of Corzan Schedule 40 CPVC materials by qualified fabrication facility.

.2 All spigots to be mitred, and set level and square to header body. Header ends to be capped with ½" CPVC plate.

.3 All joints to be factory hot-gas welded (min 4 passes) and factory fibreglass wrapped using proper surface preparation, isopthalic resin, and a minimum 2 layers chop strand fibreglass and minimum 2 layers roving mat fibreglass.

.4 Provide final gelcoat finish.

.5 Provide shop drawings for custom fabricated CPVC headers.

.4 Pool Gravity Gutter Drain:

.1 DWV – XFR 15 – 50 to CSA B181.2

2.2 Joints & Fittings

.1 Solvent weld for PVC: to ASTM D2564.

.2 Solvent weld for ABS: to ASTM D2235.

.3 Socket Fusion for Polypropylene up to 100mm Butt welding 150mm & Greater.

.4 Copper Pipe - Solder: 95/5 - tin copper alloy: lead free.

.5 Flanged connections to all equipment or dissimilar materials

.6 Saddle tees not to be use below or above grade.

2.3 Valves

.1 Ball Valves:

.1 Pool water up to 50 mm:

.1 All Corzan CPVC ball valves are to be "Safe-Bloc" (or equal) with EPDM seals and cushioned Teflon ball seats.

.2 Carriers for Teflon seats will be screw-in type internally adjustable from both ends.

.3 CPVC compound will be Type I, Grade 1, cell classification 12454-A, with minimum suffix "B" designation for chemical resistance as per ASTM D-1784.

.2 Acceptable Manufacturer:

.1 Chemline

.2 Hayward

.3 Praher

.4 GF

.2 Butterfly Valves:

.1 75 mm to 300 mm

.1 Wafer style bodies one piece molded, with a full set of ANSI class 150 flange locating bolt holes.

.2 Discs shall be solid PVC; complete have double EPDM O-ring seals at the top and bottom assuring that the shaft is non-wetted.

.3 Shaft shall be one piece high tensile stainless steel having an engagement over the full length of the disc with no disc screws.

.4 Seat shall be removable EPDM and shall provide 100% bubble tight closure all sizes, with two concentric convex molded rings on flanged face to function as a low torque gasket. Seal shall effectively isolate the body and shaft from the fluid media.

.5 75 mm to 150 mm shall have hand lever molded of polypropylene over a steel core and have a polycarbonate 13-position lock.

.6 200 mm to 600 mm are to be supplied with baked epoxy coated waterproof gear operator, with PVC covered handwheel shaft and O-ring seal, SS fasteners, sealed visual position indicator and open/close travel stops which allows adjustment for seat wear.

.7 Provide chain-operator for frequent-use valves placed at high level.

.8 One piece molded PVC bodies, are to be made of Type 1, Grade 1, cell classification 12454-A, with minimum suffix "B" designation for chemical resistance as per ASTM D-1784.

.9 PVC, compound and EPDM seals shall meet CSA Standard B-137.0 Para 5.2.1 environmental requirements for toxicity.

.2 Acceptable Manufacturer:

.1 Chemline

.2 Hayward

.3 GF

.3 Wafer Check Valves:

.1 40mm to 600mm:

.1 CPVC or Polypropylene water check valves 40 mm to 600 mm with 316SS disc springs and with EPDM O-ring disc seal.

.2 Valve will be wafer type designed to fit between ANSI Class 150 flanges

.3 Provide required companion spacer for installation of check valve.

.4 Provide flange gaskets between valve and flange and companion spacer and flange. Ensure clearances for proper valve function.

.5 Required flange gaskets will be full face Class 150, raised face low torque type of solid EPDM (or Teflon PTFE bonded EPDM).

.6 Polypropylene shall conform to ASTM D-4101 material requirements

.7 All valves shall be custom tagged with manufacturer’s inspection number to provide traceability.

.2 Acceptable Manufacturer:

.1 Chemline.

.2 Hayward.

.3 Braukmann.

.4 GF

.4 Spring-loaded Ball/Disc Check Valves

.1 12mm to 50mm:

.1 CPVC tru-union. Ball valves are to be "Safe-Bloc" (or equal) with EPDM seals and cushioned Teflon ball seats.

.2 Carriers for Teflon seats will be screw-in type internally adjustable from both ends.

.3 CPVC compound will be Type I, Grade 1, cell classification 12454-A, with minimum suffix "B" designation for chemical resistance as per ASTM D-1784.

.4 Springs to be Teflon coated.

.5 Pressure drop to be no greater than 3 PSI

.2 Acceptable manufacturers:

.1 Praher.

.2 GF

2.4 Pipe Hangers and Supports

.1 General Requirements:

.1 Construct pipe hanger and support to manufacturer's recommendations utilizing manufacturer's regular production components, parts and assemblies.

.2 Base maximum load ratings on allowable stresses prescribed by ASME B31.1 or MSS SP58.

.3 Ensure that supports, guides, anchors do not transmit excessive quantities of heat to building structure.

.4 Design hangers and supports to support systems under conditions of operation, allow free expansion and contraction, prevent excessive stresses from being introduced into pipework or connected equipment.

.5 Provide for vertical adjustments after erection and during commissioning. Amount of adjustment in accordance with MSS SP58.

.6 Provide seismic restraints for all piping. Retain seismic engineer to approve restraint of pool piping systems. Refer to section 23 05 49 – Seismic Restraints.

.7 Restrain piping against water hammer as experienced under any operating conditions, using appropriate restraints.

.8 Hangers and restraints located in the aquatic area, aquatic storage rooms, basement and main floor mechanical rooms shall be epoxy coated.

.2 Finishes:

.1 Pipe hangers shall be hot dipped galvanized metal with epoxy paint over epoxy primer on all supports located in Natatorium area, chemical storage rooms and inaccessible void spaces. Painting by qualified trade or factory supplied with cost incurred by this contract. Paint before installing hangers.

.2 Provide fiberglass unistrut-channel or CPVC angle supports in pool surge tanks/submerged areas.

.3 All metal anchors in pool surge tanks/submerged areas to be hot dipped galvanized with epoxy paint on epoxy primer.

.4 All hangers, rod, and supports required for un-encased pool piping below grade to be hot dipped Galvanized metal with epoxy over epoxy primer.

.3 Upper attachment structural: suspension from upper flange of I-Beam:

.1 Cold piping NPS 2 maximum: ductile iron top-of-beam C-clamp with hardened steel cup point setscrew, locknut and carbon steel retaining clip, UL listed to MSS SP69.

.2 Cold piping NPS 2 1/2 or greater, hot piping: malleable iron top-of-beam jaw-clamp with hooked rod, spring washer, plain washer and nut UL listed.

.3 All attachments to be hot dipped galvanized with epoxy over epoxy primer.

.4 Upper attachment to concrete:

.1 Ceiling: carbon steel welded eye rod, clevis plate, clevis pin and cotters with weldless forged steel eye nut. Ensure eye 6-mm minimum greater than rod diameter.

.2 Concrete inserts: wedge shaped body with knockout protector plate UL listed to MSS SP58

.1 Hilti Strut CIS 138-12 & Strut CIS 1316-12.

.3 Anchors: threaded rod attached to concrete via torque controlled wedge anchor and threaded coupler, or screw anchor with built-in coupler:

.1 Hilti Kwik Bolt TZ

.2 Hilti Kwik Hus EZ-I

.3 Post-installed drop-in anchors are not permitted.

.5 Shop and field-fabricated assemblies:

.1 Trapeze hanger assemblies.

.2 Steel brackets:

.3 All field fabricated supports to be hot dipped galvanized with epoxy over epoxy primer prior to installation.

.6 Hanger rods: threaded rod material to MSS SP58:

.1 Threaded rods for support of mechanical equipment within wet areas shall be minimum ½" diameter Hot dipped galvanised for exterior use and painted as per MPI INT5.3D – Galvanised Metal – Epoxy Over Epoxy Primer.

.2 Ensure that hanger rods are subject to tensile loading only.

.3 Provide linkages where lateral or axial movement of pipework is anticipated.

.7 Nuts for Hanger Supports:

.1 Provide lock type nuts or waxed bottoms to prevent loosening.

.2 Bolts and Nuts to ASTM A307, sizes as required, hot dipped galvanized.

3. EXECUTION

3.1 Installation

.1 Install in accordance with Provincial Plumbing Code and Health code. Provincial health, plumbing and electrical codes describe minimum standards of installation only and may be superseded by contract document requirements. Specification shall not be interpreted as release from minimum code requirements; note potential discrepancies at time of tender.

.2 Contractor to make assessment of documents bearing in mind good industry practices for pool mechanical systems and requirements of a complete mechanical system. Contractor to note potential discrepancies or omissions plans and note at time of tender and prior to equipment installation.

3.2 Pool Piping and Connections:

.1 All piping shall be stored above grade and covered for protection from weather. Piping sitting on the ground will be marked & will not be allowed to be installed. Unprotected piping creates bacterial growth when the systems are filled and heated.

.2 For graded piping and structural penetrations, verify inverts and pipe position allows maintaining a pipe run underground or through a mechanical room area, prior to setting sleeves or waterstop penetrations.

.3 All pool piping below pool floors shall be encased in concrete with a minimum of 75 mm of cover. Suitable reinforced concrete cover with re-bar @ 300 mm O.C. or as required by the Structural Engineer. Maintain hydrostatic pipe test when encasing pipe in concrete. (Coordinate this with structural).

.4 Piping below pool decks which are not accessible shall be considered "**Above Grade".** Materials to match specification defined earlier. Piping within these areas are un-encased and shall be braced against water hammer using rigid supports. Refer to specification for supports.

.5 All piping that penetrates the pool, including piping encased monolithically with pool structure, large tanks, or gutter walls, shall be protected with a water stop flange. Minimum flange size shall be 75 mm minimum radial dimension larger than pipe.

.6 Support piping upon or against structure prior to encasement with mechanical supports as required. Restrain against movement prior to concrete pour.

.7 Mechanical room piping layout to allow ready access to critical/regularly used valves by operator. Verify status of particular with consultant prior to beginning installation if in question.

.8 Lay out pipe penetrations at fire rated assemblies to provide sufficient clearance for acceptable firestopping system installation. Verify acceptability of system prior to installation.

.9 Use custom CPVC headers to ensure alignment of associated pipe penetrations of walls prior to concrete pour, where applicable. Submit shop drawings for review.

.10 Provide Flange or union connections when connecting to equipment.

.11 Provide Flange connections when changing materials.

.12 All unions to be S-80 CPVC, c/w EPDM O-rings. All unions to be by one manufacturer to ensure easy resupply of o-rings.

.13 Apply silicone grease to all system o-rings and union threads to ensure ease of assembly.

.14 Provide seismic restraints as per direction of seismic engineer, and provide additional restraints against water hammer in piping as may be required.

.15 All Flange bolts and washers shall be suitable for a corrosive environment. Acceptable finishes are hot dipped galvanized with zinc coating 600 g/m2 to CAN/CSA-G164.

.16 Torque all flange bolts, observing flange torque requirements, prior to system startup to ensure long-term water tightness of system.

.17 Maintain clearance to allow flange bolt removal.

.18 Use spigot flanges where required to reduce equipment layout dimensions where necessary.

.19 It is the Pool contractor's responsibility to install the pool fill lines from the backflow preventer to the connection points. Refer to drawings for exact locations.

.20 Provide gear operated valves for all pool fill manual bypass piping to prevent water hammer. Provide PVC type water hammer arrestors as required to prevent water hammer from automatic solenoid fill valves.

.21 PVC pipe shall not be threaded on site. Use tees and not saddles for large differential connections. Drill and tapping of pipe shall be used as a last resort under the following conditions:

.1 No drill and tapping whatsoever shall be used under slab. Drill and tap in mechanical room space on the mechanical room side of all isolation valves only.

.2 Where possible, tap one size larger and required and install thread x thread reducing bushing to strengthen tapping installation.

.3 Only use Sch-80 pipe for tapping. Locate tappings as required for equipment installation.

.4 In mechanical room only, drill and tap for equipment where reducing tees prevent proper device installation (i.e. flow switches and temperature sensors) and where:

.5 Threads </= 25mm diameter are tapped into pipes >/= 150mm diameter. For larger tappings or smaller pipes, use reducing tees. Do not tap pipes < 150mm diameter EXCEPT in case of chemical injection points, which require exposure to centre of flow within pipeline.

.6 Tap, thread, glue and epoxy all tapped connections except equipment/chemical injection points. Repair all leaks after pressure testing as required.

.22 Pipe Fastening

.1 PVC hot air welding in strict accordance with manufacturers recommendations shall be allowed only for non-leak flanges or back welding of glued fittings, or by permission of the Engineer.

.2 Obtain manufacturers procedure literature before welding of pipe. Submit this literature to engineer as part of shop drawings. Have the procedures on site during installation of all piping.

.3 When welding is allowed the contractor shall demonstrate to the engineer his ability to properly weld PVC piping prior to welding finished products.

.4 All cementing shall be done at temperatures exceeding 5°C. Submit manufacturers written procedures if welding at colder temperatures.

.5 Piping must be cut square and all burrs removed from inside and outside of cut end of pipe.

.6 All piping shall be cleaned prior to cementing.

.7 Following manufacturers published literature for priming and gluing of pipe ensuring the use of correct size of brush and that fittings are twisted 90° prior to glue setting.

.8 For pipes over 300 mm, joints shall be clamped for specified curing time.

3.3 Valves

.1 Ball Valves:

.1 Socket weld ball valves. Maintain upstream/downstream pipe alignment and tension to prevent unequal or excessive compression of valve components.

.2 Locate valves (when ever possible) at easy accessible elevations.

.3 Lubricate o-rings and threads with minimal silicone-grade grease.

.2 Butterfly Valves:

.1 Connect butterfly valves with flanges. Maintain upstream/downstream pipe alignment and tension to prevent unequal or excessive compression of valve components.

.2 Provide chain operators for regularly-used butterfly valves located higher than 2100 mm above floor level.

.3 Check Valves:

.1 Install check valves on parallel pump systems.

.2 Install check valves to protect flow from reversing. Refer to drawings.

.3 Align check valves to ensure proper operation and to prevent valve jamming in open position.

.4 Install a check valve at the tee of the chemical feed injector and main filtration pipe.

.4 Pressure Regulating Valves:

.1 Pressure regulating valves are to be used to protect pumps from dead heading. Install regulator on a by-pass line to recirculate flow into the suction side of the pump. Refer to schematic for locations.

.5 Air Release Valves:

.1 Install air release valves @ all high points in the system.

.6 Flow Control Valves:

.1 Install flow control valves on water feature systems to assure constant flow to the feature regardless of pump flow or pressure.

.7 Foot Valves:

.1 Install foot valves in chemical mixing tanks to assure pump is always primed.

3.4 Supports and Hangers

.1 Refer to Section 23 05 29 – Hangers & Supports for Piping & equipment for additional information.

.2 Hangers to be hot dipped galvanized with epoxy over epoxy primer prior to installation.

.3 Provide all required reinforcing bar, blocking, straps for proper support and concrete coverage when concrete encasing piping.

.4 PVC Pipe Supports:

Maximum Spacing (mm) Pipe Size		**25 mm**	**30 mm**	**40 mm**	**50 mm**	**65 mm**	**75 mm**	**100 mm**	**150 mm**	**200 mm**	**250-300mm**
Temp Range											
Up to 27c		0.9 m	1.5 m	1.5 m	1.5 m	1.8 m	1.8 m	2.1 m	2.4 m	2.7 m	2.1
Between 27c – 37c		0.9 m	1.2 m	1.2 m	1.2 m	1.5 m	1.8 m	1.8 m	2.1 m	2.4 m	2.1
Over 37c		0.9 m	0.9 m	1.2 m	1.2 m	1.2 m	1.5 m	1.5 m	1.8 m	2.1 m	2.1
Hanger Rod Diameter		10mm	10mm	10mm	10mm	10mm	10mm	10mm	12mm	12mm	15mm

.5 Minimum one hanger per section of pipe.

.6 Install hangers a maximum 300mm away from an elbow. Support on both sides of elbows.

.7 Provide seismic restraints as per direction of seismic engineer.

.8 Provide restraints against water hammer in particular piping locations as required and determined at time of equipment startup.

3.5 Firestopping

.1 Refer to section 23 07 11 : FIRE STOPPING

.2 Shop drawings to show:

.1 Material specification including CSA or ULC reference numbers.

.2 Installation details for various types of piping materials.

.3 Operating and maintenance requirements.

.3 Engage an experienced Installer who is certified, licensed, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install manufacturer's products per specified requirements. A manufacturer's willingness to sell its firestopping products to the Contractor or to an Installer engaged by the Contractor does not in itself confer qualification on the buyer.

.4 A manufacturer's direct representative (not distributor or agent) to be on-site during initial installation of firestop systems to train appropriate contractor personnel in proper selection and installation procedures. This will be done per manufacturer's written recommendations published in their literature and drawing details.

.5 Firestop System installation must meet requirements of CAN4-S115-M or ULC S-115-M tested assemblies that provide a fire rating.

3.6 Testing

.1 Pressure test buried systems before concrete encasing. Maintain under reduced pressure during concrete encasing.

.2 Allow for all required pressure test caps at various transitions in concrete structure and pour breaks.

.3 Pressure test above grade piping, including all equipment, as a whole prior to system startup.

.4 All pool related piping shall be tested to a minimum of 1.5 times system dead head pressure, or 517 kPa, whichever is greater, for a period of eight hours.

.5 Test equipment with lesser pressure ratings at lower test pressure. Isolate prior to testing remainder of equipment and piping at higher pressure if applicable.

.6 Provide Cycle pressure testing after system pressure test for mechanical room piping.

.7 All PVC pipe pressure tests shall be with water or glycol. **Air pressure tests are not permitted.**

.8 All underground pool piping shall be tested and passed prior to encasing piping in concrete. Maintain test during pipe encasement and piping will be tested again four days after concrete encasement.

.9 Pool filters shall be tested to 344 kPa for a period of eight hours. Test filters prior to introduction of sand media.

.10 All piping or equipment that fails tests will be replaced at no cost to the owner

.11 **All pressure tests to be documented and placed into maintenance manuals. Document to indicate what is being tested, start/finish times of test, pressure start pressure, finish pressure and witness**.

.12 The pool mechanical Consultant will be unable to inspect all underground pool piping. Photos must be taken of piping roughed in, reinforcement in place and during the encasement concrete pour. Photos will be kept on site and turned over to the Consultant at completion. Consultant will not sign off underground piping unless photos are available at all times on site.

.1 Prior to encasement, submit photos of piping sections to be covered. Include description of portion of system to be tested.

.2 Submit pressure test report, including start/end procedures and independent witness verification. Report to include brief explanation of piping to be encased, referencing line types and gridlines.

.3 Pictures and pressure test report to be submitted to Consultant minimum 36 hours prior to covering piping to allow proper Consultant verification of installation. RECEIPT OF PRESSURE TEST REPORTS AND SUPPLEMENTAL PICTURES OF INSTALLATION PRIOR TO ENCASEMENT IS MANDATORY.

3.7 Flushing and Cleaning

.1 Cleaning procedures:

.1 Provide detailed report outlining proposed cleaning procedures at least 2 weeks prior to proposed starting date. Report to include:

.1 Cleaning procedures, flow rates, elapsed time.

.2 Chemicals and concentrations used.

.3 Specific requirements for completion of work.

.4 Special precautions for protecting piping system materials and components.

.5 Complete analysis of water used to ensure water will not damage systems or equipment.

.2 Conditions at time of cleaning of systems:

.1 Systems: free from construction debris, dirt and other foreign material.

.2 Strainers: clean prior to initial fill.

.3 Report on Completion of Cleaning:

.1 When cleaning is completed, submit report, complete with certificate of compliance with specifications of cleaning component supplier.

END OF SECTION