Regional District of
Kitimat-Stikine

Construction & Commissioning of PW4

ITT # 2024-WS-08

MASTER MUNICIPAL CONSTRUCTION DOCUMENTS
UNIT PRICE CONTRACT

INVITATION TO TENDERERS

Owner: Regional District of Kitimat-Stikine
(NAME OF OWNER)

Contract: Construction & Commissioning of PW#4
(TITLE OF CONTRACT)

Reference No. 2024-WS-08
(OWNER'S CONTRACT REFERENCE NO.)

The Owner invites tenders for: The Contractor shall provide, at its own expense, all materials, supervision, labor, vehicles, equipment, and all else necessary for or incidental to the proper execution of the Work required under this Contract and associated Schedules for the construction and commissioning of Public Well #4
(BRIEF DESCRIPTION OF THE WORK)

Contract Documents are available during normal business hours at: BC Bid www.bcbid.gov.bc.ca

The Contract Documents are available for viewing at: BC Bid www.bcbid.gov.bc.ca and
RDKS website https://www.rdks.bc.ca/government/rfps_tenders
(ADDRESS WHERE CONTRACT DOCUMENTS CAN BE VIEWED)

Tenders are scheduled to close:

Tender Closing Time: **2 : 00 pm PST**

Tender Closing Date: **April 26, 2024**

Address: Regional District of Kitimat Stikine
Suite 300 – 4545 Lazelle Avenue
Terrace, B.C V8G 4E1
(ADDRESS WHERE TENDERS MUST BE SUBMITTED)

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SCHEDULE "A"

Instructions to Tenderers

INSTRUCTIONS TO TENDERERS

The Regional District of Kitimat-Stikine invites Tenders for:

PROJECT NAME

1.0 TENDER DELIVERY AND INQUIRIES

1.1 Closing Time and Address for Tender Delivery

Tenders must be received **no later than 2:00 pm** Pacific Daylight Time on **Friday, April 26, 2024** (the "Closing Time").

Signed Tenders are to be submitted electronically before the Closing date and Time.

Tenders and Revisions to Tenders received after the Closing Time will not be accepted or considered.

1.2 Number and Format of Copies

The RDKS prefers to receive Proposals in PDF form via email to procurement@rdks.bc.ca. Proponents are advised that the RDKS's file size limit is 15 MB. Email subject line should clearly state the Tender title and reference number as on the cover page.

The RDKS is not responsible for Tenders delivered to wrong email addresses, or Tenders that are not received before the Closing Date and Time. It is the sole responsibility of each Tenderer to ensure their Tender is received as intended (complete) before the Closing Date and Time.

1.3 Amendments to Tenders

Tenders may be revised by written amendment by e- mail, at any time before the Closing Time, but not after. Files must be emailed to procurement@rdks.bc.ca with the subject "Revision to Tender Documents for Construction & Commissioning of PW4, Tender Document Number: 2024-WS-08". The time stamp on the recipient's computer will be used to determine if the file was received on time.

An amendment may show only changes to the Schedule of Quantities and Prices. An amendment must be signed by an authorized signatory of the Tenderer in the same manner as provided by Section 1.17.

1.4 Bidders Meeting and Site Meeting

The "Site Meeting" will be held by the Regional District Representative at the PW#4 site to discuss the Regional District's requirements under this Tender Document and will include a site tour of the project location. Participation in person at the Site Meeting is **MANDATORY** for Tenderers.

The tentative date of the meeting is:

- Mandatory Site Meeting: **April 10, 2024, 9 am – 12 pm**

These dates and times may be subject to change. The Regional District will post notice of the date, time, and location of the meeting on the BC Bid website and the Regional District website (www.rdks.bc.ca). After the Bidders Meeting, a written record of questions and answers from the meeting will be posted as an addendum on the BC Bid website and the Regional District website.

1.5 Inquiries

All inquiries related to this Tender Document should be directed by E-Mail to procurement@rdks.bc.ca or to the person named below or such other person who may be named from time to time by the Regional District (the "Regional District Representative''). Information obtained from any person or source other than the Regional District Representative shall not be relied upon.

Name: Raji Ann John, Project Manager

Address: Suite 300 – 4545 Lazelle Avenue, Terrace, BC V8G 4E1

Email: rjohn@rdks.bc.ca

Phone: (250) 615-6100

All inquiries should be received in writing no later than 4 business days before the Closing Time. Hours of business are 8:30 a.m. to 4:30 p.m., Monday through Friday, except statutory holidays. Inquiries and responses will be recorded and may be distributed as per to Section 1.6 at the discretion of the Regional District.

1.6 Addenda

If the Regional District determines that an amendment is required to this Tender Document, an addendum will be posted on the BC Bid website and the Regional District website. Any addenda will form part of the Tender Document. It is the responsibility of Tenderers to check the BC Bid website and the Regional District website for addenda. Addenda will be available electronically through BC Bid at www.bcbid.gov.bc.ca and on the RDKS website at https://www.rdks.bc.ca/government/rfps_tenders. It is the sole responsibility of the Proponent to monitor these websites regularly to check for updates.

The only way the Tender Document may be added to or amended in any way is by a formal written addendum. No other communication, whether written or oral, from any person will affect or modify the terms of this Tender Document or may be relied upon by any Tenderer. By delivery of a Tender, the Tenderer is deemed to have received, accepted, and understood the entire Tender Document, including any and all addenda.

1.7 Discrepancies or Omissions

Tenderers finding discrepancies or omissions in the specifications or other documents or having any doubts on the meaning or intent of any part thereof, should immediately request clarification from the Regional District representative named in Section 1.5, who will send written instructions or explanations to all Tenderers. No responsibility will be accepted for oral instructions. Any Work done or services performed after discovery of discrepancies, errors or omissions shall be done at the Contractor's risk.

1.8 Proof of Ability

The Tenderer shall be competent and capable of performing the Work. The Tenderer may be required to provide evidence of previous experience and financial responsibility before the Contract is awarded.

A complete list of the equipment which the Tenderer will make available for the completion of the Contract shall be included with each Tender. The Form of Tender is provided in Schedule "D". Equipment must be reliable, well-maintained, and suitable for the performance of the Work.

1.9 Examination of Tender Documents

Tenderers are responsible for reading and familiarizing themselves with the Tender Document in its entirety (including all Schedules, attachments, appendices, and addenda) before preparing and submitting a Tender.

The Tenderer will satisfy himself as to the practicability of executing the Work in accordance with the Contract, and he shall be held to have satisfied himself in every detail before making up his Tender by inquiry, measurement, and calculation.

A **MANDATORY** Site Meeting with site tour is arranged for the Work on April 10, 2024. Before submitting this Tender, the Tenderer shall satisfy himself as to the nature of the site, the quantities and nature of the Work and equipment necessary for the completion of the Work, and the means of access to the site, and in general, shall obtain all relevant information as to risks, contingencies and other circumstances which may influence his Tender.

The Tenderer shall have satisfied himself as to the sufficiency of the Tender for the Work and the prices stated in the Form of Tender (Schedule "D"). These prices shall cover all his obligations under the Contract, and all matters necessary for the proper completion and maintenance of the Work, and shall include the supply of all labor, equipment, material, supervision, services, taxes, and assessments, together with the Contractor's overhead and profit, except where specifically provided otherwise elsewhere in this Tender Document or the Contract. Tender Documents may be obtained from the BC Bid website or the Regional District Website.

1.10 No Duty of Care

Tenderers acknowledge that the Regional District, in the preparation of the Tender Document and Contract documents, supply of oral or written information to Tenderers, review of Tenders or the carrying out of the Regional District's responsibilities under the Contract, does not owe a

duty of care to Tenderers or the Contractor, and the Tenderers and the Contractor waive for themselves and their successors, the right to sue the Regional District in tort for any loss, including economic loss, damage, cost or expense arising from or connected with any error, omission or misrepresentation occurring in the preparation of the Tender Document and Contract documents, supply of oral or written information to Tenderers, review of Tenders or the carrying out of the Regional District's responsibilities under the Contract.

1.11 Status Inquiries

All inquiries related to the status of this Tender Document, including whether or not a Contract has been awarded, should be directed to the Regional District representative named in Section 1.5. No information with regard to an award of a Contract will be given out between the time of closing and the time an award has been made.

1.12 Duration of Tender

The Tender will be irrevocable and will be open for acceptance by the Regional District for a period of 90 days after the Closing Time.

1.13 Process after Closing

Notwithstanding any other provision of this Tender Document, the award of a Contract is subject to the approval of the Board of Directors of the Regional District.

1.14 Conflict of Interest

A Tenderer must disclose in its Tender any actual or potential conflicts of interest and existing business relationships it may have with the Regional District, its elected or appointed officials or employees. The Regional District may rely on such disclosure.

1.15 Solicitation of Board Members, Regional District Staff and Regional District consultants

Tenderers and their agents will not contact any member of the Regional District Board of Directors, Regional District staff or Regional District consultants with respect to this Tender Document, other than the Regional District Representative named in Section 1.5 at any time prior to the award of a Contract or the cancellation of this Tender Document.

1.16 Signature

The legal name of the person or firm submitting the Tender must be inserted in the Tender. The Tender must be signed by a person authorized to sign on behalf of the Tenderer and include the following:

(a) If the Tenderer is a corporation, then the full name of the corporation must be included, together with the names of the authorized signatories executing the Tender on behalf of the Tenderer;

(b) If the Tenderer is a partnership or joint venture then the name of the partnership or joint venture and the name of each partner or joint venturer must be included, and each partner or joint venturer must sign personally (or, if one or more person(s) have signing authority for the partnership or joint venture, the partnership or joint venture must provide evidence to the

satisfaction of the Regional District that the person(s) signing have signing authority for the partnership or joint venture). If a partner or joint venturer is a corporation then such corporation must sign as indicated in subsection (a) above; or

(c) If the Tenderer is an individual, including a sole proprietorship, the name of the individual must be included.

1.17 Late Submissions

Late submissions after the closing date and time will not be considered.

2.0 GENERAL CONDITIONS

2.1 Negotiation

The Regional District may negotiate changes to any terms of a Tender, including terms that form part of this Tender Document including prices, and may negotiate with one or more Tenderers whether before or after awarding the Contract.

2.2 Limitation of Liability

Tenderers are solely responsible for their own expenses in preparing and submitting Tenders, and for any meetings, negotiations or discussions with the Regional District or its representatives and consultants relating to or arising from the Tender Document. The Regional District will not be liable to any Tenderer for any claims, whether for costs, expenses, losses or damages, or loss of anticipated profits, incurred by the Tenderer in preparing and submitting a Tender, or participating in negotiations for a contract, or other activity related to or arising out of this Tender Document. No Tenderer shall have any claim for any compensation of any kind whatsoever as a result of participating in this Tender Document or the process contemplated in it, and by submitting a Tender each Tenderer shall be deemed to have agreed that it has no claim.

2.3 Tenderer's Qualifications

By submitting a Tender, a Tenderer represents that it has the expertise, qualifications, resources, and relevant experience to perform the Work described in this Tender Document.

2.4 Confidentiality

All Tenders become the property of the Regional District upon submission and will not be returned to the Tenderers. With the exception of the identity of each Tenderer, Summary of Tenders and the total annual tendered price set out in the Tender Summary (Schedule "D"), which will be disclosed at the public opening of Tenders, all Tenders will be held in confidence by the Regional District unless otherwise required by law. Tenderers should be aware the Regional District is a "public body" as defined by and subject to the *Freedom of Information and Protection of Privacy Act* of British Columbia.

3.0 TENDER EVALUATION

3.1 Regional District's Right to Accept or Reject Tenders

The lowest or any Tender will not necessarily be accepted, and the Regional District expressly reserves the following rights:

- to accept any Tender;
- to reject any and/or all irregularities in a Tender;
- To waive any defect or deficiency in a Tender that does not materially affect the Tender and accept that Tender;
- to reject any or all Tenders;
- to accept a Tender which is not the lowest Tender;
- to make decisions with regard to experience, qualifications, references, and any other criteria the Regional District may consider relevant whether disclosed to Tenderers or not:
- to cancel the Tender Document at any time and for any reason, and to reissue the Tender Document without changes in the event that only one (1) compliant Tender is received, or in the event that all compliant Tenders received exceed the estimated budget for the Work;
- to negotiate with any Tenderer as the Regional District sees fit, whether prior to or following award of the Contract.

3.2 Mandatory Criteria

Tenders not clearly demonstrating that they meet the following mandatory criteria will be excluded from further consideration during the evaluation process:

- The Tender must be received as specified in Section 1.1 before the Closing Time;
- The Tender must be in English;
- The Tender must include the completed Form of Tender in Schedule “D” (with completed Schedules as required)

SCHEDULE "B"

Form of Contract

FORM OF CONTRACT

THIS AGREEMENT made this_____day of_____, 2024

BETWEEN:

REGIONAL DISTRICT 0F KITIMAT-STIKINE

300 - 4545 Lazelle Avenue Terrace, British Columbia

V8G 4E1

(the "Regional District")

OF THE FIRST PART

AND:

(the "Contractor")

OF THE SECOND PART

WHEREAS:

1. The Regional District issued Invitation to Tender No. 2024-WS-08 for Construction & Commissioning of PW4 on March 27, 2024.
2. The Contractor, in response to the Tender Document, submitted a Tender dated April 26, 2024.
3. The Contractor has agreed to provide the Work, and the Regional District has agreed to engage the Contractor to provide the Work on the terms and conditions set out in this Contract.

NOW THIS AGREEMENT WITNESSES that in consideration of the premises, the terms and conditions hereinafter contained, the sufficiency and receipt of which are hereby acknowledged, the parties covenant and agree each with the other as follows:

1.0 DEFINITIONS AND INTERPRETATION

1.1 Definitions

Unless otherwise defined in this Contract, words and expressions shall have the meanings assigned to them in the Definitions enclosed with the Tender Document, and the following words shall have the following meanings:

"Contract" means this Form of Contract for Construction & Commissioning of PW#4, once executed by the Regional District and Contractor, describing the scope, terms, and conditions of the Work, including its recital clauses and any Schedules attached to it;

"Effective Date" means the date on which the Contract commences, in accordance with the Notice to Proceed;

"Force Majeure" means any event or circumstance not within the reasonable control of the party claiming the Force Majeure which prevents or delays that party from meeting an obligation hereunder and including:

(a) acts of God, including wind, ice and other storms, lightning, floods, earthquakes, volcanic eruptions and landslides;

(b) epidemics, war (whether or not declared), blockades, acts of public enemies, acts of sabotage or terrorism, civil insurrections, riots and civil disobedience;

(c) acts or omissions of federal, provincial, or local governments (other than the Regional District) or any of their boards or agencies (other than boards or agencies of the Regional District), including delays of regulatory process and orders of a regulatory authority or Court of competent jurisdiction; and

(d) explosion, fires, or mechanical breakdowns; but does not include the following:

(e) strikes, lockouts and other industrial disturbances;

(f) lack of funds.

"Notice to Proceed" means a written notice given by the Regional District to begin the Work on a specified effective date, such notice to be given to the Contractor not less than 21 days prior to the Effective Date;

"Tender" means the Contractor's Tender submission in response to the Tender Document ITT #2024-WS-08 dated March 27, 2024.

"Term" means the term of this Contract, as specified in Section 2.

1.2 Gender, Number and Other Terms

In this Contract, unless the context otherwise requires, words importing the masculine and singular include the feminine and plural and vice versa and words importing a corporate entity include individuals and vice versa.

1.3 Reference to Enactments

Unless otherwise stated, any reference to an enactment includes and is a reference to such

enactment including amendments thereto and in force from time to time, and to any enactment that may supplement or supersede such enactment.

1.4 No Contra Proferentem

The language in all parts of this Contract shall in all cases be construed as a whole and neither strictly for nor strictly against either of the parties to this Contract.

1.5 Currency

Except where otherwise expressly provided, all monetary amounts in this Contract are stated and shall be paid in Canadian currency.

1.6 Governing Law and Attornment

This Contract shall be governed by and construed in accordance with the law of British Columbia and the laws of Canada applicable therein and all disputes and claims whether for damages, specific performance, injunction, declaration or otherwise, both at law and equity, arising out of, or in any way connected with this Contract will be referred to the Courts of British Columbia and each of the parties hereby attorns to the jurisdiction of the Courts of British Columbia.

1.7 Schedules

The following documents are attached hereto and together with this Form of Contract constitute the Contract:

Schedule “A” Instructions to Tenderers

Schedule “B” Form of Contract

Schedule “C” Form of Tender

Schedule “D” List of Contract Drawings

Schedule “E” Supplementary General Conditions

Schedule “F” Project Specific Supplementary Conditions

1.8 Cross-References

Unless otherwise stated, a reference in this Contract to a designated article, section, subsection, paragraph, or other subdivision or to a Schedule is to the designated article, section, subsection, paragraph, or other subdivision of, or Schedule to this Contract (or Schedule to the Tender Document, as the context requires).

1.9 Approval

A requirement in this Contract that a party provide approval or consent means that approval is not to be unreasonably withheld or delayed unless the paragraph specifies that the approval is to be in the sole discretion of a party, in which case approval is to be in the exclusive, complete, and unfettered discretion of the party.

1.10 Conflict

If there is any inconsistency or conflict between the provisions of the documents forming the Contract, then the documents shall govern and take precedence in the following order:

a) Schedule "B"- Form of Contract

b) Supplementary General Conditions

c) General Conditions *

d) Supplementary Specifications

   i. Project Specific Supplementary Specifications

   ii. Electrical (See Appendix B, General Electrical Specifications)

   iii. Structural (See drawing 2203417-1012-001)

   iv. Project Specific Supplementary Payment Procedures

e) Specifications *

f) Supplementary Standard Detail Drawings

g) MMCD Standard Detail Drawings *

h) MMCD Supplemental Updates (available at mmcd.net)

i) Schedule "C" – Form of Tender

j) Schedule "D" – List of Contract Drawings

k) Schedule "A" - Instructions to Tenderers

l) Instructions to Tenderers – Part II *

m) Addenda issued during the tender process.

NOTE: The documents noted with * are contained in the "Master Municipal Construction Documents - Platinum Edition Volume II", Printed 2009.

1.11 Headings

The headings in this Contract are inserted for convenience and reference only and in no way define, limit, or enlarge the scope or meaning of this Contract or any provision of it.

2.0 SCOPE OF CONTRACT

The Contractor shall provide, at its own expense, all materials, supervision, labor, vehicles, equipment, and all else necessary for or incidental to the proper execution of the Work required under this Contract and associated Schedules for the Construction & Commissioning of PW4, including:

1. Production well water system building, cinder block walls, wood roof truss and concrete foundation. Includes process piping, building electrical, back-up generator and dry well.

2. 250 m of 200 mm C900 PVC piping, connecting the existing well to the system.

3. 650 m of 250 mm C900 PVC piping

2.1 Project Location

Thornhill, BC.

2.2 Standard of Work

The Contractor shall perform the Work without negligence, and with that degree of care, skill and diligence normally provided by contractors having similar qualifications in the performance of duties of a similar nature to those contemplated in this Contract. Without limiting the foregoing, the Contractor shall perform the Work in a timely manner and in strict accordance with the requirements set out in this Contract.

3.0 REGIONAL DISTRICT'S REPRESENTATIVES

The Manager and their delegates will be the Regional District's Representatives during the period of execution and will observe the Work in progress on behalf of the Regional District for the purposes of ensuring that the Contractor execute the work in a satisfactory condition and for ensuring that the Work has been satisfactorily carried out.

The Regional District's Representatives will have the authority to stop the Work whenever such stoppage may be necessary, in their opinion, to ensure safety and the proper execution of the Work in accordance with the provisions of the Contract. The Regional District's Representatives may issue directions to the Contractor through written notice to ensure the proper execution of the Work in accordance with the provisions of the Contract.

4.0 SUPERVISION AND LABOUR

4.1 Contractors' Supervisors

The persons appointed by the Contractor to oversee its operations at the work site (the "Supervisors") shall be responsible for the direct supervision of Contractor's employees, Contractor's sub-contractors and all other personnel engaged in the Work, and for ensuring that the terms of the Contract are adhered to.

The Contractor shall name the Supervisors in the Form of Tender. The Supervisors shall be satisfactory to the Regional District and shall not be changed except for good reason and only if approved by the Regional District.

The Supervisors must be capable of speaking, reading, and writing the English language, and any explanations, orders, instructions, directions, and requests given by the Regional District to a Supervisor shall be deemed to have been given to the Contractor.

5.0 PERSONNEL

5.1 The Contractor shall engage, as Supervisors, subcontractors, employees, representatives, and agents only competent individuals who possess the skills, training, experience, and certification required to perform their duties. Without limiting the generality of the foregoing, the Contractor shall not engage any person for the purposes of this Agreement who is unfit, incapable, or unskilled, or who is not trained to meet the requirements of the particular job.

Employees of the Contractor engaged in performing the Work shall be certified. All staff shall be trained in WHMIS (Workplace Hazardous Materials Information System) and hold a First Aid Level 1 Certificate. Supervisors and those personnel interfacing with the public shall have Public Service Training and be capable of speaking and reading the English language and must have basic computer skills, specifically Microsoft Word and Excel.

5.2 The Contractor shall maintain good discipline among all employees, subcontractors, agents, and representatives who perform Work under this Agreement, and ensure that all such individuals conduct themselves in a courteous and professional manner.

5.3 The Contractor and the Contractor's personnel shall act in a manner consistent with good public relations practices when fulfilling the Contractor's obligations under this Agreement. Use of foul, abusive or threatening language and behavior is strictly forbidden.

6.0 SPILLS

6.1 The Contractor shall provide spill containment for all fuel tanks and lubricant storage on site. Spill containment shall be in accordance with the Ministry of Water, Land and Air Protection Transportation & Storage 3rd Edition, February 2002 A Field Guide to Fuel Handling,

6.2 The Contractor shall provide the Regional District with a copy of its Spill Containment Policy within 7 days prior to the commencement of the Work under the Contract.

6.3 Any and all hydrocarbon spills or other hazardous waste spills must be reported to the Contractor's office and the Regional District immediately.

6.4 If necessary, at the Regional District's discretion, the Contractor shall retain the Work of a qualified Contractor to properly clean up the spill. The cost to clean the spill (including contracted Work) will be borne by the Contractor.

7.0 REPORTING

7.1 The Regional District may at any time request the Contractor to produce for inspection records/reports relating to the provision of the Work. The Regional District may copy such records/reports as it deems appropriate.

8.0 REGIONAL DISTRICT ACCESS AND INSPECTION OF WORK

8.1 Access

The Regional District reserves the right at any time during the execution of the work, without notice, and for any purpose whatsoever, to access location at which the Work is being performed.

8.2 Inspection of the Work

The Regional District may, at its sole and absolute discretion, inspect the Work or elsewhere for compliance with the terms and conditions of this Agreement, and for the purpose of promoting effective execution and completion of the Work. Such inspection, or lack thereof, will not relieve the Contractor of its responsibility to perform the Work in accordance with this Agreement.

8.3 Meetings

Regular meetings between the Regional District and Contractor will be held a minimum of

every week. The Contractor shall be available for additional meetings at the Regional District's request.

9.0 TERMINATION

9.1 Termination by Regional District

The Regional District may, by written notice to the Contractor, and without limiting any other right or remedy it may have, immediately terminate the Contract in any of the following circumstances:

1. If the Contractor is in default in the performance of any of its material obligations set forth in this Agreement, then the RDKS may, by written notice to the Contractor, require such default to be corrected. If within thirty (30) days after receipt of notice such default is not corrected or reasonable steps to correct such default have not been taken, the RDKS may, without limiting any other right it may have, immediately terminate this Agreement and shall pay the Contractor for the services rendered and disbursements incurred by the Contractor to the date of termination, less any amounts necessary to compensate the RDKS for damages or costs incurred by the RDKS or by any person employed by or on behalf of the RDKS arising from the Contractor's default.

2. If for any reason the Contractor is unable to provide the services using the individuals named in the Proposal and set forth in this Agreement (other than by reason of reasonable annual vacation time or short term temporary absence because of illness, or are no longer employed by the Contractor) the RDKS may, by written notice to the Contractor, without limiting any other right it may have, immediately terminate this Agreement and shall pay the Contractor for the services rendered and disbursements incurred by the Contractor to the date of termination, less any amounts necessary to compensate the RDKS for damages or costs incurred by the RDKS or by any person employed by or on behalf of the RDKS arising from the Contractor's default.

3. If the RDKS is unwilling or unable to proceed with the Project, the RDKS may terminate this Agreement by giving fifteen (15) days prior written notice to the Contractor. Upon receipt of such written Notice, the Contractor shall perform no further services other than those reasonably necessary to close out his or her services. In such an event the Contractor shall be paid by the RDKS for all services performed and for all disbursements incurred pursuant to this Agreement and remaining unpaid as of the effective date of such termination.

4. If the Contractor becomes insolvent or is assigned into bankruptcy, the RDKS may immediately terminate this Agreement.

5. If the Contractor assigns or subcontracts part or all of the work of the services to another person, without the RDKS's consent, the RDKS may immediately terminate this Agreement

10.0 REGIONAL DISTRICT'S RIGHT TO CORRECT DEFICIENCIES

10.1 Upon failure of the Contractor to perform the Work in accordance with the Contract, and after

five (5) days written notice to the Contractor or without notice if an emergency or danger to the Work or public exits, the Regional District may, without limiting any other right or remedy it may have, correct such deficiencies of the Contractor. The cost of work performed by the Regional District to correct deficiencies shall be paid by the Contractor, or the Regional District may deduct the cost thereof from the payment then or thereafter due to the Contractor, or draw upon the Performance Security for that purpose, or both.

10.2 If the Regional District is entitled to terminate or suspend the Contract under Section 10.0 or 11.0, the Regional District may, without limiting any other right or remedy it may have, correct the default of the Contractor, and deduct the cost thereof from the payment then or thereafter due to the Contractor, or draw upon the Performance Security for that purpose, or both.

10.3 Rejection of Work

The Regional District may reject materials, procedures, workmanship, and any Work performed under this Agreement if such materials, procedures, workmanship, or Work fails to comply with the terms or conditions of this Agreement; furthermore, the Regional District may order the Contractor to stop Work until the materials, procedures, workmanship, or Work complies with the terms and conditions of this Agreement.

10.4 Testing

If the Regional District's instructions, any laws, or any authority requires any Work to be tested or approved, the Contractor will provide the Regional District with timely notice of its readiness for inspection or testing, and if the inspection or testing is by an authority other than the Regional District, of the date fixed for such inspection.

11.0 ENVIRONMENTAL RESPONSIBILITY

The Contractor shall use environmentally sensitive products and methods of performing the Work wherever possible. The Contractor shall make every effort to reduce greenhouse gas emissions and shall refrain from idling equipment when not in use. The Contractor shall advise the Regional District whenever the Contractor identifies potential for using materials or methods of performing the Work that might prevent or mitigate adverse environmental impact. Without in any way limiting the foregoing, the Contractor shall receive and process the Regional District's waste materials in a manner that minimizes environmental impacts and promotes re-use of recyclable materials.

12.0 SAFETY AND PROTECTION OF PERSONS AND PROPERTY

12.1 Safety

The Contractor alone shall at all times be responsible for the safety of its employees in the Work and for the safety, adequacy, efficiency and sufficiency of its equipment and its method of executing the Work of this Contract. The Contractor is also responsible for ensuring the safety of the Public using the service.

The Contractor agrees, at the Contractor's own expense, to procure and carry or cause to be procured and carried and paid for, full WorkSafeBC coverage for the Contractor and all workers, employees, servants, and others engaged in or upon any Work which are the subject of this Contract. The Contractor agrees that the Regional District has the unfettered right to set off the

amount of the unpaid premiums and assessments for such WorkSafeBC coverage against any monies owing by the Regional District to the Contractor. The Regional District shall have the right to withhold payment under this Contract until the WorkSafeBC premiums, assessments, or penalties in respect of Work performed in fulfilling this Contract have been paid in full.

The Contractor agrees that the Contractor is the Prime Contractor with respect to the project for the purposes of section 118 of the *Workers Compensation Act* and regulations thereunder.

The Contractor shall have an occupational health and safety plan (Safety Manual) acceptable to WorkSafeBC and the Regional District. The Contractor shall ensure that all WorkSafeBC safety rules and regulations are observed during performance of this Contract, not only by the Contractor but by all subcontractors, workers, material persons and others engaged in the performance of this Contract. The Contractor shall be responsible for coordination of safety and health pursuant to the *Workers Compensation Act* and regulations thereunder.

The Contractor shall provide the Regional District with the Contractor's WorkSafeBC registration number and a letter from WorkSafeBC confirming that the Contractor is registered in good standing with WorkSafeBC and that all assessments have been paid to the date thereof prior to the Regional District having any obligation to pay monies under this Contract, and at any time thereafter upon request by the Regional District.

The Contractor shall indemnify the Regional District and hold harmless the Regional District from all manner of claims, demands, costs, losses, penalties, and proceedings arising out of or in any way related to unpaid WorkSafeBC assessments owing from any person or corporation engaged in the performance of this Contract or arising out of or in any way related to the failure to observe safety rules, regulations, and practices of WorkSafeBC, including penalties levied by WorkSafeBC.

12.2 Orders Under the Workers Compensation Act

In any case where, pursuant to the provisions of the *Workers Compensation Act* or regulations thereunder, an order is given to the Contractor or one of its subcontractors to cease or modify its operations carried out under this Agreement because of failure to install or adopt safety devices, appliances or methods as directed or required by WorkSafeBC, the *Workers Compensation Act* and regulations thereunder, or because conditions of immediate danger exist that would be likely to result in injury to any person, the Contractor shall respond to the order and immediately notify the Regional District that the order has been issued. If the Contractor is not available or capable of removing the danger to life or equipment resultant from the Contractor's operations, then the Regional District may issue written notice to the Contractor and may immediately arrange for the removal of this danger and the Contractor shall be liable for the costs of such arrangements, but such act by the Regional District shall not relieve the Contractor of responsibility for injury, loss of life or damage which may occur in that situation.

12.3 Refusal to Comply With Order

In the event that the Contractor refuses or fails to comply with an order under the *Workers Compensation Act* or any regulations thereunder so that the performance of the Work is stopped,

the Regional District may, upon written notice, hold the Contractor in default of this Agreement.

12.4 Accidents and Incident Reports

(a) The Contractor shall promptly prepare incident reports, in writing to the Regional District that report all accidents of any sort arising out of or in connection with the performance of the Work whether on or adjacent to the project site, giving full details and statements of witnesses. If death or serious injuries or damages are caused, the accident shall be immediately reported to 911 and promptly reported by the Contractor to the Regional District.

(b) If a claim is made by anyone against the Contractor or any sub-contractor resulting from any accident, the Contractor shall promptly report the facts in writing to the Regional District, giving full details of the claim.

12.5 Emergency Response

The Contractor or a Supervisor will be required to respond to any emergencies at the project site. These could include but are not limited to break-ins, floods, fires, acts of vandalism and violence, etc.

13.0 TERMS AND CONDITIONS

13.1 Insurance

In addition, within 10 business days of written Notice of Award of the Contract, the contract must provide the following insurance with limits not less than those shown in respective items following:

(a) Comprehensive Public Liability Insurance and Property Damage Insurance providing coverage not less than FIVE MILLION ($5,000,000.00) DOLLARS inclusive against liability for bodily injury or death and/or damage to property on an all-risk occurrence basis.

(b) Motor Vehicle Insurance for public liability and property damage providing coverage up to THREE MILLION ($3,000,000.00) DOLLARS inclusive on owned, non-owned or hired vehicles;

(c) Complete Operations coverage on an all-risk occurrence basis up to THREE MILLION ($3,000,000.00) DOLLARS inclusive against liability for bodily injury, death and/or damage to property of others arising out of the existence of any condition in the Work; and

(d) WorkSafeBC coverage

The Contractor shall provide the Regional District with the Contractor's WorkSafeBC registration number and a letter from WorkSafeBC confirming that the Contractor is registered in good standing with WorkSafeBC and that all assessments have been paid to the date thereof prior to the Regional District having any obligation to pay monies under this Contract. More details on employee safety and WorkSafeBC coverage are provided in Section 15.0.

In the policies of insurance providing Comprehensive Public Liability Insurance, Property Damage Insurance and all risk insurance coverage called for by this clause, the Regional District

shall be named as an additional insured, and all such insurance shall contain a provision that the insurance shall apply as though a separate policy had been issued to each insured, as well as a cross liability and waiver of subrogation clause in favor of the Regional District. In all such policies, each subcontractor engaged in the Work shall be named as an additional insured in respect of the performance of the Work, and each such policy shall provide that no expiry, cancellation or material change in the policy shall become effective until after thirty days' notice of such cancellation or change shall have been given to the Regional District by registered mail, and the Contractor shall, upon demand of the Regional District, deliver over to the Regional District all such policy or policies of insurance and the receipts for payment of premiums thereon; and should the Contractor neglect to so obtain and/or maintain in force any such insurance as aforesaid, or fail to deliver such policy or policies and receipts to the Regional District, then it shall be lawful for the Regional District to obtain and/or maintain such insurance, and the Contractor hereby appoints the Regional District its true and lawful attorney to do all things necessary for this purpose. All monies expended by the Regional District for insurance premiums under the provisions of this article shall be charged to the Contractor.

No insurance provided or maintained by the Contractor shall relieve the Contractor from the application of or limit the obligations of the Contractor under Section 16.2.

13.2 Compliance With Laws

The Contractor shall comply with all statutes, regulations, bylaws, orders of authorities having jurisdiction, and principles of common law and equity applicable to the performance of the Work and the fulfillment of the Contractor's duties and obligations under this Contract, including without limitation the bylaws of the Regional District, and the *Workers Compensation Act*.

The Contractor must provide the Regional District with its G.S.T. number.

13.3 Permits, Fees, Licenses, Laws, Notices, etc.

The Contractor shall apply for and pay for all permits or licenses lawfully required for execution of the Contract.

The Contractor shall, at all times execute the work in full compliance with the applicable regulations, and all applicable Federal and Provincial regulations and Regional District bylaws.

13.4 Execution and Completion of Contract

The Contractor shall, at its own expense, unless it is expressly stipulated to the contrary, provide, supply, observe, perform, and do everything which, in the opinion of the Regional District, may be required for the execution and completion of this Contract.

13.5 Changes in the Work

The Regional District, without invalidating the Contract, may make changes by altering, adding to, or deducting from the Work. The Contractor shall proceed with the Work as changed, and the Work shall be executed under the provisions of the Contract.

The Contractor shall not make any alteration or variation in, or addition to, or deviation or omission from the terms of this Contract unless it shall first have received the written consent of

the Regional District, and no claims for additional compensation shall be valid unless the change was so ordered.

If, in the opinion of the Regional District, such changes affect the Contract price, the price will be adjusted at the time of ordering the changes. The value of the addition or deduction from the Contract price, and the method of determining such value, shall be decided by the Regional District, and may be based upon negotiated unit prices or combinations of unit prices in the Tender, by unit prices submitted by the Contractor and accepted by the Regional District, by lump sum submitted by the Contractor and accepted by the Regional District, or by such other method as the Regional District considers reasonable in the circumstances.

13.6 Failure of the Regional District to Act Not a Waiver of Its Rights

No action or want of action on the part of the Regional District at any time to exercise any rights or remedies conferred upon it under this Contract shall be deemed to be a waiver on the part of the Regional District or any of its said rights.

13.7 Oral Agreements

No oral instruction, objection, claim or notice by any party to the other shall change or modify any of the terms or obligations contained in the Contract and none of the provisions of the Contract shall be held to be waived or modified by reason of any act whatsoever, other than by an agreed waiver or modification thereof in writing.

13.8 Assignment

This Contract shall not be assigned, nor shall the said Work or any part thereof be subcontracted without the written consent of the Regional District to every such assignment or subcontract.

13.9 Subcontractors

Where subcontracting is permitted by the Regional District, the Contractor shall be held as fully responsible to the Regional District for the acts and omissions of its subcontractors and of persons directly or indirectly employed by it, as for the acts and omissions of persons directly employed by the Contractor. The Contractor agrees to bind every subcontractor to the conditions, specifications, and drawings applicable to its Work.

13.10 Payment of Accounts by Contractor

The Contractor shall pay any and all accounts for labor, services and materials used by it during the fulfillment of this Contract as and when such accounts become due and payable and shall furnish the Regional District with proof of payment of such accounts in such form and as often as the Regional District may require. Should payment of such accounts not be made when and as the same become due the Regional District shall be at liberty to pay the same and all monies so paid by the Regional District shall be charged to the Contractor.

13.11 Monies Charged to the Contractor

Everything charged to the Contractor under the terms of this Contract shall be paid by the Contractor to the Regional District on demand. Payments made by, or expenses charged to, the Regional District for which the Contractor is responsible under the terms of this Contract may

be deducted by the Regional District from any monies due or to become due to the Contractor. In the event that the amount is greater than that owing to the Contractor, the Regional District may then demand payment of the difference and the Contractor shall forthwith pay such difference or the Regional District may recover the amount owing from the Contractor's surety or sureties.

13.12 Monthly Invoicing

1. The RDKS shall pay to the Contractor, within thirty (30) days of receipt of an invoice from the Contractor, the amount owing for services and disbursements incurred to the date of the invoice by the Contractor, as permitted by this agreement.

2. The RDKS shall reimburse the contractor for only those disbursements and expenses listed in the Proposal, and

3. Except as otherwise agreed in writing, the RDKS shall not be liable to pay or reimburse the Contractor for any other disbursement or costs incurred or expenditures made in performing the services, other than those disbursements, costs and expenditures expressly authorized under this agreement. The total disbursements, costs and expenses payable by the RDKS shall not exceed the estimate of expenses set out in the Proposal, unless authorized in an approved change order executed by the RDKS.

4. The Contractor shall keep and maintain accurate time sheets, proper accounts, and records of all expenditures in connection with the services under this Agreement, and these shall at all times be open to audit and inspection by the authorized representative of the RDKS.

5. The Contractor shall submit monthly statements and vouchers to the RDKS to verify all reimbursable disbursements and expenses.

14.0 NOTICE

1. The provisions and Schedules herein constitute the entire Agreement between the RDKS and the Contractor and supersedes all previous expectations, understanding, communications, representations, and agreements whether verbal or written between the RDKS and the Contractor with respect to the subject matters hereof and may not be modified except by subsequent agreement in writing executed by the RDKS and the Contractor.

2. The RDKS may issue to the Contractor a change notice (a "Change Notice") to make changes to the work, omit part of the work, or require additional work. The Change Notice shall prevail over any other provision of this Agreement, in the event of an inconsistency between them. The RDKS and the Contractor shall appraise the value of the changes to the work specified by the Change Notice, and within sixty (60) days of receipt of the Change Notice, agree on the new price to be paid for the work or the reduction in the fee payable to the Contractor.

15.0 TIME

Time is of the essence of this Contract.

16.0 BINDING EFFECT

This Contract will ensure to the benefit of and be binding upon the parties hereto and their respective heirs, administrators, executors, successors, and permitted assignees.

17.0 CUMULATIVE REMEDIES

No remedy under this Contract is to be deemed exclusive but will, where possible, be cumulative with all other remedies at law or in equity.

18.0 RELATIONSHIP OF PARTIES

No provision of this Contract shall be construed to create a partnership or joint venture relationship, an employer-employee relationship, a landlord-tenant, or a principal-agent relationship.

19.0 AMENDMENT

Except as provided in Section 13.5, this Contract may not be modified or amended except by the written agreement of the parties.

20.0 INTEGRATION

This Contract contains the entire agreement and understanding of the parties with respect to the matters contemplated by this Contract and supersedes all prior and contemporaneous agreements between them with respect to such matters.

21.0 SURVIVAL

All representations and warranties set forth in this Contract and all provisions of this Contract, the full performance of which is not required prior to a termination of this Contract, shall survive any such termination and be fully enforceable thereafter.

22.0 ENTIRE AGREEMENT

The whole agreement between the parties is set forth in this document and no representations, warranties, or conditions, express or implied, have been made other than those expressed.

23.0 SEVERABILITY

Each article of this Contract shall be severable. If any provision of this Contract is held to be illegal or invalid by a Court of competent jurisdiction, the provision may be severed, and the illegality or invalidity shall not affect the validity of the remainder of this Contract.

24.0 COUNTERPART

This Contract may be executed in counterpart with the same effect as if both parties had signed the same document. Each counterpart shall be deemed to be an original. All counterparts shall be construed together and shall constitute one and the same Contract.

25.0 DISPUTE RESOLUTION

Any dispute under this Contract may, with the agreement of the parties, be submitted for arbitration pursuant to the provisions of the *Arbitration Act*.

IN WITNESS WHEREOF the parties hereto have set their hands and seals as of the day and year first above written.

Contractor

(FULL LEGAL NAME OF CORPORATION, PARTNERSHIP, OR INDIVIDUAL

(AUTHORIZED SIGNATORY)

(Name)

Title

Regional District of Kitimat Stikine (Owner)

(AUTHORIZED SIGNATORY

(Name)

(AUTHORIZED SIGNATORY

Title

SCHEDULE "C"

Form of Tender

Regional District of
Kitimat-Stikine

REGIONAL DISTRICT OF KITIMAT-STIKINE

Construction & Commissioning of PW4

FORM OF TENDER Appendix "A": SCHEDULE OF QUANTITIES AND PRICES

APPENDIX A

Construction & Commissioning of PW4

SCHEDULE OF QUANTITIES AND UNIT PRICES

(All prices and Quotations including the contract Price shall include all Taxes, except GST. GST shall be shown separately)

Summary Sheet

Item	Title	Amount
1	General Requirements	
2	Pumphouse - Site Work	
3	Pumphouse - Building	
4	Pumphouse - Wells	
5	WTP Pipeline	
7	Haaland Ave Pipeline	
	Sub-Total, excluding GST	
	GST 5%	
	Total including GST	

APPENDIX A

Construction & Commissioning of PW4

SCHEDULE OF QUANTITIES AND UNIT PRICES

(All prices and Quotations including the contract Price shall include all Taxes, except GST. GST shall be shown separately)

Item #	Spec		Item Description	Unit	Quantity	Unit Price-$	Amount -$
General Requirements						**SUB-TOTAL**	
1.01	01 33 01	SSpec	Survey Layout and Record Survey	LS	1		
1.02	01 33 01	1.8	Commissioning/Record Information/Manuals	LS	1		
1.03	01 53 01	SSpec	Mobilization/Demobilization	LS	1	$ 75,000.00	$ 75,000.00
1.04	01 55 00	SSpec	Traffic Control & Management				
			a) Traffic Control Plan	LS	1		
			b) Construction Zones - Traffic Access Management	LS	1		
Pumphouse - Site Work						**SUB-TOTAL**	
2.01	31 11 01	1.4.2	Clearing & grubbing	sq.m	550		
2.02	32 11 23	1.4.2	100mm thick - MoTI WGB (Bldg & Generator Foundation)	sq.m	26		
2.03	33 40 01	SSpec	100mm Perimeter Drain, incl. drain rock, filter fabric	LS	1		
2.04	33 40 01	SSpec	100mm Floor Drain, incl. backflow	LS	1		
2.05	33 40 01	SSpec	100mm Pressure Relief Drain, incl. backflow	LS	1		
2.06	33 44 01	1.5.1	Stormwater Drywell (DWG 010), incl. drain rock, filter fabric	LS	1		
2.07	SSpec		Back-up Generator (complete supply & install as per electrical drawings), incl. connection	LS	1		
Pumphouse - Building						**SUB-TOTAL**	
3.01	SSpec		Concrete (Bldg, Generator, Apron)	LS	1		
3.02	SSpec		Masonry	LS	1		
3.03	SSpec		Miscellaneous Metals (incl. roofing, Soffits and Fascia)	LS	1		
3.04	SSpec		Carpentry	LS	1		
3.05	SSpec		Dampproof, insulation, sealant	LS	1		
3.06	SSpec		Doors	LS	1		
3.07	SSpec		Painting	LS	1		
3.08	SSpec		Process mechanical (all mechanical and pipe works within the pumphouse structure and up to the coupler)	LS	1		
3.09	SSpec		Building mechanical - HVAC	LS	1		
3.10	SSpec		Electrical and controls (complete supply & install as per electrical drawings), incl. connection	LS	1		
Pumphouse - Well						**SUB-TOTAL**	
4.01	SSpec		Removal of Surface & Well Casings	LS	1		
4.02	SSpec		200mm dia. Pitless Unit (Maass Pitless) (DWG 015)	LS	1		
4.03	SSpec		Goulds Well Pump, inlc. Riser Piping, Check Valve, Couplers, Hub adapter flange, Transducer, Cable wire & Conduit (DWG 015)	LS	1		
WTP Pipeline						**SUB-TOTAL**	
5.01	31 23 01	SSpec	Unsuitable Trench - remove and disposal off-site, replace with 150mm minus - as directed by CA	cu.m	200		
5.02	SSpec		Sitework, Demolition, Relocation, Removal:				
			a) Asphalt Milling - Removal, haul and dispose - All Depths c/w Saw Cuts as required	sq.m	140		
5.03	32 11 16.1	1.4.3	Granular Sub-Base, 300mm thickness - 75mm minus SGSB - haul, place, compact	sq.m	140		
5.04	32 11 23	1.4.2	Granular Base, 225mm thickness - 19mm minus Crush - haul, place, compact	sq.m	140		
5.05	32 12 16	SSpec	Asphalt Pavement, 50mm thickness	sq.m	140		
5.06	33 11 01	1.8.1	Watermain - all depths, supply & install				
			a) 200mm DR18 PVC C900	lin.m	271		
5.07	33 11 01	1.8.3	Pipe Bends, supply & install c/w Restrainers				
			a) 200mm HxH 90 deg. Ductile bend	ea	1		

Item #	Spec		Item Description	Unit	Quantity	Unit Price-$	Amount -$
			b) 200mm HxH 45 deg. Ductile bend	ea	1		
			c) 200mm HxH 45 deg. Ductile bend	ea	1		
			d) 200mm HxH 11.25 deg. Ductile bend	ea	3		
5.08	33 11 01	1.8.3	Tees, supply & install c/w Restrainers				
			a) 200x200x200mm FxHxF Ductile Tee	ea	1		
			b) 200x200x200mm FxHxH Ductile Tee	ea	1		
5.09	33 11 01	1.8.3	End Cap, supply & install c/w Restrainers				
			a) 200mm PVC End Cap	ea	1		
5.10	33 11 01	1.8.3	Valves, supply & install				
			a) 200mm FxH gate valve c/w V.B. & Riser	ea	4		
			b) 200mm HxH gate valve c/w V.B. & Riser	ea	1		
5.11	33 11 01	1.8.5	Air Release Valve - complete as per detail on DWG 001	LS	1		
5.12	33 11 01	SSpec	Tie to Existing watermain (See DWG 001)	LS	1		
Haaland Ave Pipeline						**SUB-TOTAL**	
6.01	31 23 01	SSpec	Unsuitable Trench - remove and disposal off-site, replace with 150mm minus - as directed by CA	cu.m	200		
6.02	SSpec		Sitework, Demolition, Relocation, Removal:				
			a) Asphalt Milling - Removal, haul and dispose - All Depths c/w Saw Cuts as required	sq.m	1,671		
6.03	32 11 16.1	1.4.3	Granular Sub-Base, 300mm thickness - 75mm minus SGSB - haul, place, compact	sq.m	1,671		
6.04	32 11 23	1.4.2	Granular Base, 225mm thickness - 19mm minus Crush - haul, place, compact	sq.m	1,671		
6.05	32 12 16	SSpec	Asphalt Pavement, 50mm thickness	sq.m	1,671		
6.06	33 11 01	1.8.1	Watermain - all depths, supply & install				
			a) 250mm DR18 PVC C900	lin.m	653		
6.07	33 11 01	1.8.3	Pipe Bends, supply & install c/w Restrainers				
			a) 250mm HxH 22.5 deg. Ductile bend	ea	1		
			b) 250mm 5 deg. PVC bend	ea	1		
6.08	33 11 01	1.8.3	Tees, supply & install c/w Restrainers				
			a) 250x250x250mm FxHxF Ductile Tee	ea	2		
			b) 250x250x150mm HxHxF Ductile Hydrant Tee	ea	2		
6.09	33 11 01	1.8.3	End Cap, supply & install c/w Restrainers				
			a) 250mm PVC End Cap	ea	1		
6.10	33 11 01	1.8.3	Valves, supply & install				
			a) 250mm FxH gate valve c/w V.B. & Riser	ea	5		
6.11	33 11 01	1.8.13	Tie to Existing Watermain - c/w couplers	LS	2		
6.12	33 11 01	SSpec	Future Fire Hydrant Stub - complete as per MMCD W4 with C900 DR18 lead, gate valve, restrainers, end cap, misc works (Tee paid separately)	LS	2		

REGIONAL DISTRICT OF KITIMAT-STIKINE

Construction & Commissioning of PW4

FORM OF TENDER Appendix "B": PRELIMINARY CONSTRUCTION SCHEDULE

INDICATE SCHEDULE WITH GRANTT CHART WITH MAJOR ITEM DESCRIPTIONS AND TIME

Activity	**CONSTRUCTION SCHEDULE** (weeks from start date)															
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32

Regional District of
Kitimat-Stikine

REGIONAL DISTRICT OF KITIMAT-STIKINE

Construction & Commissioning of PW4

FORM OF TENDER Appendix "C": TENDERER'S EXPERIENCE/REFERENCES IN SIMILAR WORK

PROJECT/YEAR	OWNER / CONTACT NAME PHONE and FAX	WORK DESCRIPTION	VALUE ($)
	Owner / Contract ____ Phone ( ) ____ Fax ( ) ____		
	Owner / Contract ____ Phone ( ) ____ Fax ( ) ____		
	Owner / Contract ____ Phone ( ) ____ Fax ( ) ____		
	Owner / Contract ____ Phone ( ) ____ Fax ( ) ____		
	Owner / Contract ____ Phone ( ) ____ Fax ( ) ____		
	Owner / Contract ____ Phone ( ) ____ Fax ( ) ____		
	Owner / Contract ____ Phone ( ) ____ Fax ( ) ____		
	Owner / Contract ____ Phone ( ) ____ Fax ( ) ____		
	Owner / Contract ____ Phone ( ) ____ Fax ( ) ____		
	Owner / Contract ____ Phone ( ) ____ Fax ( ) ____		

Regional District of
Kitimat-Stikine

REGIONAL DISTRICT OF KITIMAT-STIKINE

Construction & Commissioning of PW4

FORM OF TENDER Appendix "D": TENDERER'S SUPERVISORY PERSONNEL

Name:

Experience:

Dates:

Project Name:

Responsibility:

References:

Dates:

Project Name:

Responsibility:

References:

Regional District of
Kitimat-Stikine

REGIONAL DISTRICT OF KITIMAT-STIKINE

Construction & Commissioning of PW4

FORM OF TENDER Appendix "E": SUBCONTRACTORS

TRADE	SUBCONTRACTOR NAME	PHONE NUMBER
SURVEYING		
PIPE LAYING		
CONCRETE		
ASPHALT PAVING		
BUILDING MECHANICAL		
BUILDING ELECTRICAL		
WELL CONTRACTOR/PUMP INSTALLATION		
OTHER: (Please Specify)		

REGIONAL DISTRICT OF KITIMAT-STIKINE

Construction & Commissioning of PW4

FORM OF TENDER Appendix "F": TENDER SUMMARY

CLOSING DATE: April 26, 2024, at 2:00p.m.

TENDERER: _____

Total Tender Sum

Grand total as listed in the Schedule of Quantities and Prices.

Grand total price: $ _____,

SCHEDULE “D”

LIST OF CONTRACT DRAWINGS

Schedule I List of Contract Drawings

(COMPLETE LISTING OF ALL DRAWINGS, PLANS AND SKETCHES WHICH ARE TO FORM A PART OF THE CONTRACT, OTHER THAN STANDARD DETAIL DRAWINGS AND SUPPLEMENTARY STANDARD DETAIL DRAWINGS.)

TITLE	DWG. NO.	DATE	REV. NO.	REV. DATE
COVER PAGE	2203417-1011-000	23/06/19	0	24/03/18
CIVIL DRAWINGS				
WELL PW4 WATER SYSTEM PLAN/PROFILE	2203417-1011-001	23/06/16	0	24/03/05
HAALAND AVENUE WATER SYSTEM STA 0+000 TO STA 0+350 PLAN/PROFILE	2203417-1011-002	23/06/16	0	24/03/05
HAALAND AVENUE WATER SYSTEM STA 0+350 TO STA 0+650 PLAN/PROFILE	2203417-1011-003	23/06/16	0	24/03/05
WELL PW4 WATER SYSTEM MECHANICAL PIPING LAYOUT	2203417-1011-010	23/06/16	0	24/03/05
WELL PW4 WATER SYSTEM MECHANICAL PIPING SECTION VIEWS	2203417-1011-011	23/06/16	0	24/03/05
WELL PW4 WATER SYSTEM MECHANICAL PIPING SCHEDULE & NOTES	2203417-1011-012	23/06/16	0	24/03/05
WELL PW4 WATER SYSTEM MECHANICAL PIPING LAYOUT DIMENSIONS	2203417-1011-013	23/06/16	0	24/03/05
WELL PW4 WATER SYSTEM BUILDING FINISHING	2203417-1011-014	23/06/16	0	24/03/05
WELL PW4 WATER SYSTEM WELL HEAD	2203417-1011-015	23/06/16	0	24/03/05
STRUCTURAL DRAWINGS				
GENERAL NOTES	2203417-1012-001	23/08/30	0	24/03/05
PUMP HOUSE BUILDING FOUNDATION PLAN	2203417-1012-002	23/08/30	0	24/03/05
PUMP HOUSE BUILDING ROOF PLAN	2203417-1012-003	23/08/30	0	24/03/05
BUILDING STRUCTURE SECTIONS & DETAILS	2203417-1012-004	23/08/30	0	24/03/05
BUILDING STRUCTURE ELEVATIONS	2203417-1012-005	23/08/30	0	24/03/05
ELETRICAL DRAWINGS				
WELL PW4 SCHEMATIC AND WIRING DIAGRAM	2203417-1661-001	23/07/06	0	24/03/13
WELL PW4 ELETRICAL SITE LAYOUT, PANEL SCHEDULE & SLD	2203417-1670-001	23/07/06	0	24/03/13
WELL PW4 PUMP HOUSE ELETRICAL LAYOUT & BILL MATERIAL	2203417-1670-101	23/07/06	0	24/03/13

WELL PW4 PUMP HOUSE ELETRICAL ELEVATION & EQUIPMENT SCHEDULE	2203417-1670-102	23/07/06	0	24/03/13
WELL PW4 PUMP HOUSE UNDERGROUND & GROUNDING LAYOUT	2203417-1674-301	23/07/06	0	24/03/13
WELL PW4 PUMP HOUSE TYPICAL INSTALLATION DETAILS	2203417-1679-901	23/07/06	0	24/03/13
WELL PW4 PUMP HOUSE CABLE BLOCK DIAGRAM	2203417-1760-001	23/07/06	0	24/03/13
WELL PW4 CONTROL PANEL (CP-100) LAYOUT & BOM	2203417-1772-001	23/07/06	0	24/03/13
WELL PW4 CP-100 & UPS-100 POWER WIRING	2203417-1781-001	23/07/06	0	24/03/13
WELL PW4 CONTROL PANEL (CP-100) DIGIAL INPUTS	2203417-1782-002	23/07/06	0	24/03/13
WELL PW4 CONTROL PANEL (CP-100) DIGITAL OUTPUTS	2203417-1782-003	23/07/06	0	24/03/13
WELL PW4 CONTROL PANEL (CP-100) AUTO DIALER OUTPUTS	2203417-1782-004	23/07/06	0	24/03/13
WELL PW4 CONTROL PANEL (CP-100) ANALOG INPUTS	2203417-1782-005	23/07/06	0	24/03/13
WELL PW4 CONTROL PANEL (CP-100) ANALOG OUTPUTS	2203417-1782-006	23/07/06	0	24/03/13
WELL PW4 CONTROL PANEL (CP-100) ETHERNET AND RADIO DIAGRAM	2203417-1782-007	23/07/06	0	24/03/13
WELL PW4 PUMP HOUSE TYPICAL INSTALLATION DETAILS	2203417-1789-901	23/07/06	0	24/03/13

SCHEDULE “E”

SUPPLEMENTAL GENERAL CONDITIONS

The General Conditions for this project are contained in the Master Municipal Construction Documents (MMCD) Platinum Edition Volume II, 2009, except as specified in the following Supplementary General Conditions and MMCD Supplemental Updates (see Schedule 1 of the Agreement). These Supplementary General Conditions take precedence over the applicable MMCD General Conditions.

1.0 Definitions

1.21 Contract Administrator ‡

SGC 1.21.1 Delete GC 1.21.1 and replace with the following:

"**Contract Administrator**" means the person appointed by the *Owner* and identified by the *Owner* in writing to the *Contractor*. The *Contract Administrator* may be an officer of the *Owner*, a direct employee of the *Owner*, an officer or employee of the consultant who designed the *Work* for the *Owner*, or an independent consultant.

1.30 Deleted Items ‡

SGC 1.30.1 Delete GC 1.30.1 "deleted items"

1.48 Optional Work

Add SGC 1.48.2 as follows:

.2 Pricing for Optional Work shall not include any general overhead costs or profit not directly related to the Optional Work.

2.0 DOCUMENTS

2.2 Interpretation ‡

SGC 2.2.4 – Delete GC 2.2.4 (1) (i) and replace with the following:

(i) Standard Detail *Drawings*

3.0 CONTRACT ADMINISTRATOR

3.4 Inspection and Site Inspector ‡

SGC 3.4.5 – Delete GC 3.4.5 and replace with the following:

.5 If at any time and for any reason the *Contract Administrator* determines that inspection or testing of the *Work*, or portion of the *Work*, is required that was not called for in the *Contract Documents*, then the *Contract Administrator* may direct the *Contractor* to perform, or have performed, that inspection or testing, as provided in GC 4.12.6.

4.0 CONTRACTOR

4.3 Protection of *Work*, Property and the Public

SGC 4.3.4 - Add the following paragraphs:

(4) Expose all connection points and crossing locations for proposed utilities at least one week prior to construction at each site and notify the Contract Administrator of the exact location and elevation of the connection points and crossing utilities for design confirmation. If this confirmation is not completed as specified, then the *Contractor* will not be eligible for any delay claims or extra costs incurred by conflicts or changes necessary to complete the related operations. Payment for pre-exposing of utilities will be incidental to payment for utility work unless shown otherwise in the Schedule of Quantities and Prices.

4.6 Construction Schedule

SGC 4.6.2 - Delete GC 4.6.2 and replace with the following: ‡

.2 The *Contractor* shall update the Baseline Construction Schedule monthly to produce an adjusted Baseline Schedule (the "Adjusted Baseline Schedule") that reflects any adjustments to the *Milestone Date(s)* or the Contract Time as provided by the *Contract Documents*, including without limitation if the *Contract Administrator* issues a Change Order or other *Contract Document(s)* which adjusts any *Milestone Date(s)*. Each Adjusted Baseline Schedule will replace the previous *Baseline Construction Schedule.*

SGC 4.6.6 - Delete GC 4.6.6 and replace with the following: ‡

.6 The time for the performance of the Work shall commence on the date specified in the *Notice to Proceed*, or if not so specified, on the date the *Notice to Proceed* is issued. Subject to a contrary provision in the *Contract Documents*, the Owner shall issue the *Notice to Proceed* within 10 Days of receipt of the documentation required from the Contractor under paragraph 5.1.1 of the Form of Tender. Failure by the *Owner* to issue the *Notice to Proceed* within the 10 Days shall entitle the *Contractor* to a claim for delay under GC 13.1.1.

SGC 4.6.8 – Add SGC 4.6.8 as follows:

.8 In preparing and updating the *Baseline Construction Schedule*, the *Contractor* shall respect and adhere to the following project scheduling considerations and constraints:

(1) The *Contractor* is permitted to *Work* between the hours of 7:00am to 10:00pm, Monday to Saturday. No *Work* is to occur on Sundays or Statutory Holidays, without prior approval.

4.12 Tests and Inspections

SGC 4.12.4 - Add the following:

As a minimum, the *Contractor* shall perform at their own cost all tests, inspections and approvals of the *Work* necessary for *Quality Control* to ensure materials, products and workmanship are in strict conformance with the *Contract Documents*. The Contractor shall provide the results of such tests, inspections and approvals to the Contract Administrator upon request.

SGC 4.12.6 (2) - Add the following:

Notwithstanding the above:

For Quality assurance purposes, where compaction and material testing services are required, the *Owner* may appoint a material testing subcontractor. The Owner shall pay for such compaction and material testing, except that the Contractor shall be required to pay for any compaction and material testing that is:

- re-testing of areas where previous tests failed;
- required to verify the acceptability of corrected work; or
- performed exclusively for the contractors convenience.

In all cases, the Contractor is responsible to facilitate and provide access to all *Work*s for the purpose of inspection and testing.

Add SGC's 4.12.11 and 4.12.12 as follows:

.11 The Owner will retain and pay for the services of a mutually agreed upon independent testing agency to complete proctor testing in the event of a dispute between quality control and quality assurance test results. The results of the independent testing agency will be considered conclusive.

.12 The cost of failed tests due to non-compliance of the work with the minimum requirements of materials and workmanship shall be paid for by the Contractor. The costs of extra tests will be calculated by the Contract Administrator, based on the invoices submitted to the Owner for testing and will be subtracted from the monthly progress payment.

6.0 OTHER CONTRACTORS

Add the following:

SGC 6.4 Shallow Utility Work By Others

6.4.1 Utility removal, relocation, adjustment or upgrading work may be required to be completed by others within the work area during the project. The Owner reserves the right to make changes in the design and scope of work as a result of conflicting utilities if required. Standard Contract clauses for Changes will apply.

6.4.2 The *Contractor* shall coordinate work with the District Utilities, Gas, Electrical and Communication Companies as required for any conflicts, adjustments or protective measures. The *Contractor* shall permit and accommodate other contractors or companies working within the site on shallow utility work or other utility improvements. Contractor shall remain the Prime Contractor as per GC 21.2.

7.0 CHANGES ‡

Delete GC 7.1.3 and replace with the following:

.3 Additional work that the *Owner* may wish performed that does not satisfy the requirements of subparagraphs (a) and (b) of *GC* 7.1.1(1) is *Extra Work* and not a *Change*. Pursuant to *GC* 8, *Extra Work* may be declined by the *Contractor* or may, upon agreement between the parties, be undertaken as *Extra Work*.

9.0 VALUATIONS OF CHANGES AND EXTRA WORK

9.4 Quantity Variations

SCG 9.4.1 - Delete GC 9.4.1 and replace with the following: ‡

.1 If for any reason, including an addition or deletion under *GC* 7.1.1.(1) or *GC* 7.1.1.(2) respectively, the actual quantity of a unit price item varies by more than plus or minus the *Variance Threshold Percentage* from the estimated quantity for that unit price item as listed in the *Schedule of Quantities and Prices* (the "*Tender Quantity*") or as otherwise agreed to pursuant to these *Contract Documents*, then either the *Owner* or the *Contractor* may by written notice request the other party to agree to a revised unit price, considering the change in quantities. A party shall make a request for a revised unit price as soon as reasonably possible after the party concerned becomes aware of the quantity variation.

Delete GC 9.4.2 (2) and replace with the following: ‡

(2) If there is an overrun in the estimated quantity, *GC* 9.4.3 (2) shall apply to the overrun.

Delete the following portion of GC 9.4.2:

"For reference see Instructions to Tenderers, paragraph 17 regarding prices for *Optional Work*."

10.0 FORCE ACCOUNT COSTS

Delete GC 10.1.1(4) and replace with the following: ‡

(4) Force Account Work Performed by a Subcontractor shall be paid for in the lesser of: (i) the amount as provided by subparagraphs (1), (2) and (3) of this GC, plus a markup of 5%, or (ii) the actual amount the Contractor pays the Subcontractor including a markup of 10% on such actual cost to cover all overhead and profit.

Add SGC 10.1.2 as follows:

.2 Within 15 Days of receipt of the written Notice of Award, the Contractor shall deliver a **Force Account Rate Schedule** to the Owner. The Force Account Rate Schedule shall include hourly rates for all Labour and Equipment intended to be used in completion of the works. These hourly rates are to be 'all-inclusive', or 'all-found'. Labour rates are to be inclusive of wages, insurance, holiday pay, benefits, small tools, overhead, and profit. Equipment rates are to be inclusive of operator, overhead, and profit. Equipment rates are not to exceed BC Road Builders current Blue Book rates.

If the Owner is in agreement with the **Force Account Rate Schedule** as submitted, written acceptance will be given by the Contract Administrator, and the payment for Force Account Work shall be calculated based on the rates included in the **Force Account Rate Schedule** instead of the rates noted in General Conditions item 10.1.1.

However, if the Owner does not agree to the rates shown in **the Force Account Rate Schedule**, or if the Contractor utilizes Labour, Equipment, or Subcontractors whose rates are not shown in the **Force Account Rate Schedule**, then MMCD items 10.1.1 (1), (2), (3), and (4) will be used to determine applicable payment for Force Account Work.

12.0 HAZARDOUS MATERIALS

12.2 Discovery of *Hazardous Materials* ‡

Delete GC 12.2.2 and replace with the following:

.2 If the *Contract Administrator* observes any materials at the *Place of the Work* that the *Contract Administrator* knows or suspects may be *Hazardous Materials* then the *Contract Administrator* shall immediately give written notice to the *Contractor* and the *Contractor* shall immediately stop the *Work* or portion of the *Work* as required by *GC* 12.2.1 (1).

17.0 DISPUTES

17.5 *Referee* ‡

SGC 17.5.2 (2) – Delete GC 17.5.2 (2) and replace with the following:

(2) if the parties have not agreed upon a *Referee* within 3 Days of a submission of names by one party to the other as provided by *GC* 17.5.2 (1), then either party may request in writing the Master Municipal Construction Documents Association to appoint the *Referee*. The Association will have the authority to appoint a *Referee* without further consultation with the parties and the parties shall accept the Association's appointment. If for any reason the Association fails to appoint a *Referee* within 5 Days of the written request then such failure shall be deemed to be an agreement between the parties to omit a review of that *Dispute* by a *Referee* and a party may at the end of the 5 Days request a *Settlement Meeting* and proceed with the remaining steps in the *Dispute* resolution process as described in this *GC*.

18.0 PAYMENT

18.2 Supporting Documentation ‡

SGC 18.2.2– Delete GC 18.2.2 and replace with the following:

.2 If requested in writing by the *Contract Administrator* the *Contractor* shall as a precondition to the issuance of the *Payment Certificate* provide a sworn declaration in a form acceptable to the *Contract Administrator*, that as of the date set out in the sworn declaration all amounts which have been incurred directly by the *Contractor* relating to the *Work* that are due and owing to third parties have been paid.

18.4 Holdbacks

SGC 18.4.2 - Delete GC 18.4.2 and replace with the following:

.2 Defects and Deficiencies: In addition to other holdbacks as provided by the *Contract Documents*, when considering *Substantial Performance*, the *Owner* may hold back from payments otherwise due to the *Contractor* 200% of a reasonable estimate, as determined by the *Contract Administrator*, on account of deficient or defective *Work* already paid for. This holdback may be held, without interest, until all deficiencies or defects are remedied. The items of defect or deficiency and the amounts of related holdbacks shall be listed separately on the *Payment Certificate*.

Add SGC 18.4.6 as follows:

.6 At the time of *Substantial Performance* the *Contractor* is required to provide record drawing information that meets Section 01 33 01 – Project Record *Drawings*. Should the *Contractor* fail to provide the record drawing information, this will be taken to be a deficiency and the *Owner* may hold back $5,000 from payments otherwise due to the *Contractor*. This holdback may be held until record drawing information is submitted and approved by the *Contract Administrator*, and the conditions of SGC 18.4.2 are met.

18.5 Payment

SGC 18.5.1 – Delete the words "15th Day" and replace with the words "30th Day,"

18.6 Substantial Performance

SGC 18.6.3 – Delete GC 18.6.3 (1) and replace with the following: ‡

(1) a sworn declaration in a form in accordance with SGC 18.2.2; and;

SGC 18.6.4 – Delete GC 18.6.4 and replace with the following:

18.6.4 The *Contract Administrator* shall include the date of *Substantial Performance* in the *Certificate of Substantial Performance*. The date for *Total Performance* shall be 14 calendar days after the date of *Substantial Performance unless otherwise agreed by the Contract Administrator.*

Note: ‡ Indicates amendment recommended by MMCD Board

SGC 18.6.5 – Add the following:

The *Contract Administrator* shall prepare a *Payment Certificate* for release of the lien holdback and the amount shall be due and payable in accordance with GC 18.5.1.

SGC 18.6.7 and 18.6.8 - Add SGCs 18.6.7 and 18.6.8 as follows:

.7 If the *Contractor* is unable to complete a portion of the *Work* because of climatic or other conditions beyond the *Contractor's* reasonable control, and the *Work*, or a substantial part of it, is ready for use or is being used for the purpose intended, the uncompleted *Work* may be removed from the calculation for determination of Substantial Performance as outlined in SGC 18.6.8.

.8 If uncompleted *Work* is removed from the calculation for determination of Substantial Performance as described in SGC 18.6.7, a new date for Substantial Performance and Total Performance for the remaining work will be established by the *Contract Administrator* in consultation with the *Contractor*. All Contract provisions for GC 13 Delays and GC 18 Payment shall apply to the remaining work.

21.0 WORKERS COMPENSATION REGULATIONS

21.2 Contractor is "Prime Contractor".

SGC 21.3 – Add the following:

21.3.3 Prior to commencing construction, Contractor to provide the following documents related to Asbestos Cement pipe removal/handling as required to meet Worksafe BC as necessary:

- Exposure Control Plan (Risk Assessments, Safe Work Procedures, Inventories of A/C Pipe);
- PPE and decontamination procedures;
- proper pipe wrap, labeling and disposal;
- submit Notice of Project – asbestos;
- plan developed by a qualified person (CIH, ROH, CSP, CRSP);
- training for all those working at the site (Moderate Level Asbestos Training);
- proper set up of work zone (protect works and the public); and
- fit testing (qualitative or quantitative).

22.0 INDEMNIFICATION

22.1 Contractor to Indemnify

Delete GC 22.1.1 and replace with the following:

.1 The *Contractor* shall indemnify and hold harmless the *Owner* and the *Contract Administrator*,

their agents, employees and elected officials from and against any claims, demands, losses, costs, damages, actions, including all costs and actual legal fees and disbursements, judgments, suits or proceedings by third parties ("Claims") of any nature whatsoever directly or indirectly arising from any breach by the *Contractor* of any of its covenants and obligations under this *Contract* or any negligent or wilful act or omission of the Contractor or its agents, employees, *Subcontractors*, suppliers, invitee, or any other person for whom the *Contractor* is responsible at law. The Contractor shall be responsible, at its cost, for investigating, handling and defending any *Claims*.

Add SGC 22.1.2 as follows:

.2 The *Contractor* shall indemnify the *Owner* from third party liability with respect to health care costs recoverable under the *Health Care Costs Recovery Act* arising out of the *Contractor's* performance of the Contract Work.

26.0 EARLY USE OF THE WORK

26.3 Effect on Maintenance Period

SGC 26.3 - Delete GC 26.3.1 and replace with the following:

26.3.1 There will be no effect on the *Maintenance Period* if the *Owner* takes over and begins to use a portion of the *Work* before *Substantial Performance* is achieved. The *Maintenance Period* for all *Work* shall commence from the date of *Substantial Performance* of the *Contract*.

SCHEDULE 17.5.3 Letter Agreement with *Referee* ‡

Add following Schedule 17.5.3 to Supplementary General Conditions:

Schedule 17.5.3

Letter Agreement with *Referee*

(Name and Address of *Referee*)

Contract:

Reference No.

BETWEEN:

_____

_____

_____

(the "*Owner*")

AND:

_____

_____

_____

(the "*Contractor*")

We write to confirm your appointment as a *Referee* under the above *Contract*. The terms of your appointment are as contained in *GC* 17.5 of the *Contract Documents*. The parties specifically confirm *GC* 17.5.5, *GC* 17.5.13 and *GC* 17.5.14.

We confirm that you agree to review any Disputes in accordance with the *Contract Documents* that may be sent to you by either of the parties, and perform the functions of a *Referee* as described in the *Contract Documents*. The written *Dispute* and related materials, including a copy of the *Contract Documents*, shall be forwarded to you.

We confirm that your daily/hourly rate for fees is $_____. In addition to your invoiced fees the *Owner* will pay any and all reasonable disbursements incurred in providing your services.

Please submit your invoices on a monthly basis directly to the *Contract Administrator*. The *Owner* shall make payment within 20 calendar days of receipt.

Please confirm your agreement to the terms as set out in this letter by signing a copy of the enclosed letter and returning it to the *Contract Administrator*.

Note: ‡ Indicates amendment recommended by MMCD Board

Yours truly,

Authorized Signatory of *Owner*	Date
Authorized Signatory of *Contractor*	Date
Referee	Date

END OF SUPPLEMENTARY GENERAL CONDITIONS

Note: ‡ Indicates amendment recommended by MMCD Board

SCHEDULE “F”

PROJECT SPECIFIC SUPPLEMENTAL SPECIFICATIONS

The Construction Specifications for this project are contained in the Master Municipal Construction Documents (MMCD) Platinum Edition Volume II, 2009, except as specified in the following Supplementary Specifications and MMCD Supplemental Updates (see 1.10 Conflict of Form of Contract). These Supplementary Specifications take precedence over the applicable MMCD Specifications.

If there is any inconsistency or conflict between the provisions of the Supplementary Specifications, then the Supplementary Specifications shall govern and take precedence in the order listed below.

CONTENTS

1.1 Project Record Documents – Section 01 33 01

.1 Add the following to Cl. 1.7.1 – Recording Actual Site Conditions: All deep utilities must be recorded in 3 dimensions as work progresses for Record Drawing purposes and data submitted to C.A. on a monthly basis.

1.2 Traffic Control and Vehicle Access – Section 01 55 00

.1 Kerby Street, Haaland Avenue, Edlund Avenue and Dobbie Street are local roads servicing residential neighborhoods. A minimum single lane alternating access with traffic control will be required at all times.

The Contractor will be required to provide a Traffic and Pedestrian Control Plan prior to construction commencing in "**Rapid Plan**" format as described in the MoT Traffic Control Manual for Work on Roadways (latest edition) and the MoT Traffic Management Guidelines for Work on Roadways (latest edition). Contractors must familiarize themselves with these documents in developing Traffic Control Plans for review by the Contract Administrator and relevant authorities.

All construction signage and traffic control must be in compliance with the above documents, and Bidders are advised not to underestimate requirements. The Contractor shall designate a Traffic Control Supervisor/Site Safety Officer responsible for site safety (pedestrian, wheelchair and vehicular) with specific training as identified in the MoT Traffic Control Manual and Work Safe BC.

The Traffic Control Supervisor must review signage identified in the Contractor's Traffic Plan prior to construction and then on a daily basis.

The Contractor shall provide additional written notice to residents one day prior to property access restrictions. The content and form of the written notifications shall be reviewed and approved by the Contract Administrator prior to delivery. Access for local traffic shall be maintained at all times except when work is proceeding immediately adjacent to a property. Suitable access shall be defined as a bladed and comfortable driving surface sufficient to accommodate a standard two-wheel drive passenger vehicle, medic scooters and wheelchairs.

Public relations related to the Works and Traffic Control Plan are the responsibility of the Contractor and is considered incidental to the work, including all specified temporary traffic control signage, barriers and flag persons.

The Contractor shall provide daily notification and coordination as required with all emergency and public services including Transit, garbage collection, Canada Post, etc.

The Contractor must liaise daily with the residents fronting on the work regarding access restrictions and alternative access measures.

Well graded pedestrian access must be kept in a clean condition and open to pedestrian traffic at all times. Contractor will make provision at all times for adequate separation between public and work area hazards, active and inactive, such as construction

equipment and excavations by means of delineation, barricades or fencing. Trenches, excavations left exposed overnight must be fenced to negate pedestrian access.

Traffic control devices overnight must have high intensity or diamond grade reflective qualities and flashing beacons. Where equipment enters or exits the work area, Traffic Control Persons shall be used.

Failure to comply with traffic control requirements will result in the OWNER coordinating and administering measures to ensure traffic or pedestrian safety at the Contractor's expense equal to cost, plus 15%.

A Block meeting with local residents will be required for Contractor to explain construction schedule, access and safety. This will be held at 5:30 p.m. on a day to be determined. Contractor to deliver notification letter to local residents 48hrs ahead of meeting. The Block Meeting must be scheduled for at least 7 Calendar days before mobilizing on site.

All costs related to traffic control and safety are deemed to be included in the lump sums tendered.

1.3 Temporary Support of Power Poles – Division 26.56.01

.1 Temporary support of power poles is not a separate pay item. Tenderers shall adjust their prices to ensure all costs associated with temporary support of power poles are accounted for within other payment items.

1.4 Excavating, Trenching and Backfilling – Section 31 23 01

Add the following to Cl. 3.5.3.4 – Backfill and Compaction:

It is intended to use native materials for backfill wherever suitable. Only materials deemed unsuitable in the opinion of the C.A. will be approved for disposal off-site and replaced with imported granulars. Native material approved for reuse must be handled, stockpiled and suitably compacted and all costs incidental thereto are deemed to be included in the unit rates tendered.

1.5 Water Supply Disruption Notice – Section 33 11 01

Delete 1.7.3, 1.7.4 and replace with:

.1 Contractor to provide minimum of 48 hours written notification to affected consumers of any impending water service interruption. Affected consumers to be identified in conjunction with OWNER. Contract Administrator will approve text. No services shall be interrupted for more than 8 hours in any one day. If necessary, then temporary service must be provided.

.2 Contractor to provide minimum 24 hours notice to Fire Department of any water system shutdown, or inactivation of hydrants.

.3 Contractor to arrange with OWNER for the operation of any watermain valve. Only

OWNER officials permitted to operate existing system appurtenances. The OWNER will operate valves and inspect cuts, caps and tie-ins to all existing watermains following Contractor testing, disinfection, flushing and approval by the Contract Administrator.

.4 Contractor to provide 48 hours notice to the OWNER prior to tie-in work. Contractor to supply all materials, excavation, bedding, backfilling, compaction, surface gravel, pumps, approved lighting for night work and traffic control required to making tie-ins to existing mains if required.

Flushing procedure modifications to Cl. 3.21

There is no capacity to meet the velocities required to meet AWWA requirements for flushing. Modifications to the flushing procedures are as follows:

- Contractor to ensure new pipe to have end caps in place during transportation and storage on site
- Prior to installation of pipe in trench, Contractor to allow Contract Administrator to observe pipe clear of all debris
- During installation, the last installed pipe to have end cap in place until next pipe installed
- Contractor to arrange with the Regional District for disposal of flushing water

Add the following to Cl. 3.21:

.10 If no testing labs are in close proximity to the project, bacteriological samples may need to be driven or couriered to an accredited lab. It is up to the Contractor to schedule testing so that samples can be delivered within the allowable time limits. At a minimum of one week before bacteriological testing, the Contract Administrator will require a written plan from the Contractor that identifies the Contractor's testing methods and procedures. No testing can commence until the plan has been approved by the Contract Administrator.

1.6 Bonding and Insurance

.1 Bonding and Insurance shall be provided for the execution of the project and include Labour and Materials Bond, Performance Bond and requisite insurance. No separate payment is made for these items. Contractor must blend these costs into their overhead calculations.

1.7 Budget Constraints

.1 The OWNER has a capital budget for this project and intends to remain within the budget. As such, the OWNER reserves the right to reduce or extend the scope of work as required at the unit rates tendered and without penalty as per Cl. 1.10. The OWNER in its sole discretion will decide on additions or deletions to the Scope of Work.

1.8 Photographic Recording of Job Site

Prior to commencing any construction, stockpiling of materials or work on-site, the Contractor shall produce a photographic/video record of the entire job site including centreline alignments of all utilities. One copy is to be provided to the OWNER after the inspection. This shall become a photographic record of the condition of the project prior to construction. Particular attention shall be given to the condition of existing pavements, ditches, landscaping, fences and other improvements. The pre-construction inspection will be done with a representative of the OWNER present.

The data obtained from this record will assist the Contractor in settling any claims that may arise from construction activities.

1.9 Public Notification

.1 The Contractor shall be responsible for public relations including, but not limited to, written notices to residences, where and when detours are occurring. The Contractor's forces shall personally advise those directly impacted (48 hours in advance) of any disruption to access or any other service inconveniences. Costs incurred by the Contractor will be incidental to the Contract.

The costs for media/newspaper releases will be borne by the OWNER and be done through the OWNER's office. The Contract Administrator will require weekly updates of project schedule and milestone objectives.

1.10 Shallow Utility Coordination

.1 BC Hydro/Telus/Shaw/Pacific Natural Gas

New services are required for electrical and natural gas. The contractor will be required to coordinate with the shallow utility provider, as required, to complete the contract scope.

No Tel/Shaw/Fortis upgrades are required on this project.

The Contractor will be required to coordinate and liaise with each utility regarding protection of existing works. All costs related to this are deemed to be incidental to the unit/lump sum prices tendered.

1.11 Disposal Sites

.1 Contractors shall locate their own site for disposal of all soil, rock or other unsuitable or excess material that results from the performance of the contract as per General Conditions, Clause 20.

.2 Disposal of asbestos material must be to a certified waste disposal site. Contractor to provide record of disposal to Contract Administrator.

MEASUREMENT AND PAYMENT

(Section and Item #'s refer to those in Schedule of Quantities and Prices)

This section provides "Measurement for Payment" clauses for items not addressed in the MMCD specifications or provides revised/amended clauses for items included in MMCD. These items have and "SSpec" notation in the 'Payment' column of Appendix A of the Form of Tender.

Note that any minor items not listed in the Form of Tender but typical for this type of work, such as but not limited to utility locates, exploratory digging, protection of utilities, temporary construction fencing, disposal of waste materials, adjustment of existing surface features or appurtenances, removal and replacement of trees, shrubs and landscaping, public relations, miscellaneous fittings, connections or removals shall be considered incidental to the work and no separate payment will be made.

General

- Payments will be made on the basis of the lump sum prices bid and the unit prices bid in the Tender.
- **The lump sum prices bid for various items of work, unless specifically noted otherwise, shall include the supply of all labour, plant, material and product equipment necessary to construct THE WORK in accordance with the specifications, and render it fully operational.**
- **The prices bid shall be full compensation for supplying, hauling, installing, cleaning, testing, and placing in service together with all other work subsidiary and incidental thereto for which separate payment is not provided elsewhere.**
- Materials on Site – Owner may, in their sole discretion, make payment for materials on site for major items of equipment with long delivery times only, e.g. standby generator, HVAC unit, etc. Payment will be made at manufacturer's invoice cost with no mark up provided the equipment is stored in a secure location in Vernon or on-site.
- Payments will be made on the basis of the following:
    a) Lump Sum and Unit Price items in the Schedule of prices in the Tender Forms.
    b) For each Lump Sum item in the Schedule of Unit Prices, the C.A. will, in cooperation with the Contractor, estimate the percentage of the item completed at the end of the payment period.
    c) Where a specific measurement and payment clause is not included, the Schedule of Quantities provides enough detail for defining payments.
- Pre-purchase of Pumps – Contractor to coordinate/liaise with supplier (Aggressive Pumps) for delivery, acceptance and safekeeping on site. All costs related to this are deemed to be incidental to the work for which separate payment is not provided elsewhere.

Item 1.0 – General Requirements

Item 1.01 – Section 01 33 01 – Survey Layout and Record Survey

The lump sum payment will be paid on pro-rata basis as project progresses.

Item 1.03 - Section 01 53 01 – Mobilization/Demobilization

Lump sum payment will be paid on commencement and end of construction as follows:

Mobilization –50%
Demobilization – 50%

A lump sum amount of up to $75,000 is provided in Schedule of quantities for mobilization/demobilization. Costs in excess of this amount are to be spread among relevant unit price items and no other compensation will be made in this regard.

Item 1.04 – Section 01 55 00 – Traffic Control

The lump sum payment will be made as follows:

a) Traffic Control Plan – Payable on review and approval.

b) Construction Zones – Payable as follows:

Lump Sum paid prorated on a monthly basis, based on the percentage of the Contract completed. The prorated amount will be adjusted as and when the Contractor revises their Construction Schedule, subject to the Contractor being compliant with the requirements of its own Traffic Control Plan. The Owner may deduct an amount from any monthly payment so computed for any traffic management work required but not satisfactorily undertaken during the Term. The foregoing determinations will be made at the sole discretion of the Owner in conjunction with the Contract Administrator.

Item 2.0 – Pumphouse – Site Work

Item 2.05 – Section 33 40 01 – 100mm Perimeter Drain

Lump sum item to install perimeter drain through to drywell. Includes drain rock, filter fabric, PVC piping and all related fittings and incidentals for which separate payment is not made elsewhere in the Contract.

Item 2.06 – Section 33 40 01 – 100mm Floor Drain

Lump sum item to install floor drain through to drywell. Includes drain, PVC piping and all related fittings and incidentals for which separate payment is not made elsewhere in the Contract.

Item 2.07 – Section 33 40 01 – 100mm Pressure Relief Drain

Lump sum item to install pressure relief drain through to drywell. Includes tie-in to process piping, PVC piping and all related fittings and incidentals for which separate payment is not made elsewhere in the Contract.

Item 2.08 – Back-up Generator

Lump sum item for the supply and install of the back-up generator. Includes gas service and power connections with PW4, coordination with Pacific Natural Gas, and all related fittings and incidentals for which separate payment is not made elsewhere in the Contract.

Item 3.0 – Pumphouse – Building

Payment will be made on a Lump Sum basis for the supply and construction of a complete, functional pumphouse within the limits of construction for the pumphouse as follows:

"All works up to and including the couplers on both sides of the Production Well PW4 building. Drain lines to be paid separately."

Item 4.0 – Pumphouse – Well

Payment will be made on a Lump Sum basis for the supply and construction of a complete, functional supply well within the limits of construction as follows:

"All works up to and including the flange adapter."

Item 5.0 – WTP Pipeline

Item 5.01 – Section 31 23 01 - Unsuitable Trench - remove and disposal off-site, replace with 150mm minus - as directed by CA

Unsuitable trench (as directed) will be measured in cubic meters in neat trench lines with side slopes not exceeding 0.75:1.0 and include excavation/removal/disposal of waste material and supply, replacement of import gravel, placed and compacted to specified densities.

Imported granular backfill will only be permitted where native material is deemed unsuitable by the C.A. for reuse.

Item 5.02 a – Asphalt Milling - Removal, haul and dispose

Asphalt removal to be measured in square meters for all depths encountered and payment shall include offsite disposal. Saw cutting edges are incidental to the cost of asphalt removal.

Item 5.05 – Section 32 12 16 – Asphalt Pavement, 50mm thickness

Measurement and payment will be based on square meters of paving for the specified depth.

Item 5.12 – Section 33 11 01 – Tie to Existing Watermain

Lump sum item for the tie-in of the new watermain to the existing watermain. Includes restraining couplers (PVC to AC), removal and disposal of asbestos pipe, and all related fittings and incidentals for which separate payment is not made elsewhere in the Contract.

Item 6.0 – Haaland Ave Pipeline

Item 6.01 – Section 31 23 01 - Unsuitable Trench - remove and disposal off-site, replace with 150mm minus - as directed by CA

Unsuitable trench (as directed) will be measured in cubic meters in neat trench lines with side slopes not exceeding 0.75:1.0 and include excavation/removal/disposal of waste material and supply, replacement of import gravel, placed and compacted to specified densities.

Imported granular backfill will only be permitted where native material is deemed unsuitable by the C.A. for reuse.

Item 6.02 a – Asphalt Milling - Removal, haul and dispose

Asphalt removal to be measured in square meters for all depths encountered and payment shall include offsite disposal. Saw cutting edges are incidental to the cost of asphalt removal.

Item 6.05 – Section 32 12 16 – Asphalt Pavement, 50mm thickness

Measurement and payment will be based on square meters of paving for the specified depth.

Item 6.12 – Section 33 11 01 – Future Fire Hydrant Stub

Paid per unit (each) to supply and install new fire hydrant stub. Includes lead, gate valve, restrainers, end cap and all related fittings and incidentals for which separate payment is not made elsewhere in the Contract. Tee paid separately and fire hydrant not included.

1.0 General

.1 Submittals are required in accordance with the provisions of this section to determine whether the specified Material and Product are furnished and installed in accordance with design intent as expressed in the Contract Documents.

.2 Individual submittals as required are detailed in other sections of the specifications.

.3 Until submissions are reviewed, work involving relevant Product or Material may not proceed.

2.0 Identification of Submittals

.1 Identify each submittal and resubmittal by showing at least the following information:

a) Name, address and telephone number of the submitter, and a name of an individual for contact.

b) Drawing number and specification number to which the submittal applies.

c) Whether or original submittal or resubmittal.

d) Confirmation of prior review by the Contractor.

e) Date of submittal or resubmittal.

f) Authorized signature of the Submitter.

3.0 Coordination of Submittals

.1 Prior to submittal for the Contract Administrator's review, coordinate all material:

a) Determine and verify field dimensions and conditions and conformance with specifications, including Material, catalogue numbers, type numbers and similar data.

b) Coordinate requirements between trades.

c) Coordinate with requirements under laws, regulations, etc.

d) Secure required approvals of public agencies, inspection agencies and standards agencies and show proof of approvals acquisition.

e) Indicate any deviations from the intent of design as expressed in the Contract Documents and request specific review of these deviations.

4.0 Timing of Submittals

.1 Make submittals far enough in advance to allow adequate time for coordination, Contract Administrator's review, revisions and resubmittals, and for supply and delivery in time for the scheduled installation in the work.

.2 Allow at least ten (10) calendar days for the Contract Administrator's review after receipt of submittals.

.3 Costs due to delays in making submittals shall be borne solely by the Contractor.

5.0 Shop Drawings

.1 "Shop Drawings" mean custom drawings, product data, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided to illustrate details of a portion of the Work.

.2 Arrange for the preparation of clearly identified shop drawings as specified or as the Contract Administrator may reasonably request. Shop drawings are to clearly indicate materials, methods of construction and attachment of 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 are to indicate their relationship to design drawings and specifications. Notify the Contract Administrator in writing of any deviations in shop drawings from the requirements of the Contract Documents.

.3 Examine all shop drawings prior to submission to the Contract Administrator 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 General Contractor for fabricated items. Shop drawings not stamped, signed and dated will be returned without being reviewed and stamped "Re-submit".

.4 Submit shop drawings with reasonable promptness and in an orderly sequence so are to cause no delay in the Work. Failure to submit shop drawings in ample time is not to be considered sufficient reason for an extension of Contract time and no claim for extension by reason of such default will be allowed. Jointly prepare a schedule fixing the dates or submission and return of shop drawings.

.5 The Contract Administrator 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 Work.

.6 The review of shop drawings by the Contract Administrator shall not relieve the Contractor of his responsibility to ensure that those portions of the Work covered by such drawings meet the specifications, and he shall not rely on the review of the Contract Administrator for quality control.

.7 Review by the Contract Administrator 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.

.8 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.

.9 Shop drawings will be returned to the Contractor with on the following notations:

- When stamped "Reviewed", distribute additional copies as required for execution of the Work.

- When stamped "Reviewed as Modified", ensure that all copies for use are modified and distributed, same as specified for "Reviewed".

- When stamped "Revise & Resubmit", make the necessary revisions as indicated, consistent with the Contract Documents.

- When stamped "Not Reviewed", submit other drawings, brochures, etc. for review consistent with the Contract Documents.

- Only shop drawings baring "Reviewed" or "Reviewed as Modified" shall be used on the Work unless otherwise authorized by the Contract Administrator.

.10 After submittals are stamped "Reviewed" or "Reviewed as Modified", no further revisions are permitted unless resubmitted to the Contract Administrator for further review.

6.0 Operating/Maintenance Manuals

.1 Not less than two (2) weeks prior to application for a Construction Completion Certificate, submit to the Contract Administrator three (3) copies, including an electronic copy, of Operating and Maintenance Manuals containing information required by the specifications. All instructions in the manual shall be in simple language to guide Owner in the proper operation and maintenance of the installation.

.2 Bind contents in a three-ring, hard covered, plastic jacketed binder. Organize contents into application sections of work, parallel to specifications breakdown. Name of facility to be embossed onto binder cover.

.3 In addition to information called for in the specifications, include the following:

a) title sheet, labeled "Operation and Maintenance Instructions", and containing project name and date;

b) list of contents;

c) reviewed shop drawings of all equipment;

d) as-built drawings for all mechanical, electrical, control and alarm installations;

e) full description of entire mechanical, electrical, control and alarm system and operation;

f) authorized signature of the Submitter;

g) name, addresses and telephone numbers of all major Subcontractors and suppliers;

h) operating instructions for all equipment;

i) maintenance instructions of all equipment, including frequency of maintenance tasks;

j) equipment part lists and equipment/valve schedules;

k) emergency operating procedures;

l) certified head/capacity curves for pumps;

m) copy of all wiring diagrams complete with wire coding;

n) copy of all test data; and

o) calibration information procedure for instrumentation.

.4 Each section shall be separated from the preceding section with a plasticized cardboard divider with a tab denoting contents of this section.

.5 The Contractor shall coordinate with the other Contractors completing the work to provide a complete manual, including electrical and site work components.

1.0 Quality

.1 Material and Product supplied and installed shall be new.

.2 Material and Product supplied shall conform to these specifications and to specified standards.

.3 Workmanship shall be the best quality, executed by workmen experienced and skilled in their respective trades.

.4 Ensure full cooperation among all trades and coordination of the Work with continuous supervision.

.5 Use Product for which replacement parts and service are readily available.

.6 Use Product of one manufacturer for Product of the same type or classification. Do not mix different manufacturer's Product in the Work or in parts of the Work.

2.0 Manufacturer's Instructions

.1 Unless otherwise specified, comply with the manufacturer's/supplier's instructions for Material or Product and installation methods.

.2 Notify the Contract Administrator in writing of any conflict between these Contract specifications and the instructions of the manufacturer/supplier.

3.0 Fastenings

.1 Provide metal fastenings and accessories in the same texture, colour and finish as the base metal in which they occur. Prevent electrolytic action between dissimilar metals. Use noncorrosive fasteners, anchors and spacers for securing exterior work, or work that may be located in a corrosive atmosphere.

.2 Space anchors within limits of load bearing or shear capacity and ensure that they provide positive permanent anchorage.

4.0 Delivery and Storage

.1 Deliver, store and maintain packaged Material and Product with manufacturer's seals and labels intact.

.2 Prevent damage and soiling of Material and Product.

.3 Store Material and Product in accordance with instructions of the manufacturer/supplier.

.4 Provide suitable areas or buildings where storage is weatherproof if dry areas are recommended by the manufacturer/supplier.

.5 Product shall have name plates displaying Product data and serial numbers.

.6 Comply with Workplace Hazardous Materials Information Systems requirements.

1.0 Description

.1 This section refers to testing of process mechanical piping and equipment.

2.0 General Testing

.1 Test all equipment and material where required by contract specification or authority having jurisdiction to demonstrate proper operation. All tests shall be witnessed by the Contract Administrator.

.2 Provide all equipment, materials and labour for tests and pay all expenses for conducting same. All instruments shall be tested by an approved laboratory and test results and certificates showing degree of accuracy shall be furnished to the Contract Administrator. If permanent gauges, thermometers, etc. are used for tests, these shall not be installed until just prior to the tests to avoid possible changes in calibration.

.3 Should tests indicate defective work or performance at variance with specified requirements, make all changes immediately to correct the defects.

.4 The Contractor shall be in charge of the work during tests. They shall assume responsibility for damages in the event of injury to the personnel, building or equipment and shall bear all costs for liability, repairs and restoration.

.5 Perform tests as specified and upon completion of mechanical installation, provide certification of tests with detailed data as required. Itemize each test as to time performed and personnel responsible. Obtain certificates of approval, acceptance and compliance with rules and regulations from authorities having jurisdiction. Include these certificates in the Operation and Maintenance manuals. This work will not be considered complete until such certificates have been delivered to the Contract Administrator.

3.0 Performance Testing

.1 After the mechanical installations are completed and pressure tested, conduct performance tests to demonstrate that the equipment and systems actually meet the specified requirements.

.2 Lubricate all bearings, adjust and/or replace and set all direct drives and “V” belt drives for proper alignment and tension; calibrate and adjust all thermostats, thermometers, linkage sequences, check all heaters/motor starters; replace and clean all filters, flush out lies and equipment, remove and clean all strainers; fill all water systems and purge all air; clean fan wheels, heating and cooling coils and fasten all loose and rattling pieces of equipment. Equipment and other apparatus must operate quietly and develop specific capacities. Control valves must operate freely.

.3 Operating tests shall be made on all systems and items of equipment. For conditions to simulate operating conditions to test start up, operation sequence, normal shutdown and all automatic and manual functions.

.4 Furnish written test reports to the Contract Administrator, noting the tests made and any adjustments made.

4.0 Testing Individual Equipment

.1 Every individual item of equipment shall be tested by itself and in combination with related items to ensure that the item and the subsystem are in perfect operating condition, comply with specified requirements and are ready for operation. **A factory representative for specialized equipment must be on site for testing, calibration as required, of pumps, control valve, chlorination system, etc.**

.2 All testing, checking, calibration, adjustments, making of connections, setting, lubrication and other requirements shall be carried out and a brief report submitted to the Contract Administrator for each item tested individually.

.3 Other sections of the specifications may contain specific testing, cleaning, disinfecting, balancing and operation requirements which are to be followed in conjunction with this Section.

.4 Inspection and testing shall include, but shall not be limited to:

a) soundness – without damaged parts;

b) completeness in all details as specified;

c) correctness of setting, alignment and arrangement of parts; and/or

d) adequacy and correctness of packing, sealing and lubrication.

5.0 Commissioning

.1 Commissioning shall include the Contractor's operation of the facilities as a complete system for sufficient time to demonstrate all systems are functioning. Owner will then take over operation under guidance of the Contractor for a period necessary to demonstrate satisfactory performance. **PLC and SCADA programming will be done by Owner's Electrical Engineer (Centrix) and costs thereof paid directly by the Owner. Contractor, however, to coordinate and liaise with Contract Administrator and costs related thereto assumed to be incidental to tender.**

.2 During the commissioning period, the Contractor shall appoint one qualified person to lead the commissioning group of Contractor's personnel, subcontractor's personnel and manufacturer's/supplier's representatives.

.3 Operation of any part of an existing system shall be performed by the Owner only.

.4 The Contract Administrator may order changes in procedure, operation methods or may take whatever actions are necessary to ensure correct commissioning.

.5 During the commissioning period, the Contractor shall demonstrate that the operation of the facility as a whole, as well as all components, is correct and in accordance with the Contract requirements.

.6 All components shall be demonstrated over the entire range of operation specified, including variations in flow, pressures, speeds and controls.

APPENDIX "A"

Geonorth Geotechnical Report

GEONORTH ENGINEERING LTD
3975 18th Avenue | Prince George | V2N 1B2
250-564-4304 | mail@geonorth.ca | www.geonorth.ca

June 12, 2023

Andrew Johnson, P.Eng., PMP
Allnorth Consultants Limited
501-2755 Tutt Street
Kelowna, B.C. V1Y061

File No. K-6011

Dear Mr. Johnson:

Re: Overview Geotechnical Report,
Pumphouse Building for Production Well PW4, Haaland Avenue, Thornhill, B.C

1.0 INTRODUCTION

The Regional District of Kitimat-Stikine has plans to build a new pumphouse building in Thornhill, B.C. for their production well PW4, and to connect PW4 to the Thornhill community water system. Allnorth Consulting Limited are providing consulting civil engineering services for the project, and commissioned GeoNorth Engineering Ltd. (GeoNorth) to provide geotechnical engineering support, based on the scope of work described in your email dated March 2, 2023. This report is based on our review of previous geotechnical reports in the area, geological publications, and well borehole logs from the installation of PW4.

PW4 is a 64.01 m deep, 152 mm diameter well that has been idle since 2010. It is located in a cleared area about 150 m northeast of the junction of Edlund Avenue, Kerby Street, and Furlong Avenue. The site is located above the 200 year flood elevation of 72 m. The well casing has 1.14 m of stick up. The site is primarily surrounded by forest, and is connected to Haaland Avenue by an access road to the northwest. A site photo that you provided, dated January 2023, shows the area is relatively flat and clear of trees and tall shrubs. Snow cover obscured the ground surface.

We understand that the design is yet to be determined, but we understand it to be a small, steel-framed building or kiosk with an above-ground watermain fitting assembly, and potentially an above-ground pump. Photos you provided indicate that the watermain assembly will likely be supported on a grade-supported floor slab.

2.0 BACKGROUND

Map 1557A by the Geological Survey of Canada, titled "Surficial Geology, Skeena River - Bulkley River Area" shows the project area is underlain by a river or kame terrace, primarily consisting of gravel and sand. Our firm is familiar with geological conditions in the area, and have completed several projects in Thornhill and neighbouring Terrace.

2.1 Well Logs

On October 5, 2009, Kala Geosciences Ltd. drilled PW4 to 64.5 m depth using cable tool drilling methods, and classified soil conditions during the drilling process. Soil conditions were observed as sand and gravel to 3.66 m depth, over mixed sand and gravel to 4.57 m, over water bearing sand to 7.32 m, over dry clay, silt and sand to 11.89 m, over sand and fine gravel to 28.65 m, over clay to 31.39 m, over water bearing sand and gravel to 60.96 m. The sand and gravel between 0 and 3.66 m was classified as SW under the United Soil Classification System, indicating that it is well-graded and typically has less than 5% fines. However, this was likely a field estimate by the drillers, and actual gradations can vary. The log did not delineate between fill, if it exists, and natural ground.

3.0 DISCUSSION AND RECOMMENDATIONS

The natural sand and gravel observed in the well log is typical for a river terrace, and will provide suitable support for the proposed building foundations. The gradation and density of the deposit can not be determined from the provided well logs, but natural sand and gravel deposits in the area are typically compact. We expect the sand and gravel to have a moderate bearing capacity, low potential for settlement under typical building loads, and a low to moderate susceptibility to the development of ice lenses that lead to frost heave.

The following recommendations are based on the necessary assumption that the soil conditions encountered during the well drilling are representative of soil conditions elsewhere on the site. Please contact our office for additional recommendations if conditions encountered during construction differ in any way from those described in this report.

3.1 Site Preparation

To prepare ground conditions, remove all existing fill and disturbed soil below the proposed building footprint to expose the natural sandy gravel. If deleterious soil is found below the footings, extend the excavations out laterally from the edges of the footings a horizontal distance equal to the depth of excavation required below the footings. Install buried water lines located below and within a 1 horizontal to 1 vertical (1H:1V) slope down from the building perimeter

prior to constructing building foundations. Bring the excavations and areas within 1H:1V of the building foundations to grade using structural fill that meets the gradation specification for Select Granular Subbase (SGSB), defined in Table 1 below. We recommend several samples of the local gravel be tested to check whether it meets the gradation specification for SGSB. Place the fill in uniform layers and compact each layer to at least 100% Standard Proctor Density (SPD) (ASTM D698). Layer thickness will depend on several factors, including the size and weight of the compactor, and the moisture content and temperature of the soil, but do not exceed a layer thickness of 300 mm.

Table 1 - Specified Gradation for Granular Fill

Sieve Size (mm)	Percentage Passing		
	Well Graded Base	Select Granular Subbase	Drain Rock
100	-	100	-
75	-	95-100	-
40	-	-	100
25	100	-	-
19	80-100	35-100	0-100
9.5	50-85	-	-
4.75	35-70	15-60	-
4	-	-	0-10
2.36	25-50	-	0-5
1.18	15-35	-	-
0.300	5-20	3-15	-
0.075	0-5	0-5	0-2

For WGB, use crushed and screened material that meets the B.C. Ministry of Transportation and Infrastructure Standard Specifications. The SGSB can be a pit run material that meets the above gradation. Use durable aggregate that will not degrade from exposure to water, freeze-thaw cycles or handling, spreading or compacting. It must not contain organic materials or an excess of flat or elongate stones. Do not place fill that is frozen and do not place fill on frozen ground.

3.2 Building Foundations

We recommend that spread footing foundations supported on the natural sand and gravel or on compacted structural fill as described in Section 3.1 be designed using a factored bearing resistance of 300 kPa (for limit states design) and an allowable bearing capacity of 200 kPa (for serviceability conditions). Use a minimum footing width of 450 mm for strip footings and 600 mm for pad footings.

Provide at least 1.2 m of cover over exterior perimeter footings, and at least 1.8 m if the footing will not be warmed by building heat, measured from the base of the footing to the adjacent final ground or slab surface. Use a maximum slope of 2 horizontal to 1 vertical (2H:1V) between footings at different elevations, unless site specific analysis indicates that steeper angles are appropriate. Step strip footings that cross areas of different elevations using a maximum vertical rise of 600 mm between horizontal steps. Construct the steps at an overall slope no steeper than 2H:1V.

3.3 Grade-Supported Concrete Slabs

The site preparation noted in Section 3.1 will provide adequate support for the proposed grade supported slab. If the building is considered to be an occupied space, as defined in B.C. Building Code section 9.13.4.2, place at least 100 mm of drain rock, as defined in Table 1, below the slab to meet radon mitigation requirements. If radon gas mitigation is not required, place a minimum 100 mm thick layer of WGB, as defined in Table 1, and compact it to at least 100% SPD**.** Provide a sleeve for pipes and conduits that passes through the slab, to allow pipes to move independently of the slab.

3.4 Buried Utilities

The City of Terrace specifies at least 1.8 m of soil cover over water mains.

Use temporary slopes for trench excavations in dry sand and gravel no steeper than 1.25H:1V. Excavations will stand unsupported at this angle but shallow instability may develop, such as ravelling of the sides of the trench, from vibration of nearby mobile equipment. We recommend that a geotechnical engineer review excavations if loose material or organic soils are encountered, if seepage is observed, and if excavations are more than 6 m deep.

Excavate the trench bottom to a width equal to the pipe diameter plus at least 600 mm to allow room for equipment to compact on each side of the pipe. Place at least 100 mm of WGB, sand containing less than 10% fines, or other materials approved by the pipe manufacturer below the pipes and up to 200 mm above, and compact the bedding to at least 95% SPD. Fill trenches

within a 1H:1V slope down from the building perimeter using a compacted structural fill as described in Section 3.1. Below roads, parking lots, and other structures sensitive to settlement, fill above the pipe bedding using mineral soil free of organic material or debris, with a maximum particle size of 150 mm, and at a moisture content that will allow it to be compacted to the specified density. Place the trench fill in uniform layers no thicker than 300 mm, compact each layer to at least 98% SPD, and to at least 100% SPD in the top 300 mm of subgrade. Compact trench fill outside these areas to at least 95% SPD.

4.0 Construction Review

We recommend that an experienced engineer or his designate, or a Building Official carry out construction review and testing of the following:

- all foundation excavations, and
- all compacted fill supporting structural components of the building.

The foundation excavation review will include checks that soil conditions are as expected and that the base is free of water or sloughed or loosened soil. If soil conditions are different than expected, we can provide recommendations for remedial measures, as required.

We recommend that an experienced geotechnical technician review the placement and compaction of all structural fill, starting with the first layer, to confirm that the fill materials and soil density meet the project specifications.

4.0 CLOSURE

This report was prepared by GeoNorth Engineering Ltd. for the use of Allnorth Consultants Limited, the Regional District of Kitimat-Stikine, and their consultants. The material in it reflects GeoNorth Engineering's judgement in light of the information available to us at the time of preparation. Any use which Third Parties make of this report, or any reliance on decisions to be made based on it, are the responsibility of such Third Parties. GeoNorth Engineering Ltd. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Please contact the writers if you have any questions or if any part of this report needs to be clarified.

Yours truly,
GeoNorth Engineering Ltd.

Per: G. Dakus, EIT

Reviewed by,
GeoNorth Engineering Ltd.

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
D. J. McDOUGALL
14614

Per: D.J. McDougall, M.Eng., P.Eng.

GEONORTH ENGINEERING LTD.
PERMIT TO PRACTICE No. **1001102**
ENGINEERS AND GEOSCIENTISTS BRITISH COLUMBIA

Enclosures: Site Plan Showing Well Location - Drawing 6011-A1
Well Completion Diagram PW4 - 1 Page

NOTE:

SITE PLAN BASED ON DIGITAL INFORMATION TAKEN FROM Google earth, © 2023 Google, Image © 2023 CNES/Airbus.

Note: Drawing is included for information purposes only and is to be interpreted with the corresponding Geotechnical Report.

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ALLNORTH CONSULTANTS LIMITED
UPGRADE TO PRODUCTION WELL PW4
FURLONG AVENUE, THORNHILL, B.C.
SITE PLAN SHOWING WELL LOCATION

SCALE:	1:4000	DATE:	2023/06/12
DRAWN BY:	LU	REVIEWED BY:	DJM
PROJECT NO:	K-6011	DWG NO:	6011-A1

Date Started	: October 5, 2009	Drilling Company	: Industrial Drillers Ltd
Date Completed	: January 19, 2010	Northing Coord.	: 54° 31' 54.1"
Well Diameter	: 406 mm	Easting Coord.	: 128° 30' 21.1"
Drilling Method	: Cable Tool	Kala Rep	: KM
Sampling Method	: Core		

Depth in Meters	MUSC	GRAPHIC	Surf Elev. 99	Soil Description
0	SW		99	sand and gravel — 3.66 m
5	GP		94	mixed sands and gravel. — 4.57 m
	SP			Water bearing sands. — 7.32 m
10	CL/ML		89	Clay, silt and sand. Dry. — 11.89 m
15	SP/GP		84	medium sand, trace fine gravel. — 16.76 m
20	SP/GP		79	sand and fine gravel (dry) — 28.65 m
25			74	
30	CL		69	blue clay — 31.39 m
35	GP		64	water bearing sand and medium to fine gravel. — 53.34 m
40			59	
45			54	
50			49	
55	GP		44	clean medium to coarse gravel. — 60.96 m
60			39	
	GP/SP			coarse gravel and coarse sand 5.05 L/s
65				

Well Construction Information

WELL CONSTRUCTION

Date Compl.	: January 19, 2010
Hole Diameter	: 508 mm
Drill. Method	: Cable Tool
Company Rep.	: KM

SURFACE CASING

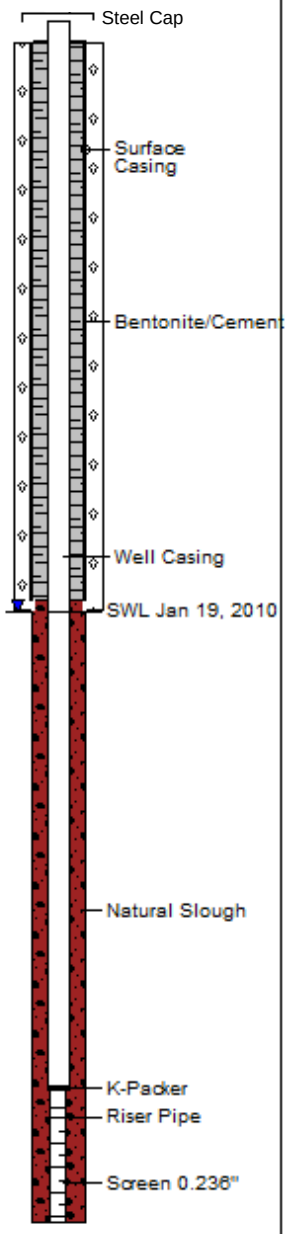
Material	: Steel
Length	: 30.48 m
Diameter	: 508 mm

WELL CASING

Material	: Steel
Length	: 58.44 m
Diameter	: 406 mm
Stick-up	: 1.14 m

WELL SCREENS

K-Packer riser	: 57.00 m
K-Packer "lip"	: 57.10 m
Assembly Length	: 0.30 m
Material	: Telescopic Steel
Diameter	: 406 mm
Slot Size	: 0.000" (Riser)
Depth Range	: 57.3 m - 58.2 m
Slot Size	: 0.236"
Depth Range	: 58.2 m - 64.5 m



KALA GEOSCIENCES LTD
Groundwater · Wastewater · Environmental

Client: Regional District of Kitimat-Stikine

Project: Stage 1 Hazard Screening of Groundwater at Risk or Containing Pathogens (GARP)
Terrace, BC

Date: Jul 2015

Drawn By: KG

Approved By: YY

Ref: 15053

Fig: 5

D.Ref: 15053.5

Scale: Not Applicable

Ref: Kala Project 09100

Figure Name: Well Completion Diagram – PW4

APPENDIX “B”

General Electrical Specifications

Regional District of Kitimat-Stikine
(Production Well No.4)
General Electrical Specification
2203417-1680-GES-001

Prepared For:	Regional District of Kitimat-Stikine
Submitted By:	Allnorth Consulting Ltd. 300 – 125 Wallace Street Nanaimo, BC V9R 5B2 Canada Phone: 250-753-7472
Allnorth Contact:	Jayson Laron, P. Eng.
Allnorth Project Number:	2203417
Date:	13-March-2024

DOCUMENT INFORMATION

Project Number:	2203417
Filename:	2203417-1680-GES-001
Document Revision:	0

REVISION HISTORY

Rev.#	Date of Issue	Prepared By	Reviewed By	Approved By	Description
0	2024/03/13	NBF	AJ	JBL	Issued for Tender

Prepared By:

Nathaniel Fortems, EIT
Electrical Engineer in Training

Reviewed By:

Andrew Johnson, P.Eng, PMP
Project Manager

Approved By:

Jayson Laron, P.Eng.
Electrical Engineer

PERMIT TO PRACTICE
ALLNORTH CONSULTANTS LIMITED
PERMIT NUMBER:
1002935
Reg No: 54120 Signature:
Date: 13 Mar. 2024
Engineers & Geoscientists British Columbia

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
J. LARON
56113
2024-03-13

TABLE OF CONTENTS

APPENDICES

1 SCOPE

1.1 Background

The objective of this General Electrical Specification (GES) is to clearly define the scope and technical requirements for the electrical and instrumentation (E&I) equipment and associated materials for the new Production Well No.4 (PW4) at Regional District of Kitimat-Stikine (RDKS) in Thornhill, British Columbia.

This GES provides a description of the E&I installation and construction work to be completed by the Electrical & Instrumentation Contractor and will provide the technical content for a Construction Work Package (CWP), if required.

1.2 General

1. This specification covers the minimum requirements of all electrical construction work as detailed on the Construction Drawings.
2. This specification is intended to be used by the installation and/or construction Electrical Contractor, other Contractors, and packaged equipment suppliers to ensure that the installation of all equipment and materials conform to applicable standards, codes, specifications, and drawings.
3. Further specific requirements are provided in the electrical and instrumentation drawings and lists as applicable.

2 APPLICABLE CODES, REGULATIONS, SPECIFICATIONS AND STANDARDS

2.1 Regulations, Codes and Standards

1. All equipment, materials, construction, and installation shall comply with the requirements of the Canadian Electrical Code (latest edition) and the applicable latest specifications, codes, standards of all authorities having jurisdiction.

2.2 Conflict Between Specifications, Codes and Standards

1. Where a discrepancy occurs between this specification and any specification, regulation, code, or standard that has been specified for a particular service, or item of equipment, then OWNER shall be consulted and a ruling in writing shall be obtained before any work is started.
2. Where regulatory codes or regulations conflict with this specification, the more technically stringent specification shall govern.
3. Where a conflict occurs between the documents explaining the work, the following order of precedence shall govern, as they apply:
    a. Contract (or Purchase Order);

b. Scope of work (or Scope of Supply);

c. Data Sheets & drawings;

d. Owner Specifications; and

e. Industry Standards.

2.3 Deviations and/or Variances

1. Requests for exceptions and deviations arising during bid preparation shall be submitted at the time of bid and shall be resolved prior to proceeding with further consideration of the bid or award of the contract.
2. After award, any requests for exceptions and deviations arising during execution of the work shall be submitted back for OWNER's consideration prior to proceeding with the affected work.
3. Site construction, operations, and maintenance requests for deviations shall follow OWNER's existing Policies and Procedures.
4. Typical deviation requests requiring approval are items such as, but not limited to:
    a. specifications or design;
    b. control logic or philosophy;
    c. approved drawings;
    d. drawings issued for construction;
    e. specified material properties; and
    f. defined installation, operation, or maintenance practices or procedures.

3 DEFINITIONS AND TERMS

3.1 Language Use

1. The language use and terms below have been defined to ensure correct interpretation where such terms (or their derivatives) appear throughout this specification:
    a. "**Must**" - is a mandatory requirement which is required to meet legislative requirements.
    b. "**Shall**" - is an absolute requirement, which is to be followed strictly in order to conform to the standard.
    c. **"Should**" - is a recommendation. Alternative solutions that have the same functionality and quality are acceptable.
    d. **"May**" - indicates a course of action that is permissible within the limits of the standard permission.
    e. **"Can**" - is conditional and indicates a possibility open to the user of the specification.

3.2 Terms

1. In this specification, unless the context states otherwise:
    a. "**OWNER**" - shall mean the OWNER of the facility where the work is performed.
    b. **"CONTRACTOR"** or **"SUB-CONTRACTOR"** - shall mean the party performing electrical installation or construction activities, including the supply of electrical materials.
    c. "**ENGINEERING CONSULTANT**" – shall mean the organization/person that is designing and specifying a project on behalf of the OWNER.
    d. "**VENDOR"** or **"SUPPLIER**" - Shall mean the party or parties engineering, designing, specifying and supplying packaged equipment.

3.3 Acronyms

1. In this specification, unless the context states otherwise:

Table 1 – Acronyms

ACIC	Armoured Control & Instrument Cable (Cable type)
AWG	American Wire Gauge
CPT	Control Power Transformer
CT	Current Transformer
EMT	Electrical Metallic Tubing (Conduit)
FCAN/FCBN	Full Capacity Above/Below Nominal
FRE	Fiberglass Reinforced Epoxy (Conduit)
FT4	Flame Test Rating (Cable marking)
LCD	Liquid Crystal Display
LED	Light Emitting Diode (Light fixture)
MCC	Motor Control Center
PVC	Polyvinyl Chloride (Cable insulation/jacket material)
RA	Rigid Aluminum (Conduit)
RGS	Rigid Galvanized Steel (Conduit)
RTD	Resistance Temperature Device
TECK	TECK Cable (Cable type)
THD	Total Harmonic Distortion
XLPE	Cross-Linked Polyethylene (Cable insulation material)

4 GENERAL SCOPE OF WORK

1. The CONTRACTOR shall be responsible for the complete supply and installation of all electrical and instrumentation equipment required for a full, operable, and code-compliant implementation of the pumphouse building.
2. The CONTRACTOR's work described herein shall specifically exclude any programming effort.

4.1 UTILITY SERVICE POLE AREA

1. The CONTRACTOR shall supply and install a utility service pole, in coordination with BC Hydro.
2. The utility service pole shall include a circuit breaker and meter socket, as described in the attached drawings and documents.
3. The utility service pole location must be installed according to the conditions present in the field. At minimum, the CONTRACTOR must ensure:
    a. the utility service pole is located within 30 m of an existing BCH utility pole; and
    b. the utility service pole is accessible via bucket truck.
4. The utility service pole shall include connections made by the CONTRACTOR and the UTILITY. The UTILITY shall be responsible for connecting UTILITY power to the primary side of the disconnect and installing a meter inside the meter socket on the utility service pole. The CONTRACTOR shall be responsible for all other connections.

4.2 PUMPHOUSE BUILDING

1. The CONTRACTOR shall supply and install all electrical and instrumentation equipment inside and around the pumphouse building according to the attached documents and drawings, as well as this specification. This will include, but not be limited to:
    a. electrical equipment;
    b. instrumentation;
    c. lights;
    d. antennas;
    e. cables;
    f. raceway; and
    g. grounding materials.
2. The CONTRACTOR shall install all electrical and instrumentation equipment according to the manufacturer's recommendations, this specification, and attached drawings and documents.
3. Unless explicitly noted otherwise, the CONTRACTOR is responsible for the installation of all materials required for a complete installation of all equipment, including housekeeping pads, bracing, anchors, and any other materials required for the complete installation of any electrical component.
4. The CONTRACTOR shall make all necessary connections between instruments and electrical equipment inside and outside the pumphouse building. These connections will include, at minimum:
    a. all connections described in the attached drawings and documents, as well as this specification; and
    b. all connections required to make the finished work complete and fully operable.

5. It should be noted that some parts of the CONTRACTOR's scope of work in the pumphouse building, especially the installation of grounding materials, underground raceway and cables, and instrumentation, will necessitate coordination between the CONTRACTOR and the contractors installing the piping and building foundations. This coordination shall be the full responsibility of the CONTRACTOR.

4.3 FIELD AREA

1. The CONTRACTOR shall supply and install all electrical and instrumentation equipment inside and around the pumphouse building according to the attached documents and drawings, as well as this specification. This will include, but not be limited to:
    a. electrical equipment;
    b. instrumentation;
    c. raceway;
    d. cables; and
    e. grounding materials.
2. The CONTRACTOR shall make all necessary connections between instruments and electrical equipment inside and outside the field area. These connections will include, at minimum:
    a. all connections described in the attached drawings and documents, as well as this specification; and
    b. all connections required to make the finished work complete and fully operable.
3. It should be noted that some parts of the CONTRACTOR's scope of work in the field area, especially the installation of grounding materials, underground raceway and cables, and instrumentation, will necessitate coordination between the CONTRACTOR and the contractors installing the piping and building foundations. This coordination shall be the full responsibility of the CONTRACTOR.
4. The installation of the Generator in the field area will include the connection of a natural gas connection. The CONTRACTOR shall coordinate with the party performing the installation of the natural gas connection to ensure that the connection can be made.
5. The installation of the PW4 pump in the field area (the PW4 well) is a process that will require close coordination between the CONTRACTOR and the party performing the piping installation. It shall be the responsibility of the CONTRACTOR to coordinate with the party to complete this installation according to the specifications, attached drawings and documents, and the manufacturer's recommendations.

5 GENERAL MATERIAL REQUIREMENTS

5.1 Material Selection and Supply

1. All materials and equipment supplied by CONTRACTOR shall be new and must be certified for use in the location they are installed in by an accredited certification body, in accordance with the certification body's terms of accreditation and shall bear evidence of this in the form of markings or labels authorized by that certification body and displayed in a conspicuous place on the equipment. Material not fulfilling this criterion will be rejected.
2. Equipment that is not certified by one of the accredited certification bodies shall require special inspection and approval by one of the accredited inspection bodies in accordance with that body's terms of accreditation and shall bear evidence of this in the form of labels authorized by that inspection body and displayed in a conspicuous place on the equipment.
3. Where equipment or materials are specified by technical description only, they shall be of the best commercial quality available for the purpose.
4. All components and material shall be of the latest field proven design and in current production. Obsolete components or those scheduled for discontinuation shall not be used.

5.2 Conduits

1. Unless otherwise specified, conduits and fittings inside the building shall be rigid aluminum, or Rigid Galvanized Steel (RGS), minimum 21 mm (NPS 3/4).
2. Electric metallic tubing (EMT) may be used in general-purpose, indoor, dry, non-hazardous locations where the conduit will not be subject to physical damage, such as office buildings, electrical rooms, or other appropriate locations.
3. Underground or concrete-encased conduit or sleeves shall be rigid PVC unless otherwise specified on the drawings or documents.

5.3 Wire and Cable

1. Wire and cable sizes shall be in accordance with those shown on cable schedules, wiring diagrams and other specifications.
2. Power cables for 600 V service shall be CSA type TECK90, -40°C rated, FT4 constructed to CSA C22.2 No. 131, with stranded copper conductors, 1000V 90°C RW90 XLPE insulation, stranded copper bonding conductor, aluminum interlocked armour with overall black PVC jacket. Conductor insulation shall be red, black and blue.
3. Control cables shall be CSA type TECK90 constructed to CSA C22.2 No. 131, with stranded copper conductors, insulation voltage rating 600 V (rated for the highest voltage present), 90°C, RW90, XLPE insulation, aluminum interlocked armour, FT4 and an overall black PVC jacket. Conductor insulation shall be black, with individual conductor's number coded.

4. Instrument cables (twisted pairs and triads) shall be CSA type ACIC constructed to CSA C22.2 No. 239, with tinned stranded copper conductors, minimum 300 V PVC or RW90 XLPE insulation, FT4, individual pair/triad and overall tape shield and stranded tinned copper drain wire. Each pair shall be individually jacketed. Twisted pairs shall be color coded black (negative) and white (positive/signal). Triads shall be color coded black (negative), white (positive), and red (signal).
5. Unless otherwise specified in the issued drawings, power conductor wiring shall be colour coded as follows:
    a. 1 phase, 2 wire – black (phase) and white (neutral)
    b. 1 phase, 3 wire – black (phase A), red (phase B) and white (neutral)
    c. 3 phase, 3 wire – red (phase A), black (phase B), blue (phase C)
    d. 3 phase, 4 wire – red (phase A), black (phase B), blue (phase C), and white (neutral).
6. TECK cables shall be terminated using watertight CSA approved TECK connectors.
7. Where cable lengths are shown on drawings or cable schedules, the CONTRACTOR shall confirm the lengths by direct measurement before any cable is cut and pulled.
8. The CONTRACTOR shall use proper pulling techniques, so the cable is not bent into smaller than designated radius, subjected to greater than allowable pulling tension, or exposed to damaging abrasions during installation.
9. The CONTRACTOR shall not splice cable unless indicated on the drawings, or the OWNER has given prior approval.
10. Where cable separation is required, cables in cable trays shall be fastened using ty-rap type cable ties (1 m for vertical and 3 m for horizontal).
11. The minimum wire size for power and lighting conductors shall be #12 AWG.
12. The minimum wire size for control wire shall be #14 AWG.
13. The minimum wire size for instrumentation wire shall be #16 AWG for pairs and #18 AWG for triads.
14. Wiring for different voltages shall not be permitted within the same cable. Composite motor feeder cables shall not be used unless approved by OWNER.
15. Wiring for DC and AC signals shall not be mixed within the same cable.
16. Cables shall be identified with a stainless-steel tag with the appropriate inscription stamped on it.
17. Tagging of conductors shall correspond with the numbers used on the electrical drawings. The conductors shall be tagged at each end of termination. Printed heat shrink must be used.

5.4 Cable Tray and Wire-ways

1. Tagging of conductors shall correspond with the numbers used on the electrical drawings. The conductors shall be tagged at each end of termination. Printed heat shrink must be used.

2. Cable tray shall be installed in accordance with the C.E.C. Part one (1), Section twelve (12).
3. Cable tray shall be located in accordance with the OWNER'S drawings. Any deviation from the indicated location shall require the OWNER'S prior approval.
4. Unless specified otherwise, all cable trays shall be CSA, Class E rated, hot dig galvanize ladder type with 150 mm (6") side rails and 225 mm (9") rung spacing.
5. The cable tray system shall be complete, free from foreign matter and rough edges, prior to the cable being installed.

5.5 Antennas

1. The CONTRACTOR is responsible for the complete supply of all the antennas as depicted in the attached drawings and documents.
2. The CONTRACTOR shall ensure that the antennas are compatible with the voltages and connection types detailed in the attached drawings and documents.

5.6 Temperature Control

1. The CONTRACTOR is responsible for the complete supply of all the heaters, exhaust fans, and thermostats as depicted in the attached drawings and documents.
2. The heater, exhaust fans, and thermostat shall be designed for the voltages and ratings specified on the drawings and documents.
3. The heater and exhaust fans shall be controlled by a thermostat installed inside the pumphouse building.

5.7 Control Panel

1. The CONTRACTOR is responsible for the complete supply of the control panel, according to the attached drawings and documents.
2. The control panel shall be designed for the voltages and ratings specified on the drawings and documents.

5.7.1 Structures and Components

1. The control panel is to be installed inside the wall mounted enclosure specified on the attached drawings and documents.
2. Panel control wiring is to be #16 TEW stranded, 600 V.
3. Colour coding for panel wiring shall be as follows:
    a. Black – AC Power;
    b. White – AC Neutral;
    c. Red – AC Control;

d. Blue – DC +; and

e. Yellow – DC-.

4. ScadaPACK I/O may be wired with #18 stranded multiconductor, 300 V rated cable.
5. All wiring to doors to be bundled with sufficient slack to allow doors to open fully. Wiring bundles shall not twist at door or bend. Wiring bundles shall be protected with spiral wrap and will be fastened to the enclosure and door.
6. All components shall be arranged to leave the maximum possible space for future reuse.

5.7.2 Communications

1. The communication protocol to be used for the Control Panel shall be Ethernet/IP.
2. The Control Panel shall include an internal ethernet switch, networked to components inside the control panel as shown on the attached drawings and documents.
3. Communications cabling shall be industrial rated, shielded and of a type as specified on the attached documents and drawings.

5.7.3 Accessories/Special Tools/Spare Parts

1. The VENDOR shall supply a complete list of recommended special tools, accessories, and spare parts, for the handling, installation, operation, and maintenance of the control panel. This shall include, at minimum, 5 spare fuses for each type of fuse supplied.

5.8 Lighting System

1. In order to provide illumination as intended by project specifications and associated lighting calculations, light fixtures shall be supplied per manufacturer and part number as specified on drawings and/or bills of materials, except where equivalent or equal fixtures are permitted by written approval by the OWNER and the ENGINEERING CONSULTANT.
2. Exterior light fixtures shall be Light Emitting Diode (LED) type.
3. Light fixtures in process buildings, indoor hazardous locations or indoor locations with rotating machinery shall be Light Emitting Diode LED type.
4. Fluorescent or LED fixtures may be used for non-hazardous indoor application such as offices, washrooms, control rooms or electrical buildings.
5. Light fixtures shall be suitable for the environment and approved for the area classification and temperature code of the location in which they are installed.

5.9 Wiring Devices

1. Light switches, receptacles, control stations and other devices shall be suitable for the environment and approved for the area classification of the location in which they are installed.

2. Devices shall be supplied per the manufacturer and part number as specified on drawings and/or bills of materials, except where equivalent or equal fixtures are permitted with approval by OWNER.

5.10 Utility Service Pole

1. The CONTRACTOR is responsible for the supply of a complete and functional utility service pole.
2. All equipment on the service pole shall be designed for the voltages and ratings specified on the attached drawings and documents.
3. The utility service pole shall be designed for safe installation at the final field location. This includes appropriate bracing and anchoring for the service pole, as well as the installation of electrical equipment on the service pole.
4. The utility service pole shall include a meter socket and service disconnect.

5.11 Instrumentation

1. The CONTRACTOR is responsible for the complete supply of all instruments as depicted in the attached drawings and documents, with the sole exception of the limit switch connected to the pressure relief valve, which shall be supplied by other parties.
2. The CONTRACTOR shall ensure that all instruments are designed for the voltages and ratings specified on the drawings and documents.

5.12 Motor Control Centers

1. The CONTRACTOR is responsible for the supply of a complete, safe, economical, operable and maintainable MCC assembly, including all necessary equipment and devices to achieve the required functionality, whether included in this specification or not.
2. The MCC shall be designed for the voltages and ratings specified on the drawings and documents. All equipment must be fully operable within the following supply variations: voltage +/-10%; frequency +/- 5%.
3. All components and materials shall be new and in undamaged condition. All components and material shall be of the latest field proven design and in current production. Obsolete components or those scheduled for discontinuation shall not be used.
4. The MCC series and manufacturer shall be as indicated on the drawings and documents.
5. The MCC shall include, at minimum, the following sections:
    a. Qty.1 combination fused disconnect and VFD;
    b. Qty.2 fused disconnects;
    c. Qty.1 surge arrestor; and
    d. Qty.1 automatic transfer switch.

5.12.1 Structures and Components

1. The MCC shall be a free-standing metal-enclosed structure, rated at NEMA Type 1A (gasketed), general purpose for indoor use.
2. The MCC shall consist of vertical sections, assembled into a group that has a common power bus and forms a structure to which additional sections may readily be added for future expansion. The structure shall have uniform height and sections shall be front aligned.
3. Each vertical section of an MCC shall be subdivided into compartments containing the various control and protective devices. Each compartment shall have a nameplate identifying its service by name or equipment number, as specified on the SLDs and/or approved MCC drawings.
4. All MCC components shall be completely accessible from the front of the structure and arranged so that field connections can be made from the front.
5. Removable lifting devices shall be provided for each shipping section, suitable for lifting each shipping section with all equipment installed.
6. All draw-out units in the MCC shall have a withdrawable stab assembly allowing the primary voltage to be disconnected with the unit door closed (i.e., closed door racking).
7. Barriers inside the MCC shall isolate:
    a. Individual compartments in vertical sections;
    b. All wireways from buses and individual compartments; and
    c. Individual compartment and bus system
8. All protection relays, meters, control and selection switches, push-buttons and indicating lights shall be mounted on a hinged front panel of each section. No instruments or controls shall be mounted in the top horizontal wireway.
9. A schematic pocket shall be included for each MCC compartment.
10. Each MCC section shall be supplied with removable gland plates at the location of cable entry to the section.
11. Pilot lights shall be push-to-test LED cluster type with diameter of 25 mm or larger. Pilot light type, make, model and voltage will be common throughout the MCC line-up.
12. Operating devices on the Main Incoming Section or any instrument compartment must not be higher than 1600 mm. This also applies to motor protection relays with digital displays.
13. Power and control fuses shall be accessible for replacement without the need to remove any components from the control device assembly or to disconnect any of the assembly wiring.
14. Compression lugs for power cables shall be NEMA 2-hole, long barrel type, sized for the cables as specified in the construction drawings and documents.
15. Warning labels and device nameplates mounted on the rear of equipment doors and on interior panels shall be located so they are not obscured by wiring or other components.

16. All MCC assemblies shall have arc flash hazard markings that comply with CSA C22.1 Canadian Electrical Code, Part I.
17. All PT and CT circuits must have a grounded secondary. CT secondary circuit wiring shall be #10 AWG minimum where CTs and the protective relay are not integral with the breaker.
18. Aluminum shall not be used for current carrying parts of the MCC without the specific written approval of the OWNER and the ENGINEERING CONSULTANT.
19. A wiring identification system shall be provided for all secondary circuits to facilitate trouble-shooting and maintenance. System may consist of colour coding, printed identification on the wires, securely mounted wire markers at each end of a circuit wire, or a combination of these methods. All wire tags shall be clearly readable after installation.
20. The MCC assembly shall include an internal surge protector. This surge protector shall be specified as per VENDOR recommendations when given the information available on the drawings and documents.

5.12.2 Bussing

1. The MCC shall include main horizontal and vertical buses. Horizontal bus shall have a minimum continuous rating of 600 amperes. Vertical bus shall have a minimum continuous rating of 400 amperes. Lower vertical bus rating may be acceptable where no future growth is possible (i.e., fully populated sections).
2. All main buses shall be insulated, tin-plated copper.
3. All main buses shall be braced and supported to withstand, without damage or degradation, the stresses produced by a 42 kA short-circuit current.
4. All main buses shall be isolated by metal or insulated barriers and be inaccessible from the wireways.
5. The vertical bus shall include automatic shutters that isolate the bus from accidental contact when starters are withdrawn.
6. The MCC shall include a full-length horizontal ground bus. Ground lugs shall be provided at both ends of the horizontal ground bus for #2/0 to #4/0 AWG ground cables.
7. Each vertical section shall also include a vertical ground bus.
8. The ground bus shall be tin plated copper, and be a minimum size of 6.5 mm x 25 mm.
9. The ground bus shall be permanently connected to all stationary parts of the structure and incorporate a connection with individual plug-in units in such a manner that the ground connection is not broken before the unit is fully disconnected from the power bus.

5.12.3 Wireways

1. The MCC shall include top and bottom horizontal wireways to the maximum available depth with minimum height of 230 mm.

2. The MCC shall include full height vertical wireways with hinged removable doors minimum 150 mm wide and to the maximum available depth, complete with wire bundle ties. Wireways shall be sized to be fit for purpose according to the size, quantity and/or bend radius of cables. Wireways shall be front accessible and completely isolated from each vertical section. Wireways shall be suitable for wiring from top or bottom entry. No accessories such as terminal strips shall be installed in wireways

5.12.4 Incoming Sections

1. The MCC shall include capacity for qty.2 (two) incoming power feeders, connected to qty.1 (one) automatic transfer switch. The automatic transfer switch shall be provided by the MCC VENDOR as part of the MCC lineup.
2. The qty.2 (two) incoming power feeds to the automatic transfer switch shall both be bottom-entry.
3. The MCC shall include an automatic transfer switch, rated as specified in this document and the attached drawings and documentation. The automatic transfer switch shall alternate MCC source power between the qty.2 (two) incoming power feeders.

5.12.5 Starter and Feeder Units

1. The MCC shall include qty.3 (three) feeder units. These units shall include:
    d. Qty.2 (two) feeder fused disconnects, rated as per the attached drawings and documentation;
    e. Qty.1 (one) variable frequency drive unit, rated as per the attached drawings and documents.
2. The qty,2 (two) feeder fused disconnects shall be installed in an MCC section which includes provisions for top-entry of feeder cables.
3. The qty.1 (one) variable frequency drive unit shall be installed in an MCC section which includes provisions for both top and bottom entry of feeder cables.
4. Variable Frequency Drive (VFD) units shall be complete with a fused disconnect which includes HRC fuses, rated as indicated on the attached drawings and documents.
5. Starter and feeder devices shall be mounted in draw-out sheet metal units, excepting any starters larger than size 5 and feeders larger than 200 A, which may be draw-out or fixed.
6. Starter and feeders of the same type and rating shall be interchangeable.
7. The means shall be provided to prevent starters and feeders from being installed or removed with the breaker/switch is in the closed position.
8. 'Finger-Safe' terminal blocks shall be applied to the extent practical within the MCC assembly, including draw-out units.
9. Each starter, VFD or feeder shall include an externally operated, trip free handle mechanism that shall serve as a disconnecting means and shall be lockable in the open position. The handle mechanism shall include an interlock that shall prevent entering the draw-out unit enclosure unless the MCP, MCCB or fused disconnect switch is open. A method to defeat this interlock shall be provided for authorized personnel.

10. Pull-apart terminal blocks are required for control wiring. A minimum of two spare terminal blocks, or 20% spare capacity, whichever is greater, shall be provided in each motor starter for external wiring.
11. Internal control wiring shall be with flexible, stranded tinned copper conductors, with type TEW, 600V rated, 90°C rated insulation. Control wiring shall be minimum #14 AWG NEMA Class I, Type B.
12. Starter compartments shall be adequately sized to allow for ease of maintenance. Compact style starters and feeder units shall not be provided except when written approval has been received by the OWNER.
13. Unless otherwise specified, all motor starters shall be complete with three-phase NEMA Class 20 electronic overload protection (includes single phase protection) and external manual reset.
14. All feeder units shall include a status contact (1 x N.O. and 1 x N.C.) wired to internal terminal blocks.
15. VFD installed in MCC's shall be provided with a door-mounted operator keypad control module. Sufficient space shall be provided for adequate cooling as well as installation of cables, line/load reactors and other control devices.

5.12.6 Communications

1. The communication protocol to be used for the MCC shall be Ethernet/IP.
2. The MCC shall include an internal ethernet switch, networked to all components inside the MCC which have the capability of ethernet communications. This ethernet switch shall be powered internal to the MCC.
3. Communications cabling shall be segregated from power and control cables as far as practicable.
4. Communications cabling shall be industrial rated and shielded..
5. The communication devices in the MCC shall be configured by the Vendor in the factory, as much as is practicable.
6. A means of monitoring the health status of the network shall be provided in the MCC.
7. Where network switches are required to be installed, they shall be rugged industrial type.
8. A complete package of commissioning software for custom configuration in the field shall be provided with the MCC.

5.12.7 Painting

1. The MCC assembly shall be cleaned, primed, and painted to the manufacturer's standard.
2. Exterior finish shall be ASA 61 light grey.
3. Interior surfaces in the control compartment shall be white unless otherwise specified.
4. The VENDOR shall supply 0.5 L cans of matching paint for each colour for touch-up after installation.

5.12.8 Accessories/Special Tools/Spare Parts

1. The VENDOR shall supply a complete list of recommended special tools, accessories, and spare parts, for the handling, installation, operation, and maintenance of the equipment.

5.13 Variable Frequency Drives

1. The VFD shall be designed for the motor loads and voltages, as well as the supply loads and voltages, provided on the attached drawings and documents.
2. The VFD shall be integral to the MCC construction. The VFD shall include a VENDOR-supplied dV/dt filter, as well as provisions for an external, top entry connection to an AUHF filter, made between the fused disconnect and variable frequency drive.
3. The VFD shall be capable of 24 VDC control, including supply of its own control power. The required control connections shall be as indicated on the attached drawings and documents.
4. The VFD shall be type PowerFlex 753 or PowerFlex 755 by Allen Bradley.

5.13.1 Structure and Components

1. The VFD shall be integral to the MCC assembly.
2. The VFD enclosure shall include provisions for both top and bottom entry of cables. Removable gland plates shall be provided at cable entry locations.
3. The input filter to the VFD shall be a lineator AUHF passive filter, mounted externally to the MCC assembly. The VFD VENDOR shall ensure that an external connection to this input filter between the fused disconnect and VFD input power can be accommodated. The VFD VENDOR shall not be responsible for the supply of the input filter.
4. The output filter from the VFD shall be an appropriate VENDOR supplied dV/dt filter, integral to the VFD section of the MCC assembly.
5. The VENDOR shall provide heat dissipation information for operation of the VFD at 100% rated output. The CONTRACTOR shall supply this information to the OWNER and the ENGINEERING CONSULTANT.
6. VFDs shall be designed for ready access to all components and terminations from the front of the MCC or VFD enclosure only, without requiring removal or disassembly of other VFD components. This also includes for maintenance and inspection of bus splices and/or cable connections, provisions for infrared thermography, and access to cooling system components.
7. Power cable termination assemblies shall be designed for easy access and termination of line and load cables of the size, type, and quantity as specified on the attached drawings and documents.
8. Dust filtering shall be provided for each VFD enclosure. Removable dust filter cartridges shall be incorporated on the outside of each enclosure to facilitate filter renewal without removing the equipment from service.

9. VFDs shall be sized for the continuous current ratings and shall be braced for the same fault current as the MCC it is installed in.
10. VFD power and ground busses shall be tin-plated copper. Lugs shall be provided for power (line and load) and ground cables as shown on the drawings and documents.
11. All capacitors in the DC bus link and in the output filter shall be equipped with discharge resistors to achieve a safe voltage level within approximately one minute after removal of external power.

5.13.2 Control Functions, Interfaces, and Alarms

1. The drive shall be equipped with a front mounted operator control panel (HMI) consisting at a minimum of a back-lit alphanumeric display and soft keys for Run/Stop, Local/Remote, Forward/Reverse, Increase/Decrease, Reset and for local programming. Messages displayed shall all be in plain English words.
2. It shall be possible to control and operate the drive and view its status without opening any covers or doors.
3. All programmed settings and configurations shall be stored in non-volatile memory so that they can be recalled in the event of a power loss.
4. Alarm and trip history shall be retained in non-volatile memory even with all power turned off, to be available for diagnostics and troubleshooting upon restoration of power.
5. VFD shall include a diagnostic system to monitor all the alarms and shutdown functions, displaying the status of each function on the front display. Alarms shall be latched type with first out indication.
6. Password protection shall be provided for all programming.
7. Transfer between Remote and Local/Manual control shall be bump-less.
8. The VFD shall have adjustable minimum/maximum speed and/or torque limits, preset speed settings, critical speed lockout settings and independently adjustable acceleration and deceleration ramps.
9. The VFD shall have at least one 4-20 mA input and one 4-20 mA output, the assigned functions to which shall be selectable or programmable.
10. The VFD shall provide discrete status outputs indicating ready, running, alarm and trip. Additional Input and Output Signals are required as specified on the drawings and documents.
11. The VFD shall incorporate self-protection against internal faults, overloads, load regeneration, over-temperatures, under voltage, unbalanced voltages, power loss, open or short-circuited load circuit, ground fault protection, etc.
12. The VFD shall provide a warning signal before the temperature limit of the drive components or motor is reached.
13. A local communications port shall be provided to display sequence logic, enable programming, and allow data transfer from a computer.

14. It shall be possible to program the drive to default to any of the following in the event of a loss of a reference signal: preset speed, minimum speed, maximum speed, the last output speed or stop. An output alarm shall be provided for loss of reference signal.
15. The VFD control system shall be designed to permit local or remote control, as well as functional testing. Remote control system voltage shall be as shown in the attached drawings and documents. The system shall function normally with control voltage in the range of 90% to 110% of normal.
16. All parameters shall be field adjustable with no component change-out required.
17. A clearly labelled first fault diagnostic display panel shall be provided with each VFD to identify major external (i.e., motor over temperature) and internal (i.e., semiconductor failure) system alarms and faults. Vendor shall provide a complete listing of the conditions monitored and displayed for approval by the Engineer.
18. All alarms, shutdowns and status information displayed shall be date and time stamped.

5.13.3 Performance Requirements

1. All VFD equipment shall be capable of operating normally during start-up, stopping, accelerating, and decelerating within the speed range specified.
2. VFD shall have output THD of less than 5% (with or without dv/dt filtering) over the entire operating speed range.
3. Unless otherwise specified, the VFD and all related parts shall be suitable for a minimum of five years of continuous operation. The Vendor shall identify any redundancy requirements necessary to meet this end.
4. The Vendor shall list all components that are expected to require replacement in a 20-year operating life. Components utilized in the VFD shall comply with the appropriate standards for these components and shall be used in accordance with their recognized ratings and other limitations of use.
5. The VENDOR shall guarantee the following VFD performance parameters:
    a. The VFD efficiency shall be a minimum of 0.96 throughout the operating speed range (this may be a challenge for smaller sized VFD's and for applications for less than 40% load (not to be confused with 40% speed)), based on a ratio of VFD output power to VFD input power, including all transformers, filters and peripheral loads forming part of the VFD system. The Vendor shall provide on the Datasheet the efficiency value of the VFD at various speeds and loads. Speed range is defined as 40-100% as this will cover all possible relevant applications, constant and variable torque.
    b. Input power factor shall be a minimum of 0.95 lagging over the operating speed range.
    c. Output torsional excitation shall be less than 1% of the operating torque over the entire speed range.

d. The drive shall meet the harmonic performance and Telephone Influence Factor (TIF) requirements contained in IEEE 519, as well as any additional TIF requirements of the local utility, where applicable.

e. Speed regulation shall be +/-0.5% without encoder or tachometer feedback.

f. The VFD shall not be affected by and shall not affect handheld radios, cellular telephones or other radio frequency emitting devices that may be in use adjacent to the drive with the cabinet doors open.

g. The average noise level of the VFD shall be less than 75 dBA sound pressure level at any speed or load with all auxiliaries operating as measured at 1.0 m from cabinet.

h. The VFD shall be capable of delivering 100% of the rated motor load current with a system input voltage variation of +/-10% or input frequency variations of +/-5%.

i. Unless otherwise specified, the VFD shall have normal continuous capacity of at least 110% of the motor load current considering a 1.0 service factor and 100% voltage supply. Unless otherwise specified for variable torque loads, the VFD shall provide an additional short time duty rating of 120% for 1 minute typical for low voltage drives.

j. VFD shall have flying re-start capability, to catch a motor spinning in either direction and decelerate and/or accelerate it to operating speed within the torque and current limits.

k. The VFD shall be capable of continuous uninterrupted operation in the case of a power loss of up to 0.5 seconds.

l. The VFD shall be capable of automatically restarting in the event of a momentary loss of power or clearing a trip.

m. The VFD shall be capable of temporary operation during a voltage sag of up to 30% on the incoming power for a period of 500 msec.

n. The VFD shall be capable of temporary operation during a voltage swell to 115% for a period of 500 msec.

o. The operation of the VFD shall remain unaffected by switching transients from capacitors or other sources.

p. VFD shall be able to produce full rated torque throughout the operating speed range. Unless otherwise specified, the VFD shall be able to produce rated torque at breakaway.

5.13.4 Control Wiring and Terminal Blocks

1. Unless otherwise indicated, control wiring shall be NEMA Type B wired to terminal blocks located in the control compartment. Terminal blocks shall be labeled on both sides using machine printed labels.

2. Control wiring shall be minimum #14 AWG grey TEW. Each wire shall be identified at each end by a machine printed wire marker of heat shrink type or equivalent performance sleeve type, showing the

wire number corresponding to the schematic and wiring diagrams. Wire numbers shall be non-erasable and shall match the terminal block numbers.

3. No more than two wires shall terminate on any terminal.
4. Internal wiring terminating at terminal blocks intended for field connections shall be terminated on one side only.
5. Wiring between cells and hinged doors shall be bundled and shall be installed with enough slack and/or protected to prevent the wiring from any damage that could result from opening and closing the door through a 120° angle. Only factory installed wiring originating within the VFD may be connected to protective relays and other devices mounted on the door.
6. Control and secondary wiring shall be one continuous length from terminal to terminal. Splicing shall not be permitted.
7. All auxiliary contacts intended for Owner's use or as spare shall be wired to accessible terminal blocks for field connections.
8. Current transformer secondary circuit wiring shall be provided with ring type lugs.
9. Terminal blocks shall be arranged so that all AC circuits, DC circuits and low voltage circuits are segregated and grouped separately.
10. Circuits to be disconnected at a shipping split shall be identified and flagged both on the wiring and on the associated terminal blocks to ensure correct reconnection at installation. "Pull-apart" terminals are preferred at shipping splits.
11. "Finger-safe" terminal blocks and control fuse holders shall be applied to the extent practical within the VFD control section.

5.13.5 Communications

1. The communication protocol to be used for the VFD shall be Ethernet/IP, and the VFD shall be connected to the MCC's internal ethernet switch.
2. Communications cabling shall be separated from power and control cables.
3. The communication devices in the VFD shall be configured by the Vendor in the factory, as much as is practical.
4. A means of monitoring the health status of the network shall be provided in the VFD.
5. A complete package of commissioning software for custom configuration in the field shall be provided with the VFD.

5.13.6 Accessories/Special Tools/Spare Parts

1. As a minimum, the Vendor shall ship two spare fuse refills of each size with the VFD equipment.
2. The CONTRACTOR shall coordinate with the VENDOR to supply the OWNER with a complete priced list of:

a. Recommended Spare Parts, including location and availability;

b. Recommended tools required to carry out routine maintenance; and

c. Recommended test equipment required to carry out routine maintenance.

5.14 Automatic Transfer Switches

1. The Automatic Transfer Switch (ATS) shall be designed for the motor loads and voltages, as well as the supply loads and voltages, provided on the attached drawings and documents.
2. The ATS shall be integral to the MCC construction. The ATS shall include qty.2 (two) bottom entry feeders, one connected to utility power supply and the other connected to a standby natural gas generator.
3. The ATS shall be capable of monitoring the power quality and status of the incoming power connection from the utility and switching power between the utility and the generator.

5.14.1 Structure and Components

1. The ATS shall be integral to the MCC assembly.
2. The ATS enclosure shall include provisions for the bottom entry of qty.2 feeder cables from the utility and the standby generator. Removable gland plates shall be provided at cable entry locations.
3. ATS shall be designed for ready access to all components and terminations from the front of the MCC only, without requiring removal or disassembly of the ATS or MCC.
4. Power cable termination assemblies shall be designed for easy access and termination of line and load cables of the size, type, and quantity as specified on the attached drawings and documents.
5. The ATS shall be sized for the continuous current ratings and shall be braced for the same fault current as the MCC it is installed in.
6. ATS power and ground busses shall be tin-plated copper. Lugs shall be provided for power (line and load) and ground cables as shown on the drawings and documents.

5.14.2 Control Functions, Interfaces, and Alarms

1. The ATS shall be equipped with a front mounted operator control panel (HMI) consisting at a minimum of a back-lit alphanumeric display and soft keys.
2. It shall be possible to control and operate the ATS and viewing its status without opening any covers or doors.
3. Alarm and trip history shall be retained in non-volatile memory even with all power turned off, to be available for diagnostics and troubleshooting upon restoration of power.
4. The ATS shall include a diagnostic system to monitor all the alarms and shutdown functions, displaying the status of each function on the front display. Alarms shall be latched type with first out indication.
5. Password protection shall be provided for all programming.

6. The ATS shall provide discrete status outputs indicating phase loss, generator fault, generator run, and ATS transfer switch position.
7. The ATS shall include an ethernet/IP communications port, networked to the MCC ethernet switch.
8. The ATS system shall be designed to permit local or remote control, as well as functional testing. Remote control system voltage shall be as shown in the attached drawings and documents. The system shall function normally with control voltage in the range of 90% to 110% of normal.
9. All parameters shall be field adjustable with no component change-out required.
10. All alarms, shutdowns and status information displayed shall be date and time stamped.

5.14.3 Control Wiring and Terminal Blocks

1. Unless otherwise indicated, control wiring shall be NEMA Type B wired to terminal blocks located in the control compartment. Terminal blocks shall be labeled on both sides using machine printed labels.
2. Control wiring shall be minimum #14 AWG grey TEW. Each wire shall be identified at each end by a machine printed wire marker of heat shrink type or equivalent performance sleeve type, showing the wire number corresponding to the schematic and wiring diagrams. Wire numbers shall be non-erasable and shall match the terminal block numbers.
3. No more than two wires shall terminate on any terminal.
4. Internal wiring terminating at terminal blocks intended for field connections shall be terminated on one side only.
5. Wiring between cells and hinged doors shall be bundled and shall be installed with enough slack and/or protected to prevent the wiring from any damage that could result from opening and closing the door through a 120° angle. Only factory installed wiring originating within the ATS may be connected to protective relays and other devices mounted on the door.
6. Control and secondary wiring shall be one continuous length from terminal to terminal. Splicing shall not be permitted.
7. All auxiliary contacts intended for Owner's use or as spare shall be wired to accessible terminal blocks for field connections.
8. Current transformer secondary circuit wiring shall be provided with ring type lugs.
9. Terminal blocks shall be arranged so that all AC circuits, DC circuits and low voltage circuits are segregated and grouped separately.
10. Circuits to be disconnected at a shipping split shall be identified and flagged both on the wiring and on the associated terminal blocks to ensure correct reconnection at installation. "Pull-apart" terminals are preferred at shipping splits.
11. "Finger-safe" terminal blocks and control fuse holders shall be applied to the extent practical within the ATS control section.

5.14.4 Communications

1. The communication protocol to be used for the ATS shall be Ethernet/IP, and the ATS shall be connected to the MCC's internal ethernet switch.
2. Communications cabling shall be separated from power and control cables.
3. The communication devices in the ATS shall be configured by the Vendor in the factory, as much as is practical.
4. A means of monitoring the health status of the network shall be provided in the ATS.
5. A complete package of commissioning software for custom configuration in the field shall be provided with the ATS.

5.14.5 Accessories/Special Tools/Spare Parts

1. The CONTRACTOR shall coordinate with the VENDOR to supply the OWNER with a complete priced list of:
    a. Recommended Spare Parts, including location and availability;
    b. Recommended tools required to carry out routine maintenance; and
    c. Recommended test equipment required to carry out routine maintenance.

5.15 Standby Generators

1. The Standby Generator shall be powered by a natural gas connection. It shall be the responsibility of the CONTRACTOR to confirm with the VENDOR that the available gas connections at the site are compatible with the Standby Generator.
2. The Standby Generator shall be designed to output the power, voltage, and current shown on the attached documents and drawings.
3. The Standby Generator shall be capable of providing automatic backup power to the pumphouse. It shall be managed by the ATS integral to the MCC.
4. The Standby Generator series and manufacturer shall be as indicated on the attached drawings and documents.

5.15.1 Structure and Components

1. The Standby Generator shall be installed inside a NEMA 3R weatherproof enclosure.
2. The Standby Generator enclosure shall include, at minimum:
    a. generator standby heating;
    b. generator control and monitoring;
    c. generator output power breaker;
    d. generator fuel system;

e. generator exhaust system;

f. batteries, including battery charger; and

g. engine-mounted instruments and controls.

5.15.2 Control Functions, Interface and Alarms

1. All Standby Generator external control connections shall operate at 24 VDC.
2. The Standby Generator shall include automatic shut down and alarm indication for, at minimum:
    a. low oil pressure, warning and shutdown;
    b. high coolant temperature, warning and shutdown;
    c. overspeed;
    d. overcrank; and
    e. emergency stop.
3. All engine shutdowns shall initiate closing of the fuel valve and shutdown the ignition circuit.
4. The Standby Generator shall include the following controls, at a minimum:
    a. fully automatic generator start and shutdown.
    b. engine start, with options for management over ethernet and discrete connection; and
    c. engine stop, with options for management over ethernet and discrete connection.
5. An engine cranking cycle shall be provided as follows:
    a. On manual operation, a single start attempt shall be employed.
    b. On automatic operation, the cranking cycle shall include three start attempts with a rest interval (adjustable up to 60 seconds) between attempts.

5.15.3 Performance

1. The generator set shall be capable of producing the rated output with the specified fuel and site conditions and appropriate derating for accessory losses. If the unit requires electrical accessories, such as remote cooler fans or lube oil pumps, the output rating shall be that specified plus the accessory requirements.
2. The engine and generator shall be controlled by a system controller which shall accept power system and control inputs. It shall issue signals to the voltage regulator, and engine governor, and shall control synchronizing.
3. The voltage dip shall not exceed 20 per cent of rated voltage upon starting of the largest electric motor. The voltage dip shall be calculated based on the generator transient reactance (X'd) without consideration of the possible effect of voltage regulator action.
4. Voltage regulation shall maintain the generator output voltage within $\pm$1 per cent of set point for all steady state conditions from no load to full load and for 5 per cent frequency variation.

5. The system controller and governor shall maintain isochronous frequency regulation from no load to full load-steady state frequency band width shall be ±0.25 per cent. When specified, governors shall be capable of accepting electrical inputs from other devices such as controllers, synchronizers and load sharing schemes. Governor response rates and damping shall be adjustable. Governors may be hydraulic for small non-critical units where there is no requirement for synchronization. Governor performance shall not be affected by non-linear loads.
6. The standby generator set shall be capable of delivering full load at rated voltage and frequency within 20 seconds upon receipt of a signal to run.

5.15.4 Control Wiring and Terminal Blocks

1. Unless otherwise indicated, control wiring shall be NEMA Type B wired to terminal blocks located in the control compartment. Terminal blocks shall be labeled on both sides using machine printed labels.
2. Control wiring shall be minimum #14 AWG grey TEW. Each wire shall be identified at each end by a machine printed wire marker of heat shrink type or equivalent performance sleeve type, showing the wire number corresponding to the schematic and wiring diagrams. Wire numbers shall be non-erasable and shall match the terminal block numbers.
3. No more than two wires shall terminate on any terminal.
4. Internal wiring terminating at terminal blocks intended for field connections shall be terminated on one side only.
5. Control and secondary wiring shall be one continuous length from terminal to terminal. Splicing shall not be permitted.
6. All auxiliary contacts intended for OWNER's use or as spare shall be wired to accessible terminal blocks for field connections.
7. Terminal blocks shall be arranged so that all AC circuits, DC circuits and low voltage circuits are segregated and grouped separately.

5.15.5 Communications

1. The communication protocol to be used for the Standby Generator shall be Ethernet/IP.
2. Communications cabling shall be separated from power and control cables.
3. The communication devices in the Standby Generator shall be configured by the Vendor in the factory, as much as is practical.
4. A complete package of commissioning software for custom configuration in the field shall be provided with the Standby Generator.

5.15.6 Accessories/Special Tools/Spare Parts

1. The CONTRACTOR shall coordinate with the VENDOR to supply the OWNER with a complete priced list of:

a. Recommended Spare Parts, including location and availability;

b. Recommended tools required to carry out routine maintenance; and

c. Recommended test equipment required to carry out routine maintenance.

5.16 Dry-type Transformers

1. Transformers for small power and lighting distribution applications shall be heavy duty dry- type. Transformers located indoors shall have minimum NEMA 1 enclosure.
2. In general, and unless otherwise specified, transformers shall include:
    a. 3-phase delta primary and wye secondary configuration
    b. Copper windings
    c. Class H insulation
    d. Off-load 2.5% taps (2 x FCAN, 2 x FCBN)
    e. Powder coated enclosure ASA 61 grey

5.17 Submersible Pumps

1. The CONTRACTOR is responsible for the complete supply of the submersible pumps, as recorded in the attached drawings and documents.
2. The CONTRACTOR shall ensure that the submersible pump is compatible with the voltages and connection types detailed in the attached drawings and documents.

5.18 Distribution Panelboards

1. Indoor panelboards shall be surface mounted, general purpose with NEMA 12 enclosure complete with hinged and lockable door.
2. Panelboards shall have copper bus and bolt-in type breakers and be of size, configuration and rating as specified on drawings and/or panel schedules.
3. Where panelboards are located outdoors or in hazardous areas, they shall be suitably enclosed and approved for the area classification.
4. For outdoor applications, the breakers shall be operable from the front exterior of the enclosure and each breaker position (On-Trip-Off) shall be discernable from the exterior of the enclosure.
5. Breakers shall be suitable for the minimum temperature to which they will be exposed, or the panelboard shall be equipped with a suitably sized space heater rated at 120 VAC.

6 INSTALLATION REQUIREMENTS

6.1 Junction Boxes

1. Junction boxes located outdoors or in process areas shall be NEMA 4X aluminum, stainless steel or fiberglass/polycarbonate construction with a gasketed hinged door.
2. Junction boxes shall be surface mount and equipped with breather drain and internal/external grounding terminal suitable for #2 AWG conductor.
3. Junction boxes shall be installed in easily accessible locations with at least 3' (0.9 m) front clearance.
4. Conduits and cables shall enter junction boxes from the bottom in outdoor or damp locations.
5. Junction boxes shall provide a minimum of 3" (75 mm) wiring space between terminal blocks and junction box sides.
6. Unless indicated otherwise on drawings, terminal boxes shall be provided with a minimum of 20% spare terminals for future use.

6.2 Cable Tray Installation

1. Cable tray shall be installed and supported in accordance with CSA C22.1, NEMA VE-2 and the manufacturer's instructions, noting requirements for warning labels and minimum access and spacing requirements.
2. The distance between supports shall not exceed 6 m unless otherwise specified.
3. Spacing between cable trays supports shall be as per manufacturer specifications or load calculations, whichever is more stringent.
4. All direction changes in cable tray shall be made using factory manufactured fittings for tees, crosses, bends, elbows, reducers, transitions, risers and dropouts from the same manufacturer.
5. Cable trays shall be supported on both sides of bends and elbows, and within 600 mm (24") of risers, drops, tees and crosses.
6. Unless otherwise indicated, minimum vertical spacing between parallel runs of cable trays (i.e. clear space between top of lower tray and bottom of upper tray) shall be not less than 450 mm (18") wherever practicable. Where this is not practical the minimum vertical distance may be reduced but shall be no less than 300 mm (12") as required by the CEC.
7. Cable tray expansion fittings shall be provided where structural expansion joints are located. Expansion fittings shall also be provided at intermediate points so that straight run between tray expansion fittings does not exceed 30 metres.
8. All conduits entering cable tray shall do so by means of an approved "conduit to tray" fitting.
9. Tray fittings shall have a minimum radius of 300 mm. Larger radii shall be used where the cable bending radius makes it necessary.

10. Where cable trays enter boxes or panels, they shall do so by means of an approved "tray to box" connector or as indicated on the drawings.
11. Cables of different voltage classifications shall be segregated in accordance with the drawings.
12. All field run tray must terminate within two feet of the destination device.
13. All runs shall be installed parallel to building walls and floors except where otherwise shown on the drawings. Trays shall be supported at required intervals, to prevent excessive stressing and/or deflection of the trays. If cable tray fittings are used, a support shall be provided immediately adjacent to each fitting. Channel supports shall be assembled with proper support fittings or welding, mounted plumb and level, and rigidly secured to the structure. All trays shall be fastened to support members. Trays covers shall be provided as indicated on the drawings.

6.3 Cable Installation

1. Cables shall be installed in accordance with project drawings and documents and in accordance with the latest version of CEC 22.1. Cable installation shall be performed in accordance with manufacturer recommendations utilizing industry accepted methods and pulling equipment designed for that use, i.e., tuggers, rollers, sheaves, etc.
2. Where TECK cables leave the main cable tray system, mechanical protection should be provided taking into consideration the type of cable, the risk of damage and other factors as appropriate.
3. Where conduit sleeves are used to protect underground cables or to stub up from direct buried cables, such sleeves shall be rigid PVC.
4. To minimize cable sidewall stress, the manufacturer's minimum cable-bending radius shall be strictly followed. As a minimum, CEC requirements shall be adhered to when manufacturer's information is not available.
5. In general, wires and cables shall not be pulled into the raceways until splicing and testing can proceed immediately. Conduit systems and enclosures shall not be left open, nor shall the wires and cables be exposed to weather or mechanical hazards longer than necessary. At no time shall cables be installed at a temperature below -18°C.
6. Mechanical methods for pulling wires or cables in conduit shall not be used in pulling wires #8 AWG or smaller. Lubricants shall be CSA approved and the type of lubricants shall be suitable for the insulation involved.
7. Splices shall be installed only in wiring for lighting and convenience outlet branch circuits.
8. Splices are not permitted in conductors larger than #10 AWG. Splicing conductors shall be made using CSA approved connectors.
9. Splices and/or taps shall be made only in approved junction or terminal boxes.

6.4 Terminations

1. 120VAC equipment such as lighting fixtures and solenoids shall be terminated with twist-on wire-nut type connectors.
2. Equipment such as motors shall be terminated by installing compression connectors to each wire end, bolting the connectors together and insulating with several layers of half-overlapped splicing tape followed by several layers of half-overlapped premium electrical tape. The connections may also be insulated with manufactured motor lead splice kits.
3. Where conductors are being terminated onto terminal strips in junction boxes, the conductors shall be looped to have sufficient length to reach the farthest terminal on the terminal strip. All spare conductors are to be terminated and identified as spare.
4. Control, instrumentation and signal wires in junction boxes shall be terminated onto 600 V rated rail-mounted terminal blocks, Weidmuller or equivalent.
5. Conductors in control panels, cabinets, etc., shall be bound. Spiral-wrap or tie-wraps shall be used with wireway as the preferred method where space permits. Lacing with string will not be permitted.
6. After termination, conductors shall be neatly formed with sufficient slack to assure no strain on the terminations.
7. Stranded wires shall be connected with compression type cable lugs or spade-type pins wherever the receiving terminals are not suitable for stranded cores. No more than two wires shall be connected to the same terminal unless that terminal has special provision for a larger number of wires.

6.5 Conduit System Installation

1. Conduit shall be cut square with proper tools, ends smoothly reamed, threads cleaned and all burrs and cuttings removed before assembly and installation.
2. Conduits joints shall be made so that no less than five full threads are engaged by the coupling or fitting.
3. Open ends of conduits and conduit fitting openings shall be covered during construction to prevent the entrance of foreign material.
4. Conduit threads shall be coated with an approved electrically conductive, corrosion-resistant compound.
5. Conduit bends shall be made with proper conduit bending equipment which shall not damage or substantially reduce the conduit cross sectional areas.
6. Conduits shall be spaced evenly and concentric blends shall be made where two or more conduits are grouped.
7. The minimum size of both rigid and flexible conduits shall be 3/4" (19 mm) unless otherwise noted on the drawings. Final connections may be 1/2" (13 mm) if necessary to connect to a device.

8. The CONTRACTOR shall install all conduits and cables in a neat workmanlike manner, such that all exposed runs shall be parallel to or perpendicular to the ground or nearby equipment.
9. Conduit and cable entry into outdoor equipment shall be from the bottom (or side). Top entry shall be avoided. Conduit entries into enclosures shall use threaded hubs approved for wet locations.
10. Conduits or cables shall not be located adjacent to equipment in a manner which would impede the maintenance of the equipment.
11. Conduits shall be supported using steel strut brackets, P type clamps, or two-hole straps at intervals not exceeding the requirements of the Canadian Electrical Code (C.E.C.).
12. Conduit expansion joints and bonding jumpers shall be installed in straight conduit runs exceeding 50 m in length.
13. All conduit or cable installations in new buildings shall be coordinated with the building VENDOR.
14. Flexible metallic conduit may be used for short runs up to 762 mm (30") for final connections to motors, other vibrating equipment or to facilitate removal of devices. Liquid tight flexible metallic conduit may be used for such connections in non-hazardous and Zone 2 locations. For Zone 1 locations such connections shall be with explosion proof flexible metallic conduit.
15. Conduit boxes shall be attached to structural supports. Boxes shall not be solely supported by conduit.
16. Conduit unions to be installed at each end device. Ninety-degree unions, if used, to be installed to accommodate ease of removal of wiring (ex: conduit removal not to require wire feed through elbow).
17. Conduits and cables shall be routed as shown on the drawings. When no route is shown on the drawings, the CONTRACTOR is responsible for field-routing the conduit and cables.
18. Each conduit system shall be complete and swabbed free of all foreign matter, prior to the pulling of cables. It is the CONTRACTOR's responsibility to prevent the entrance of foreign matter into the conduit system. Therefore, should the entrance of any foreign material into the conduit system necessitate repair or replacement, it shall be done at the CONTRACTOR's expense.
19. All field bending of rigid conduit shall be made using an approved bender. Field fabricated bends shall be made such that the conduit is not damaged. No bend shall flatten the conduit by more than one-tenth of its diameter. Field bends shall have a minimum radius of not less than six (6) times the conduit outside diameter.
20. All conduits and cables shall be clearly tagged at each end with a securely fastened stainless steel tag labelled according to the conduit and cable schedule.
21. Conduit and cable seals shall be installed as indicated on the drawings and in accordance with the requirements of the Canadian Electrical Code. The sealing compound shall be installed in accordance with the manufacturer's recommendation and only after the system tests have been conducted by the CONTRACTOR and accepted by the OWNER.

6.6 Underground Conduit and Direct Buried Cables Installation

1. Conduit and cable entry into outdoor equipment shall be from the bottom (or side). Top entry shall be avoided. Conduit entries into enclosures shall use threaded hubs approved for wet locations. All conduit entries shall be installed according to the manufacturer's specifications.
2. Underground conduits and direct buried TECK cables shall be installed at least 0.6 metres below grade in areas not subject to vehicle traffic, and 1m when in areas that are subject to vehicle traffic. Trenches shall be parallel or perpendicular to fences, pipe-racks, roads etc.
3. The cable/conduit trench shall be constructed as shown on the drawings and shall meet the requirements of CSA C22.1.
4. Unless otherwise specified or indicated, cable trenches shall have the following features:
    a. The base of the trench should be undisturbed earth.
    b. The trench shall have at least 75 mm of clean, dry screened sand compacted as bedding for the cables.
    c. A layer of screened, dry, clean sand, minimum 75 mm, hand filled above the cables.
    d. Mechanical protection (where applicable) in accordance with CSA C22.1.
    e. Backfill materials shall be unfrozen and free from large stones, roots, etc.
    f. Red or yellow plastic marker tape, 150 mm wide with the legend "Caution - Buried Cable" installed 300 mm below grade.
5. Cables and conduits shall be installed so they do not contact each other during the complete length of the run. At least 75 mm spacing both vertical and horizontal shall be observed. For large power cables, additional spacing as required by the Canadian Electrical Code shall be provided.

6.7 Lighting System Installation

1. Install all lighting fixtures and the associated conduit and wires as shown on the drawings.
2. Provide all supports and ancillary steel as required by the standard details.
3. Photocells for lighting control shall be installed a minimum of 2 m above grade facing north and shall be aligned to avoid false operation by any artificial light source.

6.8 Instrumentation Installation

1. All instrumentation, such as flow transmitters, limit switches, level transmitters, pressure transmitters, and turbidity transmitters, shall be installed as shown on the drawings and according to the Manufacturer's installation instructions or manuals.

6.9 Power Equipment Installation

1. All electrical equipment such as, MCC's, transformers, panels control centres, etc., shall be installed as shown on the drawings and according to the Manufacturer's installation instructions or manuals.

2. Electrical equipment shall be stored in a dry, heated building prior to installation. Roofing and walls for the permanent installation must be in place before equipment is set in its permanent location to provide full protection from outdoor conditions.
3. Equipment shall be mounted and secured to floor by approved means in the locations shown on the drawings. Provide mounting channels as required by the Manufacturer's installation manuals and assemble the equipment completely. Connections between sections at the shipping splits shall be completed according to the schematic diagrams and the VENDOR drawings.
4. Other equipment shall be installed and assembled as required by the scope of work, contract drawings and the VENDOR instructions.

6.10 Grounding System Installation

1. The grounding system shall be installed in accordance with the CSA C22.1 and the attached drawings.
2. Unless otherwise directed, the below grade grounding grid shall consist of bare stranded copper wire buried to a depth of 600 mm (24″) which shall be connected to 19 mm x 3 m (3/4″ x 10′) copper clad ground rods.
3. All connections, including tap, lug, and other, shall be made according to the manufacturer's specifications.
4. Buried tap connections shall be made with compression-type connectors, and shall be coated with Glyptol or equivalent, and taped or suitably protected to provide a watertight connection.
5. Ground rods shall be accessible by steel ground wells. Accessible ground connections (e.g., ground wells) shall be of the bolted type and coated with Glyptol or equivalent.
6. Any connections between a ground conductor and a dissimilar metal shall be coated with Glyptol or equivalent.
7. All vessels, columns, structures and storage tanks shall be bonded to the common ground system. Equipment ground connections shall be a minimum of AWG #2 green TW insulated copper conductor.
8. Equipment grounding conductors shall be installed as shown on the standard installation detail drawings.
9. Metal parts of cable trays and conduit systems shall be bonded and/or connected to the common grounding grid in accordance with the requirements established by the drawings and the CEC.
10. All motors shall have a separate and direct green TW insulated copper ground connection from the motor frame directly to ground. This connection shall be sized per CEC requirements and is in addition to the cable or conduit power system ground.
11. All above grade grounding conductors shall be green insulated ground wires run in PVC conduit where mechanical protection is required (e.g. install ground wires in rigid PVC sleeves where they exit the earth or floor slab). The PVC sleeves shall extend 450 mm (18″) below ground unless otherwise directed.

12. Cable trays shall be grounded using a bare copper wire run inside the full length of the cable tray and bonded a minimum of once every 12 m.
13. Piping shall be bonded to ground once every 12 m, or whenever electrical continuity between pipes is broken (e.g. an insulating flange). An appropriate Burndy connector will be used to make the connection depending on pipe size, material, and connections.

6.11 EQUIPMENT HEIGHTS

1. When equipment is to be wallmounted, the CONTRACTOR shall use the following equipment mounting heights:
    a. Receptacles – 300 mm from grade to center of receptacle;
    b. Light Switches – 1300 mm from grade to center of each receptacle;
    c. Panels – 1600 mm from grade to top of highest input device (breaker, button, etc.)
    d. Junction Boxes – 1500 mm from grade to junction box hinge.
    e. Emergency Lights – 2100 mm from grade to center of emergency light;
    f. Flood Lights – 2100 mm from grade to center of emergency light;
2. Should any conflict occur between equipment where mounting heights cannot be maintained, the contractor is to allow a deviation of 10% of total height or 300 mm, whichever is lesser, without requesting clarification from the OWNER or ENGINEERING CONSULTANT.

7 CONSTRUCTION PRACTICES

7.1 Workmanship

1. The CONTRACTOR shall utilize qualified electricians who are thoroughly experienced in the methods and materials used in industrial construction to perform the work.
2. All work shall be executed in a workmanlike manner and shall present a neat, quality appearance when completed. All work shall be performed under the direction of a competent supervisor.
3. The CONTRACTOR is responsible for performing the work in a safe manner. The CONTRACTOR shall ensure that the OWNER's safety procedures are understood and followed.
4. The CONTRACTOR is responsible for coordinating with other trades on the jobsite as to the location of conduit, cable trays and end devices and shall ensure that the work does not conflict with that of any other trade.
5. The CONTRACTOR shall be responsible for keeping the job-site clean and free of debris and refuse.
6. Devices, equipment, or material damaged during handling or installation shall be replaced or repaired by the CONTRACTOR.

7. The CONTRACTOR shall be responsible for ensuring that all finished surfaces are not damaged during electrical installation. The CONTRACTOR shall match and repair any paint chipped or scratched on equipment to the satisfaction of the OWNER.

8 CONTRACT DOCUMENTS, RECORDS, AND OTHER SUBMITTALS

8.1 Contract Documents

1. All work shall be executed in accordance with the contract documents. Should any deviation from these documents be deemed necessary by the CONTRACTOR, the details of such deviations and the reasons therefore shall be submitted in writing to the OWNER for approval as soon as practicable. No deviations from the contract documents shall be made without prior approval of the OWNER. Any departure from the intent of the contract documents by the CONTRACTOR during construction shall not be accepted, unless such deviations have the OWNER's prior approval.
2. Should any questions arise as to the intent and meaning or the interpretation of any conflicting words or phases occurring among the contract documents or drawings, the CONTRACTOR shall immediately consult with the OWNER for a decision. The OWNER shall be the sole interpreter with respect to the contract and the OWNER's decision shall be final.
3. The CONTRACTOR shall check the drawings to avoid possible installation conflicts. Should major changes be required to resolve such conflicts, the CONTRACTOR shall notify the OWNER and secure written approval before the work is started. It is the CONTRACTOR's responsibility to submit drawings to the OWNER marked-up with any implemented changes.

8.2 Records

1. One complete set of drawings issued for this contract shall be maintained exclusively for record purposes by the CONTRACTOR.
2. All changes, modifications, and additions shall be shown or noted on the drawings of this set.
3. Supplemental drawings and sketches may be added if required. Dimensions, clearances, sizes and significant references shall be made clear and kept up to date. All additional sketches, notes and data shall be sufficiently clear to permit reproductions when needed.
4. All drawings of the set maintained for record purposes shall be kept neat and clean and shall be always available to the OWNER for reference.
5. One complete set of "red-lined" as-built drawings accurately reflecting all changes shall be provided to the OWNER by the CONTRACTOR at the completion of the project.

8.3 Vendor Data

1. The CONTRACTOR shall submit full shop drawings and vendor information for all electrical and instrumentation equipment.

2. When specific shop drawings or vendor information is absolutely necessary, it is detailed in the below sections.

9 IDENTIFICATION OF EQUIPMENT AND MATERIALS

9.1 Equipment Nameplates

1. All items of equipment such as motor starters, panelboards, control stations, disconnect switches, instruments, junction boxes and pushbuttons, shall be identified with a permanent corrosion resistant "Lamacoid" nameplate indicating the equipment number, service and other information as specified.
2. Identification nameplates shall be lamacoid type, with white background and black lettering.
3. The CONTRACTOR shall select a size and font for equipment nameplates, ensuring characters shall be permanent and clearly legible.
4. All nameplates shall be attached using stainless steel screws or shall be riveted. Adhesive tape is not acceptable.
5. Nameplate letter sizing shall be appropriate for the application and shall be legible from working level.
6. For all enclosures that contain more than one voltage source, a red lamacoid with 6mm high white lettering reading "Warning: More than one voltage source" shall be attached.

9.2 Motor Control Centers

1. The CONTRACTOR shall select a size and font for MCC nameplates, ensuring characters shall be permanent and clearly legible.
2. Such nameplates shall be provided to identify the overall equipment, individual cells, door mounted components (both inside and outside) and all internal power and control components, to allow easy identification of all devices. Alternate identification methods may be proposed by the Vendor for internal components, including internal identification of door mounted components.
3. The main equipment identification nameplate shall state the equipment tag number, description and voltage if applicable, and as agreed with Owner.
4. Compartment identification labeling shall be applied on both the front and rear of each compartment.
5. Warning labels shall be as per CSA Z321.

9.3 Conduits and Cables

1. The CONTRACTOR shall select a size and font for conduit and cable tags, ensuring characters shall be permanent and clearly legible.
2. Conduits and cables used for homeruns shall be identified at both ends with corrosion-resistant markers. Markings shall correspond to their designated tag (number) shown on the conduit and cable schedules.

3. Cables connected to receptacles and light fixtures shall be provided with stainless steel tags identifying the supply panelboard and circuit number.
4. Underground conduits shall be identified at the point of transition at grade using corrosion-resistant markers. Cables in manholes shall be identified. Markings shall correspond to their designated tag (number) shown on the conduit and cable schedules.

9.4 Wiring and Terminal Blocks

1. The CONTRACTOR shall select a size and font for wire and terminal block tags, ensuring characters shall be permanent and clearly legible.
2. Wires shall be identified using machine-printed wire markers with characters corresponding to those shown on the wiring diagrams or schematics.
3. Wire markers shall be heat-shrink or ring types that completely encircle the wire.
4. Wire markers shall be installed at all termination points.
5. Branch circuit power conductors from panelboards shall be labeled with the panel number and circuit number at the end device and all interconnections.
6. Terminal blocks shall be labeled as shown on wiring diagrams.

10 EQUIPMENT HANDLING AND STORAGE

1. The CONTRACTOR shall be responsible for receiving, handling and storage of all the material that he is to supply and for picking up, transporting and storing material issued to him by the OWNER. The equipment manufacturer's handling and storage instructions shall be followed.
2. All electrical equipment such as motors, transformers, motor control centers, etc., shall be properly stored and protected from damage until finished installation is turned over to the OWNER.
3. The CONTRACTOR shall coordinate with the OWNER to obtain an appropriate storage location. Preferred storage is a clean, dry indoor location.
4. If any material is damaged during storage, it shall be the full responsibility of the CONTRACTOR to replace the materials.

11 INSPECTION AND TESTING

11.1 General

1. Before commencing the work, the CONTRACTOR shall provide a full inspection and test plan, which includes at a minimum, industry standard tests, as well as any other tests specified herein.
2. At the completion of the construction work the CONTRACTOR shall perform required tests to establish to OWNER's satisfaction that all equipment, devices and wiring have been correctly installed, are in satisfactory working condition, and will operate as intended.

3. Before energizing, the equipment shall be tested for insulation integrity as described under the latest version of the NETA "Acceptance Testing Specifications for Electric Power Distribution Equipment and Systems".
4. The OWNER may send a representative to witness all tests and shall be notified 1 week before tests are to take place. The CONTRACTOR shall reconfirm, 2 days prior to testing, that the equipment and systems are ready for testing.
5. All measurements shall conform to the listed established minimum acceptable test values.
6. CONTRACTOR's Site Supervisor and the OWNER's Representative must approve all test results before circuits or equipment is energized for the first time.
7. CONTRACTOR to provide personnel (minimum of two qualified persons) to assist OWNER during start-up. Personnel provided should be familiar with the installation and have extensive participation in CONTRACTOR's wiring, terminations and testing of the work.
8. The results of all tests shall be recorded. The required number of certified copies shall be provided to OWNER. The test records shall include the date of performance, identification of equipment or material tested, type of test applied, test equipment used, test results and the name of the person in charge of the test. When provided by OWNER, the CONTRACTOR shall use OWNER's standard forms for recording these tests.

11.2 Cables

1. Check cables for proper size, proper supports and correct tagging of both ends of the cable and the conductors.
2. Before energizing, the cable shall be tested for insulation integrity as described under "Dielectric Tests".
3. Measure insulation resistance of motor feeders with feeders disconnected from load side of motor starter and from motors.
4. Measure insulation resistance for lighting feeders with circuit breakers, lighting transformer and lighting branch circuit breakers or switches open.
5. Measure insulation resistance for lighting branch circuits after all lamp-holders, receptacles and fixtures are connected, but before installation of lamps.

11.3 Electric Motors

1. Test motors for proper rotation before connection to the driven equipment. Correct direction of rotation as required.
2. Check motor temperature, speed, current and vibration under no load and full load conditions.

11.4 Motor Control Centers

1. Production tests shall be performed per the applicable standards on each MCC assembly and on each device. A certified test report shall be submitted for Owner's approval prior to shipping, and a copy of the approved test results shall be included with the shipment.
2. After completion of the MCC construction, the whole assembly shall be checked visually and mechanically to ensure that all components are supplied in accordance with the approved drawings and that all mechanical parts are functioning properly.
3. A visual check shall include confirmation of the following:
    a. all components are supplied and installed in accordance with the approved parts list;
    b. assembly dimensions are in accordance with the approved drawings;
    c. breaker trips are adjusted;
    d. wire sizes are in accordance with the specification;
    e. nameplates are installed; and
    f. terminal and wire markings are in accordance with approved wiring diagrams.
4. A mechanical check shall be done to ensure the following:
    a. electrical clearances meet CSA requirements;
    b. all switch handles are functioning properly;
    c. all draw-out units are locked in the operating position;
    d. door mounted overload reset buttons are aligned with the overload relay;
    e. screws and bolts are properly tightened;
    f. paint finish is acceptable;
    g. wiring is neat and correct; and
    h. ground path is continuous.
5. Functional tests shall be performed on all control devices, protection relays, meters, and indicating lights to ensure a completely workable assembly.
6. Communications wiring to all devices shall be confirmed by establishing communications via a computer utilizing Vendors' standard software. Settings for device addressing and communication speed shall be configured at the factory.
7. A dielectric test shall be performed to ensure the integrity of the insulation system.
8. Components and items to be shipped loose shall be checked for completeness.

11.5 Variable Frequency Drives

1. CONTRACTOR shall submit VENDOR's formal test plan six weeks before the scheduled start of tests for review and approval.
2. Production tests shall be performed on each VFD and all VFD components per respective applicable standards and per the VENDOR's normal quality assurance procedures.
3. In addition to the VENDOR's normal quality assurance procedures, tests and inspections as listed below shall be performed:
    a. Burn-in test of all devices and printed circuit boards
    b. Insulation resistance test
    c. Visual inspection of complete system
    d. Assembly and operation of the cooling system
    e. Communication wiring to all devices shall be confirmed by establishing communications between various devices, HMI and external purchaser's control system (laptop). Setting for device addressing and communication shall be determined at the factory.
    f. System Controls Testing – Following functions shall be tested/demonstrated:
        i. Verification of all control parameter settings
        ii. Adjustment of minimum/maximum speed, acceleration and deceleration rates and other VFD operation functions
        iii. Speed and other parameter controls from external purchaser's control system (simulated from a laptop)
        iv. All trip and alarm functions shall be tested/simulated to verify proper operation and correct settings
4. Components and items to be shipped loose shall be inspected by the CONTRACTOR for completeness.

11.6 Generator

1. CONTRACTOR shall submit VENDOR's formal test plan six weeks before the scheduled start of tests for review and approval.
2. In addition to the VENDOR's normal quality assurance procedures, tests and inspections as listed below shall be performed:
    a. Full functional testing of the standby generator, to ensure functionality;
    b. A load test at 100% of rated load for a period of four hours. Heating effects based on maximum design ambient shall be simulated to confirm that the cooling system is adequate.
    c. Routine generator tests according to NEMA Std. MG 1-33.3.8 shall be conducted.

3. Components and items to be shipped loose shall be inspected by the CONTRACTOR for completeness.

11.7 Lighting Tests

1. A night test of the lighting system shall be made after wiring is complete. Floodlights and other lighting fixtures shall be reoriented and adjusted as directed by the OWNER.
2. Photo-cell orientation and control to be tested and adjustments shall be made as required.
3. Light meter readings inside the building shall be performed and recorded.

11.8 Miscellaneous Devices

1. Check all terminals for proper connections.
2. Check all terminal boxes of furnished equipment for loose wires. Check for proper identification of wires, terminals, control switches, instruments and electrical devices.
3. Check all control circuits for correct operation and sequence of operation.
4. Check that individual and/or overall shield drain wires are connected or terminated as shown on the drawings.
5. Check that all relay coils and all solenoids are rated for the operating voltage of the control circuits.
6. Electronic equipment shall be checked in accordance with the Manufacturer's Instructions.

12 E&I DRAWINGS

12.1 Electrical & Instrumentation

12.1.1 Electrical Lists – Appendix A

Document No.	Description
2203417-1618-LST-001	Electrical Load List
2203417-1650-LST-100	Electrical & Instrumentation Cable Schedule
2203417-1617-LST-003	Electrical & Instrumentation Material Take-Off

12.2 Instrumentation

12.2.1 Instrumentation Lists – Appendix B

Document No.	Description
2203417-1711-LST-001	Instrument List

Appendix A Electrical Lists

Rev	Client	Regional District of Kitimat-Stikine
0	Project Title	RDKS - Production Well PW4
	Project #	2203417
	Document #	2203417-1617-LST-003
	Client Project #	-

Rev	Issued For	YYYY-MM-DD	By	Check	Approve
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MATERIAL TAKE OFF (MTO)

			Equipment					Procurement						
Item #	Description	Type	Quantity	Units	Manufacturer	Model Number	Vendor	Specified by	Purchased by	Status	Unit Cost	Total Cost	Comments	Rev
	Electrical Equipment													
1	MCC-100 - 600VAC, 600A, 42k AIC rated		1	EA	Rockwell	-	-	Allnorth	CONTRACTOR					0
2	Lineator AUHF Passive Harmonic Filter		1	EA	Mirus International Inc.	AUHF-125-600-60-D-E1	Mirus International Inc.	Allnorth	CONTRACTOR					0
3	UH-100 - 600VAC 3 Phase Unit Heater w/ Thermostat		1	EA	Ouellet	OAS10036AMT	OPEN	Allnorth	CONTRACTOR				Ouellet OAS10036AMT or equivalent.	0
4	CP-100 - Control Panel		1	EA	-	-	OPEN	Allnorth	CONTRACTOR				See drawing 2203417-1772-001 for panel BOM.	0
5	LTSW-100 - Single Pole Light Switch		1	EA	Leviton	5601-W	OPEN	Allnorth	CONTRACTOR				Leviton 5601-W or equivalent.	0
6	L-100-X - Vapourproof Ceiling-Mounted Interior Lighting Fixture		3	EA	Cooper	2VT2-LD5-4-DR-UNV-L840-WL-U	OPEN	Allnorth	CONTRACTOR				Cooper Metalux 2VT2-LD5-4-DR-UNV-L840-WL-U or equivalent.	0
7	L-101-1 - Wallmounted Exterior Lighting Fixture		1	EA	Cooper	XTOR12B-W-PC1	OPEN	Allnorth	CONTRACTOR				Cooper Lumark Outdoor XTOR12B-W-PC1 or equivalent.	0
8	Wallmounted Exterior Flood Light		3	EA	Cooper	TGS3S401DSRB	OPEN	Allnorth	CONTRACTOR				Cooper HALO TGS Outdoor TGS3S401DSRB or equivalent.	0
9	E-100 - Wallmounter Interior Emergency Lighting Fixture w/ Internal Battery Backup		1	EA	Ready-Lite	LDX12-72-2-LD10	OPEN	Allnorth	CONTRACTOR				Ready-Lite LDX12-72-2-LD10 or equivalent.	0
10	RCPT-100-X - Interior Surface-Mounted GFCI Receptacles		3	EA	Leviton/ Red Dot	AGTR1-W / CIFS-1G-1/4-HV & CIFS-6	OPEN	Allnorth	CONTRACTOR				Leviton AGTR1-W in Red Dot CIFS-1G-3/4-HV box with CIFS-6 cover or equivalent.	0
11	RCPT-101 - Exterior Surface-Mounted GFCI Receptacle with Weatherproof Cover		1	EA	OPEN	AGTR1-W / IH3-1-LM & CKMU	OPEN	Allnorth	CONTRACTOR				Leviton AGTR1-W in Red Dot IH3-1-LM weatherproof box with CKMU weatherproof cover or equivalent.	0
12	G-100 - 175 kW Natural Gas Generator Set 175kW 14.2L Industrial Spark-Ignited		1	EA	Generac	SG175	Generac	Allnorth	CONTRACTOR					0
13	CB-100 Enclosure - Pole-Mounted CB Enclosure		1	EA	Schneider	J250SS	OPEN	Allnorth	CONTRACTOR				Part of CB-100 assembly with CB-100 breaker.	0
14	CB-100 Breaker - 200AF 200AT 100% Rated Thermal Magnetic Circuit Breaker		1	EA	Schneider	JDL36200C	OPEN	Allnorth	CONTRACTOR				Part of CB-100 assembly with CB-100 breaker.	0
15	MSM-100 - 7-Jaw Main Service Meter Socket		1	EA	Schneider	UTH7213	OPEN	Allnorth	CONTRACTOR					0
16	Utility Service Pole		1	EA	OPEN	OPEN	OPEN	Allnorth	CONTRACTOR				Min. 5m tall power pole.	0
	Motors													
17	125 HP, 575 VAC, 3600rpm Submersible Pump Motor		1	EA	Goulds	10JRLC	OPEN	Allnorth	CONTRACTOR					0
	Cables													
18	1C #2/0 AWG Bare Copper		50	m	-	-	-	Allnorth	Contractor				Grounding Cable	0
19	1C #1 AWG c/w FT4 Jacket		5	m	-	-	-	Allnorth	Contractor				Grounding Cable	0
20	1C #6 AWG c/w FT4 Jacket		20	m	-	-	-	Allnorth	Contractor				Grounding Cable	0
21	4C #4/0 AWG w/ GND, 1000V, TECK90		180	m	OPEN	TECK90	OPEN	Allnorth	Contractor					0
22	3C #4/0 AWG w/ GND, 1000V, TECK90		25	m	OPEN	TECK90	OPEN	Allnorth	Contractor					0

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MATERIAL TAKE OFF (MTO)

			Equipment					Procurement						
Item #	Description	Type	Quantity	Units	Manufacturer	Model Number	Vendor	Specified by	Purchased by	Status	Unit Cost	Total Cost	Comments	Rev
23	3C #2/0 AWG w/ GND, 1000V, TECK90		70	m	OPEN	TECK90	OPEN	Allnorth	Contractor					0
24	3C #2/0 AWG, 1000V, TECK90		15	m	OPEN	TECK90	OPEN	Allnorth	Contractor					0
25	3C #8 AWG, 1000V, TECK90		5	m	OPEN	TECK90	OPEN	Allnorth	Contractor					0
26	3C #12 AWG, 1000V, TECK90		10	m	OPEN	TECK90	OPEN	Allnorth	Contractor					0
27	4C #2 AWG, 600V, TECK90		5	m	OPEN	TECK90	OPEN	Allnorth	Contractor					0
28	6C #12 AWG, 600V, TECK90		20	m	OPEN	TECK90	OPEN	Allnorth	Contractor					0
29	2C #12 AWG, 600V, TECK90		65	m	OPEN	TECK90	OPEN	Allnorth	Contractor					0
30	10C #14 AWG, 600V, TECK90		30	m	OPEN	TECK90	OPEN	Allnorth	Contractor					0
31	4C #14 AWG 600V, TECK90		20	m	OPEN	TECK90	OPEN	Allnorth	Contractor					0
32	2C #14 AWG 600V, TECK90		10	m	OPEN	TECK90	OPEN	Allnorth	Contractor					0
33	1PR #16 AWG, 600V, TECK90		25	m	OPEN	TECK90	OPEN	Allnorth	Contractor					0
34	2PR #16 AWG, 600V, TECK90		10	m	OPEN	TECK90	OPEN	Allnorth	Contractor					0
35	4PR #16 AWG, 600V, TECK90		10	m	OPEN	TECK90	OPEN	Allnorth	Contractor					0
36	CATE 6E TECK90 ETHERNET CABLE		35	m	OPEN	TECK90	OPEN	Allnorth	Contractor					0
														0
	Grounding													0
37	Ground Rod, 20mm x 3000mm Copper-Clad or Galvanized Steel Ground Rod		4	EA	Burndy	OPEN	OPEN	Allnorth	Contractor					0
38	Ground Well c/w Cover		2	EA	Burndy	C613400	OPEN	Allnorth	Contractor					0
39	Grounding Clamp		4	EA	Burndy	GK6426	OPEN	Allnorth	Contractor					0
40	Compression Connector -1/0-250kcmil to 3/0-250kcmil		A/R		Burndy	YGHP2C29	OPEN	Allnorth	Contractor				Construction Allowance	0
41	Grounding Lug - 2 Hole, #2/0 AWG		A/R		Burndy	YGA262N	OPEN	Allnorth	Contractor				Construction Allowance	0
42	Grounding Lug - 2 Hole, #4/0 AWG		A/R		Burndy	YGA282N	OPEN	Allnorth	Contractor				Construction Allowance	0
43	Cable Tray Ground Clamp - # 2/0 AWG - 250 kcmil		A/R		Burndy	GC2929CT	OPEN	Allnorth	Contractor				Construction Allowance	0
														0
	Cable Tray													0
44	Straight - 300mm Width, HDG, 150mm Siderail, 300mm Rung Spacing		4	m	Thomas & Betts	-	OPEN	Allnorth	Contractor					0
45	Cable Trays Accessories		A/R	-	Thomas & Betts	-	OPEN	Allnorth	Contractor				Construction Allowance	0

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MATERIAL TAKE OFF (MTO)

			Equipment					Procurement						
Item #	Description	Type	Quantity	Units	Manufacturer	Model Number	Vendor	Specified by	Purchased by	Status	Unit Cost	Total Cost	Comments	Rev
46	Cable Trays Hanger Support & Accessories		A/R	-	Thomas & Betts	-	OPEN	Allnorth	Contractor				Construction Allowance	0
47	Unistrut		A/R	-	Thomas & Betts	-	OPEN	Allnorth	Contractor				Construction Allowance	0
	Junction Boxes													
48	JB-100 - Pumphouse Building Junction Box		1	EA	-	-	-	-	-				Contractor Supply or Fabricate	0
49	JB-101 - Well PW4 Junction Box		1	EA	-	-	-	-	-				Contractor Supply or Fabricate	0
50	Unistruts & Other Equipment Required to Build Supports		A/R	-	Thomas & Betts								Construction Allowance	0
	Instrumentation													
51	Magnetic Flowmeter		1	EA	Endress+ Hauser	5W4C1F-C6ELHA0DUA1K0A+AADHL	OPEN	Allnorth	Contractor					0
52	Pressure Transmitter		1	EA	VEGA	CA68666192	OPEN	Allnorth	Contractor					0
53	Level Transmitter		1	EA	VEGA	CA68665028	OPEN	Allnorth	Contractor					0
54	Temperature Transmitter		1	EA	Greystone Energy Systems Inc.	TXRCLA	OPEN	Allnorth	Contractor					0
55	Turbidity Sensor		1	EA	HACH	LXV445.99.53112	OPEN	Allnorth	Contractor					0
56	Turbidity Analyzer		1	EA	HACH	LXV525.99.AA1551	OPEN	Allnorth	Contractor					0
57	PRV Position Switch Close		1	EA	SINGER	X129	OPEN	Allnorth	Contractor				Provided with the PRV.	0
58	Generator Limit Switch		4	EA	-	-	-	Allnorth	Contractor				Provided by the Generator Manufacturer.	0

Notes:
1) All information contained herein is preliminary. Sizes, powers, equipment tags and all other contents may change as design progresses.

Abbreviations:
NO: Number
MFR: Manufacturer

PERMIT TO PRACTICE
ALLNORTH CONSULTANTS LIMITED
PERMIT NUMBER: 1002935
Reg No: 54120 Signature:
Date: 13 Mar. 2024
Engineers & Geoscientists British Columbia

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
J. LARON
#56113
2024-03-13

Rev	Client	Regional District of Kitimat-Stikine
0	Project Title	PW4 Production Well
	Project #	2203417
	Document #	2203417-1618-LST-001
	Client Project #	-

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LOAD LIST

Load				Motor / Load Data						Drive / Starter Data								
Equipment Tag	Description	Fed From	MCC Room	Motor Power [HP]	Output Power [kW]	Voltage [V]	Full Load Amps (FLA)	Frame	Speed [RPM]	Type / Size	Protection Type	Protection Size	Section / CCT	Make	Model Number	Drawing Reference	P&ID Reference	Comments	Rev
M-101	Well Pump No. 4	MCC-100	Pumphouse Building PW4	125	93.21	600			3460	VFD	Fuse	225	-	PowerFlex 755		2203417-1661-001	N/A		0
UH-100	Unit Heater	MCC-100	Pumphouse Building PW4	-	10.00	600			-	N/A	Fuse	15	-	OUELLETEL		2203417-1661-001	N/A		0
LPA	30 CCT 120/208V Lighting Panel	TX-LPA	Pumphouse Building PW4	-	-	120/208			-	N/A	Fuse	15	-	OPEN		2203417-1670-001	N/A	Refer to Panel Schedule	0
CP-100	Control Panel	LPA	Pumphouse Building PW4	-	0.85	120			-	N/A	Breaker	15	-	Emerson		2203417-1670-001	N/A	Refer to Panel Schedule	0
L-100-X	Interior Lighting	LPA	Pumphouse Building PW4	-	0.11	120			-	N/A	Breaker	15	-	COOPER		2203417-1670-001	N/A	Refer to Panel Schedule	0
E-100	Emergency Lighting	LPA	Pumphouse Building PW4	-	0.11	120			-	N/A	Breaker	15	-	COOPER		2203417-1670-001	N/A	Refer to Panel Schedule	0
L-101-X	Exterior Lighting	LPA	Pumphouse Building PW4	-	0.11	120			-	N/A	Breaker	15	-	COOPER		2203417-1670-001	N/A	Refer to Panel Schedule	0
RCPT-100-X	Interior Receptacles	LPA	Pumphouse Building PW4	-	0.11	120			-	N/A	Breaker	15	-	OPEN		2203417-1670-101	N/A	Refer to Panel Schedule	0
RCPT-101-X	Exterior Receptacle	LPA	Pumphouse Building PW4	-	0.11	120			-	N/A	Breaker	15	-	OPEN		2203417-1670-101	N/A	Refer to Panel Schedule	0
EF-100	Exhaust Fan	LPA	Pumphouse Building PW4	-	0.25	120			-	N/A	Breaker	15	-	GREENHECK		2203417-1661-001	N/A	Refer to Panel Schedule	0
G-100	Generator Battery Charger	LPA	Pumphouse Building PW4	-	0.30	120			-	N/A	Breaker	15	-	-		2203417-1670-001	N/A	Refer to Panel Schedule	0
G-100	Generator Block Heater	LPA	Pumphouse Building PW4	-	2.00	208			-	N/A	Breaker	15	-	-		2203417-1670-001	N/A	Refer to Panel Schedule	0

Notes:
1) All information contained herein is preliminary. Sizes, powers, equipment tags and all other contents may change as design progresses.

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NO: Number
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PO: Purchase Order
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TDH: Total Dynamic Head
DIA: Diameter
POLTHN: Polyethylene

PERMIT TO PRACTICE
ALLNORTH CONSULTANTS LIMITED
PERMIT NUMBER: 1002935
Reg No: 54120 Signature:
Date: 13 Mar. 2024
Engineers & Geoscientists British Columbia

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2024-03-13

Rev	Client	Regional District of Kitimat-Stikine
0	Project Title	PW4 Production Well
	Project #	2203417
	Document #	2203417-1650-LST-100
	Client Project #	-

Rev	Issued For	YYYY-MM-DD	By	Check	Approve
0	Tender	2024-03-13	NBF	JBL	JBL

ELECTRICAL & INSTRUMENTATION CABLE SCHEDULE

Identification					Cable Data						Device Data					
Item #	Cable Tag	Description	From	To	# Cores	# Runs	Gauge	Length [m]	Insulation Rating	Cable Type	Voltage	Location	Device Type	Cable Route	Comments	Rev
1	P-MCC100-1	MCC-100 Feeder	CB-100	MSM-100	3C w/GND	1	#4/0 AWG	3	1000V	TECK	600V	Power Pole		Conduit		0
2	P-MCC100-2	MCC-100 Feeder	MSM-100	MCC-100	3C w/GND	1	#4/0 AWG	160	1000V	TECK	600V	Power Pole		Direct Buried		0
3	P-G100	Generator G-100 ATS Feeder	G-100	MCC-100	3C w/GND	1	#4/0 AWG	21.5	1000V	TECK	600V	PW4 Pumphouse		Direct Buried		0
4	P-M101-1	Motor M-101 Feeder	MCC-100	Lineator AUHF Filter	3C	1	#2/0 AWG	6.5	1000V	TECK	600V	PW4 Pumphouse		Cable Tray		0
5	P-M101-2	Motor M-101 Feeder	Lineator AUHF Filter	MCC-100	3C	1	#2/0 AWG	6.5	1000V	TECK	600V	PW4 Pumphouse		Cable Tray		0
6	P-M101-3	Motor M-101 Feeder	MCC-100	JB-101	3C w/GND	1	#2/0 AWG	13	1000V	TECK	600V	PW4 Wellsite		Direct Buried		0
7	P-M101-4	Motor M-101 Feeder	JB-101	M-101	3C w/GND	1	#2/0 AWG	55	1000V	TECK	600V	PW4 Wellsite		PW4 Wellsite		0
8	P-UH100	Heater UH-100 Feeder	MCC-100	UH-100	3C	1	#12 AWG	9.5	1000V	TECK	600V	PW4 Pumphouse		Field Run		0
9	P-TXLPA	Transformer TXLPA Feeder	MCC-100	TX-LPA	3C	1	#8 AWG	4	1000V	TECK	600V	PW4 Pumphouse		Cable Tray		0
10	P-LPA	Panel LPA Feeder	TX-LPA	LPA	4C	1	#2 AWG	1	600V	TECK	120/208V	PW4 Pumphouse		Cable Tray		0
11	P-CP100	CP-100 Feeder	LPA CCT 1	CP-100	2C	1	#12 AWG	4	600V	TECK	120/208V	PW4 Pumphouse		Cable Tray		0
12	P-E100	Emergency Lighting E-100 Feeder	LPA CCT 2	E-100	2C	1	#12 AWG	5	600V	TECK	120/208V	PW4 Pumphouse		Field Run	Install lighting junction boxes as required.	0
2	P-L100	Interior Lights L-100 Feeder	LPA CCT 8	L-100-X	2C	1	#12 AWG	5	600V	TECK	120/208V	PW4 Pumphouse		Field Run	Install lighting junction boxes as required.	0
4	P-L101-1	Exterior Lighst 01 L-100 Feeder	LPA CCT 4	L-101-X	2C	1	#12 AWG	5	600V	TECK	120/208V	PW4 Pumphouse		Field Run	Install lighting junction boxes as required.	0
5	P-RCPT100	Interior Receptacles RCPT-100 Feeder	LPA CCT 3	RCPT-100-X	2C	1	#12 AWG	2	600V	TECK	120/208V	PW4 Pumphouse		Field Run		0
5	P-RCPT101	Exterior Receptacle 01 RCPT-101 Feeder	LPA CCT 5	RCPT-101-X	2C	1	#12 AWG	3	600V	TECK	120/208V	PW4 Pumphouse		Field Run		0
5	P-EF100	Exhaust Fan EF-100 Feeder	LPA CCT 6	EF-100	2C	1	#12 AWG	12	600V	TECK	120/208V	PW4 Pumphouse		Field Run		0
13	P-G101	Generator Battery Charger & Block Heater Feeder	LPA CCT 7 & 9	G-100	6C	1	#12 AWG	19.5	600V	TECK	120/208V	PW4 Pumphouse		Direct Buried		0
14	D-G100	Generator DC Controls	MCC-100	G-100	10C	1	#14 AWG	21.5	600V	TECK	24VDC	Generator G100 Area		Direct Buried		0
15	D-G101	Generator Ethernet Control	MCC-100	G-100	-	1	Cat 6E	21.5	600V	TECK	-	Generator G100 Area		Direct Buried		0
16	D-ATS100	ATS DC Controls	MCC-100	CP-100	10C	1	#14 AWG	6	600V	TECK	24VDC	PW4 Pumphouse		Cable Tray		0
17	D-ATS101	ATS Ethernet Controls	MCC-100	CP-100	1C	1	Cat 6E	6	600V	TECK	-	PW4 Pumphouse		Cable Tray		0
18	D-VFD101	VFD-101 Fault & Run Status to CP-100	VFD-101	CP-100	10C	1	#14 AWG	7	600V	TECK	24VDC	PW4 Pumphouse		Cable Tray		0
19	D-MCC100	MCC-100 Ethernet Control	CP-100	MCC-100	1C	1	Cat 6E	7	600V	TECK	-	PW4 Pumphouse		Cable Tray		0
3	D-JB100	JB-100 Discrete Feeder	CP-100	JB-100	4C	1	#14 AWG	6	600V	TECK	24VDC	PW4 Pumphouse		Buried Conduit		0
6	D-ZSC100	ZSC-100 Discrete Signal	JB-100	ZSC-100	2C	1	#14 AWG	2	600V	TECK	24VDC	PW4 Pumphouse		Field Run		0
7	D-AIT100	AIT-100 Discrete Controls	CP-100	AIT-100	4C	1	#14AWG	9	600V	TECK	24VDC	PW4 Pumphouse		Buried Conduit		0

Rev	Client	Regional District of Kitimat-Stikine
0	Project Title	PW4 Production Well
	Project #	2203417
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	Client Project #	-

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Regional District of Kitimat-Stikine

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ELECTRICAL & INSTRUMENTATION CABLE SCHEDULE

Identification					Cable Data						Device Data					
Item #	Cable Tag	Description	From	To	# Cores	# Runs	Gauge	Length [m]	Insulation Rating	Cable Type	Voltage	Location	Device Type	Cable Route	Comments	Rev
6	A-LT100-1	Hydrostatic Level Transmitter Analog Signal	CP-100	JB-101	1PR	1	#16 AWG	14	600V	TECK	24VDC	PW4 Wellsite		Direct Buried, Cable Tray		0
5	A-LT100-2	Hydrostatic Level Transmitter Analog Signal	JB-101	LT-100	MFR	1	MFR	-	600V	TECK	24VDC	PW4 Wellsite		Production Well Conduit		0
20	A-JB100	JB-100 Analog Signals	CP-100	JB-100	4PR	1	#16 AWG	6	600V	TECK	24VDC	PW4 Pumphouse		Buried Conduit		0
21	A-TIT100	Temperature Transmitter Analog Signal	CP-100	TIT-100	1PR	1	#16 AWG	5	600V	TECK	24VDC	PW4 Pumphouse		Field Run		0
22	A-PIT100	Pressure Transmiter - JB-100 to PT-100	JB-100	PT-100	MFR	1	MFR	-	600V	TECK	24VDC	PW4 Pumphouse		Field Run		0
23	A-FIT100	Flow Transmitter - JB-100 to FIT-100	JB-100	FIT-100	MFR	1	MFR	-	600V	TECK	24VDC	PW4 Pumphouse		Field Run		0
24	A-AIT100	Turbidity Transmitter - CP-100 to AIT-100 Turbidity Transmitter	CP-100	AIT-100	1PR	1	#16 AWG	9	600V	TECK	24VDC	PW4 Pumphouse		Buried Conduit		0
25	A-AE100	Turbidity Transmitter - AIT-100 Turbidity Transmitter to Sensor AE-100	AIT-100	AE-100	MFR	1	MFR	9	600V	TECK	24VDC	PW4 Pumphouse		Field Run		0
26	A-TIT100	Pump House Temperature Indication Transmitter	CP-100	AIT-100	2PR	1	#16 AWG	5	600V	TECK	24VDC	PW4 Pumphouse		Field Run		0

Notes:

1) Contractor shall field verify all cable lengths prior to procurement and installation. Cable lengths shown are estimate only.

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Appendix B Instrumentation Lists

Rev	Client	Regional District of Kitimat-Stikine
0	Project Title	PW4 Production Well No.4
	Project #	2203417
	Document #	2203417-1711-LST-002
	Client Project #	-

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Regional District of Kitimat-Stikine

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INSTRUMENT LIST

Tag						RTU PLC I/O Count				Drawings		I/O					Device				
Area	Type	UID	Description	Signal Type	SIL	AI	AO	DI	DO	P&ID Ref	Layout Ref	Location	Remote I/O Cabinet or JB	Rack	Slot	Channel	Catalog Type	Manufacturer	Detail Part Number	Comments	Rev
-	FIT	100	Magnetic Flowmeter	4-20mA	-	1				-	2203417-1670-101	CP-100	CP-100	-	-	-	Flow Transmitter	Endress+Hauser	5W4C1F-C6ELHA0DUA1K0A+AADHL	Flow meter materials is Carbon Steel. RDKS to provide feedback if this acceptable.	0
-	PIT	100	Pressure Transmitter	4-20mA	-	1				-	2203417-1670-102	CP-100	CP-100	-	-	-	Pressure Transmitter	VEGA	CA68666192		0
-	LIT	100	Level Transmitter	4-20mA	-	1				-	2203417-1670-103	CP-100	CP-100	-	-	-	Level Transmitter	VEGA	CA68665028		0
-	TIT	100	Temperature Transmitter	4-20mA	-	1				-	2203417-1670-104	CP-100	CP-100	-	-	-	Temperature Transmitter	GREYSTONE ENERGY SYSTEMS INC.	TXRCLA		0
-	AIT	100	Turbidity Analyzer	Discrete	-	1		1		-	2203417-1670-105	CP-100	CP-100	-	-	-	Turbidity Analyzer	HACH	LVX525.99.53112		0
-	ZSC	100	PRV Position Switch Close	Discrete	-			1		-	2203417-1670-106	CP-100	CP-100	-	-	-	Limit Switch	SINGER	X129	C/W Pressure Relief Valve	0
-	ZSC	101	Generator Limit Switch	Discrete	-			1		-	2203417-1670-107	CP-100	CP-100	-	-	-	Limit Switch	-	-	Generator Manufacturer to provide details of the limit switches.	0

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