Appendix 2 - Supplementary General Conditions and Specifications

Division 01 – General Requirements

Section 011000 Summary

.1 **DOCUMENTS**

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

.2 The Specifications have been divided into approximate trade sections. However, the division of the Specifications into sections shall not operate to define or limit the responsibility of any Subcontractor.

.2 **COORDINATION AND COOPERATION**

.1 The Contractor shall coordinate the work of his Subcontractors with efficient and continuous supervision and be fully aware of the Work requirements including, without limitation, those of the Specifications and Drawings.

.2 The Contractor is responsible for determining which Subcontractor shall perform Work. Differences in interpretation of the Specifications or Drawings as to which Subcontractor shall perform certain Work shall not be grounds for claims for extras.

.3 The Contractor shall coordinate the use of Products and Construction Equipment, including cranes, hoists, ladders and scaffolds, and access to the Place of the Work, with the work of Subcontractors. The cost of use of Construction Equipment and Products by Subcontractors shall be governed by the agreements between the Contractor and the Subcontractors.

.3 **DAILY RECORD**

.1 From the day of commencement of the Work, the Contractor shall maintain a careful daily record of the progress of the Work on his standard record form, with applicable trades listed. This record shall be open to the Regional District's inspections at all reasonable times. A copy of the record shall be turned over to the Regional District at weekly intervals.

.2 Contractor's diary shall record all pertinent data such as:

.1 Daily weather conditions, including maximum and minimum temperatures.

.2 Commencement, progress and completion of various portions of the Work.

.3 Dates of visits or inspections by government authorities, inspectors, and any other visitors to the Site.

.4 Record of work force employed and work performed thereby.

.4 **PERMITS AND FEES**

.1 The Contractor shall obtain and pay for all permits and licenses required for the Work.

.2 The Regional District will obtain the required archeological and Moti permits.

.3 The Contractor shall conform to the codes, ordinances, regulations and orders of all authorities having jurisdiction over the performance of the Work. Should conflicts arise, the Contractor shall forthwith request clarification from the Regional District.

.5 **WORK AREA**

.1 The Work and the operation of vehicles and machinery, storage of equipment, materials and/or supplies will be contained within the Place of the Work.

.2 Streets beyond the limits of the work and other construction areas shall be kept clean.

.3 The Contractor is responsible for dust control within the Place of the Work and roadways beyond the limits of the Place of the Work that have been affected during construction. While performing the Work the Contractor shall control dust originating from the Work and

shall take immediate corrective action if directed by the Regional District.

.4 The Contractor shall provide for efficient drainage of all sections of the work during all stages of construction at his own expense. The Contractor will be held responsible for all damage which may be caused through his failure to provide proper drainage facilities. The Contractor shall restore any existing drainage works which are disturbed as a result of his construction activities.

.5 The Contractor will give the Regional District at least 48 hours' notice in writing before requiring any baselines or benchmarks in connection with the work. The Contractor shall clearly state in such notice the exact location where levels, lines, or stakes are required. The Contractor will satisfy himself before commencing any work as to the meaning and correctness of all stakes and marks, and no claim will be entertained by the Regional District for or on account of any alleged inaccuracies, unless the Contractor notified the Regional District of such inaccuracies in writing before commencing the work.

.6 The Contractor will be held responsible for the preservation of all stakes and marks in their proper positions, and where any of them are disturbed, lost or destroyed, it shall at once notify the Regional District in writing, and all expenses incurred in replacing such stakes or marks will be billed against the Contractor and if not paid by the Contractor will be deducted from any monies due the Contractor under the Contract.

.7 All stakes and marks set will not in every case represent all the grades, levels, lines, angles or surfaces in the finished work and in this regard the Contractor shall ensure that such stakes and marks are read correctly and used in a manner consistent with the plans, details, specifications and directions of the Regional District. Should the Contractor discover or suspect any errors in stakes, lines, and grades which have been established for its use, the Contractor shall at once discontinue the work until such suspicions are investigated and any errors or misunderstanding rectified, but no claims shall be made or allowed on this account, or because of any resulting delay.

.8 The Contractor shall assume full responsibility for alignment, elevations, and dimensions of each and all parts of the Work, regardless of whether the Contractor's layout work has been checked by the Regional District.

.9 The Contractor shall furnish the Regional District or any of his assistants with all reasonable help which may be required at any time in driving stakes or laying out the work. The Contractor will receive no additional compensation for this.

.10 In order to satisfy the Regional District that the Contractor has addressed concerns regarding traffic control and safety it will be required to submit a sketch indicating its proposed method of barricades and/or signage for each of the work sites included in the Contract. This information shall be available for review and approval by the Regional District at the Contract pre-construction meeting.

.11 The Contractor shall provide additional written notice to Ministry of Transportation and Infrastructure's (MOTI) Area Manager a minimum of seven (7) days prior to restrictions for residential access and lane closure through an MOTI H1080 form. The content and form of the written notifications shall be reviewed and approved by the Regional District prior to delivery. Emergency access and pedestrian access to all properties shall be maintained at all times. Access for local traffic shall be maintained at all times except when work is proceeding immediately adjacent to a property. Dusty materials shall be transported in covered haulage vehicles. Wet materials shall be transported in suitable watertight haulage vehicles.

.12 The Contractor shall take such steps as may be required to prevent dust nuisance resulting from its operations either within the limits of the work or elsewhere or by public traffic where it is the Contractor's responsibility to maintain a roadway through the Work.

.6 CONSTRUCTION SCHEDULE

.1 To co-ordinate the work, the Contractor or person(s) authorized to act for the Contractor

will attend regular meetings with the Regional District or his representative during the period over which the work under the Contract is carried out, at a time and place to be decided by the Regional District.

.2 The Contractor shall commence the Work within five (5) days after receiving Notice to Proceed from the Regional District.

.7 **PRECONSTRUCTION MEETING**

.1 The Contractor shall attend a meeting with the Subcontractors, field inspectors, supervisors and the Regional District to discuss and resolve administrative procedures and responsibilities, and scheduling prior to commencing the Work.

.2 Items to be discussed at such meeting shall include, but shall not necessarily be limited to the following:

.1 Confirmation of authorized representatives of the Regional District, consultants working behalf of the Regional District and the Contractor and the name of the Contractor's Construction Safety Officer.

.2 Schedule of Work.

.3 Site security.

.4 Takeover procedures, and acceptance.

.5 Monthly progress pay requests, administrative procedures and holdbacks.

.8 **PROGRESS MEETINGS**

.1 The Contractor shall hold progress meetings every week at the Regional District’s office throughout the duration of the Work.

.2 The Contractor, and Subcontractors involved in the Work shall attend the weekly progress meetings.

.3 The Regional District will record minutes of weekly progress meetings and circulate same to attending parties within three (3) days of meeting.

.9 **CONSTRUCTION SAFETY**

.1 The Contractor shall comply with the Workers' Compensation Prevention Regulations of British Columbia (latest edition) and provide all necessary safety requirements as prescribed by such regulations.

.10 **SECURITY**

.1 The Contractor shall be responsible for security of the Work and at the Place of the Work. The Contractor shall secure the work area by installation of a minimum six-foot-high metal fence enclosing the full perimeter of the worksite prior to commencing the Work and until the Work is complete and approved by the Regional District.

.2 The Contractor and his Subcontractors shall make their own arrangements to ensure the security of their own equipment and materials.

.3 The Regional District, and/or their respective representatives will not be liable for any loss or damage to materials, equipment or other property of the Contractor, unless caused by their negligence.

.11 **CONCEALED OR UNKNOWN CONDITIONS**

.1 Before commencing any Work at the Place of the Work, the Contractor shall be responsible to locate in three (3) dimensions all underground utilities and structures indicated on the Contract Documents as being at the Place of Work. The Contractor shall also be responsible to consult with all utility providers that provide electricity, communication, gas, or other utility services in the area of the Place of Work, to locate in three (3) dimensions all underground utilities for which they have records. The Contractor shall also locate in

three (3) dimensions any other utilities or underground structures that are reasonably apparent in an inspection of the Place of the Work.

.12 **OPERATING AND MAINTENANCE MANUALS**

.1 Upon Substantial Performance of the Work, the Contractor shall submit to the Regional District two (2) copies of Operating and Maintenance Manuals in a three-ring binder, with each chapter clearly labeled, containing pertinent information on maintenance, inspection, and emergency procedures, receipts, test reports, warranties, equipment and finish schedules, and other Work information. Also, a pdf of the three-ring binder contents shall also be provided to the Regional District by the Contractor.

.13 **RECORD DRAWINGS**

.1 The Contractor shall keep one set of current white prints of all Drawings and all addenda, revisions, clarifications, change orders, and reviewed shop drawings in the site office; and have them available at all times for inspection by the Regional District.

.2 At completion of the Work, the Contractor shall employ competent personnel to transfer all deviations, including those required by addenda, revisions, clarifications, shop drawings, change directive and change order, to a set of white prints. Each as- built print shall bear the Contractor's identification, the date of record and the notation, “We hereby certify that these drawings represent the work 'As Built Drawings'.” The Contractor's signature shall be placed below that notation.

.3 The Regional District shall transcribe the “As- Built Drawings” and create and full set of “Record Drawings” depicting the work completed.

.14 **SYSTEMS DEMONSTRATION**

.1 Prior to final inspection, the Contractor shall coordinate, execute and demonstrate operation of each system component, including the reinstalled submersible pump and motor, pitless adaptor unit, MAG flow meter and hypochlorite system and reconnection to the satisfaction of the Regional District engineer and shall instruct personnel in operation, adjustment, and maintenance of equipment and systems, using data provided by operation and maintenance manuals as the basis for instruction. The Contractor will submit to the Regional District a schedule and a demonstration program at least two (2) weeks prior to foreseen time of demonstration.

.15 **SUBSTANTIAL PERFORMANCE**

.1 Prior to or at the time of applying for a review to establish Substantial Performance of Work, the Contractor shall submit to the Regional District the following items:

.1 Letters of Assurance from the Contractor, attesting to the successful installation, startup testing, and commissioning of the submersible pump and motor assembly and pitless adaptor assembly. Reports of pipes and mechanical instruments pressure testing, chlorination and bacteriological testing.

.2 All required manufacturer’s inspections, certifications, guarantees, warranties as specified in the Contract Documents.

.3 All maintenance manuals, operating instructions, maintenance and operating tools, replacement parts or materials as specified in the Contract Documents.

.4 Certificates issued by all permit issuing authorities indicating approval of all installations requiring permits.

.5 Certificates issued by all testing, commissioning, cleaning, inspection authorities and associations as specified in the Contract Documents.

.6 All Drawings and as-installed documents in the form specified in the Contract Documents.

.7 A certificate issued by Workers Compensation Board confirming that the Contractor

has paid all assessments.

.2 Prior to Substantial Performance of the Work and in addition to the lien holdback, a deficiency holdback shall be established for Work determined by the Regional District to be defective or incomplete (the “Deficiency Holdback”). The Regional District shall establish the amount of the Deficiency Holdback as twice the estimated cost to rectify defective work and finish incomplete Work using the services of another Contractor or the Regional District’s own forces. No part of the Deficiency Holdback shall become payable until all of the defective Work is corrected and all of the Work is complete. If the defective or incomplete Work is not corrected or completed within a reasonable time as determined by the Regional District, then all or a portion of the Deficiency Holdback as determined by the Regional District may be retained to be applied against the loss and damage suffered by the Regional District to correct or complete the Work

.16 **PROJECT COMMISSIONING**

.1 The Contractor shall:

.1 Coordinate, execute, and successfully complete the startup testing and commissioning of the reinstalled pump and motor assembly, including the hypochlorite system, and demonstrate for a duration of 24 hours of successful and uninterrupted operation of the reinstalled pump and motor and pitless adaptor assembly. The Contractor will submit a commissioning program prior to start up including checklists and verifications to be conducted during the 24 hours test. The Contractor shall promptly correct deficiencies and defects identified by the Regional District. A commissioning final report will be submitted to the Regional District after the successful commissioning.

.2 Review maintenance manual contents (operation, maintenance instructions, record drawings, spare parts, materials) for completeness.

.3 Submit required documentation such as statutory declarations, Workers' Compensation certificates, warranties, certificates of approval or acceptance from regulating bodies.

.4 Attend “end-of-work” testing and break-in or start-up demonstrations.

.5 Review inspection and testing reports to verify that the findings conform to the intent of the documents and that changes, repairs or replacements have been completed.

.6 Review condition of equipment that has been used in the course of the Work to ensure turning over at completion in “as new condition” with warranties, dated and certified from time of Substantial Performance of the Work.

.7 Arrange and coordinate instruction of Regional District's staff in care, maintenance and operation of building systems and finishes by suppliers or Subcontractors. The duration of the instruction shall be a minimum of two hours of Regional District instruction.

.8 When partial occupancy of uncompleted Project is required by the Regional District, coordinate Regional District's uses, requirements and access with Contractor's requirements to complete Project.

.9 Provide ongoing review, inspection and attendance to building call back, and maintenance, and repair problems during the warranty periods.

.17 **Record Drawings**

.1 The Contractor shall keep one set of Contract drawings on the site at all times. As the work progresses, he shall record, in a neat legible manner, all changes in the work. The following information shall be recorded for each change:

.1 Full Description of change.

.2 Redline mark up on the Issued For Construction Drawings including lengths and offsets from a fixed object.

.3 Date.

.4 Authority.

.18 **FIELD SERVICES**

.1 The Contractor shall be responsible for providing survey services to measure and stake the Site and survey services to establish and confirm alignment and grade measurements for the Work. Unless otherwise stipulated in the Contract Documents, all Work is to be laid out by the Contractor. Layout will consist of horizontal and vertical baseline controls.

.2 The field surveyor shall have a minimum of three (3) years surveying experience on projects of similar or larger size. The Contractor shall submit a resume of the surveyor's experience prior to commencement. If in the Regional District's opinion, the surveyor does not have sufficient experience and familiarity with the Work, the Contractor, at no extra cost to the Regional District, shall provide a suitable alternate.

.3 Existing base horizontal and vertical control points will be provided by the Regional District. The Contractor's surveyor is to locate, confirm and protect control points prior to starting site work and preserve permanent reference points during construction. No changes or relocations are permitted without prior written notice to Regional District. Report to Regional District when a reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations.

.4 Survey Requirements:

.1 Establish at least two (2) additional permanent benchmarks on Site, referenced to established bench marks by survey control points.

.2 Establish lines and levels, locate and lay out, by instrumentation.

.3 Stake for excavation, pipe laying, road construction, etc.

.4 Provide cross sections for calculation and payment of road excavation.

.5 Provide completed cut sheets and grade sheets to the Regional District at least 24 hours prior to the start of each section.

.5 Maintain a complete, accurate log of control and survey work as it progresses. On request of the Contract Administrator, submit documentation to verify accuracy of field work.

.6 Promptly notify the Regional District in writing if subsurface conditions at the Place of the Work differ materially from those indicated in the Contract Documents, or a reasonable assumption of probable conditions based thereon. After prompt investigation, should Contract Administrator determine that the conditions do differ materially, instructions will be issued for changes in the Work as provided in the General Conditions.

.7 The Contractor, upon entering the site for the purpose of beginning Work, shall locate all reference points and take all necessary precautions to prevent their destruction. The Contractor shall be charged with the cost of verifying or replacing any legal survey pins, monuments, or reference stakes damaged during construction operations. In the event that the Contractor requires the removal of any legal survey markers for the purpose of the Work, the cost of replacement will be borne by the Regional District, provided the written consent of the Regional District is first received and the pin has been adequately referenced by a BCLS. The Contractor shall provide and pay for all stakes, markers and tools.

END OF SECTION

Section 011100 Summary of Work

1.0 GENERAL

1.1 Existing Conditions

The Chaster Well and Pump Station consists of an existing 22.37 kW (30 HP) vertical submersible pump, manufactured by Pentair. The motor model is a Pentair model 6T30-225.

The existing well head is located inside a utility valve vault and the scope of the work under this project involves civil, mechanical and electrical construction and installation of a well pitless adaptor seal.

The station has a daily flow rate of approximately 400 to 500 m3/day in the peak season (May to September) and 350-400 m3/day in the off season (October to April).

1.2 Work Covered by Contract Documents

The work to be completed under this Contract will consist of providing all the labour, equipment, material, including completion of civil, mechanical, and electrical improvements for the construction and installation of the following;

- Installation of a drinking water well pitless adaptor wellhead and seal assembly,
- Removal and disposal of the existing concrete valve vault,
- Installation of well protection kiosk.

- Contractor provided professional engineering and certified electrical design services, in the completion of all the site civil, mechanical, and electrical improvements
- Optional certified well redevelopment services, and materials required to complete a vertical submersible well pump and motor removal using a certified water well removal and installation contractor along with the completion of Certified factory cleaning, testing, and redevelopment of the Chaster Well.

All work will be completed in accordance with these Contract Documents and Drawings.

The Scope of Work includes, but is not limited to, the following elements:

The Tender Price for the Work is comprised of the following components and the tenderer's overhead and profit are included in each component: Items 1 through 8. More information on the can be found on IFC drawings issued with this document.

Payment Item	Description	Approx. Quantity (for Proposal Evaluation)	Unit
1	Removal of the existing vertical submersible pump and motor assembly from the well by a qualified and certified pump installer/servicer. Cleaning and disinfection of the well by a qualified well hydrogeologist, utilizing a surge and bail pipe cleaning method.	1	LS
2.	Transportation from work site to pump installer/servicer yard and back again to work site. Pump and motor de-staging, disassembly, cleaning, mechanical and electrical testing by a qualified pump installer at the pump installer's pump yard. Pump installer shall transport pump and motor assembly from well site to pump yard and then back again to the site after completion of pump and motor cleaning, then execute the reassembly and reinstall the pump and motor assembly back into the cleaned and disinfected well.	1	LS

3.	Remove and dispose of the existing valve vault. Furnish, assemble and install a new pitless adaptor unit including completing all related mechanical, electrical, site civil modifications (including concreting), connections and improvements necessary to provide for a complete and functioning above grade pitless adaptor unit.	1	LS
4.	Perform and complete the necessary electrical and mechanical modifications to the existing electrical mechanical operating necessary, if required to ensure the system improvements are integrated and provide for the uninterrupted function of the Chaster well station for a complete operable system. Stainless Steel piping is to be of pressure class 350.	1	LS
5.	Install a well level data logger with a sounding tube for well level monitoring, Contractor to propose the design and means and methods of installation.	1	LS
6.	Contractor to install new Mag Flow meter, air relief valve and new check valves as per the design drawings.	1	LS
7.	Contractor to design and install the required structures as shown on drawings including the doghouse and well protection.	1	LS
8.	Contractor to complete a start up test of the reinstalled pump and motor, complete the camera video well survey and complete a continuous 48 hour step test well yield aquifer testing program.	1	LS
9.	Contractor to provide O&M Manuals for the upgrades	1	LS
10.	Mobilization, Site Cleanup and Demobilization	1	LS
11.	Provide adequate sediment and erosion control measures from the discharge point of the pumped water and ensure that the discharge water does not undermine and carry any roadway fines so as to undermine roadside ditches.	1	LS
12.	Optional : Supply and install a 1.5 meter high interlocked steel frost fence or equal enclosing around the complete perimeter of the site, complete with a 12 foot wide swing out locking access gate.	1	LS

.1 All other work required for the completion of a fully operational and functioning well and pump station system, complete.

.2 The Work shall not be deemed complete until the Work is accepted by the Regional District. The Work, unless specifically stated otherwise, shall include the furnishing of all labour, supervision, management, materials, installation of Regional District Supplied Materials, temporary works, supplies, services, Contractor's Plant and Equipment, receiving and handling, transportation, foreign, federal, provincial, and municipal taxes and duties of whatsoever kind, permits and licenses, and other things necessary for and incidental to the performance of all the Work. The Contractor shall advise the Regional District prior to applying for any permits or licenses.

.3 Any minor or incidental item of the Work not called for in the Specifications or shown on the Drawings but clearly required to meet the intent of design and normally provided for the proper

operation of the Work shall be provided as if specifically called for in the Contract Documents. The intent is that the Contractor provides a complete Project.

.4 The Work of the Contract consists of the construction of all Work described and as shown in the Contract Documents and by implication.

.5 The Work may commence at the Site immediately following a Notice to Proceed and in compliance with the project milestones dates provided in the RFP requirements section 1.8. The Work is to be substantially complete by the date indicated in Section 013200 – Construction Progress Schedule. The Contractor may be required to commence Work on Submittals after the Notice of Award, but not prior to the Notice to Proceed.

1.3 Contract Method

.6 The Contractor shall construct the Work under a unit price Contract.

1.4 Responsibility

.1 The Contractor shall be responsible for the safe keeping of the Regional District's materials, and shall immediately replace or repair lost or damaged Regional District's Materials, including any associated equipment, appurtenances and accessories to the complete satisfaction of the Regional District and Regional District at no cost to the Regional District.

.2 All Regional District Materials damaged by the Contractor shall be immediately repaired or replaced by the Contractor to the satisfaction of the Regional District, at no cost to the Regional District.

.3 The Contractor shall be responsible for all mechanical and electrical interface connections for Regional District Materials and appurtenant connections.

.4 The Contractor shall be responsible for final assembly and alignment, and shall provide the necessary labour, supervision, materials, to ensure that the equipment meets the alignment tolerance specified for the pump and motor equipment.

.5 The Contractor is responsible for providing all labour, equipment and supplemental specialist support necessary to ensure the proper installation, trial operation, performance testing and proof of successful operation to achieve the designated requirements.

1.5 Milestone Dates

.1 Time and all time limits stated in the Contract Documents are of the essence of the Contract. The Contractor should perform his work expeditiously and with adequate forces to achieve the milestone dates.

1.6 Permits

.1 It is the Contractor's responsibility to obtain all required electrical, Technical Safety BC, Work Safe BC, and all other permits. The Regional District will procure the archeological and MoTi permits.

2.0 Products

.1 Product specifications is as specified within these Contract Documents.

3.0 Execution

.1 Execution of work is as specified within these Contract Documents.

END OF SECTION

Section 011400 Work Restrictions

1.0 GENERAL

1.1 SPECIAL PROJECT NOTE:

1. The Contractor shall NOT modify the existing pump and motor assembly nor take the well out of operating condition between May 31st, 2023 and October 15th, 2023, as this time period is the peak summer usage period when limited water supply is available. The Contractor may perform all other work during this period of time but under no circumstances shall the Chaster Well be out of service between May 31st 2023 and October 15th 2023.
2. The Contractor should also note the complete ban on all outdoor water use during the Sunshine Coast Regional District's imposed stage 4 water restrictions which can be imposed any time after July 15. See Sunshine Coast Regional District Bylaw 422for a summary of the Sunshine Coast Regional District Drought Policy and outdoor water restriction program, https://web.scrd.ca/wp-content/uploads/2023/04/422-Water-Rates-and-Regulations-consolidated-to-include-422.42-in-effect-from-2023-JAN-12-to-present.pdf

2.0 PRODUCTS

Not Applicable.

3.0 EXECUTION

Not Applicable.

END OF SECTION

Section 012900 Payment Procedures

1.0 GENERAL

1.1 Measurement and Payment

.1 The Work, including any Materials, equipment and services, will be paid for in accordance with the prices set out in Schedule of Quantities, in this Supplementary General Conditions and Specifications and in the RFP Document. Prices and any further breakdown do not limit the Work to the items listed therein. The Contractor has allowed for sufficient amounts to cover the cost of any Work or Materials not specifically listed in Schedule of Quantities, but included in the Drawings and Specifications by either direct mention or implication, by including all such amounts in the items to which they pertain most closely in Schedule of Quantities. Costs of a general nature that do not pertain to any one item have been distributed among all the items.

1.2 Applications for Payment

.1 Refer to Part 18 Payment – General Conditions (MMCD 2019)

.2 The Contractor shall use standard forms for submission of progress claims in the format agreed prior to the first application for payment.

.1 Show previous amount claimed and the amount claimed for the period ending.

.2 Show percentage of Work completed to date and holdback retained.

1.3 Changes in the Work

.1 Refer to Part 7 Changes in the Work – General Conditions (MMCD 2019).

2.0 PRODUCTS

Not Applicable

3.0 EXECUTION

Not Applicable

END OF SECTION

Section 013200 Construction Progress Documentation

1.0 GENERAL

1.1 Description

.1 Prior to the Regional District's approval for the Contractor to commence Work at the Site, the Contractor shall produce and submit a detailed Baseline Schedule, acceptable to the Regional District, which demonstrates the conformance to the requirements agreed to above and elsewhere in this Section. Once finalized and agreed to by the Regional District, this schedule will be deemed the Contract Schedule, to which the Contractor shall base all future updates and from which further detail will be developed.

.2 Specifically, the Contract Schedule shall include, but not be limited to, a level of detail conforming to the following:

.1 Identify the work of both the Contractor and other Contractors that access the Site.

.2 Include submission, review and approval of critical shop drawings, product data, samples, etc. The Contractor shall manage the cycle(s) of all other Submittals using a compatible spreadsheet or database program. Refer to Section 013300 – Submittals.

.3 Include performance testing, verification, start-up and demonstration procedures by the Contractor, allowing appropriate intervals for commissioning by third parties, and for integrated system certification.

.3 The Contractor shall base the scheduled duration of each activity on the Work being performed during the work week established and agreed upon as of the date of the Notice of Award with allowances made for legal holidays and normal weather conditions.

.4 The Contractor shall advise the Regional District within two (2) days of any problems anticipated by any activity shown in the Contract Schedule.

.5 The Contractor shall revise the schedule to reflect changes in the actual sequence and the future sequence of Work, should the actual sequence of Work performed by the Contractor deviate from the planned sequence indicated in the accepted Contract Schedule.

1.2 Submissions

.1 The Contractor shall provide Submittals in accordance with Section 013300 – Submittals and with the requirements noted herein.

.2 The Regional District's acceptance of any schedule submission does not relieve the Contractor from any of its contractual responsibilities.

.3 For the initial submission of project controls documents, the Contractor shall submit one (1) electronic copy of the following:

.1 Critical Path Schedule in bar chart and time scaled logic diagram formats.

.4 The Contractor shall submit monthly schedule status reports with the monthly progress claim consisting of two (2) hard copies and one (1) electronic copy of the following project control documents:

.1 Update of Critical Path Schedule in bar chart and time scaled logic diagram formats.

.5 The Contractor shall show the percentage of completion of each item or activity as projected for the last day of the month for which the schedule is issued. Modify the timing and duration of future activities to indicate current planning.

.6 The Contractor shall submit proposed revisions to the accepted Contract Schedule to the Regional District for review. Changes in timing for activities may be modified with agreement of the Contractor and Regional District. A change affecting the Contract Price, the completion time and sequencing of the Work may be made only by approved Change Order.

1.3 Project Milestone Dates

.1 The Contractor should schedule the Work in accordance with the following Project Milestone Dates:

Expected Construction commencement	by October 16, 2023
Substantial Completion	by December 30, 2023
Total Performance	by February 28, 2024

2.0 PRODUCTS

Not Applicable.

3.0 EXECUTION

Not Applicable.

END OF SECTION

Section 013300 Submittal Procedures

1.0 GENERAL

1.1 General Requirements

.1 Unless otherwise noted, make submittals to the Regional District for review.

.2 Make submittals with reasonable promptness and in an orderly sequence to avoid any delay in the Work. Failure to submit in ample time is not considered cause for an extension of Contract Time, and no claim for extension by reason of such default will be allowed.

.3 Do not proceed with Work affected by submittals until review is complete.

.4 The submittal reviews do not authorize changes in cost or time. Changes involving cost or time are authorized only by a signed change order.

1.2 Shop Drawings

.1 Arrange for the preparation of clearly identified shop drawings as specified or as the Regional District may reasonably request. Shop drawings are to clearly indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of the Work. Where articles or equipment attach or connect to other articles or equipment, clearly indicate that all such attachments and connections have been properly coordinated, regardless of the trade under which the adjacent articles or equipment will be supplied and installed. Shop drawings will be submitted with the appropriate Specification Sections attached. Notify the Regional District in writing of any deviations in shop drawings from the requirements of the Contract Documents.

.2 Examine all shop drawings prior to submission to the Regional District to ensure that all necessary requirements have been determined and verified and that each shop drawing has been checked and coordinated with the requirements of the Work and the Contract Documents. Examination of each shop drawing shall be indicated by stamp, date and signature of a responsible person of the Subcontractor for supplied items and of the Contractor for fabricated items. Shop drawings not stamped, signed and dated will be returned without being reviewed and stamped "Resubmit".

.3 The Regional District will review and return shop drawings in accordance with the schedule agreed upon or otherwise with reasonable promptness so as to cause no delay in the Work. Allow sufficient time for review and consideration by the Regional District. Claims for costs or contract extensions due to such review time will not be allowed.

.4 Submit a reproducible original or digital copy, minimum of one (1) electronic copies of white prints and two (2) copies of all fixture cuts and brochures. If the Contractor needs more copies for his own distribution purposes, additional copies should be submitted.

.5 Shop drawing review by the Regional District is solely to ascertain conformance with the general design concept. Responsibility for approval of detail design inherent in shop drawings rests with the Contractor and review by the Regional District shall not imply such approval.

.6 Review of Shop Drawings by the Regional District shall not relieve the Contractor of his responsibility for errors or omissions in shop drawings or for proper completion of the Work in accordance with the Contract Documents.

.7 Responsibility for verification and correlation of field dimensions, fabrication processes, techniques of construction, installation and coordination of all parts of the Work rests with the Contractor.

.8 Shop drawings will be returned to the Contractor with one (1) of the following notations:

.1 When stamped “NO EXCEPTIONS TAKEN”, distribute additional copies as required for execution of the Work.

.2 When stamped “MAKE CORRECTIONS NOTED”, ensure that all copies for use are modified and distributed, same as specified for “NO EXCEPTIONS TAKEN”. Resubmit for final records.

.3 When stamped “REVISE RESUBMIT”, make the necessary revisions, as indicated,

consistent with the Contract Documents and submit again for review.

.4 When stamped “REJECTED”, submit other drawings, brochures, etc. for review consistent with the Contract Documents.

.5 Only shop drawings bearing “NO EXCEPTIONS TAKEN” or “MAKE CORRECTIONS NOTED” shall be used on the Work unless otherwise authorized by the Regional District.

.6 It is understood that the following is to be read in conjunction with the wording on the Regional District’s shop drawing review stamp applied to each and every data sheet or drawing submitted:

“THESE (SHOP DRAWINGS) (SUBMITTALS), (PLANS)

HAVE BEEN REVIEWED FOR GENERAL COMPLIANCE WITH CONTRACT DOCUMENTS. NO RESPONSIBILITY IS ASSUMED BY THE REGIONAL DISTRICT FOR QUANTITIES, CORRECTNESS OR DIMENSIONS OR DETAILS.”

This does not mean that the Regional District approves the detail design inherent in the shop drawings, responsibility for which remains with the Contractor, and such review does not relieve the Contractor of the responsibility for errors or omissions in the shop drawing or of his responsibility for meeting all requirements of the Contract Documents. Be responsible for confirming and correlating dimensions at the Place of the Work, for information that pertains solely to fabrication processes or to techniques of construction and installation, and for coordination of the work of all sub-trades.”

.9 After submittals are stamped “NO EXCEPTIONS TAKEN”, no further revisions are permitted unless re-submitted to the Regional District for further review.

.10 Any adjustments made on shop drawings by the Regional District are not intended to change the Contract Price. If it is deemed that such adjustments affect the Contract Price, clearly state as such in writing prior to proceeding with fabrication and installation of work.

.11 Make changes in shop drawings which the Regional District may require consistent with Contract Documents. When re-submitting, notify the Regional District in writing of any revisions other than those requested by the Regional District.

.12 Shop drawings indicating design requirements not included in the Contract Documents require the seal of a qualified Professional Regional District, registered in British Columbia.

.13 Only two reviews of a shop drawing will be made by the Regional District at no cost. Each additional review will be charged to the Contractor at the Regional District’s scheduled rates. The Regional District’s charges for additional work will be deducted from the Contractor’s Progress Certificates.

1.3 Record Drawings

.1 After award of the Contract, the Regional District will provide a complete set of drawings for the purpose of maintaining Project record drawings. These drawings shall consist of a full-size white paper copy.

.2 Record on the white prints on a daily basis, work constructed differently than shown on the Contract Documents. Record all changes in the Work caused by site conditions, or originated by the Regional District, the Regional District, the Contractor, or a Subcontractor and by addenda, supplemental drawings, site instructions, supplementary instructions, change orders, correspondence, and directions of regulatory authorities. Do not use these drawings for daily working purposes and make the set available for periodic inspection by the Regional District.

.3 Accurately record the location of concealed mechanical services and electrical main feeders, junction boxes and pull boxes. Do not conceal critical Work until its location has been recorded.

.4 Dimension the installed locations of concealed service lines on the site or within the structure by reference from the center line of the service to structure column lines or other main finished faces or other structural points easily identified and located in the finished Work.

.5 Make records in a neat and legibly printed manner with a non-smudging medium.

.6 Identify drawings as “Project Record Copy”. Maintain in good condition and make available for inspection on site by Regional District at all times.

.7 At completion of operational testing, neatly transfer notations to second set of prints and submit both sets of record drawings to Regional District.

.8 Failure to provide acceptable “As –Built “Drawings may delay acceptance of the project by the Regional District. The Regional District may assess against the Contract a sum based on their calculations of costs to prepare such plans.

.9 The Regional District will transcribe the Contractor provided As Built Drawings and create a set of “Record Drawings.”

2.0 PRODUCTS

Not Applicable.

3.0 EXECUTION

Not Applicable.

END OF SECTION

Section 013500 Special Procedures

1.0 GENERAL

1.2 Permits/Inspections

.1 The Contractor will be responsible for obtaining all project permits and coordinating the required inspections. The Regional District will obtain the archeological and Moti permits.

.2 The Contractor shall arrange and pay for the regulatory submittals and inspections necessary for the completion of the Work in accordance with Federal, Provincial, regulations, and by-laws.

1.3 Applicable Codes/Standards

.1 Conform to all Federal, Provincial, and District Codes, regulations and by laws.

2.0 PRODUCTS

Not Applicable.

3.0 EXECUTION

Not Applicable.

END OF SECTION

Section 015000 Temporary Facilities and Controls

1.0 GENERAL

1.1 Temporary Facilities

.1 Installation/Removal

.1 The Contractor shall:

.1 Provide temporary toilet facilities for the Site.

.2 Maintenance of Public Utilities

.1 The Contractor shall:

.1 Arrange Work to avoid interruption of utilities serving the Regional District and the public. Pay all penalties and costs including legal fees and other expenses imposed on the Regional District as a result of actions of the Contractor, its employees, or subcontractors.

1.2 Site Requirements – General

.1 Sanitary Facilities

.1 The Contractor shall:

.1 Provide temporary portable toilet facilities for the use of the Contractor's, subcontractors' and Regional District's work forces.

.2 Disinfect facilities frequently.

.3 Dispose of sanitary wastes, in accordance with the applicable regulations.

.4 Contain all wastewater and later dispose of offsite at an approved facility at the Contractor's cost.

.5 Keep the Site and premises in a sanitary condition.

.6 Post notices and take such precautions as required by local health authorities or other public agency having jurisdiction.

.2 Construction Power

.1 Coordinate the supply of an electrical power supply for construction purposes with BC Hydro.

.2 The Contractor shall:

.1 Locate construction power at the designated location.

.2 Provide and distribute construction power and lighting as required for the execution of the Work.

.3 Pay for its power connection, routing, consumption and similar costs.

.4 Provide its own source of construction power to operate other equipment when or where necessary.

.5 Supply and pay for its own independent power for the Work.

.6 Install and maintain temporary facilities for power such as pole lines and underground cables to approval of local inspection authority.

2.0 PRODUCTS

Not Applicable

3.0 EXECUTION

Not Applicable

END OF SECTION

Section 017500 Starting and Adjusting

1.0 GENERAL

1.1 Equipment and Systems Training

.1 General Requirements

Provide training during the Equipment Performance Testing period for the following equipment and systems:

.1 Pump and motor start up testing including performance pump curve and motor control testing.

.2 All components of the above and below mentioned systems as described within these contract documents and any identified equipment and systems in all Divisions.

1.2 Training Completion Forms and Payment

.1 One copy of **Form 101** and will be required to demonstrate the pump and motor assembly is operating correctly and without deficiencies

2.0 Products

2.1 PRODUCTS

Not Applicable

3.0 EXECUTION

.1 The Contractor shall demonstrate to the Regional District satisfactory start up testing and operation of the submersible pump and motor by completion of the following **FORM 101.**

FORM 101

CERTIFICATE OF SATISFACTORY EQUIPMENT PERFORMANCE

I certify that the equipment listed below has been continuously operated for at least two (2) full operating cycles and that the equipment operates satisfactorily meets its specified operating criteria. No defects in the equipment were found. The equipment is therefore classed as “conforming”.

PROJECT: _____

ITEM OF EQUIPMENT: _____

_____

SERIAL NO: _____

REFERENCE

SPECIFICATION: _____

_____ _____

(Authorized Contractor Signature) Date

_____ _____

(Authorized Signing Representative of the Regional District) Date

END OF SECTION

Section 017800 Closeout Submittals

General

1.1 SECTION INCLUDES

.1 Record Drawings, samples, and specifications.

.2 Equipment and systems.

.3 Product data, materials and finishes, and related information.

.4 Operation and maintenance data.

.5 Spare parts, special tools and maintenance materials.

.6 Warranties and bonds.

.7 Final site survey.

1.2 SUBMISSION

.1 Prepare instructions and data using personnel experienced in maintenance and operation of described products.

.2 Copy will be returned after final inspection, with Engineer's comments.

.3 Revise content of documents as required prior to final submittal.

.4 Two (2) weeks prior to Substantial Performance of the Work, submit to the Engineer, two (2) final hardcopies of operating and maintenance manuals and one digital version in PDF-A format in English.

.5 Ensure spare parts, maintenance materials and special tools provided are new, undamaged or defective, and of same quality and manufacture as products provided in Work.

.6 If requested, furnish evidence as to type, source and quality of products provided.

.7 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.

.8 Pay costs of transportation.

1.3 FORMAT

.1 Organize data in the form of an instructional manual.

.2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.

.3 When multiple binders are used, correlate data into related consistent groupings. Identify contents of each binder on spine.

.4 Cover: Identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.

.5 Arrange content by systems under Section numbers and sequence of Table of Contents.

.6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.

.7 Text: Manufacturer's printed data, or typewritten data.

.8 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

1.4 CONTENTS - EACH VOLUME

.1 Table of Contents: provide title of project:

.1 Date of submission; names.

.2 Addresses, and telephone numbers of Engineer and Contractor with name of responsible parties;

.3 Schedule of products and systems, indexed to content of volume.

.2 For each product or system:

.1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.

.3 Product Data: mark each sheet to clearly identify specific products and component parts, and data applicable to installation; delete inapplicable information.

.4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

1.5 RECORD DRAWINGS AND SAMPLES

.1 In addition to requirements in General Conditions, maintain at the site for Engineer one record copy of:

.1 Contract Drawings.

.2 Specifications.

.3 Addenda.

.4 Change Orders and other modifications to the Contract.

.5 Reviewed shop drawings, product data, and samples.

.6 Field test records.

.7 Inspection certificates.

.8 Manufacturer's certificates.

.2 Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.

.3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.

.4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.

.5 Keep record documents and samples available for inspection by Engineer.

1.6 RECORDING ACTUAL SITE CONDITIONS

.1 Record information on set of black line opaque drawings and digitally for all as-built and record surveys.

.2 Provide felt tip marking pens, maintaining separate colours for each major system, for recording information.

.3 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.

.4 Contract Drawings and shop drawings: legibly mark each item to record actual construction, including:

.1 Measured depths of elements of foundation in relation to finish first floor datum.

.2 Measured horizontal and vertical locations of underground utilities and appurtenances,

referenced to permanent surface improvements.

.3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.

.4 Field changes of dimension and detail.

.5 Changes made by change orders.

.6 Details not on original Contract Drawings.

.7 References to related shop drawings and modifications.

.5 Specifications: legibly mark each item to record actual construction, including:

.1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.

.2 Changes made by Addenda and change orders.

.6 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.

1.7 FINAL SURVEY

.1 Submit final site survey certifying that elevations and locations of completed Work are in conformance, or non-conformance with Contract Documents.

1.8 EQUIPMENT AND SYSTEMS

.1 Each Item of Equipment and Each System: include description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.

.2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.

.3 Include installed colour coded wiring diagrams.

.4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

.5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions. .6 Provide servicing and lubrication schedule, and list of lubricants required.

.6 Include manufacturer's printed operation and maintenance instructions.

.7 Include sequence of operation by controls manufacturer.

.8 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

.9 Provide installed control diagrams by controls manufacturer.

.10 Provide Contractor's coordination drawings, with installed colour coded piping diagrams.

.11 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

.12 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

.13 Provide an asset and life cycle list for all equipment.

.14 .Additional requirements: As specified in individual specification sections.

1.9 MATERIALS AND FINISHES

.1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations.

.2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.3 Moisture-protection and Weather-exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.4 Additional Requirements: as specified in individual specifications sections.

1.10 SPARE PARTS

.1 Provide spare parts, in quantities specified in individual specification sections.

.2 Provide items of same manufacture and quality as items in Work.

.3 Include the following:

.1 Part number.

.2 Identification of equipment or system for which parts are applicable.

.3 Installation instructions as applicable.

.4 Name and address of nearest supplier.

.4 Identify spare parts to indicate equipment or system for which parts are applicable.

.5 Deliver to site; place and store.

.6 Receive and catalogue all items. Submit inventory listing to Engineer. Include approved listings in Maintenance Manual.

.7 Obtain receipt for delivered products and submit prior to final payment.

1.11 MAINTENANCE MATERIALS

.1 Provide maintenance and extra materials, in quantities specified in individual specification sections.

.2 Provide items of same manufacture and quality as items in Work.

.3 Deliver to site specified items packaged to prevent damage; place and store.

.4 Receive and catalogue all items. Identify, on carton or package, colour, room number, system or area, as applicable, where item is to be used. Submit inventory listing to Engineer. Include approved listings in Maintenance Manual.

.5 .Obtain receipt for delivered products and submit prior to final payment.

1.12 SPECIAL TOOLS

.1 Provide special tools, in quantities specified in individual specification section.

.2 Provide items with tags identifying their associated function and equipment.

.3 Deliver to site; place and store.

.4 Receive and catalogue all items. Submit inventory listing to Engineer. Include approved listings in Maintenance Manual.

1.13 STORAGE, HANDLING AND PROTECTION

.1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.

.2 .Store in original and undamaged condition with manufacturer's seal and labels intact.

.3 Store components subject to damage from weather in weatherproof enclosures.

.4 Store paints and freezable materials in a heated and ventilated room.

.5 Remove and replace damaged products at own expense and to satisfaction of Engineer.

1.14 WARRANTIES AND BONDS

.1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.

.2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

.3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of work.

.4 Except for items put into use with Regional District's permission, leave date of beginning of time of warranty until the Date of Substantial Performance is determined.

.5 Verify that documents are in proper form, contain full information, and are notarized.

.6 Co-execute submittals when required.

.7 Retain warranties and bonds until time specified for submittal.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Division 02 Existing conditions

Section 024113 Demolition

Part 1 General

1.1 REFERENCES

1. Canadian Federal Legislation
    .1 Canadian Environmental Protection Act (CEPA).
    .2 Canadian Environmental Assessment Act (CEAA).
    .3 Transportation of Dangerous Goods Act (TDGA).
    .4 Motor Vehicle Safety Act (MVSA).
2. United States Environmental Protect Agency
    .1 CFR 86.098-10, Emission Standards for 1998 and Later Model Year Otto-Cycle Heavy Duty Engines and Vehicles.
    .2 CFR 86.098-11, Emission Standards for 1998 and Later Model Year Diesel Heavy Duty Engines and Vehicles.

1.2 STORAGE AND PROTECTION

.1 Protect existing items designated to remain and items designated for salvage. In event of damage to such items, immediately replace or make repairs to approval of Regional District and at no cost to Regional District.
.2 In all circumstances ensure that demolition work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.
.3 Do not dispose of waste of volatile materials such as, mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers. Ensure proper disposal procedures are maintained throughout the project.
.4 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers or onto adjacent properties.
.5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authorities.
.6 Protect trees, plants and foliage on site and adjacent properties where indicated.

Part 2 Execution

2.1 PREPARATION

.1 Inspect site with Engineer and Regional District, and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.
.2 All items indicated to be removed or salvaged shall remain the property of the Regional District, and Contractor shall coordinate with the Regional District for removal of these items.
.3 Locate and protect utilities. Preserve active utilities traversing site in operating condition.
.4 Notify and obtain approval of utility companies before starting demolition.

2.2 SEQUENCES OF OPERATION

.1 Removal
    .1 Remove items as indicated.
    .2 Do not disturb items designated to remain in place.
    .3 When removing pipes under existing or future pavement area, excavate at least 300 mm below pipe invert.
    .4 Remove only as many trees as required during demolition. Obtain written approval of Engineer prior to removal of any trees not designated.
    .5 All cleared trees shall be disposed of as directed in MMCD Section 31 11 01 – Clearing Grubbing and Stripping.
    .6 Stockpile topsoil for final grading and landscaping. Provide erosion control and seeding if not immediately used.

.2 Removal from Site
    .1 Interim removal of stockpiled material will be required by Regional District, if it is deemed to interfere with operations of Engineer or other contractors.
    .2 Remove stockpiles of like materials by an alternate disposal option once collection of that material is complete.
    .3 Only dispose of specified material by selected alternative disposal option as provided by Engineer. Do not dispose of these materials in a landfill or a waste stream destined for landfill. Additional disposal options will be provided by Engineer's on-site representative prior to disposal.
.3 Salvage
    .1 Carefully dismantle items containing materials for salvage and stockpile salvaged materials at locations as directed by the Regional District.
.4 Sealing
    .1 Seal pipe ends and walls of manholes or catch basins as indicated. Securely plug to form watertight seal.
.5 Disposal of Material
    .1 Dispose of materials not designated for salvage or reuse on site at authorized facilities.

2.3 RESTORATION

.1 Restore areas and existing works outside areas of demolition to match condition of adjacent, undisturbed areas.
.2 Use only soil treatments and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

2.4 CLEANUP

.1 Upon completion of work, remove debris, trim surfaces and leave work site clean.
.2 Use only cleaning solutions and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

2.5 REPORTING

.1 Record off-site removal of debris and materials and provide following information regarding removed materials to Engineer within 24 hours.
    .1 Time and date of removal.
    .2 Type of material.
    .3 Weight and quantity of materials.
    .4 Final destination of materials.
.2 The Contractor is responsible for ensuring all reporting requirements are fulfilled to the satisfaction of Engineer.

2.6 COORDINATION

.1 Coordinate disposal activities with Engineer's on site representative.
.2 Potential volumes of divertible materials, a list of verified alternate disposal options, and a collection outline upon award of contract will be provided by Engineer on request.
.3 The Contractor is responsible for ensuring all coordination requirements are fulfilled to the satisfaction of Engineer.

END OF SECTION

Division 03 Concrete

Section 033000 Cast-In-Place- Concrete

1.0 GENERAL

1.1 Description

.1 The extent of concrete work is shown on the drawings. This section covers cast-in -place concrete including formwork, shoring for concrete and installation into formwork of items such as anchor bolts, and other items to be embedded in concrete.

1.2 Quality Assurance

.1 Codes and Standards - Comply with the provisions of the following codes, specifications and standards, except as otherwise shown or specified.

.2 American Society for Testing and Materials (ASTM)

.1 C33 “Standard Specification for Concrete Aggregate”

.2 C94 “Standard Specification for Ready-Mixed Concrete”

.3 C150 “Standard Specification for Portland Cement”

.3 Forming

.1 The Contractor shall be solely responsible for the adequacy of the forming, shoring and bracing design.

.2 Any formwork installed by Contractor shall be solely at Contractor’s risk. The Engineer’s review will not lessen or diminish the Contractor’s liability.

1.3 Concrete Mix Designs

.1 All concrete materials shall be proportioned so as to produce a workable mixture in which the water content will not exceed the maximum specified.

1.4 Ready-mixed Concrete

.1 Ready-mixed concrete shall conform to the requirements of ACI 301 and ASTM C94. In case of conflict, ACI 301 shall govern.

2.0 PRODUCTS

2.1 Concrete Composition

.1 Concrete shall be composed of Portland cement, fine aggregate, coarse aggregate, water, and specified additives so proportioned and mixed as to produce a plastic workable mixture in accordance with requirements of this section of the specification and suitable to the specific conditions of placement.

2.2 Portland Cement

.1 Portland cement shall be from an approved source and shall conform to the requirements of the current ASTM Specification C150, for Type II cement. Only one brand of cement from one manufacturing plant may be used. The use of ground granulated blast furnace slag is not allowed.

2.3 Water

.1 Water for mixing shall be clean, fresh and free from injurious amounts of oil, acid, chlorides, sulfates, alkali or organic matter. Water shall conform to ACI 301.

2.4 Proportioning Normal Concrete

.1 Unless indicated otherwise on the Drawings, concrete shall be of the following classes, each meeting the mix and compressive strength requirements as specified hereafter, and shall be used as follows:

.1	Class “C”	Foundations and slabs, columns, column footings, and beams and appurtenances.

2.5 Measurement

.1 All measurements shall be by weight. However, Contractor, at his own expense, may increase the cement content at a corresponding reduction in weight of aggregate and sand, whenever he is concerned that the minimum strength and mix ratio requirements under these specifications cannot be met. The amount of water to be used shall be the amount necessary to produce a plastic mixture of the specified slump.

.2 The slump shall be between two inches and four inches when tested in accordance with ASTM Specifications C143. Variations in the slump range may be allowed by the Engineer if admixtures, such as water reducers or superplasticizers, are utilized in the concrete mix. Regardless of the measured slump, the maximum allowable water-cement ratios as specified here-in, shall be strictly adhered to.

2.6 Compressive Strength, Water and Cement Content

.1 Notwithstanding what has been stated here-before, and unless shown otherwise on the Drawings, the concrete shall meet the following requirements:

		Class C
1. Min. Compressive Strength		4,000 psi
2. Max. Water Content (gallon per 94 lb. sack of cement)		4.5 gal.
3. Min. Cement Content (94 lb. sack of cement per cubic yard of solid concrete)		6.0 sacks
4. The cement content is required irrespective of strength. Up to a maximum of 15% of cementatious material may be fly ash in accordance with ASTM C618. The use ground granulated blast furnace slag is not allowed.		
5. The total chloride ion content of hardened concrete shall be less than 0.06 percent by weight of cement.		

2.7 Curing Compound

.1 All horizontal, screeded and floated surfaces, exposed to drying winds and sunlight, shall be sprayed with ATLAS QUANTUM-CURE as manufactured by Atlas Construction Supply, Inc. (application rate: 200 sf/gallon). Application of the curing compound shall conform to the requirements specified within this Section

.2 Alternate curing compounds will be accepted if they are pigmented or colored, such as white, at the time of application and are non-toxic to potable water. Regardless of the type of curing compound used, CONTRACTOR shall assume complete responsibility for its adequacy.

3.0 EXECUTION

3.1 Concrete Quality

.1 Concrete shall conform to the requirements specified within this Section. The required proportions shall be assembled, well mixed, transported, placed, consolidated, finished and cured as here-in-after specified. Concrete shall be uniformly dense and sound, free from faults, cracks, voids, honeycomb and other imperfections.

.2 If not called for specifically, and unless specified otherwise, concrete requirements shall follow ACI 301 where applicable.

3.2 Mixing

.1 Concrete shall be batched in fully automatic or semi-automatic stationary plants or approved portable batch type plants, and mixed in stationary or truck mixers. Mixing equipment and mixing procedures shall be subject to the approval of the Engineer.

.2 Ready-mixed Concrete

.1 Provide central-mixed concrete conforming to ASTM C94 except as modified by these Specifications.

.2 Limit the haul time of central-mixed concrete so that the specified slump is attained without the onsite addition of water which will cause the mix design water-cement ratio to be exceeded. In no event shall the time exceed 90 minutes from the batch plant to the completion of the pour, unless specifically approved by the ENGINEER.

.3 Use truck-transported, dry-batched concrete or mix on the jobsite when haul time is excessive. Do not re-temper partially hardened concrete.

.3 Cold joints in slabs and in wall-footings shall be avoided at all costs.

.4 If avoidable, do not place concrete during rainstorms. Protect concrete placed immediately before rain to prevent rainwater from coming in contact with it. Keep sufficient protective covering on hand at all times for this purpose.

3.3 Surface Finishes

.1 Steel Trowel Finish

.1 This shall be an integral finish obtained by trowelling with a steel trowel after the surface has been floated and allowed to stand until all water-sheen has disappeared.

.2 Final trowelling shall be done after the concrete has hardened sufficiently to prevent drawing moisture and fine materials to the surface and when the concrete is sufficiently hard that no mortar accumulates on the trowel.

.3 Cement or mixture of cement and sand, shall not be spread on surfaces to absorb excess water or to stiffen the concrete.

.4 Trowelling shall produce a dense, smooth, impervious surface free from defects and blemishes.

.5 All finished top surfaces of wall and wall-corbel (if required), column-footings (if required) and slabs shall receive a smooth, even, level and hard (so called "burnt") steel trowel finish. The entire wall footing surface, particularly along each side of the circumferential waterstop in the area to receive neoprene pads, shall also receive a hard steel trowel finish.

.2 Schedule of Finishes

Surface Description:

Slab on Grade: Smooth Steel Troweled Finish

3.4 Curing

.1 The Contractor shall begin curing immediately after initial concrete set has occurred. Exposed concrete surfaces shall be kept moist during finishing operations prior to initiating specified curing procedures.

.2 Curing of the slabs shall be made by covering the slab with curing blankets, which incorporate a water containing felt or burlap element and a white plastic cover, and kept continuously wet for a period of no less than 7 days (168 hours). After removal of curing blankets the slab shall be sprayed with a curing compound.

.3 All other horizontal, screeded and floated surfaces, exposed to drying winds and sunlight, shall be sprayed with a curing compound at an application rate of 200 sf per gallon or more as recommended by the manufacturer.

.4 Water for curing shall be generally clean and free from any elements which might cause staining or discoloration of the concrete.

.5 Cracked or damaged visible concrete surface shall be repaired appropriately for a completely smooth finished surface to the satisfaction of the Regional District.

END OF SECTION

Division 09 Painting and Coating

Section 099100 Painting

1.0 GENERAL

1.1 SUMMARY

.1 Section includes:

.1 Field applied paints and coatings for normal exposures.

.2 Painting Accessories.

.2 Related sections:

.1 The Contract Documents are complementary; what is called for by one is as binding as if called for by all.

.2 It is the Contractor's responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other individuals or entities performing or furnishing any of Contractor's Work.

.3 The following Sections are related to the Work described in this Section. This list of Related Sections is provided for convenience only and is not intended to excuse or otherwise diminish the duty of the Contractor to see that the completed Work complies accurately with the Contract Documents.

.1 Section 013300 - Submittal Procedures.

1.2 SUBMITTALS

.1 General: Submit as specified in Section 013300.

.2 Shop drawings: Include schedule of where and for what use coating materials are proposed in accordance with requirements for Product Data.

.3 Product data: Include description of physical properties of coatings including solids content and ingredient analysis, VOC content, temperature resistance, typical exposures and limitations, and manufacturer's standard color chips.

.4 Samples: Include 8-inch square draw-downs or brush-outs of topcoat finish when requested. Identify each sample as to finish, formula, color name and number and sheen name and gloss units.

.5 Paint Schedule: Provide schedule of all proposed paint products for the items to be painted in format matching the Schedule provided in Part 3 of this Section.

.6 Paint Draw Down Samples: Submit two painted samples, illustrating selected colors for each color and system selected. Submit on heavy paper card stock, 8" x 10" inch in size.

1.3 QUALITY ASSURANCE

.1 Products: First line or best grade.

.2 Materials for each paint system: By single manufacturer.

.3 Applicator qualifications: Applicator of products similar to specified products with minimum 5 years' experience.

.4 Regulatory requirements:

.1 Comply with by using paints that do not exceed governing agency's VOC limits or do not contain lead.

.2 Conform to applicable code for flame and smoke rating requirements for products and finishes.

.5 Field samples:

.1 Paint 1 complete surface of each color scheme to show colors, finish texture, materials, and workmanship.

.2 Obtain approval before painting other surfaces.

1.4 PROTECTION

.1 Protect adjacent surfaces from paint and damage. Repair damage resulting from inadequate or unsuitable protection.

.2 Furnish sufficient drop cloths, shields, and protective equipment to prevent spray or droppings from fouling surfaces not being painted and in particular, surfaces within storage and preparation area.

.3 Place cotton waste, cloths, and material that may constitute fire hazard in closed metal containers and remove daily from site.

.4 Remove electrical plates, surface hardware, fittings and fastenings, prior to painting operations.

.1 Carefully store, clean and replace on completion of painting in each area.

.2 Do not use solvent or degreasers to clean hardware that may remove permanent lacquer finish.

1.5 EXTRA MATERIALS

.1 Extra materials: Deliver a minimum 1 gallon of each type and color of coating applied:

.1 When manufacturer packages material in gallon cans, deliver unopened labeled cans as comes from factory.

.2 When manufacturer does not package material in gallon cans, deliver material in new gallon containers, properly sealed and identified with typed labels indicating brand, type, and color.

2.0 PRODUCTS

2.1 MANUFACTURERS

.1 Paints:

.1 Tnemec: Tnemec Co., Kansas City, MO.

2.2 PRETREATMENT, PRIMERS, AND PRIMER-SEALERS

.1 Ferrous metal primer:

.1 Tnemec: Series 104.

.2 Galvanized metal surface pretreatment materials:

.1 Carboline: Surface Cleaner 3.

.3 Galvanized metal surface primer:

.1 Tnemec: Series 104.

.4 Wood primer for opaque finish paint, interior exposure: One of following or equal:

.1 Carboline: Sanitile 120.

.2 S/W: PrepRite Latex Primer B28W111.

.5 Wood primer for opaque finish paint, exterior exposure: One of following or equal:

.1 Carboline: Sanitile 120.

.2 S/W: A-100 Primer B42W.

2.3 METAL SURFACES

.1 High solids epoxy (self-priming) not less than 72 percent solids by volume:

.1 Tnemec: HS Epoxy Series 104.

3.0 EXECUTION

3.1 INSPECTION

.1 Thoroughly examine surfaces scheduled to be painted before starting work.

.2 Start painting when unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

.1 Prepare surfaces in accordance with paint manufacturer's instructions or when none, the following:

.1 Canvas and cotton insulation coverings: Remove dirt, grease, and oil.

.2 Galvanized surfaces:

.1 Remove surface contamination and oils and wash with degreasers.

.2 Apply coat of etching type primer.

.3 Zinc coated surfaces: Remove surface contamination and oils and prepare for priming in accordance with metal manufacturer's recommendations.

.4 Unprimed steel and iron: Remove grease, rust, scale, dirt and dust by wire brushing, sandblasting or other necessary method.

.5 Shop primed steel:

.1 Sand and scrape to remove loose primer and rust.

.2 Feather out edges to make touch-up patches inconspicuous.

.3 Clean surfaces.

.4 Prime bare steel surfaces.

.6 Wood:

.1 Sandpaper to smooth even surface.

.2 Wipe off dust and grit prior to priming.

.3 Spot coat knots, pitch streaks, and sappy sections with sealer.

.4 Fill nail holes and cracks after primer has dried and sand between coats.

3.3 APPLICATION

.1 Apply each coat at proper consistency.

.2 Tint each coat of paint slightly darker than preceding coat.

.3 Sand lightly between coats to achieve required finish.

.4 Do not apply finishes on surfaces that are not sufficiently dry.

.5 Allow each coat of finish to dry before following coat is applied, unless directed otherwise by manufacturer.

.6 Where clear finishes are required ensure tint fillers match wood.

.1 Work fillers well into grain before set.

.2 Wipe excess from surface.

.7 Backprime exterior woodwork, which is to receive paint finish, with exterior primer paint.

.8 Backprime interior woodwork, which is to receive paint or enamel finish, with enamel undercoat paint.

.9 Prime top and bottom edges of metal doors with enamel undercoat when they are to be painted.

3.4 MECHANICAL AND ELECTRICAL EQUIPMENT

.1 Identify equipment, ducting, piping, and conduit in accordance with Related Sections.

.2 Remove grilles, covers, and access panels for mechanical and electrical system from location and paint separately.

.3 Finish paint primed equipment with color selected by the Engineer.

.4 Prime and paint insulated and bare pipes, conduits, boxes, insulated and bare ducts, hangers, brackets, collars, and supports, except where items are plated or covered with prefinished coating.

.5 Replace identification markings on mechanical or electrical equipment when painted over or spattered.

.6 Paint dampers exposed immediately behind louvers, grilles, convector, and baseboard cabinets to match face panels.

.7 Paint exposed conduit and electrical equipment occurring in finished areas with color and texture to match adjacent surfaces.

.8 Paint both sides and edges of plywood backboards for electrical equipment before installing backboards and mounting equipment on them.

.9 Color code equipment, piping, conduit, exposed ductwork, and apply color banding and identification, such as flow arrows, naming and numbering, in accordance with the Contract Documents.

3.5 SURFACES NOT REQUIRING FINISHING

.1 Stainless steel, brass, bronze, copper, monel, chromium, anodized aluminum: Specially finished articles such as porcelain enamel, plastic coated fabrics, and baked enamel.

.2 Items completely finished at factory, such as preformed metal roof and wall panels, aluminum frames, toilet compartments, sound control panels, acoustical tiles, shower compartments, folding partition, and flagpole.

3.6 CLEANING

.1 As work proceeds and upon completion, promptly remove paint where spilled, splashed, or spattered.

.2 During progress of work, keep premises free from unnecessary accumulation of tools, equipment, surplus materials, and debris.

.3 Upon completion of work, leave premises neat and clean.

3.7 INTERIOR PAINT SCHEDULE

.1 Metal, galvanized: 2 coats of following finish paints over specified primer:

.1 High Solids Epoxy:

.1 Surfaces not scheduled otherwise.

.2 Metal, non-galvanized ferrous: 2 coats of following finish paints over specified primer:

.1 High Solids Epoxy: TNEMEC

END OF SECTION

Division 22 Plumbing

Section 220500 Common Results for Plumbing

1.0 GENERAL

1.1 REFERENCE STANDARDS

.1 2018 BC Plumbing Code, BCPC.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

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

.3 Shop Drawings:

.1 Indicate on drawings:

.1 Mounting arrangements.

.2 Operating and maintenance clearances.

.2 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.

.3 In addition to transmittal letter referred to in Section 01 33 00 - Submittal Procedures: use MCAC "Shop Drawing Submittal Title Sheet". Identify section and paragraph number.

1.3 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

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

.1 Operation and maintenance manual approved by, and final copies deposited with, Regional District before final inspection.

.2 Operation data to include:

.1 Control schematics for systems including, where applicable, 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 Color coding chart.

.2 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.

.3 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 Approvals:
.1 Submit (2) copies of draft Operation and Maintenance Manual to Regional District for approval. Submission of individual data will not be accepted unless directed by Regional District.
.2 Make changes as required and re-submit as directed by Regional District.
.5 Additional data:
.1 Prepare and insert into operation and maintenance manual additional data when need for it becomes apparent during specified demonstrations and instructions.
.6 Site records:
.1 Regional District 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.
.2 Transfer information to reproducibles, revising reproducibles to show work as actually installed. Maintain at least one (1) copy at the site trailer for review by Regional District.
.3 Use different color waterproof ink for each service.
.4 Make available for reference purposes and inspection.
.7 Record drawings:
.1 Prior to start of Testing, Adjusting and Balancing for plumbing, 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 Contractor) (Date).
.3 Submit to Regional District for approval and make corrections as directed.
.4 Perform testing, adjusting and balancing for plumbing using as-built drawings.
.5 Submit completed reproducible as-built drawings with Operating and Maintenance Manuals.
.8 Submit copies of as-built drawings for inclusion in final TAB report.

1.4 MAINTENANCE MATERIAL SUBMITTALS

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
.2 Furnish spare parts 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.
.3 Provide one set of special tools required to service equipment as recommended by manufacturers.

1.5 DELIVERY, STORAGE AND HANDLING

.3 Deliver, store and handle materials in accordance with Section 01 60 00 - Basic Product Requirements with manufacturer's written instructions.
.4 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
.5 Storage and Handling Requirements:
.1 Store materials indoors in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
.2 Store and protect fixtures from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

2.0 PRODUCTS

2.1 NOT USED

.1 Not used.

3.0 EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for fixture installation in accordance with manufacturer's written instructions.
  .1 Visually inspect substrate in presence of Regional District.
  .2 Inform Regional District of unacceptable conditions immediately upon discovery.
  .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Regional District.

3.2 SYSTEM CLEANING

.1 Clean interior and exterior of existing building and all systems including strainers. Vacuum interior of ductwork and air handling units.

3.3 CLEANING

.1 Progress Cleaning:
  .1 Leave Work area clean at end of each day.
  .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.
  .3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Waste Management and Disposal
    .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.4 PROTECTION

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

END OF SECTION

Division 33 Utilities

Section 330810 Commissioning of Water Utilities

1.0 GENERAL

1.1 GENERAL INFORMATION

.1 The Contractor shall be responsible for successful Preliminary Adjustments and Testing, and Commissioning of the completed facility. Commissioning will be completed after a continuous 48 hours operational test without any fault. The Contractor shall arrange for, and pay all costs associated with the services of the manufacturer's representatives to assist with startup and testing of the systems and/or equipment.

2.0 Products

Not Used

3.0 Execution

3.1 PRELIMINARY ADJUSTMENTS AND TESTING

.1 The Contractor is required to submit a Preliminary Adjustments, Testing and Commissioning program, to include verification and installation forms, schedule and detail on any qualified professional presence.

.2 All systems and/or equipment shall be tested, calibrated, and adjusted by the manufacturer's representative prior to placement in operation.

.3 Preliminary adjustment and testing shall include, but not be limited to, visual inspection for damage or missing parts, lubrication, alignment check, calibration, and functional testing. Any malfunctioning equipment or systems shall be immediately repaired and/or replaced and/or adjusted and revised.

.4 Due to operational considerations, it may not be possible to run systems and/or equipment under actual operating conditions during the initial site visit by the manufacturer's field representative. The Contractor shall anticipate that multiple site visits by the manufacturer's field representative may be necessary to complete preliminary adjustments and testing.

.5 The Engineer will not approve the beginning of the 48 hours Commissioning test until all preliminary adjustments and testing have been completed and documented. The Contractor shall provide to the Engineer written confirmation from the manufacturer's field representative that the applicable system and/or equipment has been tested, the results of the tests, and that the system and/or equipment is ready for operation.

.6 At a minimum, it is required that the Supplier’s and/or Manufacturer’s Representative perform Preliminary Adjustments and Testing for the equipment specified in the following Specification sections:

Section	Title
432413	Vertically Suspended Well Pump

.7 The Contractor shall provide the services of the manufacturer’s field representative for Preliminary Adjustments and Testing for the number of site visits and duration of on-site time as required to complete Preliminary Adjustments and Testing. If, during commencement of the Facility Operational Test, the Engineer determines that the facility is not ready for operational testing and startup, the Contractor shall complete Preliminary Adjustments and Testing before proceeding with the Commissioning 48 hours test, during which the Contractor will be present for monitoring (for performance and faults) and assistance.

3.2 COMMISSIONING 24 HOURS OPERATIONAL TEST

.1 The Contractor shall provide written notice to the Engineer when Preliminary Adjustments and Testing of the facility has been completed. The Contractor shall certify that all systems have been tested and are operational. This certification is required before Commissioning

48 hours Test will be performed.

.2 The Contractor's electrical engineer and Regional District staff will perform the Commissioning 48 hours Test to verify that all systems perform in accordance with the Contract Documents.

.3 The Contractor shall coordinate the services of the manufacturer's representatives, as required, to assist with the Commissioning 48 hours Test. Manufacturer's representatives shall include, but not be limited to, those listed in Paragraph 3.2.1, above. The Contractor shall anticipate that Commissioning 48 hours Test activities may hinder or delay the Contractor. No additional compensation will be paid, or extension of Contract Time will be made to the Contractor, for assistance or delays caused by, or resulting from, the Commissioning 48 hours Test.

.4 The Contractor shall immediately correct deficiencies discovered during the Commissioning 48 hours Test. The Contractor shall anticipate that the Engineer may re-test deficient systems to determine if the corrections are satisfactory.

.5 The Contractor shall provide sufficient water supply during Commissioning 24 hours Testing, at a flow rate range as specified within these contract documents.

.6 The Contractor shall minimize the down time how long the existing well is out of service. The Regional District will allow no more than 10 calendar days that the well and pump are out of service. The Contractor will complete the removal of the existing well and motor from the well, the well casing assessment, the reinstallation of the pump and motor, the piping modifications, the motor control work, and the SCADA improvements and successful well and station start up within the 7 working days.

END OF SECTION

Division 43 Process Gas and Liquid Handling, Purification and Storage Equipment

Section 432413 Vertically Suspended Centrifugal Pump

1.0 GENERAL

1.1 SUMMARY

.1 Section includes:

.1 Vertical turbine well pump with features as shown in the Contract drawings.

.2 Related section:

.1 It is the Contractor's responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other individuals or entities performing or furnishing any of Contractor's Work.

1.2 REFERENCES

.1 American Water Works Association (AWWA):

.1 C654 - Disinfection of Wells.

.2 National Electrical Manufacturers Association (NEMA).

.3 NSF International (NSF):

.1 Standard 61 Annex G - Drinking Water System Components - Health Effects.

.4 International Standards Organization (ISO):

.1 9001-2000 - Quality Management Systems --Requirements.

1.3 SOURCE QUALITY CONTROL

.1 Witnessing: Source or factory testing shall be witnessed by the Engineer or Regional District when scheduled; provide 3 weekdays minimum advanced notice of source testing.

.2 Equipment performance test: Test level.

.3 Driver test: Test driver as part of pump test.

.4 Temperature, noise, and vibration testing specified within the general equipment performance and pump performance test sections is not required for wet pit installations.

2.0 PRODUCTS

.1 As specified within the Contract Documents

3.0 EXECUTION

3.1 PUMP INSTALLATION AND WELL MAINTENANCE

.1 Install products in accordance with manufacturer's instructions and as specified herein. Pump installation and well testing will be performed by a Qualified Pump Installer (QPI) or Qualified Well Drillers (QWD), respectively, registered with the Province of British Columbia. A Hydrogeologist will be provided by the Contractor at key points throughout the installation and testing, as described below. In no case, will the QPI or QWD complete activities without pre-approval from Contractor's hydrogeologist, where the procedural specifications indicate involvement from Contractor's hydrogeologist.

3.2 WELL CLEANING AND TESTING PROCEDURAL SPECIFICATIONS

.1 Pre-well cleaning Aquifer Test:

.1 In coordination with Regional District, the existing pump will be turned off.

.2 Three static groundwater levels, five minutes apart, will be measured and recorded by the Contractor's QPI/QWD and provided to the Regional District.

.3 Following approval from the Hydrogeologist, remove the existing pump and install the temporary testing pump. The temporary testing pump will be provided by the QWD / QPI. The temporary pump is to be capable of pumping rates between 6.3 L/s (100 US gallons per minute [gpm]) and 15.1 L/s (240 US gpm). The maximum head from top of well to dynamic pumping level of approximately 111 m (364 ft). This does not account for drawdown and friction is considered negligible. (See Appendix 3 for more information)

.4 Once the temporary pump has been installed, allow for one hour for water levels to stabilize. Then, collect and record, three groundwater levels, five minutes apart. Provide the data to Contractor's hydrogeologist to confirm stable groundwater levels have been achieved.

.5 A discharge hose will run directly from the groundwater supply well to a nearby drainage ditch located approximately 30 m from the pump station at the corner of King and Chaster road. Barricades will be installed by the QWD/QPIto ensure that pedestrian traffic does not walk, step or depress the discharge hose, to allow for a constant flow rate during testing.

.6 The QPI will turn on the pump at a rate of 11.4 L/s (180 US gpm), and measure and record flow rates and groundwater levels according to the following schedule, and as directed by Contractor's hydrogeologist:

1. 0-5 minutes: every 30 seconds
2. 5-10 minutes: every minute
3. 10-20 minutes: every 2 minutes
4. 20-50 minutes: every 5 minutes
5. 50-100 minutes: every 10 minutes
6. 100-180 minutes: every 20 minutes
7. 180-240 minutes: every 30 minutes

The test will proceed to 240 minutes (4-hours). The pump can be shut off only after confirmation from Contractor's hydrogeologist.

.7 When the pump is shut off, measure and record the recovering groundwater levels according to the same schedule above and until confirmation from the Contractor's Hydrogeologist. Assume 1 hour of recording.

.2 Pre-Cleaning Camera Survey:

.1 The QPI will install and operate a downhole optical well camera.

.2 The camera will descend to the bottom of the screen and view and record the condition of the well screen and well casing to the surface.

.3 Footage from the survey will be made available to the Regional District on USB or DVD.

.4 Record the measurement to top of the well screen, bottom of the well screen, bottom of well and any observation about the well casing and screen condition / integrity, along with the corresponding depths.

.3 Well Cleaning:

.1 The QWD will mount a cable-tool drill rig over the wellhead, parking in the grass area southeast of the well.

.2 To complete the physical/mechanical cleaning of the screens, the cable tool will gently mechanically agitate the well screens using surge-and-bail techniques that include the

use of a surge block, a bailer, and a pump or similar techniques. The pump will discharge disturbed groundwater and debris that is anticipated to be loosened from well screen. The physical/mechanical cleaning will be complete when the bailer removes no more observed debris, the discharge is clear, and the Hydrogeologist confirms the cleaning is complete. It will be the responsibility of the QWD / QPI to safely dispose of any debris and solids that are discharged.

.3 Following this, a variety of chemicals agents can be used to clean the well screen. Various companies have de-scalers. The chemicals are a proprietary blend and can be purchased following the completion of the camera survey. The chemicals chosen by the QWD or QPI will be approved by the Hydrogeologist prior to use. The de-scaling agent will need to be injected across the length of the well screen via tremie pipe and will remain in the well, undisturbed, for up to 24-hours. The prescription for the chemical cleaning is to be similar to that prescribed by WSEI's June 25, 2019 report A copy of the Chemical Cleaning Prescription is provided in Appendix A).

.4 Once the chemicals have cleaned the well screen over a period of 24-hours, pumping will be started.

.5 Discharge water shall be neutralized, conservatively, to meet the British Columbia Approved Water Quality Guidelines for maximum exposure, controlled, intermittent concentrations for Marine and Estuarine Aquatic Life pH, turbidity and chlorine (0.40 mg/L1 for chlorine, a pH between 7.0 and 8.7 2), before discharge. If the guidelines are exceeded, turbidity management and continued treatment will be initiated by the QWD. Once the discharge water meets applicable guidelines, it can be discharged to ground through nearby drainage ditch located approximately 30m from the site at the corner of King and Chaster Road.

.4 Post-Cleaning Aquifer Test

.1 A discharge hose will run directly from the groundwater supply well to a nearby drainage ditch locate approximately 30 m from the pump station at the corner of King and Chaster road.

.2 The static groundwater level will be measured and recorded the QPI will turn on the pump at a rate of 11.4 L/s (180 US gpm), and measure and record flow rates and groundwater levels according to the following schedule, and as directed by the Contractor's contracted field and certified hydrogeologist:

1. 0-5 minutes: every 30 seconds
2. 5-10 minutes: every minute
3. 10-20 minutes: every 2 minutes
4. 20-50 minutes: every 5 minutes
5. 50-100 minutes: every 10 minutes
6. 100-180 minutes: every 20 minutes
7. 180-240 minutes: every 30 minutes

The test will proceed to 240 minutes (4 hours). The pump can be shut off only after confirmation from Contractor's Hydrogeologist.

.3 When the pump is shut off, measure recovering groundwater levels according to the same schedule above and until confirmation from Contractor's Hydrogeologist. Assume one (1) hour of recording.

3.3 TEMPORARY TEST PUMP REMOVAL AND PERMANENT PUMP INSTALLATION

.1 The QPI will mount their truck on the grass to the southeast of the well.

.2 The temporary test pump will be removed from the well. A permanent vertical turbine pump assembly (pump assembly) will be collected from Regional District's maintenance building to replace the existing pump assembly.

.3 The static groundwater level will be measured and recorded. The permanent pump supplied by Regional District will be installed into the groundwater supply well with the pump intake installed as per the IFC drawings. The installation depth will be confirmed by Contractor's Hydrogeologist and the actual pump intake depth recorded.

.4 Along with the permanent pump, two schedule 40 PVC, 38 mm nominal ID sounding tubes will be installed. The sounding tubes will extend from the top of casing to the top of the pump intake. The bottom meter of the sounding tubes will be slotted with maximum 5 mm perforations and an end cap will be secured to the bottom end of the tubes. The sounding tubes will be installed at the same time as the pump by the Contractor.

3.4 WELL DISINFECTION PROCEDURAL SPECIFICATIONS

.1 Following pump installation, diluted liquid 6-8% sodium hypochlorite (household bleach) will be poured into the well to shock chlorinate direct the discharge and kill any bacteria. The volume of chlorine will be determined by Contractor's Hydrogeologist. The QWD / QPI will direct discharge water back into the well casing, cleaning the sodium hypochlorite from the casing, drop-pipe, and wiring. Once chlorine is present in the discharge line, the chlorine will be considered wholly circulated. Pumping will stop for 12-hours to allow for sufficient contact time between the chlorine solution, the well screen, and surrounding aquifer.

.2 The well water will be pumped to storage containers and treated with sodium thiosulphate to remove chlorine. Dechlorinated water shall meet the British Columbia Approved Water Quality Guidelines for maximum exposure, controlled, intermittent concentrations for Marine and Estuarine Aquatic Life for chlorine.

.3 Once the water quality has been dechlorinated to maximum concentrations of 0.40 mg/L3 for chlorine, a pH between 7.0 and 8.7 4, and the concentration results have been reviewed with Contractor's Hydrogeologist, the dechlorinated well water can be discharged to ground at the drainage ditch located approximately 30m from the site at the corner of King and Chaster road. Solids from the tank(s) shall be disposed of by the Contractor in accordance with local legislation.

.4 Disinfection procedures shall be in accordance with AWWA C654 standard for disinfection of wells and will be undertaken after the permanent pump, drop pipe and pump wire has been installed into the groundwater supply well.

3.5 ANALYSIS REQUIREMENTS

.1 Samples for bacteriological analysis shall be collected at the pump discharge in sterile laboratory provided sampling bottles, and analyzed for coliform organisms.

.1 After sterilization, the well shall be pumped at open discharge to an aboveground storage holding tank. The water shall be pumped until chlorine odour cannot be detected, and the chlorine concentration is <0.40 mg/L. The well will be pumped free of chlorine before the water samples are collected for laboratory analysis.

.2 Water samples shall be collected from the well on two successive days for laboratory analysis of coliform organisms. Laboratory results will indicate that the samples are free from coliform organisms with each sample before the well is accepted for potable

water use.

.3 The first samples shall be collected by the Contractor and the second by the Regional District in laboratory provided sampling bottles, ordered by the Contractor. The coliform organism analysis and approval shall be made by the laboratory, and the Regional District shall be furnished a copy of the laboratory report.

.4 If any coliform organisms are found present in the samples, the QWD / QPI shall re-sterilize the well and have the water resampled, as stated above until such time as no coliform organisms are found present in a water sample analysis.

.5 All expenses of sterilization of the pump and laboratory analyses for coliform organisms shall be borne by the QWD / QPI.

3.6 MATERIAL SPECIFICATIONS

.1 38 mm nominal schedule 40 PVC to be used for two 45 m sounding tubes.

.2 Aboveground storage tank(s) for pump and treat to neutralize/dechlorinate well water prior to discharge.

.3 Down-hole optical well camera will need an on-board lighting array, side view with 180° swivel, down-view, and the ability to record time-stamped footage. The camera will need to be able to descend to a depth of 115 m.

.4 Well descaling/cleaning (proprietary acid blend) and disinfection (6-8% sodium hypochlorite) chemicals.

.5 Neutralizing chemicals:

.1 Sodium thiosulphate for chlorine

.2 Soda ash for pH

.6 Water-tight bin for collecting solids and debris from well.

3.7 FIELD QUALITY CONTROL

.1 Witnessing: All field testing shall be supported by telephone from a Hydrogeologist; provide advanced notice of field testing as specified in Section 01 40 00.

.2 Inspection and checkout: As specified in Sections 01 40 00.

.3 Equipment performance test: Test level as scheduled; test as specified in Section 01 40 00.

3.8 REGIONAL DISTRICT'S FIELD SERVICE

.1 Require Regional District’s Water Utility Operations Department to inspect permanent pumping system and set-up before initial start-up to certify that system has been correctly installed and prepared for start-up as specified in this Section and in other pertinent Sections.

END OF SECTION

Division 46 Water and Wastewater Equipment

Section 460800 Commissioning of Water and Wastewater Equipment

1.0 GENERAL

1.1 SUMMARY

.1 Section includes: Testing of mechanical equipment and systems.

1.2 REFERENCES

.1 American National Standards Institute (ANSI):

1. S1.4 Specification for Sound Level Meters.

.2 Hydraulic Institute (HI).

.3 National Institute of Standards and Technology (NIST).

1.3 SUBMITTALS

.1 Schedule of source (factory) tests, Regional District training, installation testing, functional testing, clean water facility testing, closeout documentation, process start-up and process operational period as specified in this Section and equipment sections.

.2 Test reports as specified in this Section and equipment sections.

2.0 PRODUCTS

Not Used.

3.0 EXECUTION

3.1 GENERAL

.1 Commissioning and process start-up of equipment as specified in:

.1 This Section.

.2 Equipment sections.

1. If testing requirements are not specified, provide Level 1 Tests.

.2 Prepare and submit test reports as specified.

.3 Testing levels

.1 Level 1 Tests:

1. Level 1 General Equipment Performance Test:

.1 Confirm that equipment is properly assembled, equipment moves or rotates in the proper direction, shafting, drive elements and bearings are installed and lubricated in accordance with proper tolerances, and that no unusual power consumption, lubrication temperatures, bearing temperatures, or other conditions are observed.

2. Level 1 Pump Performance Test:

.1 Measure flow and head while operating at or near the rated condition; for factory testing, testing may be at reduced speeds with flow and head corresponding to the rated condition when adjusted for speed using the appropriate affinity laws.

.2 Record measured flow, suction pressure, discharge pressure, and make observations on bearing temperatures and noise levels.

3. Level 1 Vibration Test:

.1 Test requirement:

1. Measure filtered vibration spectra versus frequency in 3 perpendicular planes at each normally accessible bearing housing on the driven equipment, any gears and on the driver; 1 plane of measurement to be parallel to the axis of rotation of the component.

2. Vibration spectra versus frequency shall be in accordance with Vibration Acceptance Criteria.

.2 Equipment operating condition: Test at specified maximum speed.

4. Level 1 Noise Test:

.1 Measure unfiltered overall A-weighted sound pressure level in dBA at 3 feet horizontally from the surface of the equipment and at a mid- point of the equipment height.

.2 Level 2 Tests:

1. Level 2 General Performance Test:

.1 For equipment, operate, rotate, or otherwise functionally test for at least 2 hours after components reach normal operating temperatures.

.2 Operate at rated design load conditions.

.3 Confirm that equipment is properly assembled, equipment moves or rotates in the proper direction, shafting, drive elements and bearings are installed and lubricated in accordance with proper tolerances, and that no unusual power consumption, lubrication temperatures, bearing temperatures, or other conditions are observed.

2. Level 2 Pump Performance Test:

.1 Test 2 hours minimum for flow and head at the rated condition; for factory testing, testing may be at a reduced speeds with flow and head corresponding to the rated condition when adjusted for speed using the appropriate affinity laws.

.2 Test for flow and head at 2 additional conditions; 1 at 25 percent below the rated flow and 1 at 10 percent above the rated flow.

.3 Record measured flow, suction pressure, discharge pressure, and observations on bearing temperatures and noise levels at each condition.

3. Level 2 Vibration Test:

.1 Test requirement:

1. Measure filtered vibration spectra versus frequency and measure vibration phase in 3 perpendicular planes at each normally accessible bearing housing on the driven equipment, any gears and on the driver; 1 plane of measurement to be parallel to the axis of rotation of the component; measure actual rotational speeds for each vibration spectra measured using photometric or other tachometer input connected directly to the vibration data collector.

2. Vibration spectra versus frequency shall be in accordance with Vibration Acceptance Criteria.

.2 Equipment operating condition: Repeat test requirements at design specified maximum speed and at minimum speed for variable speed equipment.

.3 Natural frequency test of field installed equipment:

1. Excite the installed equipment and support system in 3 perpendicular planes, use same planes as operating vibration measurement planes, and determine the as-installed natural resonant frequency of the driven equipment, the driver, gears and supports.
2. Perform test at each bearing housing, at each support pedestal, and for pumps on the suction and discharge piping.
3. Perform with equipment and attached piping full of intended service or process fluid.

4. Level 2 Noise Test:

.1 Measure filtered A-weighted overall sound pressure level in dBA for each of 8 octave band mid-points beginning at 63 hertz measured at 3 feet horizontally from the surface of the equipment at mid-point height of the noise source.

.4 Variable speed equipment tests:

.1 Establish performance over the entire speed range and at the average operating condition.

.2 Establish performance curves for the following speeds:

1. The speed corresponding to the rated maximum capacity.
2. The speed corresponding to the minimum capacity.
3. The speed corresponding to the average operating conditions.

3.2 COMMISSIONING PHASE

.1 Source testing

.1 Witnessing not required unless specified otherwise in equipment section.

.2 Witnessed tests: Schedule test date and notify Engineer at least 5 days prior to start of test.

END OF SECTION

Division 40 Process Interconnections

Section 400567 Specialized Pressure and Flow-Control Valves

INTRODUCTION

This specification covers the design, manufacture, and testing of 1 in. (25 mm) through 36 in. (900 mm) Control Valves

1.0 GENERAL

.1 Standard products - use the same manufacturer for multiple units of same type.

.2 "Tying" of equipment into packages for the purpose of thwarting competition shall be considered to be in non-compliance with these specifications.

.3 Manufacturers shall price items under different subsections or sections separately.

2.0 PRODUCTS

2.1 PRESSURE RELIEF / SUSTAINING CONTROL VALVES

.1 FUNCTION

.1 The Pressure Relief/Sustaining Control Valve shall maintain a constant upstream pressure by bypassing or relieving excess pressure and shall maintain close pressure limits without causing surges. Valve will remain closed until the upstream pressure exceeds a pre-determined set point. Valve will be fast opening and modulate to limit the upstream pressure to a pre-determined set point. If upstream pressure decreases below the pilot spring setting, the valve shall close. Valve will be slow closing to prevent surges.

.2 MATERIALS

.1 Material Specification for the Pressure Relief/Sustaining Control Valves Main Valve as follows:

Component	Material
Body & Cover	Ductile Iron-ASTM A536
Main Valve	Trim Stainless Steel
Disc Retainer	Cast Iron
Diaphragm Washer	Cast Iron
Seat	Stainless Steel
Stem, Nut and Spring	Stainless Steel
Seal Disc	Buna-N® Rubber
Diaphragm	Nylon Reinforced Buna-N® Rubber
Internal Trim Parts	Stainless Steel: Bronze; Brass
End Detail	Flanged (1-1/2” – 36”)
Threaded (1” – 3”)	
Grooved (1-1/2” – 8”)	
Pressure Rating	Class 150 lb. (250psi Max.)
Temperature Range	Water to 180^{o}F
Any other wetted metallic parts	Stainless Steel; Bronze; Brass
Coating	Fusion Bonded Epoxy Coating (Interior and Exterior);
ANSI / NSF 61 Approved /	
AWWA coating specifications C116-03.	

.3 MANUFACTURE

.1 Main Valve:

1. The main valve shall be hydraulically operated, single diaphragm actuated, globe or angle pattern. The valve shall consist of three major components; the body with seat installed, the cover with bearing installed and the diaphragm assembly. The diaphragm assembly shall be the only moving part and shall form a sealed chamber

in the upper portion of the valve, separating the operating pressure from line pressure. Packing glands, stuffing boxes and/or rolling diaphragm technology will not be permitted and there shall be no pistons operating the main valve or pilot controls. No fabrication or welding shall be used in the manufacturing process. Y-pattern valves shall not be permitted. Main valve shall comply with NSF/ANSI Standard 61 and certified lead free to NSF/ANSI 372 as a safe drinking water system component.

.2 Main Valve End Connections:

1. End Connections for control valve shall be flanged per ASME/ANSI B16.42, Class 150 or Class 300 (1-1/2" thru 36") or Threaded End Connections (1" thru 3") or Grooved End Connections (1-1/2" thru 8").

.3 Main Valve Body:

1. No separate chamber(s) below the diaphragm shall be allowed between the main valve cover and body. No fabrication or welding shall be used in the manufacturing process.
2. The valve shall contain a resilient, synthetic rubber disc with a rectangular cross-section contained on three and one-half sides by a disc retainer and forming a tight seal against a single removable seat insert. No O-ring type discs (circular, square, or quad type) shall be permitted as the seating surface. The disc guide shall be of the contoured type to permit smooth transition of flow and shall hold the discs firmly in place. The disc retainer shall be of a sturdy one-piece design capable of withstanding opening and closing shocks. It will have straight edge sides and a radius at the top edge to prevent excessive diaphragm wear as the diaphragm flexes across this surface. No hours-glass shaped disc retainers shall be permitted, and no V-type or slotted-type disc guides shall be used.
3. The diaphragm assembly containing a non-magnetic stainless-steel stem; of sufficient diameter to withstand high hydraulic pressures and shall be fully guided at both ends by a bearing in the main valve cover and an integral bearing in the valve seat. The valve seat shall be a solid, one-piece design and shall have a minimum five-degree taper on the seating surface for a positive, drip-tight shut off. No center guides shall be permitted. The stem shall be drilled and tapped in the cover end to receive and affix such accessories as may be deemed necessary. The diaphragm assembly shall be the only moving part and shall form a sealed chamber in the upper portion of the valve, separating the operating pressure from the line pressure. No bolts or cap screws shall be permitted for use in the construction of the diaphragm assembly.
4. The flexible, non-wicking, FDA approved diaphragm shall consist of nylon fabric bonded with synthetic rubber compatible with the operating fluid. The diaphragm's center hole for the main valve stem will be sealed by the vulcanized process or a rubber grommet sealing the center stem hole from the operating pressure. The diaphragm will withstand a Mullins Burst Test of a minimum of 600 X per layer of nylon fabric and shall be cycled tested 100,000 times to assure longevity. The diaphragm shall not be used as the seating surface. The diaphragm shall be fully supported in the valve body and cover by machined surfaces which support no less than one-half of the total surface area of the diaphragm in either the fully opened or fully closed position. Bellofram type rolling diaphragms shall not be permitted.
5. The main valve seat and stem bearing in the valve cover shall be removable. The cover bearing and seat in the 6" and smaller size valve shall be threaded into the cover and body. The valve seat in the 8" and larger size valves shall be retained by flat head machine screws for ease of maintenance. The lower bearing of the valve stem shall be contained concentrically within the seat and shall be exposed to the flow on all sides to avoid deposits. To assure proper alignment of the valve stem, the

valve body and cover shall be machined with a locating lip. No “pinned” covers to the valve body shall be permitted. Cover bearing, disc retainer and seat shall be made of the same material. All necessary repairs and/or modifications other than replacement of the main valve body shall be possible without removing the valve from the pipeline. The valve shall be designed such that both the cover assembly and internal diaphragm assembly can be disassembled and lifted vertically straight up from the top of a narrow opening/vault. Y-pattern valves shall not be permitted. The seat shall be of the solid one-piece design. Two (2) piece seats or seat inserts shall not be permitted. Packing glands and/or stuffing boxes shall not be permitted.

.4 Pilot Control System:

1. The pressure relief/sustaining pilot shall be a direct-acting, adjustable, spring-loaded, diaphragm valve designed to permit flow when controlling pressure exceeds the adjustable spring setting. The pressure relief pilot control is normally held closed by the force of the compression in the spring above the diaphragm and it opens when the pressure acting on the underside of the diaphragm exceeds the spring setting. Pressure relief pilot control sensing shall be upstream of the pilot system strainer so accurate control may be maintained if the strainer is partially blocked. Pilot shall comply with NSF/ANSI 61 and certified lead free to NSF/ANSI 372 as a safe drinking water system component.
2. The pilot control system shall include a strainer, a fixed orifice closing speed and all required control accessories, equipment, control tubing and fittings. No variable orifices shall be permitted. The pilot system shall include an opening speed control on all valves sizes 3” and smaller as standard equipment. The pilot system shall include isolation ball valves on sizes 4” and larger as standard equipment. A full range of spring settings shall be available in ranges of 0 to 400 psi. Pilots to be manufactured by control valve manufacturer.

.5 Material Specification for Pilot Control System:

Component	Material
Pressure Relief / Sustaining Pilot Control	
Body & Cover	Bronze, Low Lead CuZn21Si3P or UNS 87850
Pilot Trim	Brass & Stainless Steel 303
Rubber	Buna-N®
Connections	FNPT
Pressure Rating	400 psi Max.
Temperature Range	Water to 180^{o}F Max.
Control Tubing	Copper
Control Fittings	Brass

.6 Factory Assembly:

1. Each control valve shall be factory assembled.
2. For all control valves, the factory assembly shall include the complete main valve, pilot valve(s), and all associated accessories. Each control valve shall be factory assembled.
3. The Quality Management System of the factory shall be certified in accordance with ISO 9001: 2008.
4. For all control valves, the factory assembly shall include the complete main valve, pilot valve(s), and all associated accessories and control equipment.
5. During factory assembly the control valve manufacture shall make all necessary adjustments and correct any defects.

.7 Nameplates:

1. Each Control Valve and associated pilot(s) shall be provided with an identifying nameplate.
2. Nameplates, depending on type and size of control valve, shall be mounted in the most practical position possible, typically on the inlet side of the valve body.
3. Nameplates shall be brass and a minimum of 3/32" thick, ¾" high and 2-3/4" long.
4. Pertinent control valve data shall be etched or stamped into the nameplate. Data shall include control valve Catalog number, function, size, material, pressure rating, end- connection details, type of pilot controls used and control adjustment range.

.8 Factory Testing:

1. Each control valve shall be factory tested.
2. The Quality Management System of the factory shall be certified in accordance with ISO 9001: 2008
3. Tests shall conform to approved test procedures.
4. The standard factory tests shall include a valve body and cover leakage test, seat leakage test and a stroke test. Control valves and pilot valves, in the partially open position, with both ends closed off with blind flanges (valves) and pipe plugs (pilots), shall be subject to an air test. The applied air pressure shall be 90 psi minimum. All air pressure tests shall be applied for a minimum of 15 minutes. No visible leakage is permitted through the valve seat, the pressure boundary walls of the valve body, valve cover, pilot body, pilot cover or the body-cover joint.
5. Control valve manufacturer shall, upon request, offer additional testing, such as high-pressure hydrostatic testing, positive material inspection testing, ferrite testing, liquid penetration inspection testing, magnetic particle examination testing and radiographic examination testing.

.4 PRODUCT DATA

.1 The following information shall be provided:

1. Control Valve manufacturer's technical product data.
2. Control Valve manufacturer's Installation, Operation and Maintenance manual (IOM).

.2 Provide specific information on all optional features specified above and confirm that these items are provided.

.3 The valve manufacturer shall be able to supply a complete line of equipment from 1" through 36" sizes and a complete selection of complementary accessories and equipment.

.4 The control valve manufacture shall provide a computerized cavitation analysis report which shows flow rate, differential pressure, and percentage of valve opening. Cv factor, system velocity, and if there will be cavitation damage.

.5 The manufacturer will also provide valve noise levels according to International Standards over the flow range of the valve. Noise calculation program will be specific to the control valve manufacturer, and based upon tests conducted by a third party, independent laboratory and will be able to provide dBA values for octave band frequencies between 31.5 and 8000 Hz. (Valves with KO trim calculations are per another industry accepted standard without the octave band frequency noise levels). Generic, third party noise calculation for non-specific control valves will not be accepted.

3.0 EXECUTION

.1 DELIVERY, STORAGE AND HANDLING

.1 Delivery

1. The Supplier shall deliver the control valves to the pump station location.
2. Upon delivery, control valves to be unloaded and stored by the:
3. Regional District, District, or municipality.

.2 Packing and Shipping

1. Control valves specified herein shall be factory assembled. Any control valve appurtenances, accessories, parts and assemblies that are shipped unassembled shall be packaged and tagged in a manner that will protect the equipment from damage and facilitate the final assembly in the field.
2. Care shall be taken in loading, transporting and unloading to protect control valves, appurtenances, or coatings from damage. Equipment shall not be dropped. All control valves and appurtenances shall be examined before installation and no piece shall be installed which is found to be defective. Any damage(s) shall be repaired.
3. Prior to shipping, the control valves and all associated accessories shall be acceptably packaged and covered to prevent entry of foreign material.
4. All packaged control valves shall be shipped, remain covered and stored on site until they are installed and put into use.

.2 FIELD TESTING

.1 1. A direct factory representative shall be made available by the equipment supplier for start-up service,

.2 Inspection and necessary adjustments.

The control valve shall be Cla-Val Company Model No. 50-01**,** Pressure Relief/Sustaining Control Valve, as manufactured by Cla-Val Company, Costa Mesa, CA 92627-4416.

END OF SECTION

SECTION 407113 Magnetic Flow Meter

1.0 GENERAL

1.1 SUMMARY

.1 Section includes:

1. Full-body magnetic flowmeter.

.2 Related sections:

1. The Contract Documents are complementary; what is called for by one is as binding as if called for by all.
2. It is the Contractor's responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other individuals or entities performing or furnishing any of Contractor's Work.
3. The following sections are related to the Work described in this Section. This list of related sections is provided for convenience only and is not intended to excuse or otherwise diminish the duty of the Contractor to see that the completed Work complies accurately with the Contract Documents.
    a. Section 013300 - Submittal Procedures.

.3 Provide all instruments identified in the Contract Drawings.

1.2 SUBMITTALS

.1 Furnish submittals as specified in Sections 013300.

1.3 QUALITY ASSURANCE

.1 Examine the complete set of Contract Documents and verify that the instruments are compatible with the installed conditions including:

1. Process conditions: Fluids, pressures, temperatures, flows, materials, etc.

.2 Physical conditions:

1. Installation and mounting requirements.
2. Location within the process.
3. Accessories: Verify that all required accessories are provided and are compatible with the process conditions and physical installation.

.3 Notify the Engineer if any installation condition does not meet the instrument manufacturer's recommendations or specifications.

2.0 PRODUCTS

2.1 MANUFACTURERS

.1 Magnetic Flowmeter shall be manufactured by SIEMENS MAG – 1500W 7ME6580.

.2 Magnetic flowmeter:

1. General:
    .1 Magnetic flowmeters obtain the flow velocity by measuring the changes of induced voltage of the conductive fluid passing across a controlled magnetic field.
    .2 Complete zero stability shall be an inherent characteristic of the flowmeter

system.

.3 Include for each magnetic flow metering system:

1. A metering tube with electrodes (sensor).
2. Signal cable.
3. Transmitter integral or remote as indicated on the Drawings.
4. Flowmeter grounding rings.
5. A digital display expressed in Litres per second (L/s).
6. A digital totalizer display expressed in Metres Cubed.

2. Performance requirements:

.1 Accuracy:

1. 0.25 percent of flow rate from 10 to 100 percent of full scale for velocities ranging between 1.9 to 10 feet per second.

.2 Repeatability:

1. 0.25 percent of rate.

3. Element:

.1 Metering tube: Constructed of carbon steel or Type 304 stainless steel (unless specifically noted otherwise in the instrument data sheets) with flanged connections to match with piping material.

1. Liner material in conformance with:

.1 Manufacturer's recommendations for the intended service.

.2 NSF certified for all drinking water applications.

2. Electrodes type and material in conformance with:

.1 Manufacturer's recommendations for the intended service.

.2 Utilize a minimum of 2**,** self-cleaning electrodes.

3. Meter terminal housing NEMA Type 4X unless specifically noted otherwise in the instrument data sheets.
4. Meter coating consisting of epoxy painted finish.
5. Components:

.1 2 grounding rings:

1. Which are in conformance with the manufacturer's bore and material recommendation for the meter's intended service.
2. Designed to protect and shield from abrasion of the liner's edge interface at the meter's end.

.2 Magnetic Flow Meter shall be furnished with an Integrated Sensor and Transmitter.

4. Transmitter:

.1 Power supply:

1. 120 VAC.
2. Power consumption: 60 VA maximum.

.2 Outputs:

1. As noted in the instrument data sheets.
2. For all instruments with 4 to 20 mA HART provide a Device Type Manager (DTM) certification by FDT group.

.3 Microprocessor-based signal converter/transmitter.

.4 Utilize DC pulse technique to drive flux-producing coils.

.5 Contain a 6-digit display for flow rate, percent of span, and totalizer.

.6 Operator keypad interface.

.7 Integral zero return to provide consistent zero output signals in response to an external dry contact closure.

.8 Integral low flow cut-off zero return.

.9 Programmable parameters including:

1. Meter size.
2. Full-scale flow rate.
3. Magnetic field frequency.
4. Time constant.

.10 Data retention for a minimum of 5 years without auxiliary main or battery power.

.11 Self-diagnostics and automatic data checking.

.12 Protected terminals and fuses in a separate compartment which isolates field connection from electronics.

.13 Ambient operating temperature limits of -5 to 140 degrees Fahrenheit (-20 to 60 degrees Celsius).

2.2 ACCESSORIES

.1 Stainless steel tag labeled as specified in the Contract Documents.

.2 Provide sunshades for all transmitters located outdoors. Provide galvanic isolation gaskets, nylon/Teflon flange bolt insulation bushings and nylon washers on all meters installed on pipes with cathodic protection.

2.3 SOURCE QUALITY CONTROL

.1 Factory calibrate each flow metering system at a facility that is traceable to the NIST.

.2 A real-time computer generated printout of the actual calibration date indication actual velocities and as read values of the flow tube.

1. Flow calibration report of the manufacturers flow lab calibration procedure shall be shipped with the meter system.
2. Minimum calibration shall be a 3-point calibration including 1, 3, and 10 feet per second velocities for every meter and transmitter system.
3. Manufacturer shall archive all calibration reports for future reference.

3.0 EXECUTION

3.1 EXAMINATION (NOT USED)

3.2 PREPARATION (NOT USED)

3.3 INSTALLATION

.1 As specified in per manufacturer's specifications.

3.4 FIELD QUALITY CONTROL

.1 As specified in per manufacturer's specifications.

.2 Provide manufacturer's services to perform installation inspection.

3.5 ADJUSTING

.1 Verify factory calibration of all instruments in accordance with the manufacturer's instructions:

.2 Return factory calibrated devices to the factory if they do not meet the field verification requirements for calibration.

3.6 CLEANING

.1 As specified in per manufacture's instructions.

3.7 DEMONSTRATION AND TRAINING

.1 Demonstrate performance of all instruments to the satisfaction of the Engineer before commissioning.

END OF SECTION