Colwood
3300 Wishart Road
Victoria, B.C. V9C 1R1
(250) 478-5999

Request for Proposal:

Allandale Pit Pumping System

March, 2017

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Owner: *City of Colwood*

Contract: *Allandal**e** Pit Pumping System*

Reference No. RFP-2017-01

The Owner requests proposals for:

Construction of a new pumping station for the collection of wastewater on Allandale Road. The work generally consists of, but not limited to:

- Construction of a wet well re-purposing an existing wetwell and interconnection through a forcemain
- Construction of a 900 mm drilled well
- Submersible sewage pumps with spare and piping
- Electrical controls, SCADA and programing, and standby diesel gen-set
- Containment for project elements with Electrical Control Room

Voluntary Site meeting:

Meeting Time: 12:00pm (Noon)
Meeting Date: March 28th, 2017
Location: Allandale Pit. Meet at Allandale Rd and Lauren Road

Tenders are scheduled to close:

Tender Closing Time: 2:00 pm local time
Tender Closing Date: April 11, 2017
Address: Tetra Tech
117 – 877 Goldstream Ave.
Victoria, BC V9B 2X8

NAME OF *OWNER'S* REPRESENTATIVE

Larry Sawchyn, P.Eng.
Larry.Sawchyn@tetratech.com

**(TO BE READ WITH "INSTRUCTIONS TO TENDERERS - PART II"
CONTAINED IN THE EDITION OF THE PUBLICATION
"MASTER MUNICIPAL CONSTRUCTION DOCUMENTS" SPECIFIED IN ARTICLE 2.2 BELOW)**

Owner: ***City of Colwood***

Contract: ***Allandale Pit Pumping System***

Reference No. RFP-2017-01

1.0 Introduction

1.1 These Instructions apply to and govern the preparation of tenders for this *Contract*. The *Contract* is generally for the following work:

- Construction of a wet well re-purposing an existing wetwell and interconnection through a forcemain
- Construction of a 900 mm drilled well
- Submersible sewage pumps with spare and piping
- Electrical controls, SCADA and programing, and standby diesel gen-set
- Containment for project elements with Electrical Control Room

1.2 Direct all inquiries regarding the *Contract* in writing to:
Larry Sawchyn, P.Eng.
Larry.Sawchyn@tetratech.com

2.0 Tender Documents

2.1 The tenderer should review tender documents to prepare a tender that consists of all of the *Contract Document*s listed in Schedule 1 entitled "Schedule of Contract Documents". Schedule 1 is attached to the Agreement which is included as part of the tender package. The *Contract Documents* include the drawings listed in Schedule 2 to the Agreement, entitled "List of *Contract Drawings*".

2.2 A portion of the *Contract Documents* are included by reference. Copies of these documents have not been included with the tender package. These documents are the Instructions to Tenderers - Part II, General Conditions, Specifications and Standard Detail Drawings. They are those contained in the publication entitled "Master Municipal Construction Documents - General Conditions, Specifications and Standard Detail Drawings" (MMCD). Refer to Schedule 1 to the Agreement or, if not specified in Schedule 1, then the applicable edition shall be the most recent edition as of the date of the *Tender Closing Date.* All sections of the MMCD and referenced documents listed in the Agreement are by reference included in the *Contract Documents*.

2.3 Any additional information made available to tenderers prior to the *Tender Closing Time* by the *Owner* or representative of the *Owner* which is not expressly included in Schedule 1 or Schedule 2 to the Agreement, is not included in the *Contract Documents*. Such additional information is made available only for the assistance of tenderers who must make their own judgment about its reliability,

accuracy, completeness and relevance to the *Contract*, and neither the *Owner* nor any representative of the *Owner* gives any guarantee or representation that the additional information is reliable, accurate, complete or relevant.

3.0 Submission of Tenders

3.1 Tenders must be submitted in a sealed envelope, marked on the outside with the above *Contract* Title and Reference No., and must be received by the office of:

Attention: Tetra Tech

on or before:

Tender Closing Time: 2:00**:** p.m. local time

Tender Closing Date: April 11, 2017
Address: 117 – 877 Goldstream Ave.
Victoria, B.C. V9B 2X8

3.2 Late tenders will not be accepted or considered, and will be returned unopened

4.0 Additional Instructions to Tenderers

4.1 **SITE FAMILIARIZATION**

1. The Tenderer shall examine the Place of Work before submitting a Tender and shall satisfy themselves as to the nature and location of the Work, the means of access to the site, and shall obtain all necessary information as to the risks, contingencies and circumstances which may affect his Tender.
2. A voluntary site visit to the place of Work is scheduled in accordance with the Invitation to Tender.
3. Claims for additional costs will not be entertained with respect to conditions which would reasonably have been ascertained by an inspection of the site prior to the Tender closing.
4. The Site is open to Tenderers for their inspection and due diligence.

4.2 **OMISSIONS/DISCREPANCIES/INTERPRETATIONS**

1. Tenderers finding discrepancies or omissions in the drawings or specifications, or having doubt as to the meaning or intent thereof, shall at once notify the Contract Administrator who will, if necessary send a written Addenda or explanation to all tenderers.
2. Any Addenda will be issued no later than three working days prior to the Tender closing date. All tenderer enquiries must be obtained in written format for inclusion in the last Addendum. Inquiries not in writing or after the date of the last Addendum will not be answered.

4.3 **PERMITS**

1. Tenderer to ensure that Price includes all necessary permits from the City of Colwood, including the Permit to Alter or Construct on City Property.

4.4 **ALTERNATIVES**

1. Instruction to Tenderers – Part II, Section 6.3 is deleted and replaced with the following:

   "Tenderers are encouraged to offer alternatives. *Alternative Tenders* must meet pumping capacity, generator capacity, line velocity, and head requirements. Alternative submissions shall conform to the Form of Tender and include a schedule of quantiles and prices, baseline construction schedule, experience of superintendent, comparable work experience, subcontractors, and a workplan and methodology."

4.5 **APPROVED EQUAL**

1. Tenderers may request Approved Equals during the RFP phase in accordance MMCD Instructions to Tenderers - Part II, 7.0. Applications for Approved Equal shall be directed to the contact person listed in 1.2 above.

2. Applications for Approved Equals shall be made prior to the date of the last Addendum as listed in 4.2.2 above.

4.6 **EVALUATION MATRIX**

3. The City of Colwood will compare and evaluate the Proposals to identify the Proposal which the City of Colwood in its sole and absolute discretion judges to be the most advantageous to the City of Colwood by applying the following evaluation criteria.

	Evaluation Criteria	**Weight**
1.	Price	50%
2.	Workplan	20%
3.	Schedule	5%
4.	Proposed Team and Experience	15%
5.	Comparable Work Experience	10%

The lowest contract price will not necessarily be perceived to provide the Owner with the best value. To assist in evaluation of tenders the City may, in its sole and absolute direction, conduct reference checks and background investigations with internal and external sources and consider any relevant information received from the references.

ALLANDALE PIT PUMPING SYSTEM

Appendix 1 - Schedule of Quantities and Estimate

Section	*Para*	*Specification Title*	*Unit*	*Quantity*	*Amount*
01 30 00		**General Requirements**			
	1.0	**Mobilization**	Lump Sum	100%	$
	1.8	**Survey Layout and Utility Verification**	Lump Sum	100%	$
01 57 01		**Environmental Protection**			
	1.5.1	**Erosion Controls**	Lump Sum	100%	$
		Pumping System			
02 00 01 SS	1.2	**Secondary Lift Station**	Lump Sum	100%	$
02 00 02 SS	1.3	**Supply and Installation of Pumps**	Lump Sum	100%	$
02 00 03 SS	1.2	**Supply and Installation of Enclosure**	Lump Sum	100%	$
02 00 04 SS	1.3	**Electrical Controls and Instrumentation**	Lump Sum	100%	$
02 00 05 SS	1.2	**Supply and Installation of Generator**	Lump Sum	100%	$
02 00 06 SS	1.3	**Supply and Installation of Piping**	Lump Sum	100%	$
				Tender Total	**$**

Allandale Pit Pumping System – Preliminary Construction Schedule

See paragraph 5.3.2 of the Instructions to Tenderers – Part II.

The tenderer shall submit a proposed construction schedule identifying the commencement and completion dates, sequencing of activities, and time required for undertaking the Work.

The Tenderers schedule shall include, at a minimum, the dates in the milestone table below.

No.	Event	Start Date	End Date
	Notice of Intent to Award		Week of April 17, 2017
	Collaborative Meeting		Week of April 24, 2017
	Issued for Construction Drawings / Notice to Proceed		Week of May 1, 2017
	Mobilization		
	Well drilling		
	Pump Installation		
	Sewer Pipe Installation		
	Enclosure Modifications and Installation		
	Electrical , Instrumentation and Controls		
	Commissioning and Testing		

Allandale Pit Pumping System – Experience of Superintendent

See paragraph 5.3.3 of the Instructions to Tenderers – Part II.

Name: _____

Experience:

Project Name: _____

Date: _____

Responsibility: _____

References: _____

Project Name: _____

Date: _____

Responsibility: _____

References: _____

Project Name: _____

Date: _____

Responsibility: _____

References: _____

Allandale Pit Pumping System – Comparable Work Experience

See paragraph 5.3.4 of the Instructions to Tenderers – Part II.

The Tenderers should provide a brief description of 3 completed projects of similar nature and complexity.

Projects profiled should demonstrate experience in pumping systems, piping and interconnection.

The description of the projects should include:

- the name, location, and owner of the project.
- reference w/ phone number
- scope of involvement including its role as prime contractor
- commencement and completion dates
- total costs of the tenderers work
- approach methodology
- challenges

Allandale Pit Pumping System – Subcontractors

See paragraph 5.3.5 of the Instructions to Tenderers – Part II.

In addition to 5.3.5, Tenderers shall include a brief description of its subcontractor's previous comparable work, responsibility, and a reference (phone number). This may include information from sub-contractors for specific scope such as the drilling of the secondary lift station well, gen-set, supply and installation of enclosure, or testing of HDPE line.

Information regarding Proline Electrical is NOT required as Proline are the City's preferred proponent. If an alternate to Proline is proposed, full experience is required including at least 1 project of similar scope and size for a Colwood electrical and control scope for this project.

		Indicate if Proline is a subcontractor	
Tender Item:	02 00 04 1.3		
Trade:	Electrical		
Subcontractor Name:	Proline Electrical	Yes	No

Tender Item: _____

Trade: _____

Subcontractor Name: _____

_____

_____

Dates: _____

Project Name: _____

Responsibility: _____

_____

_____

_____

_____

_____

_____

References: _____

Tender Item:
Trade:
Subcontractor Name:

Dates:
Project Name:
Responsibility:

References

Tender Item:
Trade:
Subcontractor Name:

Dates:
Project Name:
Responsibility:

References

Tender Item:
Trade:
Subcontractor Name:

Dates:
Project Name:
Responsibility:

References

Allandale Pit Pumping System – Work Plan / Methodology

Tenderers must provide a Work Plan/Methodology outlining its proposed techniques; amount, type, and productivities of equipment and crew and proposed shifts including duration and daily operating hours.

The tenders should describe at a minimum, its plan to:

- Drill and concrete the secondary lift station well
- Install and commission the sewage pumps
- Trenching and running sewage piping
- Method for installing the sewer line in the existing forcemain
- Interconnection to existing infrastructure
- Supply and installation of modular enclosure for system works.
- Method for controlling pedestrian traffic through the site (note no auto traffic anticipated)
- Coordination with electrical contractor and migration of controls including generator package.
- Quality control procedures
- Staging
- Testing
- Commissioning

BETWEEN *OWNER* AND *CONTRACTOR*

This agreement made in duplicate this

_____ day of _____, 20_____.

Contract:

(TITLE OF CONTRACT)

Reference No.

(OWNER'S CONTRACT REFERENCE NO.)

BETWEEN:

The

_____
(NAME OF OWNER)

(the "*Owner*")

AND:

_____

_____

_____
(NAME AND OFFICE ADDRESS OF CONTRACTOR)

(the "*Contractor*")

The *Owner* and the *Contractor* agree as follows:

Article 1 The Work Start / Completion Dates

1.1 The *Contractor* will perform all *Work* and provide all labour, equipment and material and do all things strictly as required by the *Contract Documents*.

1.2 The *Contractor* will commence the *Work* in accordance with the *Notice to Proceed*. The *Contractor* will proceed with the *Work* diligently, will perform the *Work* generally in accordance with the construction schedules as required by the *Contract Documents* and will achieve *Substantial Performance* of the *Work* on or before _____ subject to
(INSERT DATE OF SUBSTANTIAL PERFORMANCE)
the provisions of the *Contract Documents* for adjustments to the *Contract Time*.

1.3 Time shall be of the essence of the *Contract.*

Article 2 Contract Documents

2.1 The "*Contract Documents*" consist of the documents listed or referred to in Schedule 1, entitled "Schedule of Contract Documents", which is attached and forms a part of this Agreement, and includes any and all additional and amending documents issued in accordance with the provisions of the *Contract Documents*. All of the *Contract Documents* shall constitute the entire *Contract* between the *Owner* and the *Contractor*.

2.2 The *Contract* supersedes all prior negotiations, representations or agreements, whether written or oral, and the *Contract* may be amended only in strict accordance with the provisions of the *Contract Documents.*

Article 3 Contract Price

3.1 The price for the *Work* ("*Contract Price*") shall be the sum in Canadian dollars of the following

1.1.1 the product of the actual quantities of the items of *Work* listed in the *Schedule of Quantities and Prices* which are incorporated into or made necessary by the *Work* and the unit prices listed in the *Schedule of Quantities and Prices*; plus

1.1.2 all lump sums, if any, as listed in the *Schedule of Quantities and Prices*, for items relating to or incorporated into the *Work*; plus

1.1.3 any adjustments, including any payments owing on account of *Changes* and agreed to *Extra Work*, approved in accordance with the provisions of the *Contract Documents.*

3.2 The *Contract Price* shall be the entire compensation owing to the *Contractor* for the *Work* and this compensation shall cover and include all profit and all costs of supervision, labour, material, equipment, overhead, financing, and all other costs and expenses whatsoever incurred in performing the *Work*.

Article 4 Payment

4.1 Subject to applicable legislation and the provisions of the *Contract Documents*, the *Owner* shall make payments to the *Contractor*.

4.2 If the *Owner* fails to make payments to the *Contractor* as they become due in accordance with the terms of the *Contract Documents* then interest calculated at 2% per annum over the prime commercial lending rate of the Royal Bank of Canada on such unpaid amounts shall also become due and payable until payment. Such interest shall be calculated and added to any unpaid amounts monthly.

Article 5 Rights and Remedies

5.1 The duties and obligations imposed by the *Contract Documents* and the rights and remedies available thereunder shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law.

5.2 Except as specifically set out in the *Contract Documents*, no action or failure to act by the *Owner*, *Contract Administrator* or *Contractor* shall constitute a waiver of any of the parties' rights or duties afforded under the *Contract*, nor shall any such action or failure to act constitute an approval of or acquiescence in any breach under the *Contract*.

Article 6 Notices

6.1 Communications among the *Owner*, the *Contract Administrator* and the *Contractor*, including all written notices required by the *Contract Documents*, may be delivered by hand, or by fax, or by pre-paid registered mail to the addresses as set out below:

The *Owner*:

_____

_____

_____

Fax: _____

Attention: _____

The *Contractor*:

_____

_____

_____

Fax: _____

Attention: _____

The *Contract Administrator*:

_____

_____

_____

Fax: _____

Attention: _____

6.2 A communication or notice that is addressed as above shall be considered to have been received

1.1.4 immediately upon delivery, if delivered by hand; or

1.1.5 immediately upon transmission if sent by fax and received in hard copy; or

1.1.6 after 5 *Days* from date of posting if sent by registered mail.

6.3 The *Owner* or the *Contractor* may, at any time, change its address for notice by giving written notice to the other at the address then applicable. Similarly if the *Contract Administrator* changes its address for notice then the *Owner* will give or cause to be given written notice to the *Contractor.*

6.4 The sender of a notice by fax assumes all risk that the fax is received in hard copy.

Article 7 General

7.1 This *Contract* shall be construed according to the laws of British Columbia.

7.2 The *Contractor* shall not, without the express written consent of the *Owner*, assign this *Contract*, or any portion of this *Contract*.

7.3 The headings included in the *Contract Documents* are for convenience only and do not form part of this *Contract* and will not be used to interpret, define or limit the scope or intent of this *Contract* or any of the provisions of the *Contract Documents*.

7.4 A word in the *Contract Documents* in the singular includes the plural and, in each case, vice versa.

7.5 This agreement shall ensure to the benefit of and be binding upon the parties and their successors, executors, administrators and assigns.

IN WITNESS WHEREOF the parties hereto have executed this Agreement the day and year first written above.

Contractor:

(FULL LEGAL NAME OF CORPORATION, PARTNERSHIP OR INDIVIDUAL)

(AUTHORIZED SIGNATORY)

(AUTHORIZED SIGNATORY)

Owner:

(FULL LEGAL NAME OF CORPORATION, PARTNERSHIP OR INDIVIDUAL)

(AUTHORIZED SIGNATORY)

(AUTHORIZED SIGNATORY)

Schedule 1 Schedule of Contract Documents

The following is an exact and complete list of the *Contract Documents*, as referred to in Article 2.1 of the Agreement.

***NOTE*:** The documents noted with "*" are contained in the "Master Municipal Construction Documents - General Conditions, Specifications and Standard Detail Drawings", edition dated 2009. All sections of this publication are included in the *Contract Documents.*

8.1 Agreement, including all Schedules;

8.2 Supplementary General Conditions

8.3 General Conditions*;

8.4 Supplementary Specifications and Exhibits;

8.5 Specifications*;

8.6 Supplementary Standard Detail Drawings;

8.7 Standard Detail Drawings*;

8.8 Executed Form of Tender, including all Appendices;

8.9 *Contract Documents* listed in Schedule 2 to the Agreement –"List of *Contract Documents*";

8.10 Instructions To Tenderers - Part I;

8.11 Instructions to Tenderers - Part II*;

8.12 The following Addenda:

_____

_____

_____

_____

_____

_____

_____

_____

(ADDENDA, IF ANY)

Schedule 2 List of Contract Documents

TITLE	DRAWING NO.	DATE	REVISION	REVISION DATE
Cover				
Overall Site Plan - Ortho	J0001	2017-03-21	Indicative Design	
Overall Site Plan	J0002	2017-03-21	Indicative Design	
General Arrangement Plan - Ortho	J0003	2017-03-21	Indicative Design	
General Arrangement Plan	J0004	2017-03-21	Indicative Design	
Details – Manhole Views	J0005	2017-03-21	Indicative Design	
Proposed Tube Feeding, Plan and Profile, Guidance Only	J0006	2017-03-21	Indicative Design	
Steel Storage Container – General Arrangement	J0007	2017-03-21	Indicative Design	
Proposed Site Lift Station	J0008	2017-03-21	Indicative Design	
Piping and Instrumentation Diagram	PID-P0001	2017-03-21	Indicative Design	

The following conditions form part of the Contract and are supplementary to the MMCD General Conditions and Specifications. In the event of a direct conflict between the MMCD General Conditions and these Supplementary GC's the Supplementary GC's take precedence. Notwithstanding this order of precedence, in the event of a conflict between or within any of the Contract Documents, the more stringent provisions shall apply with the intent that those which produce the highest quality and performance, shall govern.

Section	***Sub Section***	***Supplementary Specifications***
GC 1 DEFINITIONS	1.79 Archaeological Artifacts	Add 1.79 as follows: **"Archaeological Artifacts"** means any fossils, artifacts, coins, articles of value or antiquity remains and other things of geological, archaeological or historical interest or value discovered at the Place of the Work."
	1.80 Utilities	Add 1.80 as follows: **"Utilities"** is used broadly and includes but is not limited to any and all hydro, cable and telephone lines, poles, structures, facilities; telecommunications; all sanitary and storm sewers, sanitary and storm sewer utilities ; all water and water utilities including valves and meter boxes ; and all oil, gas, steam pipes and utilities; all survey monuments; all street lights, traffic lights, traffic detector loops embedded in pavement; culverts; rail tracks; whether located above or below ground, whether visible or invisible, whether man-made or natural."
GC 2 DOCUMENTS	2.2.4 Document Hierarchy	Replace Section (1) with the following: "The *Contract Documents* shall govern and take precedence in the following order with the Agreement taking precedence over all other *Contract Documents:* a) Agreement, including all Schedules; b) The following Addenda: _____ _____ _____ c) Modifications and Additions to MMCD Specifications d) Supplementary MMCD General Conditions e) Supplementary Specifications and Exhibits f) Contract Drawings; g) Master Municipal Construction Documents Platinum Edition; h) MMCD Standard Detail Drawings; i) Executed Form of Tender, including all Appendices; j) Supplementary Instructions to Tender Part II; k) Instructions to Tenderers - Part I; l) Instructions to Tenderers - Part II and

		m) All other *Contract Documents."*
GC 2 DOCUMENTS	2.4 Copies of Contract Documents	Add 2.4.3 Construction Drawings "The Contract Drawings shall not be used for the construction of the *Work* unless marked Issued for Construction by the Engineer of Record."
GC 3 CONTRACTOR ADMINISTRATOR	3.2.2 Authority	Amend 3.2.2 by adding "or other relationship recognized at law" after "contractual relationship."
	3.7 Site Inspectors	Add 3.7 Payment Certifier "The roles for a Payment Certifier are defined in the British Columbia Builders Lien Act. For the Contractor, the Payment Certifier shall be the Contract Administrator. The Payment Certifier for the Subcontractors shall be the Contractor."
GC 4 CONTRACTOR	4.1 Control of the Work	Add 4.1.3 as follows: "No advertising signs or notices will be permitted on-site without prior approval of the Owner."
	4.1 Control of the Work	Add 4.1.4 as follows: "The Contractor shall provide notification five (5) calendar days prior to commencing work and obtain and pay for necessary permits required to work within the road allowance."
	4.1 Control of the Work	Add 4.1.5 as follows: "In addition to any requirements of MMCD, the Contractor shall provide the Contract Administrator with one marked-up set of signed "As Constructed Drawings" as record drawings for all Utilities and work prior to request for Substantial Completion. "
	4.1 Control of the Work	ADD 4.1.6 as follows: "The Owner will provide survey control points as shown on the drawings and as required by MMCD GC 3.3.5. In addition of any requirements in GC 4.1, the Contractor is responsible for all staking and survey layout required for the completion of all Work called for in the Contract Documents, or as directed by the Contract Administrator; and to affect incidental field adjustments. Geodetic Monuments shown on the drawings shall be replaced by the contractor at the contractor's expense if damaged during construction. In addition or contrary to any requirement in MMCD, Measurement for Payment Quantities shall be completed by the contractor. All survey and calculations necessary shall be performed by the Contractor and provided to the Contract Administrator at the end of each month in support of the monthly payment certificate. Contrary to MMCD GC 18.1.1, the Contractor will be required to prepare all monthly payment certificates in a format consistent with the

		Form of Tender Appendix 1 - Approximate Quantities and Unit Prices for this project. Notwithstanding the requirements of GC 18.1 and 18.2, the Payment Certificate will be prepared by the Contractor and submitted to the Contract Administrator for approval and shall include all payment items, survey and measured quantities and contractor completed forced account worksheets, including all supporting backup, with each monthly Payment Certificate. Monthly progress payments will be withheld until all supporting documentation is provided and accepted by the Contract Administrator. Contrary to GC 18.5, payment on a payment certificate shall be due and payable to the Contractor on or before the 30th day after the issuance of the payment certificate."
	4.1 Control of the Work	ADD 4.1.7 as follows: "During the Work, the Contractor will be responsible for: – Observing excavated soil for any visual or olfactory signs of suspected contamination; – Notifying the Contract Administrator as soon as any suspect contaminated soil is observed; – As directed by the Contract Administrator, segregate, stockpile, and manage any suspect soils encountered; and – Once suspect contaminated soil is characterized by the Contract Administrator ; loading, hauling and disposal of contaminated soil off-site at an approved remediation facility. Provide supporting documentation and chain of custody documentation."
	4.2 Safety	Add 4.2.2 as follows: "Before commencing work the Contractor shall provide an Emergency Contact List with a minimum of three personnel listed in priority, with contact information for both regular working hours and outside regular working hours."
	4.3 Protection of Work, Property and the Public	Add 4.3.7.1 as follows: "The Contractor shall notify the Contract Administrator immediately if damage to any existing structures occurs."
	4.5 Errors, Inconstancies or Omissions in the Contract Documents	Amend 4.5.1 and 4.5.2 by deleting "or omission" whenever it appears and substituting, "omission or any incorrect, inaccurate or misrepresented fact." Add 4.5.4 as follows: "If *Additional Instructions* are required to address any error, inconsistency, omission or incorrect, inaccurate or misrepresented facts, the *Contractor's* inefficiencies or mismanagement, if any, shall not be taken into account

		when determining any impact of those *Additional Instructions* on the *Contract Price."*
	4.6 Construction Schedule	Amend 4.6.2 by deleting "monthly" and substituting "monthly or within a shorter time specified in the *Contract Documents*."
	4.7 Superintendent	Add 4.7.4; "The key personnel named in the Contractor's Tender response, shall remain in these key positions throughout the project. In the event that key personnel leave the Contractors firm, or for any unknown reason are unable to continue fulfilling their role, the Contractor must propose a suitable replacement, and obtain written consent from the Owner. Acceptance of the proposed replacement is at the sole discretion of the Contract Administrator and the Owner."
	4.9 Materials	Add 4.9.3 as follows: "Handle and store products in a manner such as to prevent damage, deterioration and soiling. Store packaged or bundled products in original and undamaged condition with manufacturer's seals and labels intact, and for materials subject to damage from weather, store in weatherproof enclosures."
	4.11 Subcontractors	Add 4.11.7 as follows: "Notify all sub-contractors of the provisions of the Standard and Supplementary General Conditions, General Requirements, Specifications and Supplementary specifications of the Contract."
	4.17 Existing Utilities	Add 4.17 "Existing Utilities" as follows ".1 Size depth and location of existing utilities, structures and surface features indicated on the Drawings are for guidance only based on best available information. Completeness and accuracy are not guaranteed. The Contractor shall make no claim for delay as a result of having to alter, support or protect any feature which has been incorrectly shown or omitted from the Drawings. .2 Before commencing work, establish location, elevation and extent of all utilities in the area of Work and notify Consultant of findings. .3 Notify Contract Administrator five (5) days in advance of commencing any work which may affect buried utility, utilities and related structures. Establish exact location, elevation and state the condition of these and any other buried items. Clearly mark such locations, prevent disturbance during work and notify Contract Administrator of findings. .4 Notify the police, emergency response, gas, telephone, cable, water and power companies five (5) days in advance of commencing work in vicinity of gas,

		telephone, cable, water and power utilities. The Contractor shall work closely with the Contract Administrator and utility company representatives and shall carefully excavate those areas where crossing of existing utilities is anticipated. The Contractor shall provide written confirmation that these agencies have been contacted and have marked lines at potential crossing conflicts. .5 Protect existing structures from any damage while work is in progress. .6 The Contractor shall take all reasonable steps to maintain existing utilities in place while constructing the works. .7 Where Work involves breaking into or connecting to an existing utility, carry out work at times directed by authorities having jurisdiction, with minimum of disturbance to pedestrian and vehicular traffic. .8 Where a temporary shut-down of utility is necessary, the Contractor shall liaise with the appropriate utility companies, emergency utility and the Contract Administrator. The Contractor shall give 48 hour notice to all those affected by the interruption of the utility. The Contractor shall immediately notify the Contract Administrator if existing utility cannot be maintained. .9 The Contractor shall be held liable for all claims from failure to give such advance notice. .10 Where unknown utilities are encountered, immediately advise Contract Administrator and confirm findings in writing. .11 Record locations of maintained, re-routed and abandoned utility lines on record documents. .12 In all cases where new construction shall connect to existing underground utilities, and where any portion of the Works are to be constructed in the vicinity of existing underground utilities and conflict may occur, the existing underground utility shall be excavated by the Contractor in the presence of the Contract Administrator to verify the exact location and elevation of the existing utility. .13 Verification of existing underground utilities shall be proven before work commences, and not less than 72 hours in advance of anticipated new construction in order to permit adjustments to the new and/or existing utility as may be deemed necessary by the Contract Administrator.”
GC 7.0 CHANGES	7.4 Optional Work	Payment of Extra or Additional Work shall be based on applicable Unit Prices in the Form of Tender Appendix 1 - Quantities and Unit Prices, at a negotiated price, or on a Force Account Basis in accordance with the Contract documents at the discretion of the Contract Administrator.

		No work shall be undertaken by the Contractor until written approval in the form of a Field Order or Change Order is provided by the Contract Administrator.
GC 9 VALUATION OF CHANGES AND EXTRA WORK	9.2 Valuation Method	Amend 9.2.4 by deleting "unless at the time of the agreement the *Contractor* expressly reserved in writing the right to claim for additional payment or *Contract Time* adjustments."
GC 13 DELAYS	13.9 Liquidated Damages for Late Completion	Amend 13.9.1 by deleting "$500" and replace with "$2,000"
GC 15 OWNERS RIGHTS ON CONTRACTORS DEFAULT	15.3 Termination	Delete GC 15.3.1(1) and substitute: (I) be entitled to (i) take possession of the *Place of Work* and the materials to be incorporated into the *Work* but not yet delivered, (ii) utilize the construction machinery and equipment, subject to the right of third parties, and (iii) complete the *Work* by whatever method the *Owner* may consider Expedient, and
GC 16 CONTRACTORS RIGHTS ON OWNERS DEFAULT	16.2 Work Stoppage	Amend 16.2.1 and 16.2.2 by deleting 30 calendar days and substituting 60 calendar days.
GC 17.0 DISPUTES	17.5 Referee	Delete GC 17.5.3 and replace with: "If a Referee is selected for appointment as provided by this GC then the parties shall enter into agreement with the Referee by signing a letter in the form set out in Schedule 17.5.3 to these GC's. If one party and the Referee sign the agreement and, after presentation, the other party fails or refuses to sign the agreement, the defaulting party shall be deemed to be a party to that agreement."
	17.5 Referee	Amend 17.5.8 by adding after "the Referee" the following: "shall make decisions in a fair and impartial manner and".
	17.5 Referee	Amend 17.5.11 by renumbering it GC 17.5.11.1 and adding the following at the end: "unless the parties agree otherwise."
	17.5 Referee	Add 17.5.11.2 "Despite 17.5.11.1, on written application of a party, the Master Municipal Documents Association may revoke the appointment of the Referee if the Association is satisfied the Referee is biased, unqualified to discharge the Referee's duties, or has failed to diligently and

		conscientiously perform the Referee's duties. A replacement Referee shall be selected for appointment as provided by this GC."
	17.5 Referee	Amend 17.5.13 by deleting "by either party, or both parties," and replacing with: "by both parties but not by one party,".
	17.7 Arbitration or Litigation	Delete GC 17.7.1 and replace with: "If (a) within 7 calendar days of the commencement of the Settlement Meeting, or such further period agreed by the parties, the matter is not settled by agreement, or (b) either party fails or refuses to participate in the Settlement Meeting within the time limit set out in GC 17.6.2, the Dispute shall, on delivery of a notice of arbitration by either party, be finally resolved by arbitration conducted under the arbitration rules of procedure of the B.C. International Commercial Arbitration Centre."
	17.7 Arbitration or Litigation	Add GC 17.7.2 "If neither party requires, by notice of writing, that the Dispute submitted to arbitration under GC 17.7.1 be arbitrated within the time limits required in the arbitration rules of procedure, all Disputes referred to arbitration under the Contract shall be:" 1) held in abeyance until (a) Substantial Performance, (b) the Contract has been terminated, or (c) the Contractor has abandoned the Work, or whichever is earlier, and 2) Consolidated into a single arbitration under the arbitration rules of procedure."
	17.7 Arbitration or Litigation	Add GC 17.7.3 "Nothing in this GC shall be construed in any way to limit a party from asserting any statutory right to a lien under the Builder's Lien Act and the assertion of such right by initiating judicial proceedings not to be construed as a waiver of any right that party may have under GC 17.7.1 to proceed by way of arbitration to adjudicate the merits of claim upon which such a lien is based."
GC 18 PAYMENT	18.5 Payment	Amend 18.5.1 by replacing "15th day" to read "30th day". And add the following: "The actual amount paid is subject to the Owners rights under law or this contract to make deductions."
GC 18 PAYMENT	18.9 Waiver of Claims	Amend 18.9.1 by deleting the last sentence and replacing with: "This waiver of claims shall include without limitation those claims that might arise from (a) the negligence or breach of contract by the *Owner,* or

		(b) the negligence or wrongful acts of the *Owner's* consultants or the *Contract Administrator,* but shall not include claims made by the *Contractor* in writing prior to such application in accordance with the provisions of the *Contract Documents* and delivered to the *Contract Administrator* prior to the date of *Substantial Performance* and still unsettled." Amend 18.9.2 by deleting the last sentence and replacing with: "This waiver of claims shall include without limitation those claims that might arise from (a) the negligence or breach of contract by the *Owner,* or (b) the negligence or wrongful acts of the *Owner's* consultants or the *Contract Administrator,* but does not include claims made by the *Contractor* in writing prior to such application in accordance with the provisions of the *Contract Documents* and delivered to the *Contract Administrator* prior to the date of *Substantial Performance* and still unsettled."
GC 20 LAWS, NOTICES, PERMITS AND FEES	20.4 Environmental Law	Add 20.4.2 "The Contractor shall indemnify the *Owner* for any costs, fines, expenses and penalties that the *Owner* is required to pay on account of the *Contractor* performing *Work* in breach of any applicable Federal, or Provincial or Municipal environmental laws, regulations, or orders."
	20.5 Municipal Regulations	Add 20.5.1 Municipal Regulations "In tendering for this *Work*, and when called upon to enter into an agreement with the Owner, the Contractor and sub-contractors will be bound to comply with all laws, statutes and municipal bylaws pertaining to the *Work*."
GC 21 WORKERS COMPENSATION REGULATIONS	21.1 Evidence of Compliance	Add 21.1.3 as follows: "1) The Contractor must be registered, and in good standing, with Worksafe BC. Please provide your WSBC Registration/Firm number. 2) A current WSBC Clearance Letter from the Contractor must be received prior to the award of the Contract and must accompany all contract invoices (monthly) and from each Sub-Contractor with each monthly progress draw. 3) The Contractor must ensure that all fees, charges and/or assessments levied by the Worksafe BC for the protection of the Contractors work force are paid prior to the commencement of the Work, and remain up-to-date throughout the length of the Contract.

		4) The Contractor shall provide evidence of compliance upon request prior to receiving payment on substantial and total performance of the Work. 5) The Contractor shall indemnify the Owner and hold the Owner harmless from all manner of claims, demands, costs, losses, penalties and proceedings arising out of or in any way related to unpaid WorkSafe BC assessments owing from any person employed on the work by the Contractor, by its sub-contractors or by any other person doing or contracting to do all or any part of the Work of this Contract or arising out of or in any way related to a failure to observe safety rules, regulations and practices of WorkSafe BC, including any penalties levied by WorkSafe BC."
	21.3 Compliance with Workers Compensation Requirements	Add 21.3.3 "The Contractor shall indemnify the Owner and hold the Owner harmless from all manner of claims, demands, costs, losses, penalties and proceedings arising out of or in any way related to unpaid WorkSafe BC assessments owing from any person employed on the work by the Contractor, by its sub-contractors or by any other person doing or contracting to do all or any part of the Work of this Contract or arising out of or in any way related to a failure to observe safety rules, regulations and practices of WorkSafe BC, including any penalties levied by WorkSafe BC."
GC 22 INDEMNIFICATION	22.1 Contractor to Indemnify	Remove and replace 22.1.1 as follows: "The Contractor shall indemnify and save harmless the Owner and its officials, officers, employees and agents from any claim, lawsuit, liability, debt, demand, loss or judgment (including costs, defense expense and interest) whatsoever and howsoever arising either directly or indirectly as a result of the granting of this Contract or the use of the Owner's property or facilities. The Contractor shall waive all rights of subrogation or recourse against the Owner as a result of the granting of this Contract or the use of the Owner's property or facilities. The Contractor shall indemnify and pay to the Owner promptly, on demand for any loss or damage to the Owner's property and facilities arising either directly or indirectly as a result of the use of the property or facilities under the terms of this Contract.""
	22.1 Contractor to Indemnify	Add new clause 22.1.2 as follows: "The Contractor shall be obligated to defend the Owner and Contract Administrator from third party actions defined in 22.1."
GC 25.0 MAINTENANCE PERIOD	25.1 Correction of Defects	Add 25.1.4 "The Owners shall provide the Contractor with access, at all reasonable times, to the location of any defect or deficiency to enable the Contractor to correct the defect or deficiency, but the Contractor shall be responsible for

		(1) exposure of the defect or deficiency in order to correct or repair the defect or deficiency; (2) the restoration of the Work or other property that is disturbed or damaged in the course of i. exposing the defect or deficiency, or ii. correcting or repairing the defect or deficiency, and (3) all risks associated with any activity described in paragraphs (a) and (b); and (4) all costs to correct the defect or deficiency.
GC 26.0 EARLY USE OF WORK	26.1 Partial Use	Amend 26.1.1 by deleting "on written approval of the Contract Administrator" and substituting "with prior written notice to the Contract Administrator"
SGC 27.0 ARCHAEOLOGICAL ARTIFACTS	27.1	Add 27.1.1 as follows: "Any Archaeological Artifacts discovered by the Contractor shall, as between the Owner and the Contractor, be deemed to be the absolute property of the Owner".
	27.1	Add 27.1.2 as follows: "The Contractor shall immediately advise the Contract Administrator of the discovery by the Contractor of any Archaeological Artifacts and take all reasonable precautions to protect and preserve same. The Contractor Administrator will contact the Archaeological Branch and advise on the next steps".
SGC 28.0 APPROVED SUPPLEMENTAL	28.1	Add 29.1 as follows: "All MMCD board approved Supplementaries as listed at www.mmcd.net/ are to be included and in effect for this Contract."

The following list of MMCD Supplementary Specifications and requirements are supplemental to the "Master Municipal Construction Documents Platinum Edition":

In cases of conflict the order of precedence for measurement and payment clauses is:

- Supplementary Specifications
- MMCD Specifications

Supplementary and Additional Specifications			
Section	***Sub Para***	***Specification Title***	***Supplementary Specifications***
01 30 00		**General Requirements**	**Add Section 01 30 00SS**
	1.0	Design Criteria	Project design criteria and general specifications are included in Exhibit A through G.
	1.1	Mobilization	Payment for Mobilization will be made at the lump sum prices as shown in the Tender Form. This item is to cover all costs associated with project start-up and close-out and shall not exceed five percent (5%) of the Contract price. Fifty percent (50%) of this item will be paid out on the first progress payment and the remaining fifty percent (50%) will be paid out on the last progress payment.
	1.2	Schedule	Substantial Performance to be completed by September 30, 2017.
	1.3	Right of Way	All Work shall be restricted to the Site. The Contractor shall contain its operations to the right-of-way, unless it enters into formal agreements with private property owners. The Contactor may use Colwood easement for storage of equipment and materials and are responsible for security.
	1.4	Right of Way	Contractor should note that the area is very active with pedestrian traffic. The Contractor shall install appropriate signage notifying the public of the work. Signage shall include dates and duration of work. The Contractor shall provide secure fencing to prevent public access to the Site.
	1.5	Right of Way	The Contractor shall acquire a City of Colwood Permit to Alter or Construct on City Property at a cost of $150 as outlined in Schedule B of the Traffic and Highway Regulation Bylaw No. 1134. The City will cover the Engineering Fee and Security Deposit. Upon receipt of right-of-way permit, the Contractor may use the road right-of-way for staging and parking.
	1.6	Survey Layout, and Verification of Utilities	The Contractor shall layout all of the Work and shall locate, excavate, expose, and confirm the location and elevation of all existing underground work and utilities prior to the start of construction. The Work shall include excavation, backfilling, survey layout, compaction and temporary patching and all other work and materials necessary restore the area to its original or better condition to complete the works.

Supplementary and Additional Specifications			
Section	***Sub Para***	***Specification Title***	***Supplementary Specifications***
	1.7	Survey Layout, and Verification of Utilities	Survey Layout shall include delineation of the legal lot boundaries adjacent to the Site. The lot lines shall be marked with yellow tape, or other means acceptable to the Contract Administrator.
	1.8	Survey Layout and Verification of Utilities	Payment for Survey Layout and Verification of Utilities will be at the Unit Price Bid in the Form of Tender Appendix 1 - Approximate Quantities and Unit Prices and shall be accepted as full compensation for everything furnished and done. This item shall not exceed two percent (2%) of the Contract price. Payment will be spread out equally in monthly installments based on the duration of the project.
01 33 01		**Project Record Drawings**	
	1.1	**Recording Actual site Conditions**	Add Clause 1.7.5 as follows: "In addition to any requirements of MMCD, the Contractor shall provide the Contract Administrator with one marked-up set of signed "As Constructed Record Drawings" as record drawings for all project elements including sewer and electrical drawings prior to request for Substantial Completion. The record drawings shall be hand or CAD-produced and will show in a neat and accurate manner all changes, additions, and deletions to the original Contract Drawings to show the "as-constructed" installation. In general, the record drawings shall include both horizontal and vertical layout and the location of new and existing features. As construction progresses, changes to the Contract in (x, y, z) co-ordinates may be requested for review by the Contract Administrator. In addition to submitting "As Constructed Record Drawings" the contactor shall conduct a survey of all surface installation in NAD 83 ground coordinates using City of Colwood descriptor codes suitable for insertion into the City's GIS system. All record drawings and survey information shall be submitted to the Contract Administrator with the request for Substantial Performance pursuant to GC18.6. Substantial Performance will not be granted if the record drawings and record survey have not been received and accepted by the Contract Administrator." No separate payment will be made for this Work and the cost thereof will be considered incidental to and included in the various items of Work in Form of Tender Appendix 1 – Approximate Quantities and Unit Prices.
01 57 01		**Environmental Protection**	
	1.4	Environmental Protection	Add 1.4.4 as follows: "The Contractor shall prepare and submit an Environmental Protection Plan. The Environmental Protection Plan shall be

Supplementary and Additional Specifications			
Section	***Sub Para***	***Specification Title***	***Supplementary Specifications***
			submitted to the Contract Administrator for review by Owner, a minimum 5 working days prior to commencing construction. No additional payment will be made for the preparation or any revision to the plan. The Environmental Protection Plan will provide details and procedures to be followed for the following: .1 Disposal of wastes .2 Fuel spill control .3 Drainage and treatment and disposal of dewatering; including estimated settling times prior to release. .4 Size and type of spill kits .5 Erosion and Sediment Protection Plan .6 Handling and disposal of contaminated soil.
	1.4	Environmental Protection	Add 1.4.5 “Disposal of Waste” as follows: .1 Do not bury rubbish and waste materials on site. .2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers. .3 Dispose of waste materials off property, in accordance with applicable provincial and/or federal regulations. .4 Removal and disposal of Asbestos Cement pipe shall be in compliance with current WBC requirements.
	1.4	Environmental Protection	Add 1.4.5 “Contaminated Soil” as follows: .1 Specific requirements for handling, storing, testing, transportation and disposal of contaminated soil shall be integrated into the Contractors Environmental Protection Plan. .2 The Contractor shall immediately contact the Contract Administrator should contaminated soils be encountered during construction and take steps to reassign staff to other areas of Work.
02 00 01		**Secondary Lift Station**	**Add Section 02 00 01SS**
	1.1	Secondary Lift Station	The Contractor shall drill a 900mm cased well with a concrete plug at the base in accordance with the Drawings and Specifications.
	1.2	Payment	Payment for the well and concrete base will be made at the applicable Lump Sum price bid in the Form of tender Appendix 1 – Approximate Quantities and Unit Prices and shall be accepted as full compensation for everything furnished and done. Contractor to develop a drilling program with drilling sub-contractor to mitigate cost escalation if rock is encountered in well area.

Supplementary and Additional Specifications			
Section	***Sub Para***	***Specification Title***	***Supplementary Specifications***
02 00 02		**Pumping System**	**Add Section 02 00 02SS**
	1.1	Lift Station 0173 Sewage Pump	The Contractor shall supply, install, and commission a submersible sewage pump with spare pump for lift station manhole 0173 as shown on the drawings and in accordance with Exhibit C – Pumping System Specifications.
	1.2	Secondary Lift Station Sewage Pump	The Contractor shall supply, install, and commission a submersible sewage pump for the secondary lift station as shown on the drawings and in accordance with Exhibit C – Pumping System Specifications.
	1.3	Payment	Payment for the supply and installation of the pumping system will be made at the applicable Lump Sum price bid in the Form of Tender Appendix 1 – Approximate Quantities and Unit Prices and shall be accepted as full compensation for everything furnished and done.
02 00 03		**Enclosure**	**Add Section 02 00 03SS**
	1.1	Enclosure	The Contractor shall supply and install a containment for system works complete with heating, ventilation and air conditioning. Containment to include room with separate access to house the electrical and controls, the generators and the wet well pump with spare pump at the location shown on the drawings and in general accordance with Exhibit D – Enclosure Specifications.
	1.2	Payment	Payment for the supply and installation of the containment will be made at the applicable Lump Sum price bid in the Form of Tender Appendix 1 – Approximate Quantities and Unit Prices and shall be accepted as full compensation for everything furnished and done.
02 00 04		**Electrical Controls and Instrumentation**	**Add Section 02 00 04SS**
	1.1	Electrical	The Contractor shall supply and install all electrical and control components in accordance with Exhibit E – Electrical Controls and Instrumentation Specification. Colwood infrastructure controls and instrumentation standard package is provided by Pro Line Electric. The Contractor shall retain and utilize Proline for the controls and SCADA system that aligns with the municipal standard. The electrical scope or work will also include the electrical services within the enclosure including interior lighting. The Contractor shall coordinate installation and commissioning services with Kevin Dejong at < prolineelecsystems@gmail.com >
	1.2	Electrical Drawings	Electrical drawings to be provided including a single line diagram. Drawings to be sealed by a Professional Engineer of BC.
	1.3	Payment	Payment for the Electrical Controls and Instrumentation, including Proline's scope of services, will be made at the applicable Lump Sum price bid in the Form of Tender Appendix 1 – Approximate

Supplementary and Additional Specifications			
Section	***Sub Para***	***Specification Title***	***Supplementary Specifications***
			Quantities and Unit Prices and shall be accepted as full compensation for everything furnished and done.
02 00 05		**Generator**	**Add Section 02 00 05SS**
	1.1	Generator	The Contractor shall supply, install and commission a generator in accordance with Exhibit F – Generator Set.
	1.2	Payment	Payment for the supply and installation of the generator will be made at the applicable Lump Sum price bid in the Form of Tender Appendix 1 – Approximate Quantities and Unit Prices and shall be accepted as full compensation for everything furnished and done.
02 00 06		**Piping**	**Add Section 02 00 06SS**
	1.1	150mm Forcemain	The Contractor shall supply and install approximately 310m of 150 mm diameter forcemain from the lift station 0173 to SMH0116 as shown on the Drawings and in general accordance with Exhibit G – Piping Specification.
	1.2	75mm Forcemain	The Contractor shall supply and install approximately 10m of 75 mm diameter forcemain from the secondary lift station to lift station 0173 as shown on the Drawings and in general accordance with Exhibit G – Piping Specification.
	1.3	Payment	Payment for the piping will be made at the applicable Lump Sum price bid in the Form of Tender Appendix 1 – Approximate Quantities and Unit Prices and shall be accepted as full compensation for everything furnished and done.

EXHIBIT A – DESIGN CRITERIA

1. BACKGROUND

1.1. Colwood requires a Contractor to complete the supply, installation and commissioning of a forcemain to connect two existing manholes located on Allandale Road. The scope will also require construction of a lift station in an existing manhole complete with interconnecting forcemain to connect to the same existing manhole; and a new secondary lift station. The Work must be completed within the City's Right-of-Way, with very tight site area constraints.

1.2. Tenderers are encouraged to review the drawings and specifications and provide an Alternative Tender in accordance MMCD Instructions to Tenderers – Part II.

1.3. The preference is to have this work completed as quickly as possible. Time is of the essence.

1.4. The Project pumping system will replace the current gravity operation where Colwood operation staff are required to bring a vacuum truck to site and evacuate collected water from the existing manhole 0173. The Project is intended to offset the high operation and maintenance costs plus provide a more reliable and robust drainage solution.

1.5. The new secondary lift station must provide drainage to below 64.9 m elevation for future construction in the area. A 900 mm steel cased well will be drilled to serve as a wet well. When drainage is required for service to the lower elevation, connection to the new manhole will be by others.

1.6. This contract will include the connection and electrical service for a new pumping system in an existing manhole and a 150 mm forcemain, and a secondary lift station with a 75 mm forcemain connecting to the existing manhole or to an existing gravity main.

1.7. The scope also includes controls and instrumentation to provide unattended operation. The scope will include power supply using a diesel generator and the scope will include an enclosure to support the Project mechanical and electrical scope requirements.

1.8. The scope will include Project close out includes commissioning and testing, training and as-build drawings and pump station manuals.

2. DESIGN CRITERIA

2.1. Existing Manhole SMH0173

2.1.1. The existing manhole will be converted into a lift station with pumps and discharge piping that will meet the ultimate flow per the KWL May 2013 Sewer Mater Plan (SMP) flows. Colwood originally had only 3 homes connected to the manhole SMH0173. Recently, an additional 33 homes have been connected. This additional manual removal of sewage has substantially increased operational costs and has resulted in overutilization of community operational resources.

2.1.2. Currently flow enters existing manhole SMH0173 via a 375 mm diameter PVC DR 35 pipe from west. Additionally, there is an existing 375 mm PVC DR 350 mm diameter pipe to the north and an existing 200 mm diameter PVC DR35 to the west. The intent of this Project is to address present to future flows. The infrastructure would remain in use or be repurposed to serve the intended needs/ optimal location.

2.1.3. The pump station will meet the interim design flow and peak design flow of a permanent Allandale Road pump station of 38.9 L/s.

2.1.4. The pump will be landed at base of wet well which is 66.228 at benching per drawing J-0005

2.1.5. The pumps in SMH 0173 will pump to SMH 0116 at a discharge elevation of 74.053 m.

2.1.6. The pump will include a Variable Frequency Drive (VFD) to provide increased flow variation as more sewage is connected to this manhole.

2.1.7. The new pump will be installed in the existing manhole SMH0173 complete with guide rails to allow easy removal of pump for service. A standby pump will be provided as a shop spare to be located in the enclosure that is part of the Project scope.

2.1.8. The spare pump will be wired and ready for use. In case of an emergency call out, operation staff will remove the pump from the lift station and exchange with the stand-by unit.

2.1.9. To facilitate operational issues associated with deposition of materials, the pump system includes an allowance for a flushing system integral with the submersible pump. The flush valve will be to supply's standard and will flush at initiation of pump cycle. Electrical controls will include an automated flush cycle by stopping and re-starting the pump should excessive times be monitored without a stop. This will include ability for operator to change the cycles based on gained experience.

2.1.10. Pump to include a non-clog ball check valve suitable for sewage service located to allow easy access for service of the valve. Valve to be ANSI B 16.1 cast flanges to Class 125 and operate in either horizontal or vertical position. Valve to be NSF Approved Fusion Bond Epoxy Coated and Lined

2.1.11. Pump discharge line to include a 2" Valmatic 48ADISV Wastewater Air Release Valve or equal with Ductile Iron Body and Cover, NPT Threaded Inlet and Outlet with 316 Stainless Steel Trim and Fasteners, Buna N Seat. Valve to be NSF Approved Fusion Bond Epoxy Coated and Lined. Contractor to field locate the discharge valve in container with vent return to the wet well to prevent sewage discharge to container interior. Vent must end above high water level. Contractor may propose installation outside of container provided access to valve is included in proposed approach. Valve to be connected to the highest point of piping from wet well to the point of entry into the feed pipe. No relief valve is proposed for the high point of piping located roughly 200 meters from wet well.

2.2. New Secondary Lift Station

2.2.1. A secondary lift station is required to provide drainage to the 64.9 m to address future drainage from lower elevation service area.

2.2.2. Connection of the sewage entering this new lift station is not part of this scope. Currently, no flows enter the system at this lower elevation. This will be needed as development proceeds in lower elevations. As development occurs in the adjacent area, a future contractor will connect to the secondary lift station.

2.2.3. The secondary lift station will be connected to the existing 375 mm line to the east of the new wet well as shown on Drawing J-0004. Alternatively connect to the existing 200mm PVC SDR3r or existing manhole 0173. Contractor is provided choice of connection to existing infrastructure based on preference of construction techniques within the tight area. Contractor can avoid crossing CRD water line if connecting to the 200 mm line but excavation must not encroach Right of Way.

2.2.4. The well for the secondary lift station shall be drilled to a depth of 61.9 m. and provide a minimum interim design flow of 5 L/s. The flow rate will allow use of a 75 mm forcemain to reduce the risk of plugging plus allow evacuation of the secondary list station wet well in a short period of time. This will result in excessive start stops over normal design however this drainage is a temporary system that will likely be redundant to a new lift station specifically engineered to the development in the drainage area.

2.2.5. The secondary lift station needs to service a lowest inlet of elevation of 64.9 m to allow drainage of the lower area of the catchment area and the wet well is to be 3 meter lower at 61.9 m. The existing ground level elevation at the proposed area for the lift station is at roughly 71 m

2.2.6. The top water elevation for the wet well will be approximately 6 m below the current grade elevation and controlled on level with on/off control.

2.2.7. The top cap from the existing manhole 0173 will be placed over drilled well and a hook installed to secure the chain or cable used to remove the submersible sewage pump and piping. Manhole to be located at finished grade.

2.2.8. A junction box will be installed for electrical connection for pump power in locate and control wiring such that these connections will be inaccessible to public.

2.2.9. Intent of pump installation is to lower pump to wet well floor by use of cable or chain. The Contractor may propose discharge piping configuration in an Alternative Tender. Indicative design assumes use of flexible line with an elbow. The elbow would include a short spool with a Cam lock connection to connect to the 75 mm forcemain. The line would include a chain or cable to allow a separate hoist point to remove pipe and pump at same time.

2.2.10. No hoist is required and owner will remove with either crane truck or tripod with hoist.

EXHIBIT B – GENERAL SPECIFICATIONS

1. GENERAL

1.1. GENERAL SITE CONDITIONS

1.1.1. The temperature, precipitation, winds and seismic information listed in the following subsections is based on Appendix C NBCC 2010 Table C-2 Design Data for Selected locations in Canada.

1.1.2. The assumption is that the area is within the Colwood Sand and Gravel Unit per the geotechnical information for the area. Drilling program included in Contractor program must consider potential of encountering rock and include pilot hole investigation or use of rigging to drill through rock or overburden.

1.2. DESIGN AND FABRICATION

1.2.1. The rotating equipment shall meet or exceed the Project specified production requirements for the design life of minimum 20 years.

1.2.2. All equipment shall be capable of operating in accordance with the performance specification in the equipment data sheet. The plant operating time is as follows:

- Operating days per year: 365
- Operating hours per day: 24

1.2.3. All designs shall facilitate ease of access for handling, transportation, installation, adjustment, control, maintenance, and repair.

1.2.4. The equipment shall be the manufacturer's standard heavy-duty design, incorporating the best materials and practices in line with modern engineering concepts, suitable for continuous operation for the duty specified.

1.2.5. All materials used in the construction or assembly of equipment shall be new, free of defects and suitable for the duty and service intended.

1.2.6. Unless otherwise specified in the standard specification, the manufacturer's standard surface protection system for all proprietary plant and equipment shall be provided. This system shall be suitable for the conditions on site.

1.2.7. Suppliers are not required to depart from their standard design or specification, but significant non-fundamental differences between their product and the requirements of the RFP documents must be explained in their Workplan/Methodology. Where no differences are explained, the Supplier undertakes to supply equipment and/or materials in accordance with the bid documents.

1.2.8. This specification is applicable to all Engineering Specifications. In case of conflict between this document and a specific equipment technical specification, the requirements contained in the technical specification shall govern.

1.2.9. Equipment shall be fabricated such that the items are suitable for transportation, storage, handling and installation at site

1.2.10. Shipping limitations must be considered in determining the transition point from shop fabricated components / items.

1.2.11. Ultimate delivery to the Site must be timely to align Project completion as defined by Contractor. Colwood would prefer expedited completion of this Project

1.3. UNITS

1.3.1. The Project will be designed in the metric units. Suppliers shall use these units in all specifications and drawings. Based on the International System of Units (SI), following are the typical presentation of unit of measurement and units.

Quantity / Derived Quantity	Name of Unit	Symbol
length	meter	m
mass	kilogram	kg
	metric tonne	t
time, duration	second	s
	minute	min
	hour	h
	day	d
celsius temperature	degree celsius	^{o}C
power	kilowatt	kW
pressure	kilopascal	kPa
stress	mega Pascal	MPa
force	Newton	N
frequency	Hertz	Hz
area	square meter	m^2
volume	cubic meter	m^3
	liter	L
velocity (or speed)	meter per second	m/s
density, mass density	kilogram per cubic meter	kg/m^3

1.4. CODES AND STANDARDS

1.4.1. All design material, equipment manufacturing, fabrication, testing, installation and construction will be in accordance with the latest edition of the applicable codes and standards of the following organizations. The organizations include, but are not limited to, the following:

Institution	Description
ABMA	American Bearing Manufacturers Association
ACGIH	Industrial Ventilation: A Manual of Recommended Practice published by American Conference of Governmental Industrial Hygienists
AGMA	American Gear Manufacturers Association
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ASME Sec. VIII	Boiler & Pressure Vessel Code Section VIII Division 1
ASTM	American Society for Testing and Materials

Institution	Description
AWS	American Welding Society
AWWA	American Water Works Association
CISC	Canadian Institute of Steel Construction
CSA	Canadian Standards Association
CSA C22.1	Canadian Electrical Code
HI	Hydraulic Institute
ICEA	Insulated Cable Engineers Association
IEEE	Institute of Electrical & Electronics Engineers
IESNA	Illuminating Engineering Society of North America
ISA	International Society of Automation
NACE	National Association of Corrosion Engineers
NBCC	National Building Code of Canada
NFC	National Fire Code
NFPA	National Fire Protection Association
OHS	Occupational Health and Safety Regulations
PFI	Pipe Fabricators Institute
PPI	Plastics Pipe Institute
ULC	Underwriters Laboratories of Canada
BCBC	British Columbia Building Code

1.4.2. Referenced publications within this specification will be the latest revision, unless otherwise specified and applicable parts of the referenced publications will become a part of this specification as if fully included.

1.4.3. The codes and laws as stipulated by local, provincial or federal governments or jurisdiction in which the Project is being executed may take precedence over the aforementioned codes.

1.5. SPARE PARTS

1.5.1. The Contractor is responsible for all spare parts as recommended by equipment supplier including Commissioning, Initial, Operating, and Other Spare Parts.

1.5.2. Scope to include shelving for supplied spares in pump room.

1.5.3. Definitions of the various categories are listed below.

1.5.4. Start-up/Initial and Commissioning Spare Parts—Spare parts that are to be supplied with the equipment and shall be available for pre-commissioning and for the initial start-up and running-in period. Examples include seals, joints, and consumables such as fuses, indicator lights, lights, breakers, etc.

1.5.5. Operational Spare Parts; Two Year Operational Spare Parts—Spare parts required for day-to-day maintenance after the initial first two years of operation. These parts may fail in use; there is no planned replacement interval and replacement is part of a corrective maintenance action or of an overhaul scheduled as a result of monitoring. Also included are normal operating (replacement) parts that deteriorate gradually during their life cycle;

1.5.6. The Contractor shall restrict the variety of types/makes of spares as much as possible. (i.e. Fuses shall be only of a certain mfg.).

1.5.7. Relevant vendor documentation shall accompany the completed attachments. Depending on equipment complexity, this should include maintenance manuals, cross-sectional drawings, process engineering flow schemes, parts lists, skid layouts etc.

1.5.8. The Contractor shall assemble and package all required spares and include storage in container for spares within the pump room.

1.5.9. Spare parts as described above - packages shall be identified with 'Start-Up/Initial and Spare Parts"

1.6. COMMISSIONING

1.6.1. Equipment to include testing as per supplier standard to verify the performance of the supplied equipment. Equipment suppliers to provide test report confirming performance prior to shipping equipment and Contractor shall include in Project close out documentation.

1.6.2. Factory testing must demonstrate that the supplied equipment and systems function as specified and operate in the manner intended;

1.6.3. Site testing shall include re-testing of equipment to confirm performance including but not limited to checking for confirming electrical connectivity, proper rotation, alignment, speed, excessive vibration, quiet operation, and full capability of all monitoring and automated functions. This will also include equipment and system adjustment and calibrations.

1.6.4. Verification of all mechanical including shut in pressure of the pumps to confirm they match factory testing,

1.6.5. Verification of instrument signals are received properly at wire terminal cabinet by manual stimulation,

1.6.6. Verification of automated control ladder logic is simulated and proven to respond as designated (e.g., alarm failure conditions and trip signals);

1.6.7. Verification that simulated signals, including alarms, are received and properly indicated at the Operations Control Station;

1.6.8. Verification that software displays the screens for each of the unit processes and for the overall treatment process.

1.7. WARRANTY PERIOD

1.7.1. Startup Period. Startup of any portion of the entire facility will be considered complete when the facility or designated portion has properly operated transferring wastewater without interruption. This period is in addition to the Testing and training. After all functional and equipment tests have been performed and all equipment has successfully met startup requirements, the facility shall be operated as a complete system for commissioning, to demonstrate overall plant performance for the performance requirements

1.7.2. A minimum one-year period of time commencing with the issuance of Certificate of Substantial Performance or 18 months from date of supply, and ending with the issuance of a Final Acceptance Certificate, during which time the Contractor shall be responsible for the maintenance in accordance with the Contract Documents, and reparation of any deficiencies.

EXHIBIT C – PUMPING SYSTEM SPECIFICATIONS

1. PUMPING SYSTEM

1.1. GENERAL

1.1.1. NPSHA shall exceed NPSHR by a minimum of 10% or 2 m whichever is greater.

1.1.2. The motor size for the pumps should be at least 20% greater than designed power.

1.1.3. The operating point on the head-capacity curve shall be as close as possible to the left of the best efficiency point shown on the pump performance curve.

1.1.4. The minimum continuous flow requirement shall be specified on the pump curve. Contractor to provide pump curves and pump information for proposed pumps.

1.2. PUMP REQUIREMENTS MANHOLE 0173

1.2.1. Contractor shall furnish and install two wet well (submersible) non-clog pumps. Selection of pumps must address present to future flows.

1.2.2. One pump shall be installed within the existing manhole 0173 wet well and the second pump will remain within enclosure for standby service. The stand by pump will be connected to electrical supply and include a manual disconnect as provided within Exhibit E - Electrical Controls and Instrumentation.

1.2.3. Pumps to include an integral flushing valve that will be controlled within the control system included in Exhibit E as provided by Proline Electric.

1.2.4. Contractor shall install pump within the existing wetwell and integrate the pump within the pump room of the enclosure (refer to Exhibit D, Enclosure).

1.2.5. Current service includes only 33 connections however the pump must meet the future peak design flow of a permanent Allandale pump station of 38.9 L/s.

1.2.6. Pump to deliver a design Total Dynamic Head of 15 meters and a static head of 8.1 meters

1.2.7. Pump to include a motor with a 600 v / 3 phase / 60 hertz power supply.

1.2.8. The pumps shall be supplied with a mating cast iron discharge connection. The pump shall be automatically and firmly connected to the discharge connection, guided by no less than two galvanized steel guide bars extending from the top of the wet well to the discharge connection. There shall be no need for personnel to enter the wet-well. Sealing of the pumping unit to the discharge connection shall be accomplished by a machined metal to metal watertight contact. Sealing of the discharge interface with a diaphragm, O-ring or profile gasket will not be acceptable.

1.2.9. No portion of the pump shall bear directly on the wet well floor.

1.2.10. Contractor may need to make changes to existing floor benching to install rails. Pump suction to be no lower than 300 mm from wet well floor.

1.2.11. Each pump shall be fitted with galvanized lifting chain or stainless steel cable with a manual chain hoist connected to the roof of the enclosure. Hoist shall be located directly above the pump

1.2.12. The working load of the lifting system shall be 50% greater than the pump unit weight.

1.2.13. Contractor shallprovide grating over wet well connected to enclosure floor. Grating shall not create a tripping hazard and be at same elevation of enclosure floor. A section of the grating will have a removable section to allow removal of the pump without removing all grating.

1.2.14. Flanged sewage check valve to be installed to prevent drainage of sewage from forcemain.

1.2.15. Flush valve system shall allow automated flushing of the wet well. Contractor shall coordinate flushing system with Proline for the control and operation of the flushing system. This will include training for Colwood staff and standard operating procedures to modify the on and off features.

1.3. PUMP REQUIREMENTS SECONDARY LIFT STATION

1.3.1. Contractor shallfurnish and install two wet pit (submersible) non-clog pumps.

1.3.2. One pump shall be installed within the wet well and the second pump will remain within enclosure for standby service.

1.3.3. Contractor shall install pump within the new cased well.

1.3.4. Cased well shall be drilled with a base elevation of 61.0 m and include a 900 mm concrete plug. Plug must be tested to confirm water tight seal to prevent seepage of pathogens into surrounding area.

1.3.5. Cased well will include a cap to prevent water ingress and restrict access for public. Finished grade will match access point with no tripping hazard.

1.3.6. Contractor shall provide drilling program that will address encountering bedrock. This may include exploratory work to confirm rock location or use of equipment that can drill through both rock and overburden.

1.3.7. Pumps shall deliver 5 l\/sec and fit within the 900 mm well and fit within the access point of well casing.

1.3.8. Pump to deliver a design Total Dynamic Head of 19 meters and a static head of 12 meters

1.3.9. Pump to include a motor with a 600 v/3 phase / 60 hertz power supply.

1.3.10. Contractor shall provide a galvanized lifting chain or stainless steel cable for pump removal and include flexible hose to connect to 75 mm dia HDPE forcemain connection.

1.3.11. Contractor shall provide hook for cable at or near grade for both pump and piping plus junction boxes for electrical elements.

1.3.12. All electrical services will be provided from enclosure over SM 0173.

1.4. PUMP CONSTRUCTION

1.4.1. Major pump components shall be of grey cast iron, ASTM A-48, Class 35B, with smooth surfaces devoid of blow holes or other irregularities. All exposed nuts or bolts shall be of AISI 316 stainless steel construction. All metal surfaces coming into contact with the pumpage, other than stainless steel or brass, shall be protected by a factory applied spray coating of acrylic dispersion zinc phosphate primer with a polyester resin paint finish on the exterior of the pump.

1.4.2. The pump and motor shaft shall be a single piece unit. The pump shaft is an extension of the motor shaft. Shafts using mechanical couplings shall not be acceptable. The shaft shall be stainless steel – ASTM A-479 S43100-T. Shaft sleeves will not be acceptable.

1.4.3. The impeller leading edges shall be mechanically self-cleaned automatically upon each rotation and shall be capable of handling solids, fibrous materials, heavy sludge and other matter normally found in wastewater.

1.4.4. The pump volute shall be designed to provide smooth passages of sufficient size to pass any solids that may enter the impeller.

1.5. BEARINGS AND SEALS

1.5.1. Sealing design shall incorporate metal-to-metal contact between machined surfaces. Critical mating surfaces where watertight sealing is required shall be machined and fitted with Nitrile rubber O-rings. Fittings will be the result of controlled compression of rubber O-rings in two planes and O-ring contact of four sides without the requirement of a specific torque limit.

1.5.2. Rectangular cross sectioned gaskets requiring specific torque limits to achieve compression shall not be considered as adequate or equal. No secondary sealing compounds, elliptical O-rings, grease or other devices shall be used.

1.5.3. The minimum L10 bearing life shall be 50,000 hours at any usable portion of the pump curve.

1.5.4. Each pump shall be provided with a positively driven dual, tandem mechanical shaft seal system. The lower primary seal, located between the pump and seal chamber, shall contain one stationary and one positively driven rotating corrosion and abrasion resistant tungsten-carbide ring. The upper secondary seal, located between the seal chamber and the seal inspection chamber shall be a leakage-free seal. The upper seal shall contain one stationary and one positively driven rotating corrosion and abrasion resistant tungsten-carbide seal ring. The rotating seal ring shall have small back-swept grooves laser inscribed upon its face to act as a pump as it rotates, returning any fluid that should enter the dry motor chamber back into the lubricant chamber. All seal rings shall be individual solid sintered rings. he seal springs shall be isolated from the pumped media to prevent materials from packing around them, limiting their performance.

1.5.5. Each pump shall be provided with a lubricant chamber for the shaft sealing system. The lubricant chamber shall be designed to prevent overfilling and shall provide capacity for lubricant expansion. The seal system shall not rely upon the pumped media for lubrication.

1.5.6. The area about the exterior of the lower mechanical seal in the cast iron housing shall have cast in an integral concentric spiral groove. This groove shall protect the seals by causing abrasive particulate entering the seal cavity to be forced out away from the seal due to centrifugal action. A separate seal leakage chamber shall be provided so that any leakage that may occur past the upper, secondary mechanical seal will be captured prior to entry into the motor stator housing. Such seal leakage shall not contaminate the motor lower bearing. The leakage chamber shall be equipped with a float type switch that will signal if the chamber should reach 50% capacity.

1.5.7. Seal lubricant shall be non-hazardous.

1.6. PROTECTION

1.6.1. Each pump motor stator shall incorporate three thermal switches, one per stator phase winding and be connected in series, to monitor the temperature of the motor. Should the thermal switches open, the motor shall stop and activate an alarm.

1.6.2. A switch shall be provided to detect leakage into the chamber. The thermal switches and leakage switch shall be interconnected to the Proline control package

1.7. DRIVE

1.7.1. The pump will include a Variable Frequency Drive (VFD) to provide increased flow variation as more sewage is connected to the manhole.

1.7.2. Motor horsepower shall be sufficient so that the pump is non-overloading throughout its entire performance curve, from shut-off to run-out. The motor and cable shall be capable of continuous submergence underwater without loss of watertight integrity.

1.7.3. The pump motor shall be a NEMA B design, induction type with a squirrel cage rotor, shell type design, housed in an air filled, watertight chamber. The stator windings shall be insulated with moisture resistant Class H insulation rated for 180°C (356°F). The stator shall be insulated by the trickle impregnation method using Class H monomer-free polyester resin resulting in a winding fill factor of at least 95%. The motor shall be inverter duty rated in accordance with NEMA MG1, Part 31.The stator shall be heat-shrink fitted into the cast iron stator housing. The use of multiple step dip and bake-type stator insulation process is not acceptable. The use of pins, bolts, screws or other fastening devices used to locate or hold the stator and that penetrate the stator housing are not acceptable. The motor shall be designed for continuous duty while handling pumped media of up to 104°F. The motor shall be capable of no less than 30 evenly spaced starts per hour. The rotor bars and short circuit rings shall be made of aluminum. Three thermal switches shall be embedded in the stator end coils, one per phase winding, to monitor the stator temperature. These thermal switches shall be used in conjunction with and supplemental to external motor overload protection and shall be connected to the motor control panel.

1.7.4. The motor service factor (combined effect of voltage, frequency and specific gravity) shall be 1.15. The motor shall have a voltage tolerance of +/- 10%. The motor shall be designed for continuous operation in up to a 40°C ambient and shall have a NEMA Class B maximum operating temperature rise of 80°C. A motor performance chart shall be provided upon request exhibiting curves for motor torque, current, power factor, input/output kW and efficiency. The chart shall also include data on motor starting and no-load characteristics.

1.7.5. Pump to include 16 meters of submersible cable (SUBCAB) suitable for submersible pump applications. The power cable shall be sized according to NEC and ICEA standards and also meet with P-MSHA Approval.

1.7.6. Pump unit shall be provided with an integral motor cooling system. Fans, blowers or auxiliary cooling systems that are mounted external to the pump motor are not acceptable.

1.7.7. The cable entry seal design shall preclude specific torque requirements to insure a watertight and submersible seal. The assembly shall provide ease of changing the cable when necessary using the same entry seal. The cable entry junction chamber and motor shall be sealed from each other, which shall isolate the stator housing from foreign material gaining

access through the pump top. Epoxies, silicones, or other secondary sealing systems shall not be considered equal.

1.7.8. The junction chamber shall be sealed off from the stator housing and shall contain a terminal board for connection of power and pilot sensor cables using threaded compression type terminals. The use of wire nuts or crimp-type connectors is not acceptable. The motor and the pump shall be produced by the same manufacturer.

1.8. CRANES, HOISTS, AND MONORAILS

1.8.1. All cranes, hoists, and monorails shall be designed, manufactured, tested and certified in accordance with the latest applicable editions of Crane Manufacturers Association of America (CMAA) Specifications #70 and #74 as well as the Hoist Manufacturers Institute (HMI) specification “100-74 – Standard Specification for Electric Wire Rope Hoists”.

1.9. TESTING

1.9.1. Contractor shall verify pump internal controls are properly functioning and integrated with the Proline control package.

1.9.2. Contractor shall demonstrate the flushing cycle and as part of training demonstrate how cycle can be adjusted to meet the wet well flushing requirements

1.9.3. Contractor shall verify shut in pressure of all pumps to verify performance is consistent with published pump curve.

EXHIBIT D – ENCLOSURE SPECIFICATIONS

1. PUMP SYSTEM ENCLOSURE

1.1. GENERAL

1.1.1. An enclosure is required to house the electrical and controls, the generators and the spare pump. The one pump will be installed in the existing manhole and the other pump will be stored as an electrically connected spare at grade.

1.1.2. The indicative design is based on the purchase of a used sea can container, measuring 8 feet wide by 40 feet long by 9 feet high, and repurposed for the project. The enclosure will be placed directly over the existing manhole with the floor cut out. This will allow a hoist point for pump removal plus good cover and lighting for night service. Gen set would be installed in a separate room. The enclosure is shown in drawing J-0007.

1.1.3. The container must be refurbished with an exterior enamel coating to provide an as-new appearance. Color to be approved by owner. Existing surfaces to be cleared of all grease and stains. Surface to be prepared meeting coating manufacturer's standard.

1.1.4. The wall separating the well form the electrical will include a vapour barrier to prevent gas migration to electrical room.

1.1.5. Internal walls in pump room shall not be drywall.

1.1.6. Electrical room will include insulation providing R-12 in walls and R-20 for roof. Other rooms will not require insulation

1.1.7. Contractor shall include locking doors providing access for service to electrical room and generator room. Contractor to confirm operation staff will have sufficient room for normal service. Major service of generator set is assumed to be done off-site.

1.1.8. Contractor shall include lockable access at either end of enclosure. Doors must be in good working order if used sea can is proposed.

1.1.9. The pump room will be classified as an explosion proof area.

1.1.10. Provide a ductless 14,000 BTU room style air conditioner for the electrical room. Unit to include Energy Star certification.

1.1.11. Well room and gen room to include wall mounted 120 volt, 400 SCFM ventilation fans complete with heavy duty motor with 12 inch by 12 inch louvered opening on opposite site of ventilation fan for cross ventilation.

1.1.12. Generator room to have a carbon monoxide sensor as included in the electrical control package. The wet well room to have a methane sensor as provided in the electrical package. Contactor to install to vendor standards.

1.1.13. Contractor shall provide sufficient lighting within each room for night time operation. No external lighting is required.

1.1.14. Contactor shall provide a plan for generator fuel line to allow fill from inside of the enclosure.

1.1.15. Exhaust from generators shall terminate outside of enclosure and include a galvanized or stainless steel screen to avoid rodent entry.

1.1.16. Contractor shall install electrical control panel to Proline standards.

1.1.17. Contractor shall include removable non-metallic grating over the wet well opening.

1.1.18. Contactor shall provide support for manual chain hoist for removal of the submersible pump from wet well.

1.2. PUMP REQUIREMENTS MANHOLE 0173

1.2.1. The Project includes installation of a pump, check valve, and flushing valve into the existing manhole. The manhole is 1500 mm diameter. One pump will be installed in the existing manhole and the other pump would be stored as a shelf spare in the pump room. Air relief valve can be installed in enclosure or outside container in a manhole. This room will be rated Class 1 Div 2 explosion proof requiring intrinsically safe instrumentation and explosion proof wiring connection.

1.2.2. Room will include a louver and ventilation fan for 3 air changes per hour.

1.2.3. The opposite end of the container will house the two gen sets (with one operating and the other standby). This room is to be accessed by a lockable end door (the standard door on re-furbished sea can is acceptable) for diesel fueling the gen set. The room will include a carbon monoxide sensor wired to the SCADA system. All exhaust will be piped to top of container including a goose neck to avoid water ingress and insect screen. Room will include a ventilation louver and fan to provide 3 air changes per hour.

1.2.4. The middle room will house the control panel. This room will include a door access to outside. No access is allowed to other two rooms and two walls to include barrier to avoid gas passage. This room will not be classified for explosion proof requirements. This room will be insulated.

1.2.5. The enclosure shall be placed directly over the existing manhole with the floor cut out. This will allow a hoist point for pump removal plus good cover and lighting for night service. Contactor to provide chain hoist for pump removal and grating to cover opening when pump is in service. Grating shall not present a trip hazard and have a removable section to allow removal of pump. Air relief valve and any other accessories must be installed clear of pump removal area.

1.2.6. Contractor to provide lighting for all three rooms. Exterior lighting not required.

1.2.7. Windows are not permitted.

EXHIBIT E – ELECTRICAL CONTROLS AND INSTRUMENTATION SPECIFICATIONS

1. BACKGROUND

1.1. Colwood infrastructure controls and instrumentation standard package is provided by Pro Line Electric. The Contractor shall retain and utilize Proline to provide the controls and SCADA system that aligns with the municipal standard. Contractor to contact Kevin Dejong at < prolineelecsystems@gmail.com >.

1.2. Electrical drawings to be provided with contract including a single line diagram. Drawings to be sealed by a Professional Engineer of BC.

1.3. Proline will supply the electrical components. The Contractor shall install all the electrical elements including the wiring and junction boxes. Proline will wire, test and commission the electrical works.

1.4. Contractor is to include Proline scope in base bid and arrange coordination for installation and commissioning services.

1.5. The submersible pump will include an electrical cord integral with the pump junction box. Contactor will provide a junction box for this connection and connection to main feed. Junction box to be located outside of wet well.

1.6. Contractor shall secure all wiring with supports at 1 meter spacing.

2. GENERAL

2.1. The following standards shall apply where motors, controls, and other electrical equipment are supplied by the Supplier in conjunction with mechanical or other equipment.

2.2. All electrical and instrumentation devices and systems shall be designed and constructed so that they can be installed and operated in accordance with:

- Canadian Standards Association Electrical Code Part I (current edition).
- Underwriters Laboratories of Canada (ULC) standards.
- National Fire Protection Association (NFPA) codes.
- International Society of Automation (ISA).

2.3. All electrical equipment shall bear a CSA Approvals label where appropriate standards exist. The arrangements for such special "one-off" approval and the cost thereof shall be the Supplier's responsibility. These requirements shall apply to all electrical equipment including that provided with mechanical items.

2.4. ELECTRIC MOTORS

2.4.1. In general, all motors supplied are provided as part of mechanical equipment packages. Submersible pump motors shall be to the supplier standard and include controls to protect the motor in submerged condition.

2.4.2. All new motors shall be TEFC, premium efficiency type.

2.4.3. All new motors shall use Class F winding insulation with a Class B rise.

2.4.4. Equipment supplier shall select motors based on derated output characteristics for the altitude and maximum design temperature stated in Part 2 and Part 3 of this specification.

2.5. ELECTRICAL EQUIPMENT ENCLOSURES

2.5.1. Control panels located within control rooms shall meet NEMA 12 (IP52) standards, with door gaskets.

2.5.2. NEMA 4X (IP56) (plastic or stainless steel) enclosures shall be used in well room.

2.6. ELECTRICAL WIRING

2.6.1. Control wiring shall be minimum No. 14 AWG insulated stranded copper with 90° C rated 300/600 volt insulation.

2.6.2. All instrument wiring shall be completely shielded from A.C. control wiring within all control panels, junction boxes and similar. Instrument wiring shall be shielded twisted pair or similar with the shield grounded at only one point. All thermocouple circuits shall be wired using appropriate shielded thermocouple extension wire.

2.6.3. All control and instrument wiring shall be identified at each end. Wiring for connection to external circuits shall be wired out to terminal blocks.

2.6.4. Unless specified otherwise clamp type terminals shall be provided for all power connections.

2.6.5. Adequate space and supports shall be provided for cable entry to all panels.

2.7. GROUNDING

2.7.1. Equipment shall be provided with ground terminals or where more than one connection is required, a ground bus shall be provided. A ground terminal shall be provided, with one bolt-type cable clamp (adjustable between No. 8 and 2/0 AWG) at each end of the power and control equipment ground bus.

2.7.2. Other control equipment (push-buttons, etc.) shall be provided with ground terminal and shall be grounded.

2.8. INSTRUMENT STANDARDS

2.8.1. All field mounted instrument electrical devices shall be supplied in weatherproof enclosures rated NEMA 4 (IP65) watertight and dust-tight as a minimum.

2.8.2. All analog field instruments shall be HART protocol capable, microprocessor based with 4-20 mA DC outputs. Two-wire 24 VDC systems are preferred. Non two-wire systems are not preferred but, when necessary, shall have an isolated 4-20 mA output and be 120 VAC, 1 phase, 60 Hz powered.

2.8.3. All discrete switch type field instruments shall have dry form “C” contact outputs rated to a minimum of 120 VAC 2 Amp.

2.8.4. Instruments shall be installed with flanges or unions and isolation valves to permit removal without process shutdown. Isolation valves shall be provided so that inline valves and instruments can be removed for maintenance without draining tanks and equipment.

2.8.5. Instruction manuals are required as specified elsewhere within this document for all electrical and electronic equipment. They shall be bound or placed in ring binders, indexed, and shall include complete installation, calibration, operation and maintenance manuals for all equipment supplied. They shall include detailed schematic and wiring diagrams, parts lists, printed circuit board layouts and other drawings as may be appropriate. System operation and pilot and control device settings shall be clearly documented.

2.8.6. Engraved, suitably sized plastic (lamacoid) name plates shall be provided to identify all front of panel devices such as switches, push buttons, pilot lights, instruments and similar. All back of panel instruments and relays shall also be so identified. Field devices such as pressure switches, temperature switches and similar shall be identified by engraved stainless steel name plates wired in place.

2.8.7. Complete schematic and wiring diagrams for electrical controls and P & ID drawings shall be provided. Simple connection diagrams, showing circuit function and logic are acceptable.

2.8.8. Name plate and tag letters shall be 7 mm high minimum.

2.9. INSTRUMENT ELECTRICAL WIRING

2.9.1. Analog instruments shall be wired to junction boxes using armoured instrument cable. Armoured instrument cable shall be shielded twisted single pair No. 16 AWG (1.29 mm) stranded copper conductor with drain wire, FRPVC inner jacket, aluminium armour, FRPVC outer jacket type cable. Wire pairs shall be coloured black and white. Black is positive, white is negative.

2.9.2. Discrete type instruments and instruments requiring external power will be wired to junction boxes using armoured control and instrument power cables. Armoured control and instrument power cables shall be Teck type cables with stranded copper conductors, aluminium interlocked armour, PVC outer jacket and bare copper grounding conductor.

2.9.3. All wiring shall be clearly identified at every termination with a permanent marking system.

3. ELECTRICAL SCOPE

3.1. System to include a 600 volt 3 phase power supply from a diesel generator.

3.2. The generator shall include an operating unit and an installed spare. The generators will be an auto start and cycle on with warm up period base on wet well level.

3.3. The controls shall be included for detection of generator failure and automatically start the stand by.

3.4. The generator shall include fuel level indication including a low level alarm operating status.

3.5. All alarms and running indication will be connected to SCADA system.

3.6. The Generator as defined in Exhibit F will include a battery supply to provide LED lighting and dc power level devices in the two wet wells. Contractor shall provide all electrical wiring including power and control.

3.7. The enclosure shall include solar power to augment charging to batter that will also provide standby power for all controls.

3.8. All electrical drawings to be provided by Contractor as sealed by a Professional Engineer in BC. Contractor is responsible for the installation of the electrical works and inspection by the Safety officer.

3.9. PROLINE CONTROLS AND INSTRUMENTATION

3.9.1. Proline Electric scope includes the following that is to be included in the Contractor cost:

- VFD simplex pump station controller
- KPSI/Easterline pressure transducer continuous level control
- Control panel c/w PLC, HMI, programming for simplex pump system
- SCADA tie in for alarms, trending etc. (no SIM card for cell)
- Floats
- Level transducer
- 600 Volt VFD starter to meet Contractor selected pump for 0173 wet well
- Lockable disconnect switches for pumps located at main feed
- 600 volt soft starter for pump selected in secondary lift station
- Wiring for all pump power plus instruments and controls
- 600 volt to 120/240 volt transformer
- 600 volt panel
- 120/240 volt panel
- 100 amp generator transfer switch
- deep cycle batteries and charger
- conduit, wire
- SCADA with licensing from Eaton
- Cellular modem interconnection
- Gen set Auto start controller with warm up prior to pump start
- Gen charger for battery with solar panel augmented power supply
- Wiring for generator power and controls
- Wiring of valve actuator power and controls
- Solar package
- Methane detector and CO detector interconnected with SCADA
- Periodic flush cycle system controller

3.9.2. Any equipment and controls not specifically listed in the above list shall be supplied and installed by the Contractor.

3.9.3. The Contractor shall obtain electrical schematics and equipment dates sheets include in the final close out package.

EXHIBIT F – GENERATOR SPECIFICATIONS

1. GENERATOR SET

1.1. Contractor shall supply and install electrical generator to provide all power required for the pumping system and ancillary equipment.

1.2. Contractor shall provide generation set information of intended unit for approval by Engineer.

1.3. Generator set is to be provided as a package for one-source responsibility for the generating system and accessories.

1.4. Generator set and its components are to be prototype-tested, factory-built, and production-tested.

1.5. Contractor shall provide a Kohler Power System 600 v Model 100 REOZJF or Approved Equal generator.

1.6. Unit to include a Decision Maker 6000 Paralleling Controller or Approved Equal.

1.7. Generator set shall meet a UL 2200 listing and be CSA or equivalent for use in BC. And meets NFPA 110, Level 1.

1.8. Generator set shall accept rated load in one step.

1.9. Generator set will have as a minimum a low coolant level shutdown.

1.10. Contractor shall secure unit to enclosure floor and include vibration isolation.

1.11. Alternator to meet NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting.

1.12. Alternator shall meet sustained short-circuit current of up to 300% of the rated current for up to 10 seconds.

1.13. Alternator shall meet sustained short-circuit current enabling downstream circuit breakers to trip without collapsing the alternator field.

1.14. Alternator shall include self-ventilated and drip proof construction.

1.15. Contractor shall furnish and install exhaust for engine and seal opening to prevent ingress of gas into the container.

1.16. Exhaust exit will avoid moisture ingress and include a rodent screen.

1.17. Contractor shall furnish and install fuel supply system for engines. The preference is for a single fill location located within the enclosure.

1.18. Fuel connection shall include spill prevention and containment of fuel at fueling area.

1.19. Contractor shall ensure placement of unit is enclosure will provide access to control panel and access for oil change and other typical service needs as defined by the equipment supplier.

1.20. Generator to include vendor standard designed controllers with integration to control system as supplied by Proline Systems.

2. TESTING AND COMMISSIONING

2.1. Generator to be tested to confirm supplied power meets vendor standards.

2.2. Contractor shall confirm auto start features of the control package operates properly and that generator can start and warm up before pump is turned on.

2.3. Contractor shall provide standard warranty for generator package.

2.4. Contractor shall provide training to staff for proper service and maintenance of the supplied units.

EXHIBIT F – PIPING SPECIFICATIONS

1. GENERAL

1.1. This specification provides minimum requirements for HDPE pipe and fittings.

1.2. Contractor shall furnish and install 150 mm HDPE line threaded in the existing 300 mm line.

1.3. Contractor shall seal and make watertight the existing 300 mm line once the 150 mm line is installed to prevent ingress of water in the annular area of the two lines.

1.4. Contractor shall furnish and install 75 mm diameter forcemain discharge to connect the existing 375mm dia into SMH 0173 or directly into the 0173 wet well or connect to the existing 200pvc. Contractor is provided option for connection based on preferred construction technique.

1.5. REFERENCES

1.5.1. Unless otherwise specified, references to documents shall mean the latest published edition of the referenced document in effect at the bid date of the Project.

Reference	Standard	Title
ASTM	D3035	Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter
	D2837	Standard Test Method for Obtaining Hydrostatic Design Basis for thermoplastic Pipe Materials
	D2321	Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications
	D2774	Standard Practice for Underground Installation of Thermoplastic Pressure Piping
	D3350	Standard Specification for Polyethylene Plastic Pipe and Fittings Materials
	F714	Standard Specification for Polyethylene Plastic Pipe Based on Outside Diameter
	F1290	Standard Practice for Electrofusion Joining Polyolefin Pipe and Fittings
	F1417	Standard Practice for Installation Acceptance of Plastic Non-pressure Sewer Lines Using Low-Pressure Air
	F2164	Standard Practice for Field Leak Testing of Polyethylene(PE) Pressure Piping Systems Using Hydrostatic Pressure
	F2620	Standard Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings
ISO	*9001: 2008*	*Quality Systems, Model for Quality Assurance in Production and Installation*
PPI	TN-38	Bolt Torque For Polyethylene Flanged Joints
	TN-46	Guidance for Field Hydrostatic Testing Of High Density Polyethylene Pressure Pipelines: Owner's Considerations, Planning, Procedures, and Checklists

	TR-4	Plastic Pipe Institute (PPI) Listing of Hydrostatic Design Basis (HDB), Hydrostatic Design Stress (HDS), Strength Design Basis (SDB), Pressure Design Basis (PDB) and Minimum Required Strength (MRS) Ratings For Thermoplastic Piping Materials or Pipe
	TR-33	Generic Butt Fusion Joining Procedure For Field Joining of Polyethylene Pipe
	TR-41	Generic Saddle Fusion Joining Procedure for Polyethylene Gas Piping

2. PRODUCTS

2.1. QUALIFICATION OF MANUFACTURERS

2.1.1. The general quality assurance practices and methods shall be in accordance with ISO 9001:2008.

2.2. APPROVED VENDOR

2.2.1. Sclairpipe from Uponor Infra, Corix, or Approved Equal.

2.3. MATERIALS

2.3.1. The pipe shall be made from a HDPE material having a minimum material designation code of PE4710. The material shall have a minimum cell classification of 445484C as defined in ASTM D3350. PE4710 resins shall have a minimum PENT value of 2000 hours per ASTM F1473. The Hydrostatic Design Stress (HDS) at 23°C (73.4°F) shall be 1000 psi, and shall be listed in the name of pipe manufacturer in PPI TR-4. In addition, the material shall be listed as meeting NSF/ANSI 61.

2.3.2. The pipe material shall contain 2% - 3% well dispersed carbon black. Additives which can be conclusively proven not to be detrimental to the pipe may also be used, provided the pipe produced meets the requirements of this specification.

2.3.3. Contractor shall provide data sheet for review and include information in Project close out documentation.

2.4. PIPE

2.4.1. The pipe shall be manufactured in accordance with ASTM F714 or ASTM D3035.

2.4.2. The pipe shall contain no recycled compound except that which is generated in the manufacturer's own plant, from resin of the same specification and from the same raw material supplier.

2.4.3. Tables 1 gives the Pressure Class or Pressure Rating and Total Allowable Pressure during surge events for pipe. The design pressure rating shall be derived using an HDS of 1000 psi at 23°C (73.4°F) for a PE4710 designation.

2.4.4. Table 1: Pressure Class or Pressure Rating and Total Allowable Pressure during surge events for pipe made with PE4710 materials

Pipe Standard Dimension Ratio (DR)	Pressure Rating (PR) or, Pressure Class (PC) for water @ 73°F, psig	Allowable Total Pressure During Recurring Surge	Allowable Total Pressure During Occasional Surge
17	125	188	250

2.5. FITTINGS

2.5.1. HDPE pipe flange assemblies shall meet the following requirements unless otherwise specified by the engineer:

2.5.2. Solid HDPE stub ends or flange adapters shall be made from PE4710 and shall be formed using extrusion or molding methods.

2.5.3. Flange rings shall have bolt-holes and bolt-circles conforming to be Class 150, ANSI B16.1/B16.5. Flange rings shall be ductile iron (ASTM A536-84). They shall be protected from corrosion by coal-tar.

2.5.4. Methods for flange assembly, gasket selection and bolt torque application shall be as outlined in PPI Technical Note TN-38.

3. SUBMITTALS

3.1. The manufacturer shall affirm in a Certificate of Compliance that product shipped meets or exceeds the standards set forth in this specification.

4. MARKING AND SHIPPING

4.1. MARKING

4.1.1. The pipe shall be marked in accordance with the standards to which it is manufactured ASTM D3035 or ASTM F714.

4.2. SHIPPING AND HANDLING

4.2.1. Unless otherwise specified by the purchaser, all pipe and fittings shall be prepared in accordance with PPI Handbook of Polyethylene Pipe (2nd Edition), Chapter 2. Care shall be taken to prevent cuts, scratches and other damage.

4.2.2. Unless specifically requested by the customer in writing, pipe shipments shall not be nested.

5. CONSTRUCTION PRACTICES

5.1. INSPECTION OF MATERIALS

5.1.1. The Contractor shall inspect all pipe and accessories for shortages, loss or damage upon receipt of the shipped material at the time of unloading, recording this information directly on the waybill received from the carrier.

5.1.2. Acceptable limits for cuts, gouges or scratches are 10% of the pipe minimum wall thickness.

5.2. HANDLING AND STORAGE

5.2.1. The pipe shall be handled and stored in accordance with the PPI Handbook of Polyethylene Pipe (2nd Edition).

5.3. JOINING METHODS

5.3.1. Butt Fusion: The pipe shall be joined by the butt fusion procedure outlined in ASTM F2620 or PPI TR-33, and the pipe manufacturer's recommendations.

5.3.2. Saddle Fusion: Joints between the pipe main and service saddles, tapping tees and branch saddles shall be done in accordance with ASTM F2620 or PPI TR-41, and the fitting manufacturer's recommendations.

5.3.3. Socket Fusion: Joints between the pipe and socket fitting shall be done in accordance with ASTM F2620, and the fitting manufacturer's recommendations.

5.3.4. Electrofusion: Electrofusion joining shall be done in accordance with the electrofusion fitting manufacturer's recommendations, and ASTM F1290.

5.3.5. Mechanical: Mechanical connection of HDPE to auxiliary equipment such as valves, pumps, and fittings shall use mechanical joint adapters and other devices as outlined in the PPI Handbook of Polyethylene Pipe (2nd Edition), Chapter 9 and AWWA Manual of Practice M55, Chapter 6.

5.3.6. Fusion technicians, who have been trained in the use of the appropriate procedures and evaluated by the fusion equipment manufacturer, must conduct the fusion joining.

5.3.7. The critical parameters of each fusion joint, as required by the manufacturer and these specifications, shall be recorded either manually or by an electronic data logging device. All fusion joint data shall be included in the Fusion Technician's joint report.

6. INSTALLATION

6.1. GENERAL

6.1.1. The HDPE pressure pipe and fittings shall be installed in accordance with ASTM D2774 to confirm design pressure.

6.1.2. Buried HDPE non-pressure pipe and fittings shall be installed in accordance with ASTM D2321.

6.1.3. Minimum bend radius shall be in accordance with the PPI Handbook of Polyethylene Pipe (2nd Edition), Chapter 7.

6.1.4. A minimum 3.0 horizontal clear separation and 450mm clear vertical separation shall be maintained between the watermain and sanitary forcemain.

6.1.5. Contractor shall propose sealing method for the 150 mm pipe and the existing force main to ensure no moisture ingress into the annular area.

7. TESTING

7.1. LEAK TESTING

7.1.1. Hydrostatic leakage testing for pressure piping should comply with ASTM F2164 and PPI TN-46.

7.1.2. Pneumatic (compressed air) leakage testing of HDPE pressure piping is prohibited for safety reason.

7.1.3. Hydrostatic leakage testing for non-pressure piping should be conducted in accordance with ASTM F1417. Contractor shall be responsible for supply of water and safe disposal of test water.

7.1.4. If the test section fails the test, the Contractor shall repair or replace all defective materials and/or workmanship at no additional cost to the owner.