



MUNICIPALITY  
of the County of Kings

**Tender  
22-21  
Regional Wastewater Treatment Plant  
De-Sludging and Aeration Equipment Installation**

Bids submitted on the attached bid form ONLY in a vendor identified envelope:

**Tender # 22-21 – Regional Wastewater Treatment Plant  
De-Sludging and Aeration Equipment Installation**

Addressed to:

Municipality of the County of Kings  
181 Coldbrook Village Park Drive,  
Coldbrook, Nova Scotia  
B4R 1B9

Will be received until **2:00 pm Atlantic Time, August 25, 2022**, for the above Tender as per the specifications and terms and conditions.

**Check for changes to this request** - Before submitting your bid, visit the Provincial Government Web Portal at [www.gov.ns.ca/tenders](http://www.gov.ns.ca/tenders) or contact our office to see if any Addenda detailing changes have been issued on this tender. Changes may be posted up until the tender closing time. It is the bidders' responsibility to acknowledge and take into account all Addenda.

Bidders shall be solely responsible for the delivery of their bids in the manner and time prescribed. Bids received after the time and date specified shall be rejected.

Tenders shall be submitted by hard copy. Send hard copy submissions to the address addressed above with attention to Omar Abdelkhalek. Hard copy submissions to include contract name and number, as well as all required documentation indicated in the tender, including tender security, safety certification and clearance letter. The Municipality will require the original tender documents of the selected bidder to be delivered at a later date.

Tenders will be opened in the Boardroom of the Municipality of the County of Kings immediately following Tender Closing at 2:00 pm Atlantic Time, August 25, 2022.

- Late tenders shall be returned unopened.
- All tenders shall be and remain valid for acceptance for 60 days from the time of Tender Closing, unless withdrawn prior to the designated closing time

The lowest or any submission will not necessarily be accepted.

## *Overview*

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## OVERVIEW

This document is a Supplementary Specification to the Standard Specifications for Municipal Services, developed by the Nova Scotia Roadbuilders - Consulting Engineers of Nova Scotia Joint Committee on Contract Documents.

The Municipality of the County of Kings, in response to a need to standardize their specification practices, reduce review and approval time, and regulate the specifications produced by their consultants, have adopted the Standard Specification for Municipal Services.

These project documents have been prepared for use with and require being read in conjunction with the 2022 updated version of The Standard Specifications for Municipal Services as published by the Nova Scotia Roadbuilders - Consulting Engineers of Nova Scotia Joint Committee on Contract Documents. Copies of The Standard Specifications for Municipal Services are available from the Joint Committee on Contract Documents, 18 Laurier Street, Dartmouth, NS, B3A 2G7; Telephone (902)233-9362, OR EMAIL: nsmunicipalservices@gmail.com.

# MUNICIPALITY OF THE COUNTY OF KINGS

## REGIONAL WASTEWATER TREATMENT PLANT DE-SLUDGING AND AERATION EQUIPMENT INSTALLATION

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#### DRAWINGS

Generally Entitled: REGIONAL WASTEWATER TREATMENT PLANT  
DE-SLUDGING AND AERATION EQUIPMENT INSTALLATION

Dated: August 2022

0	Cover Sheet
1	P001 – Existing Conditions & Removals
2	P002 – Proposed Aeration Plan
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***Information to Tenderers***

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PROJECT: Regional WWTP De-Sludging &  
Aeration Equipment Installation

OWNER: Municipality of the County of Kings  
181 Coldbrook Village Park Drive  
Coldbrook, NS B4R 1B9

ENGINEER: Abdelkhalek Omar, P.Eng.,  
Manager of Engineering services

1. Tender

Submission

- .1 Tenders shall be submitted by email or hardcopy up until **2:00 p.m., local time on August 25, 2022**, hereinafter referred to as Tender Closing.

Email submissions are to use a subject heading of "TENDER NO. 22-21 - TENDER SUBMISSION". The time stamp of the email received by [procurement@countyofkings.ca](mailto:procurement@countyofkings.ca) will be used to determine if the submission was received in time - not the time it was sent by the sender. Last minute submissions are not recommended.

Hard copies are to be submitted in a sealed envelope marked as follows: "Municipality of the County of Kings, Regional WWTP De-Sludging & Aeration Equipment Installation Tender No. 22-21 to the address below.

Late tenders will be returned to the tenderer unopened. If submitted by email, provide hardcopies of the complete submission within five (5) business days of Tender Closing to the following location:

181 Coldbrook Village Park Drive  
Coldbrook, NS  
Canada B4R 1B9

Attention: Abdelkhalek Omar, P.Eng.,  
Manager of Engineering services

2. Tender Opening

- .1 Tenders will be opened in the Boardroom of the Municipality of the County of Kings, immediately following Tender Closing. Opening will be public.

3. Document Fee

- .1 A \$50.00 non-refundable deposit is required, payable to the Municipality of the County of Kings for the hard copy of the document.

4. Accuracy of Referencing .1 Indexing and cross-referencing are for convenience only.
5. Conditions of Tendering .1 Take full cognizance of content of all Contract Documents in preparation of Tender. Refer to Section 00 41 43 - Tender Form, clause 3.8 for a complete list of Contract Documents.
6. Tenderers to Investigate .1 Tenderers will be deemed to have familiarized themselves with existing site and working conditions and all other conditions which may affect performance of the Contract. No plea of ignorance of such conditions as a result of failure to make all necessary examinations will be accepted as a basis for any claims for extra compensation or an extension of time.
- .2 With the permission of the Owner, bidders may visit and examine the site and sub-surface conditions to satisfy themselves of the conditions which may be encountered during execution of the work. Such a visit and investigation shall be done at the expense of the Tenderers. For authorization and information contact:
- Omar Abdelkhalek  
Manager of Engineering Services  
Municipality of the County of Kings  
Phone: (902) 690-6192  
e-mail: [aomar@countyofkings.ca](mailto:aomar@countyofkings.ca)
7. Municipality of Kings Preference .1 The Municipality of the County of Kings recognizes the importance of buying locally and using local suppliers as much as possible. This factor will always be taken into account when evaluating effectiveness and efficiency.
- .2 For details on the Municipality of Kings Preference, refer to Section 16 of the Municipality's Procurement Policy, which is located on the Municipality's website:  
<http://www.countyofkings.ca/business/tenders.aspx>
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8. Clarification and Addenda .1 All questions concerning this Tender shall be directed to the following: Abdelkhalek Omar, P.Eng, at (902)-690-6192 or [aomar@countyofkings.ca](mailto:aomar@countyofkings.ca). Any attempt by the Proponent or any of its employees, agents, contractors, or representatives to contact members of the Municipal Council or Municipal staff not identified in this clause may lead to disqualifications.
- .2 Notify the Engineer not less than four (4) working days before Tender Closing of omissions, errors or ambiguities found in Contract Documents. If Engineer considers that correction, explanation or interpretation is necessary; a written addendum will be posted on the Municipality's procurement website <http://www.countyofkings.ca/business/tenders.aspx>.
- .3 All addenda will form part of the Contract Documents.
- .4 Any changes to this tender shall be stated in writing by Addenda. Verbal statements made by Municipal staff or their representatives shall not be binding.
- .5 Confirm in Tender Form that all addenda have been received.
9. Preparation of Tender .1 Complete Tender Form provided with Contract Documents in ink. Tender all items and fill in all blanks. Have corrections initialed by person signing Tender.
10. Taxes .1 Include all taxes except Harmonized Sales Tax (HST) in tender unit prices.
11. Tender Security .1 Provide Tender Security in amount of ten percent (10%) of the Total Amount Payable with Tender in the form of a Certified Cheque payable to the Owner, or a Bid Bond on CCDC Form 220.
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12. Return of Tender Security .1 The initial deposit of the unsuccessful Tenderers will be returned to them after the Contract is awarded or the expiration of validity of their tenders, whichever is the sooner.
13. Contract Security .1 Provide, prior to commencement of the Work Contract Security, in the amount and form as specified in GC 11.2 and as supplemented in Section 00 73 10.
14. Insurance .1 Provide, prior to commencement of the Work insurance as specified in GC 11.1.
15. Form of Agreement .1 Form of Agreement is attached for information purposes only.
16. Amendment or Withdrawal of Tender .1 Tenders may be amended or withdrawn by post or facsimile prior to the date and time of closing.
- .2 Amendment of individual unit prices is the only acceptable price amendment. Amendments shall not disclose either original or revised Contract Price.
- .3 Head amendment or withdrawal as follows:  
"[Amendment]/[Withdrawal] of Tender for the Municipality of the County of Kings, Regional WWTP De-Sludging & Aeration Equipment Installation. Sign and seal as required for Tender, and submit at address given for receipt of Tenders. All submissions must be received prior to Tender Closing.
17. Informal or Unbalanced Tenders .1 Tenders which in the opinion of the Owner are considered to be informal or unbalanced may be rejected.
18. Right to Accept or Reject any Tender .1 Owner reserves right to accept or reject any Tender.
19. Safety Certification .1 Provide within 72 hours of Tender submission a copy of Tenderer's current and valid Letter of Good Standing, Certificate of Recognition (COR) Program, issued by an audit provider approved by Workers' Compensation Board of Nova Scotia.
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- .2 Out of province companies shall submit, with their Tender, a current and valid Letter of Good Standing from their province of origin or from a recognized Safety Association which utilizes an external audit element.
- .3 In any event, out of province Tenderers will have to satisfy a Workers' Compensation Board of Nova Scotia in respect to their safety status prior to being awarded a contract.
20. Clearance Letter .1 Provide within 72 hours of Tender submission a copy of Tenderer's current valid Clearance Letter, issued by Workers Compensation Board of Nova Scotia.
21. Regulatory Approvals and Permits .1 It shall be the Contractor's responsibility to apply and pay for all necessary construction permits. It is also the responsibility of the Contractor to conform to the contents of said permits.
22. Contingency Allowance .1 A Contingency Allowance is included in Section 00 41 13 - Tender Form. This amount covers any cost for extra work, as directed by the Engineer, which is not included in the lump sum price provided. Specific information regarding the use of this Contingency Allowance is provided in Section 00 72 45 - General Conditions, Subsection GC4.2 - Contingency Allowance of the Standard Specification for Municipal Services.
23. Liquidation Damage .1 Construction must be substantially completed within the schedule noted in the contract documents. Should the Contractor fail to meet this deadline, Liquidated Damages shall be applied as per GC 6.5 - Delays (refer to Section 00 60 00).

END

**1.1 SALUTATION:**

- .1 To: Municipality of the County of Kings  
181 Coldbrook Village Park Drive  
Coldbrook, Nova Scotia  
B4R 1B9
- .2 For: Tender #22-21  
Regional WWTP De-Sludging and Aeration Equipment Installation  
New Minas, Nova Scotia
- .3 From:
- 
- 

**1.2 TENDERER DECLARES:**

- .1 That this tender was made without collusion or fraud.
- .2 That the proposed work was carefully examined.
- .3 That the tenderer was familiar with local conditions.
- .4 That Contract Documents and Addenda No. \_\_ to \_\_ inclusive were carefully examined.
- .5 That all the above were taken into consideration in preparation of this tender.

**1.3 TENDERER AGREES:**

- .1 To enter into a contract to supply all labour, material and equipment and to do all work necessary to construct the Work as described and specified herein for the unit prices stated in Subsection 1.4 hereunder, Schedule of Quantities and Unit Prices.
- .2 That the estimated Contract Price shall be the sum of the products of the tendered unit prices multiplied by the estimated quantities in Subsection 1.4 hereunder excluding Harmonized Sales Tax (HST).
- .3 That this tender is valid for acceptance for sixty (60) days from tender closing.
- .4 That measurement and payment for items listed in Subsection 1.4 hereunder shall be in accordance with corresponding items in Section 01 22 00 Measurement and Payment.
- .5 To execute in triplicate the Form of Agreement and forward same together with the specified contract security and insurance documents to the Owner within ten (10) Working Days of written notice of award.
- .6 That failure to enter into a formal contract and provide specified insurance documents and contract security within time required will constitute grounds for forfeiture of tender security.

- .7 That if tender security is forfeited, Owner will retain difference in money between amount of tender and amount for which Owner legally contracts with another party to perform the Work and will refund balance, if any, to tenderer.
- .8 That Contract Documents include:
  - .1 Standard Specification for Municipal Services (2022)
  - .2 Tender Form
  - .3 Form of Agreement
  - .4 Supplementary Specifications
  - .5 Drawings
  - P001** / Existing Conditions & Removals / July 29, 2022
  - P002** / Proposed Aeration Plan / July 29, 2022
  - P003** / Sections & Details / July 29, 2022
  - P004** / Miscellaneous Details / July 29, 2022
  - .6 All addenda as issued and as confirmed in subsection 1 of this section.

**1.4 SCHEDULE OF QUANTITIES AND UNIT PRICES**

Item No.	Description	Unit of Measurement	Estimated Quantity	Unit Price	Item Total
1.	Mobilization & Demobilization	LS	1	_____	_____
2.	Geotube Area Preparation	LS	1	_____	_____
3.	Desludging and Dewatering	BDT	377	_____	_____
4.	Cell 1 In-Pond Aeration Equipment <b>*PROVISIONAL*</b>	LS	1	_____	_____
5.	Cell 2 In-Pond Aeration Equipment	LS	1	_____	_____
6.	Aeration Headers	LS	1	_____	_____
7.	Yard Piping and Structures	LS	1	_____	_____

SUBTOTAL ADDITIONAL ITEMS \$ \_\_\_\_\_

CASH ALLOWANCE \$ 10,000 \_\_\_\_\_

CONTINGENCY ALLOWANCE \$ 100,000 \_\_\_\_\_

ESTIMATED CONTRACT PRICE (EXCLUDING HST) \$ \_\_\_\_\_ (A)

ADD HARMONIZED SALES TAX (15% of Estimated Contract Price) \$ \_\_\_\_\_ (B)

TOTAL PRICE (A + B) \$ \_\_\_\_\_

TENDERER'S HST REGISTRATION NO. \_\_\_\_\_

**1.5 COMPLETION TIME**

.1 Tenderer agrees to complete the Work within \_\_\_\_\_ weeks of written notification of award.

**1.6 SIGNATURES\***

DATED THIS \_\_\_\_\_ DAY OF \_\_\_\_\_, 20\_\_\_\_\_.

\_\_\_\_\_  
Name of Tenderer

\_\_\_\_\_  
Witness

\_\_\_\_\_  
Signature of Signing Officer

\_\_\_\_\_  
Name and Title (Printed)

\_\_\_\_\_  
Witness

\_\_\_\_\_  
Signature of Signing Officer

\_\_\_\_\_  
Name and Title (Printed)

\*NOTE: Tenders submitted by or on behalf of any Corporation must be signed in the name of such Corporation by a duly authorized officer(s) or agent(s).

**END OF SECTION**

This Agreement made on the \_\_\_\_ day of \_\_\_\_\_ in the year 2022.

**BY AND BETWEEN**

**MUNICIPALITY OF THE COUNTY OF KINGS**

hereinafter called the "Owner"

and

**CONTRACTOR**

hereinafter called the "Contractor"

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

**ARTICLE A1 - THE WORK**

The Contractor shall:

- .1 Perform the Work required by the Contract Documents for

**Regional WWTP De-Sludging and Aeration Equipment Installation**

located in New Minas in Kings County for which the Agreement has been signed by the parties, and for which

**Dillon Consulting Limited**

is acting as and is hereafter called the "Engineer", and

- .2 do and fulfill everything indicated by this Agreement, and
- .3 commence the work by the within two weeks of the award of the contract and attain Substantial Performance of the work as certified by the Engineer by the 28 day of February in the year 2023.

**ARTICLE A2 - AGREEMENTS AND AMENDMENTS**

The Contract supersedes all prior negotiations, representations or agreements, either written or oral, relating in any manner to the work, including the bidding documents that are not expressly listed in Article A3 of the Agreement.

### ARTICLE A3 - CONTRACT DOCUMENTS

The following is an exact list of the Contract Documents referred to in Article A1.1 of this Agreement and as defined in subsection 6 of Section 00 71 00 DEFINITIONS. This list is subject to subsequent amendments in accordance with the provisions of the Contract Documents.

.1 Standard Specifications for Municipal Services

.2 Project Documents

.1 Information to Tenderers

.2 Tender Form

.3 Form of Agreement

.4 Supplementary Specifications:

Section 00 60 00 – Supplementary Specifications

Section 31 32 21 – Sludge Dredging and Dewatering

Section 40 05 50 – Fine Bubble Aeration System (Installation Only)

.5 Drawings:

Generally Entitled: Regional WWTP De-Sludging and Aeration Equipment Installation

Dated: June 2022

Specifically Titled:

Sheet No.	Title	Latest Revision
	Cover Sheet	29/07/2022
P001	Existing Conditions	29/07/2022
P002	Proposed Aeration Plan	29/07/2022
P003	Sections & Details	29/07/2022
P004	Miscellaneous Details	29/07/2022

.6 Addenda \_\_\_\_\_ to \_\_\_\_\_.



#### **ARTICLE A4 - CONTRACT PRICE**

- .1 The Estimated Contract Price is the sum of the products of the estimated quantities multiplied by the appropriate Unit Prices in the Form of Tender excluding the amount of Harmonized Sales Tax.
- .2 The Estimated Contract Price is \$\_\_\_\_\_.
- .3 The amounts shall be subject to adjustment as provided in the Contract Documents.
- .4 All amounts shall be in Canadian funds.
- .5 The Contract Price is the sum of the products of the actual final quantities that are incorporated in, or made necessary by the Work, as confirmed by count and measurement, multiplied by the appropriate Unit Prices from the Tender together with any adjustments that are made in accordance with the provisions of the Contract Documents excluding the amount of Harmonized Sales Tax.

#### **ARTICLE A5 - PAYMENT**

- .1 The Owner shall pay the Contractor in Canadian funds for the performance of the Contract.
- .2 The Owner shall make monthly payments on account to the Contractor for the Work performed, as certified by the Engineer, subject to a 10% holdback.
- .3 The amount of monthly payments shall be calculated as follows:
  - .1 The quantity for each pay item on which actual work has been performed shall be measured.
  - .2 For each Unit Price item this quantity shall be multiplied by the applicable Unit Price as provided in the Tender Form.
  - .3 For each lump sum item, multiply the percent complete by the value of the lump sum item.
  - .4 The total value of work completed for the payment period shall be calculated by adding the total of the products for all pay items from subsection 3.2 and 3.3 of this Article.
  - .5 The amount of the monthly payment shall be determined by deducting the 10% holdback and the total of all previous payments from the total value of such completed work as determined under subsection 3.4 of this Article.
  - .6 To the amount calculated above, the Harmonized Sales Tax will be added.
- .4 The last day of the payment period shall be the last working day of the month.

- .5 Upon Substantial Performance of the Work as certified by the Engineer the Owner shall pay to the Contractor the holdback monies then due in accordance with the provisions of Section 00 72 45 - General Conditions, subsection GC5.8 - PAYMENT OF HOLDBACK UPON SUBSTANTIAL PERFORMANCE OF THE WORK.
- .6 Upon the issuance of the final certificate for payment as certified by the Engineer, the Owner shall pay to the Contractor the balance of monies then due in accordance with the provision of Section 00 72 45 - General Conditions, subsection GC5.10 - FINAL PAYMENT.
- .7 In the event of loss or damage occurring where payment becomes due under the property and boiler insurance policies, payment shall be made to the Contractor in accordance with the provisions of Section 00 72 45 - General Conditions, subsection GC 11.1 - INSURANCE.
- .8 If the Owner fails to make payments to the Contractor as they become due under the terms of the Contract, interest shall be payable as follows:
  - .1 The annual interest rate applicable to the contract is three percent (3%) compounded semi-annually.
  - .2 Interest shall be calculated on the overdue balance from the due date.

#### **ARTICLE A6 - RECEIPT OF AND ADDRESSES FOR NOTICES**

- .1 Notices in writing will be addressed to the recipient at the address set out below.
- .2 The delivery of a Notice in Writing will be by hand, by courier, by prepaid first class mail, or by facsimile or other form of electronic communication during the transmission of which no indication of failure of receipt is communicated to the sender.
- .3 A Notice in Writing delivered by one party in accordance with this Contract will be deemed to have been received by the other party on the date of delivery if delivered by hand or courier, or if sent by mail it shall be deemed to have been received five (5) working days after the date on which it was mailed.
- .4 A Notice in Writing sent by facsimile or other form of electronic communication shall be deemed to have been received on the date of its transmission provided that if such day is not a Working Day or if it is received after the end of normal business hours on the date of its transmission at the place of receipt, then it shall be deemed to have been received at the opening of business at the place of receipt on the first Working Day next following the transmission thereof.

- .5 An address for a party may be changed by Notice in Writing setting out the new address delivered to the other party in accordance with this Article.
- .1 The Owner at Municipality of the County of Kings, 181 Coldbrook Village Park Drive, Coldbrook, NS, B4R 1B9
  - .2 The Contractor at
  - .3 The Engineer at Dillon Consulting Limited, 137 Chain Lake Drive, Suite 100, Halifax, NS, B3S 1B3.

#### **ARTICLE A7 - QUANTITIES AND MEASUREMENT**

- .1 The project is to be completed on a lump sum basis including all ancillary items necessary to complete the work.
- .2 Measurement for progress payments shall be done on a percent complete basis for the items outlined in the Form of Tender.

#### **ARTICLE A8 - SUCCESSION**

The aforesaid Contract Documents are to be read into and form part of the Agreement and the whole shall constitute the Contract between the parties and subject to law and the provisions of the Contract Documents shall enure to the benefit of and be binding upon the parties hereto, their respective heirs, legal representatives, successors and assigns.

#### **ARTICLE A9 - RIGHTS AND REMEDIES**

No action or failure to act by the Owner, Engineer, or Contractor shall constitute a waiver of any right or duty afforded any of them under the Contract, nor shall any such action or failure to act constitute an approval of or acquiescence in any breach thereunder, except as may be specifically agreed in writing.

#### **ARTICLE A10 - TIME**

Time shall be construed as being of the essence of the Contract.

**SIGNATURES**

**IN WITNESS WHEREOF** the parties hereto have executed this Agreement under their respective corporate seals and by the hands of their duly authorized representatives.

SIGNED AND SEALED AND  
DELIVERED in the presence of:

**CONTRACTOR**

[Seal]

\_\_\_\_\_  
Company Name

\_\_\_\_\_  
Witness

\_\_\_\_\_  
Signature of Signing Officer

\_\_\_\_\_  
Name and Title of Person Signing

\_\_\_\_\_  
Name and Title (printed)

\_\_\_\_\_  
Signature of Signing Officer

\_\_\_\_\_  
Name and Title (printed)

**OWNER**

[Seal]

Municipality of the County of Kings

\_\_\_\_\_  
Company Name

\_\_\_\_\_  
Witness

\_\_\_\_\_  
Signature of Signing Officer

\_\_\_\_\_  
Name and Title of Person Signing

\_\_\_\_\_  
Name and Title (printed)

\_\_\_\_\_  
Signature of Signing Officer

\_\_\_\_\_  
Name and Title (printed)

(Where legal jurisdiction, local practice or Owner or Contractor requirements calls for (a) proof of authority to execute this document, attach such proof of authority in the form of a certified copy of a resolution naming the representative(s) authorized to sign the Agreement for and on behalf of the corporation or partnership; or (b) the affixing of a corporate seal, this Agreement should be properly sealed.

- 1. INTENT** .1 The work of this contract is to be constructed in accordance with the Standard Specifications for Municipal Services as developed and published by the Nova Scotia Road Builders Association and Consulting Engineers of Nova Scotia Joint Committee on Contract Documents, except as modified herein.
- .2 These Supplementary Specifications modify the specification sections to which they refer.
- .3 The Supplementary Specifications take precedence over the specification to which they refer.

**2. SECTION 00 53 43 – FORM OF AGREEMENT CCDC 2 2020 Stipulated Price Contract**

**GC 5.3 – BASIS OF PAYMENT FOR LUMP SUM WORK**

- .1 Add the following:
- “5.3.2 A warranty holdback in the amount of two and one half (2.5) percent of the Total Estimated Contract Price will be retained by the Owner until the expiry of the twelve (12) month warranty period. In addition to the holdback amount required by applicable lien legislation.”

**GC 5.8 – SUBSTANTIAL PERFORMANCE OF THE WORK AND PAYMENT HOLDBACK**

- .1 Add the following:
- “5.8.6 Holdback monies shall not be released until the Contractor has submitted the following documents, each in a form satisfactory to the Consultant dated after the expiration of sixty days from the date of Substantial Performance of the Work as specified in the Certificate of Substantial Performance issued by the Consultant.
- .1 Statutory Declarations verifying that all liabilities incurred by the Contractor and his Sub-Contractors in carrying out the Work have been paid and there are no outstanding liens, garnishees, attachments or claims relating to the work except for amounts properly retained as a holdback or as an identified amount in dispute.
- .2 A certificate of clearance from the Workers' Compensation Board of the Province in which the Work is being performed certifying the Contractor's compliance with the requirements, if any, of the Workers Compensation Act of the Province in which the Work is being performed, including any payment due thereunder.
- .3 All warranties required under the provision of this contract, whether originating from the Contractor or Sub-Contractors or Suppliers.
- ”

- .4 A copy of the Tenderer's current and valid Letter of Good Standing issued jointly by the Nova Scotia Construction Safety Association and the Province of Nova Scotia Department of Labour.
- .5 A Certificate to the Owner by a solicitor qualified to practice law in the Province in which the Work is being performed to the effect that no lien associated with the Work exists against the Owner's property and the Work under the applicable lien legislation of the Province or Provinces in which the Work is being performed.
- .6 A letter of release from the Surety Company.
- .7 Submission of Final Record Drawings."

#### GC 5.10 – FINAL PAYMENT

- .1 Add the following:

"5.10.5 Sixty days after the contract is substantially performed the holdback amount may be reduced to two and one-half (2.5) percent of the value of the work, service and materials actually done, placed or finished and this balance of two and one-half percent shall be retained until all required work, including warranty work, is performed completely. The two and one-half (2.5) percent shall be in addition to the two and one half (2.5) percent Warranty Holdback noted below in Subsection 5.8.4."

"5.10.6 A warranty holdback in the amount of two and one half (2.5) percent of the Total Estimated Contract Price will be retained by the Owner until the expiry of the twelve (12) month warranty period. In addition to the holdback amount required by applicable lien legislation."

#### GC 6.4 - CONCEALED OR UNKNOWN CONDITIONS

- .1 Add Clause 6.4.5

"6.4.5 Utilities of various types as well as structures immediately adjacent to the line of the work have been shown on the Drawings. The locations of these utilities, buildings, and structures are shown using the best information available but no guarantee is given that the locations are absolutely accurate or that utilities or structures other than those shown are not present."

#### GC 6.5 - DELAYS

- .1 Add Clause 6.5.6

"6.5.6 Notwithstanding the above subsections, time shall be construed as being of the essence of the Contract. The date of expiring of the time allowed in accordance with the Contract for substantial performance of the Work shall be termed the Date for Completion. Should the Contractor fail to substantially perform the Work by the Date

of Completion, the period of time from the Date for Completion to the date of Substantial Performance of the Work as determined by the Engineer, shall be termed the Period of Delay.”

- “6.5.7 In the event of there being a Period of Delay, the Contractor shall be liable for and shall pay to the Owner the cost of continuance of supervision during the Period of Delay, and all additional fees, disbursements and costs incurred by the Owner by reason of there being such period of delay. The said sum or sums in view of the difficulty of ascertaining the losses which the Owner may suffer by reason of delay in the performance of the said Works, is hereby agreed upon, fixed and determined by the parties hereto as liquidated damages that the Owner will suffer by reason of said delay and default and not as a penalty. The value of the liquidated damages shall be \$750.00 per day for the duration of the Period of Delay. The Owner may deduct the amount of such liquidated damaged from any monies payable to the Contractor under the Contract.”

### GC 9.5 - CONSTRUCTION SAFETY

- .1 Add the following:

"9.5.2 The Contractor shall develop and be responsible for the implementation of a comprehensive safety program covering all aspects of the Work. A copy of this program shall be delivered to the Consultant prior to any work being conducted on the project.”

## 3. SECTION 01 10 00 - GENERAL REQUIREMENTS

### SUBSECTION 2 - SUMMARY OF WORK

Add the following:

- “2 The work to be completed under this contract includes the dredging of sludge from Cell 2 of the municipal wastewater treatment lagoon in New Minas, Nova Scotia. Dewatering to be performed via Geotube dewatering bags or onsite centrifuge. This includes preparation of a suitable dewatering cell area to place the equipment/dewatering bags which is water tight and drains to the existing lagoons, supply and operation of polymer makedown and injection equipment, supply and placement of dewatering equipment, temporary power if required, traffic control and general site reinstatement to pre-construction conditions.

Supply and installation of a new onshore aeration header connecting the in-pond aeration systems to the existing blower buildings is also within this scope.

The work also includes supply and installation of a fine bubble aeration system in lagoons 1 & 2 following dredging and dewatering of the sludge. This includes receiving, assembly, installation, testing, startup and commissioning of the diffusers, downcomers, floating laterals, isolation valves and anchor system. The contractor shall provide end caps on the ends of the laterals for future connection by the Owner.”

### SUBSECTION 5 - EXISTING SITE CONDITIONS

.1 Add the following new Subsection:

"4 Locations of existing buried utilities as indicated on the drawings are approximate only. Contractor is responsible to confirm actual locations of utilities prior to construction. Contractor is to arrange for a locate company to provide underground locate services whether underground piping and electrical cable exists in the area."



SUBSECTION 7 - SUBMITTALS, 7.1 - Shop Drawings

.1 Add the following new Subsection:

"8 Submit, for review, shop drawings for:

- .1 Aeration equipment, including header piping/valves
- .2 Installation methodology
- .3 Polymer data sheet;
- .4 Polymer injection equipment;
- .5 Dredging and dewatering plan
- .6 Dewatering equipment layout schematic;
- .7 Dewatering equipment laydown pad details;
- .8 Dewatering equipment data sheets;
- .9 All other items specified herein that typically require Shop Drawing Submittal."

SUBSECTION 11 - DELIVERY OF MATERIALS AND USE OF THE SITE

.1 Revise Subsection 11.1 to read:

"1 Confine equipment, products, and operations to within the boundaries of roads, specified right-of-way of the Owner, or site limits shown."

SUBSECTION 12 – TRAFFIC CONTROL

.1 Add the following new subsections:

"6 Contractor is to maintain at least single lane access on roads at all times. The Contractor shall comply with the temporary traffic control manual and all other specific requirements stipulated by Nova Scotia Department of Transportation and Infrastructure Renewal.

.7 The Contractor is responsible for notifying the public and local businesses of traffic interruptions and/or detours. Notices shall include newspaper and radio advisories as well as traffic control signage for the public and direct contact with affected business owners.

.8 The Contractor shall not interfere with the movement of waste delivery vehicles and waste delivery vehicles shall be given the right-of-way on all roads."

**4. SECTION 01 22 00 - MEASUREMENT AND PAYMENT**

1. Replace Section 01 22 00 with the following:

1.0 GENERAL

.1 Unit Prices and Lump Sum Prices are full compensation for the work necessary to

complete each item in the Contract in combination with all other work necessary to the completion of the Work as a whole and not bid as a separate item.

- .2 Include all of the following as required where individual quantities are not provided in the Form of Tender: environmental protection, clearing and grubbing, excavation (except rock), shoring, dewatering, bedding, backfilling, compaction, disposal of surplus common, marker stakes, reinstatement, traffic control, and all incidentals.
- .3 All measurements shall be along a horizontal plane unless otherwise indicated.**
- .4 The numbers of the items described below correspond to the numbers of the items in Section 00 41 43 “FORM OF TENDER” “SCHEDULE A”, “SCHEDULE B” and “SCHEDULE C”, where applicable.
- .5 Additional instructions for measurement and/or payment for items of the Work may be contained in specific sections of the Technical Specifications Divisions 1 through 31 where appropriate. In the case of a conflict between the instructions for measurement and payment contained in this section and another section, the requirements of this section shall govern.
- .6 The Contractor shall provide a reliable and accurate method of measuring dry solids extracted from the lagoons. Methods shall be able to be monitored by the Owner through confirmation of feed solids flow and concentration. All data collected shall be turned over to the Owner on a daily basis so that the progress can be tracked and adjustments made to the solids removal program as required. Contractors shall assume that the Owner or its representatives will not be responsible for collecting this data.

## 2.0 SCHEDULE ‘A’ ITEMS

Under ‘Additional Items’, add the following:

### “1. Mobilization & Demobilization

Unit of Measurement: Lump Sum (L.S.)

Item Includes: Insurance, bonding, loading, transportation, contracting of all plant, material, personnel, equipment necessary to complete the work associated with the contract and demobilization/cleanup after the work associated with the contract is completed.

### 2. Geotube Area Preparation

Unit of Measurement: Lump sum

Item Includes: All equipment, supply, transport and installation of materials, health and safety, testing, calibration, commissioning, labour and restoration associated with the construction of suitable water tight laydown areas which drain to the lagoons in accordance with the geotextile dewatering bag manufacturer’s product requirements, wastage, storage, quality control testing and all else required to complete the work in in

space available at the site.

3. Desludging and Dewatering

Unit of Measurement: Bone Dry Tonne (BDT)

Item Includes: All equipment, supply, transport and installation of materials, health and safety, testing, calibration, commissioning, labour and restoration for the complete removal of the existing lagoon aeration equipment and subsequent removal and dewatering of sludge from lagoon #2. This includes supply and placement of dewatering equipment, quality control testing, chemical supply & calibration.

4. Aeration Equipment (Supply)

Unit of Measurement: Lump sum

Item Includes: Complete supply of an engineered, in-pond fine bubble aeration system including materials for connecting to/isolating the on-shore main header. Includes diffusers, downcomers, floating laterals, valves, weights and anchor systems.

5. Aeration Equipment (Installation)

Unit of Measurement: Lump sum

Item Includes: All equipment, materials, labour, and incidentals required to install, startup and commission the aeration system supplied under item 4.

6. Aeration Headers

Unit of Measurement: Lump sum

Item Includes: All equipment, materials, labour, and incidentals required to supply, install, test, startup and commission the onshore aeration header and associated valves, couplings, excavation, bedding and backfill to grade.

7. Yard Piping and Structures

Unit of Measurement: Lump sum

Item Includes: All equipment, materials, labour, and incidentals required to supply, install, test, startup and commission yard piping with associated manholes, valves, couplings, excavation, bedding and backfill to grade.”

**5. SECTION 31 20 00 - EARTHWORK**

.1 Add Clauses 3.9.13

Berms

- .1 Do not place boulders and rock fragments with dimensions exceeding 150 mm within 300 mm of subgrade elevation.
- .2 Use approved native site material and imported clay till for embankment construction.
- .3 Material for berm/embankment construction to be completed to a minimum of 95 percent Standard Proctor Density with a maximum recommended moisture content of optimum  $\pm 2\%$ . Fill is to be placed in a maximum uncompacted lift of 300 mm. Compaction is to be undertaken using heavy (18 tonne) sheep foot type rollers. Smooth drum vibrating rollers may be utilized provided the surface of each lift is scarified prior to placement of the subsequent lifts to ensure good bond between lifts.
- .4 Fill is to be placed in continuous lifts, parallel to berm/embankment alignment. Care should be taken to ensure good bonding between successive lifts is obtained.
- .5 Berm/embankment shall be brought up uniformly around the perimeter. Where openings are excavated through the embankment or it is necessary to join one embankment with another, the joint shall be stepped and completed as shown on the drawings.

**6. ADDITIONAL SECTIONS OF SPECIFICATIONS**

- |                  |   |  |
|------------------|---|--|
| Section 31 32 21 | – | Sludge Dredging and Dewatering           |
| Section 40 05 50 | – | Fine Bubble Aeration System Installation |

**\*\*\* END OF SECTION 00 60 00 \*\*\***

**Part 1            General**

**1.1                SECTION INCLUDES**

- .1        To facilitate installation of a new aeration system, dredging and dewatering of municipal wastewater sludge in Cell 2 is required.
- .2        The work covered by this section includes: (a) provision of all equipment, labour, and materials; (b) construction of a suitable dewatering pad and (c) performance of all operations in connection with the construction of the geotextile tube (Geotube) unit on constructed dewatering areas and dredging and dewatering of municipal biosolids material.

**1.2                RELATED SECTIONS**

- .1        Section 00 72 45 – General Conditions
- .2        Section 00 60 00 – Supplementary Specifications

**1.3                MEASUREMENT PROCEDURES**

- .1        All costs in connection with the mobilization and demobilization of the contractor's equipment shall be included in a lump sum price where indicated on the Tender Form. A separate unit cost should be included based on bone dry tonne to complete de sludging and de watering. No separate measurement will be made for Geotubes, placement of the underlying geotextile filter cloth, and/or coating of the completed tubes. Payment shall be made at the contract lump sum price and shall constitute full compensation for providing all materials necessary for the complete and satisfactory delivery and installation of the Geotubes. No separate payment shall be made for any other incidental items associated with the proper installation of the Geotubes or compliance with required permits.
- .2        The Contractor shall provide a reliable and accurate method of measuring dry solids extracted from the lagoons. Methods shall be able to be monitored by the Owner through confirmation of feed solids flow and concentration. All data collected shall be turned over to the Owner on a daily basis so that the progress can be tracked and adjustments made to the solids removal program as required. The daily report shall include a brief summary of the anticipated volumes to be removed (tender quantity), amount removed that day, amount removed prior and total amount remaining in contract.

**1.4                REFERENCES**

- .1        American Society for Testing and Materials International, (ASTM)
  - .1        ASTM D4491-99a, Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
  - .2        ASTM D4751-99a, Standard Test Method for Determining Apparent Opening Size of a Geotextile.
- .2        Canadian General Standards Board (CGSB)
  - .1        CAN/CGSB-4.2 No. 11.2-M89(April 1997), Textile Test Methods - Bursting Strength - Ball Burst Test (Extension of September 1989).

- .2 CAN/CGSB-148.1, Methods of Testing Geotextiles and Complete Geomembranes.
  - .1 No.2-M85, Methods of Testing Geosynthetics - Mass per Unit Area.
  - .2 No.3-M85, Methods of Testing Geosynthetics - Thickness of Geotextiles.
  - .3 No.6.1-93, Methods of Testing Geotextiles and Geomembranes - Bursting Strength of Geotextiles Under No Compressive Load.
  - .4 No.7.3-92, Methods of Testing Geotextiles and Geomembranes - Grab Tensile Test for Geotextiles.
  - .5 No. 10-94, Methods of Testing Geosynthetics - Geotextiles - Filtration Opening Size.

## **1.5 SUBMITTALS**

- .1 Submit a written certificate of compliance of geotextile tube manufacturer's catalog cuts, brochures, specifications, and product data for approval at least 4 weeks prior to start of work. The information provided shall attest that the geotextile tube meets the chemical, physical, and manufacturing requirements stated in these specifications.
- .2 Submit a Plan of Construction describing the sequence of operations for the dredging and dewatering operation. The plan should conform to the general guidelines presented in these contract specifications, but should also include additional information. The plan shall address the approach and techniques required for: (a) fabrication of the geotextile tubes, laydown pad, (b) construction site preparation, (c) geotextile tube deployment and filling, and (d) monitoring and analysis of parameters such as characteristics of the material to be dredged, pipeline pressure, and hydraulic-fill characteristics. Equipment to be used for geotextile tube placement and filling shall be specified.

## **1.6 DELIVERY, STORAGE AND HANDLING**

- .1 During delivery and storage, protect geotextiles from direct sunlight, ultraviolet rays, excessive heat, mud, dirt, dust, debris and rodents.
- .2 Geotextiles shall be labeled, shipped, stored, and handled in accordance with ASTM D 4873 and as specified herein. Each segment of geotextile tube shall be wrapped in an opaque and waterproof layer of plastic during shipment and storage. The plastic wrapping shall be placed around the geotextile in the manufacturing facility and shall not be removed until deployment. Each packaged segment of geotextile tube shall be labeled with the manufacturer's name, geotextile type, lot number, roll number, and roll dimensions (length, width, and gross weight). Appropriate handling equipment and techniques, as recommended by the manufacturer and as mentioned in the submittals and approved by the contracting officer, shall be used.
- .3 Geotextile and/or plastic wrapping damaged as a result of delivery, storage, or handling shall be repaired or replaced, as directed by the contracting officer, at no additional cost to the Owner
- .4 Geotextiles shall not be handled with hooks, tongs, or other sharp instruments. Geotextiles shall not be dragged along the ground. Any surface upon which the geotextile may rest or from which it may be deployed shall be leveled and prepared to a relatively smooth condition free of ruts, erosion rills, obstructions, depressions or debris (brush, burrs, or protrusions) greater than 150 mm in height (6 in.) that could snag and tear the fabric. A shallow "swale"

or “cradle” may be constructed under low-water conditions on the tube center line to prevent geotextile tubes from rolling during filling operation.

## **1.7 WASTE MANAGEMENT AND DISPOSAL**

- .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.
- .3 All waste material is to be disposed in accordance with applicable regulations. The Contractor is responsible to obtain all permits.

## **Part 2 Products**

### **2.1 FABRIC REQUIREMENTS**

- .1 The geotextile for the tubes shall be a woven monofilament or multifilament pervious sheet of polymeric yarn. Fibers used in the manufacture of the geotextile fabric shall consist of long-chain synthetic polymers composed of at least 85 percent by weight polyolefins, polyesters, or polyamides. Stabilizers and/or inhibitors shall be added to the base polymer if necessary to make the filaments resistant to deterioration by ultraviolet light, oxidation, and heat exposure.
- .2 Reclaimed or recycled fibers (post-consumer) or polymer shall not be added to the formulation.
- .3 Geotextiles shall be formed into a network such that the filaments or yarns retain dimensional stability relative to each other (including the filaments or yarns at the edges of the fabric).
- .4 The geotextile physical properties shall equal or exceed the minimum average roll test values (MARV) listed in Table 2, as determined by the standard test methods listed.
- .5 Acceptance of geotextile shall be in accordance with ASTM D 4759.
  - .1 Strength values shown in Table 1 are for the weaker principal direction. Geotextile fabrics that are not in accordance with ASTM D 4759 shall be replaced as directed by the Engineer at no additional cost to the government.
  - .2 Standard of Acceptance: Miratech GT500 Sludge Dewatering Geotube or approved equivalent only.

Table 1: Geotextile, Type 1 (Geo-tube) Physical properties (woven)			
Property	Test Method	Unit	Minimum Test Value
Apparent Opening Size	ASTM D 4751	US Sieve	#60
Puncture Strength	ASTM D 4833	lb	400
Wide Width Tensile (in any direction)	ASTM D 4595	lb/in	1000
Wide Width Tensile Elongation (in any direction)	ASTM D 4595	%	15
Trapezoidal Tear	ASTM D 4533	lb	550
Seam Strength	ASTM D 4884	lb/in	500

**2.2 TEST, INSPECTIONS, AND VERIFICATIONS FOR GEOTEXTILES**

- .1 Geotextiles and factory seams shall meet the requirements specified in Table 1. Conformance testing shall be performed on random samples in accordance with quality control practices as prescribed by the manufacturer.

**Part 3 Execution**

**3.1 SUBMITTALS**

- .1 The contractor is responsible to submit a general plan of operations, a list of all equipment, chemicals, and the general specifications thereof, to the Consultant, 1 week before arriving on site for the designated date of project start up.
- .2 Before arriving on site on the agreed upon date, the contractor will provide a letter of certification to the Engineer that all their equipment has been completely cleaned and disinfected, using NSF disinfectant solutions only.
- .3 The contractor will be required to submit a work hazard assessment before commencing operations and supply a list of all personnel that will be on site.
- .4 The contractor will be required to submit an environmental safety plan to be in keeping of the requirements of work conducted in an area designated as a protected water supply in the province of Nova Scotia

**3.2 INSTALLATION**

- .1 The area of operation designated for equipment set up within the constraints of the site. The surface area of each lagoon is approximately 30,700 m<sup>2</sup>. The contractor must be able to effectively maneuver the hydraulic dredge equipment to be able to cover this area in its entirety to be able to remove all of the contents.



- .2 The contractor is responsible to set up and take down all equipment for the entire project and arrange for outside contracting to position equipment as required, on the agreed upon date
- .3 The contractor will provide a letter of certification that will verify any lubrication or hydraulic oil used on site for any equipment for any reason is food grade designated only.
- .4 The contractor will provide onsite spill kits designed for chemicals and/or petrochemicals, and of large enough size (including generator fuel storage) to contain and secure any spills from all equipment.
- .5 The contractor will be responsible for maintaining a clean operational area while on site, adhering strictly to environmentally appropriate best practices at all times.
- .6 The sludge will be taken out of the lagoons by hydraulic vacuum dredging and delivered to the dewatering system. Alternative methods are subject to approval by the Engineer.
- .7 The contractor is responsible for providing any required source water supply on site.
- .8 The Geotube dewatering system will be a high volume, high solids type, with suitably sized conveyance equipment for dewatered sludge.
- .9 The contractor will consult with the Municipality and must have prior approval of any chemical used on site to achieve dewatering, and subsequent solids percentage targets. All chemicals used will be NSF certified and the contractor will provide letters of certification for each one on site whether used or not. The chemicals chosen will be of the highest quality available to enhance and optimize performance of the dewatering operations.
- .10 The contractor must consult with the Municipality to ensure the positioning of the Geotubes will allow for proper collection of large amounts by a transport truck and continual operator of the facility.
- .11 The Contractor will optimize the use of any chemical coagulants as percent solids of the alum sludge changes throughout the delivery process from the dredging, to ensure a high solids dewatered sludge (minimum 20%) after the dewatering process, while maintaining a clear filtrate back to the lagoon at all times.
- .12 The contractor will ensure that any remaining amounts of chemical unused in the normal operations, even if partially full and activated, is secured and removed of in an environmentally appropriate manner from the work site, as reported to the Engineer during each, and then on the last day of dewatering operations.
- .13 Within 30 days after notice to proceed, the contractor shall submit the Plan of Construction. The plan shall incorporate the requirements of these specifications with respect to tube (and associated components) geometry, orientation, fabrics, fabrication, deployment and filling procedures per manufacturer's recommendations.
- .14 Fabrication details or installation techniques that differ from those outlined in these specifications may be documented in the Plan of Construction and submitted for consideration by the Owner. However, rejection of alternative methods suggested by the Contractor shall not constitute a basis for claim against the Owner or their representative.

- .15 Prior to installation, the contractor shall visually inspect the geotextile and ports for damage and imperfections. Defective geotextiles shall be replaced no cost to the Owner.
- .16 Check surface on which flexible liner is to be placed and remove projections that may puncture lining.
- .17 Excavate anchor trenches at locations indicated.
- .18 Place and secure liner in anchor trenches.
- .19 Clean edges of panels to be spliced and join as outlined in manufacturer's recommendations.
- .20 Complete anchoring of panels at base of slope.
- .21 Cut liner sheets to fit accurately around inlets, outlets, sleeves, concrete structures and other projections through lining.
- .22 Complete flashing and sealing of penetrations as indicated.
- .23 Place cover blanket as indicated.

### **3.3 PUMP AND EQUIPMENT**

- .1 The pump and equipment used for the work required shall be determined by the contractor, identified in the Plan of Construction, and shall be approved by the Owner.

### **3.4 QUALITY CONTROL**

- .1 The contractor shall establish and maintain quality control procedure to be submitted to the Owner.

### **3.5 FINAL EXAMINATION AND ACCEPTANCE**

- .1 The final condition of the work site, lagoons and sludge bed thickness will be reviewed at the completion of the dredging to ensure sufficient sludge has been removed from the Lagoon Cells.
- .2 A cash allowance has been included under this contract. At the Owner's discretion, the Contractor may be directed to use all or parts of this allowance to retain a third party surveying firm (selected by the Owner) to complete a ROV bathymetric survey of the lagoon following desludging. The purpose of this exercise will be to confirm removal efficacy against pre-construction surveys. Any cash allowance amount not authorized shall be removed from the contract value.

### **3.6 CLEANING**

- .1 Remove construction debris from Project site and dispose of debris in an environmentally responsible and legal manner.

### **3.7 PROTECTION**

- .1 Vehicular traffic not permitted directly on geotextile.

**END OF SECTION**

## **PART 1 GENERAL**

### **1.1 Description**

- .1 This section covers the requirements for a new fine bubble aeration system and associated equipment for cells 1 and 2 of their WWTP, as outlined herein. The WWTP consists of 5 aerated cells in total, cells 3-5 are outside the scope of this project.
- .2 All equipment specified shall be supplied as a complete package, from one supplier (unless specifically noted otherwise in the specifications), in order to unify responsibility for the system warranty, performance, and proper operation.

### **1.2 Referenced Standards**

- .1 ASTM A240 – Chromium-Nickel Stainless Steel Plate
- .2 ASTM A312 – Seamless, Welded, and Cold Worked Austenitic SS Pipe.
- .3 ASTM A351 – Castings, Austenitic, for Pressure-Containing Parts
- .4 ASTM A380 – Corrosion Protection, Acid Pickling
- .5 ASTM A403 – Wrought Austenitic Stainless Steel Piping Fittings
- .6 ASTM A480 – Stainless Steel Finish
- .7 ASTM A530 – Specialized Carbon and Alloy Steel Pipe
- .8 ASTM A554 – Welded Stainless Steel Mechanical Tubing
- .9 ASTM A743 – Castings, Iron-Chromium, Iron-Chromium Nickel for General Applications.
- .10 ASTM A744 – Castings, Iron-Chromium-Nickel for Severe Service.
- .11 ASTM A774 – Stainless Steel Welded Fittings
- .12 ASTM A778 – Stainless Steel Welded, Unannealed Austenitic Pipe
- .13 ASTM D1171 – Elastomer Deterioration
- .14 AISI 304 – 304 Stainless Steel Plate
- .15 AISI 304L – 304L Stainless Steel Plate
- .16 AISI 316 – 316 Stainless Steel Plate
- .17 AISI 316L – 316L Stainless Steel Plate
- .18 ANSI B-16.1 – Pipe Flanges
- .19 ANSI B-16.5 – Pipe Flanges
- .20 AWWA C606 – Grooved and Shouldered Joints

### **1.3 Handling and Storage of Materials**

- .1 Assume complete responsibility for the safe delivery to the site of all equipment specified herein.
- .2 Inspect all fabricated material for damage in transit before installation in the work.

- .3 Exercise particular care to avoid damage to equipment.
- .4 The Engineer reserves the right to reject equipment that is damaged or defective.

#### **1.4 Guarantees**

- .1 The equipment shall be guaranteed to perform to the specified design operating conditions.

#### **1.5 Submittals**

- .1 Submit Shop Drawings in accordance with Section 01 33 00 showing fabrication, fixings, layout and installation of all equipment specified in this Section for approval prior to construction.
- .2 All dimensions and other units are to be metric.
- .3 Include with Shop Drawings the following:
  - .1 Show grid layout, location dimensions and elevation of grid.
  - .2 Provide engineering reports stating the clear water oxygen transfer efficiency, including a description of test facility procedures, methods of sampling and calculations. The test procedure shall be in accordance with "A Standard for Measurement of Oxygen Transfer in Clean Water" ASCE.
  - .3 Provide headloss calculations for the aeration equipment. Calculations shall be derived at standard conditions and at design maximum air flow rate per diffuser including air supply piping from the blowers.
  - .4 Provide calculations for determining the number of diffusers required to meet design requirements.
  - .5 Details of:
    - .1 Diffusers, holders, retainers and gaskets
    - .2 Piping, including anchorage system, supports, and expansion and fixed joints
    - .3 Airline purge system where applicable
    - .4 Should there be any deviations or exceptions to these Specifications, submit a statement from the manufacturer listing such deviations/ exceptions. Include specification reference, proposed alternative and reason for changes
- .4 Submit installation manual prior to shipment of equipment.
- .5 Submit Operation and Maintenance Manuals in accordance with Section 01 78 00.

#### **1.6 Basis of Design**

- .1 The design drawings, system layout, equipment selection, etc. have been generally based on the systems below. Final layout is the responsibility of the aeration supplier and subject to review/approval of the Engineer.
- .2 Standard of acceptance:
  - .1 Nexom Inc.
  - .2 TriplePoint Environmental
  - .3 Approved equivalent

- .3 Components specified herein shall be supplied by one supplier and shall be of the manufacturer's latest design.
- .4 Under no circumstances will a system consisting of parts compiled and assembled by a manufacturer's representative or distributor be accepted.
- .5 Contractor shall specify at time of bid all major subcontractors and suppliers to be used. Use of any subcontractors or suppliers other than specified will not be accepted.
- .6 This specification shall be the standard by which any alternative system submittal will be reviewed. The decision of the Contract Administrator with respect to approval or rejection of any alternate equipment proposed is final (refer to Approval of Alternates section)

### **1.7 General Layout/Arrangement**

- .1 The Lagoon aeration system shall generally consist of shallow buried main air supply headers with distribution laterals:
  - .1 Lateral piping shall be connected to the main air supply header with a flanged connection.
  - .2 Each lateral pipe shall have a shutoff valve at the main header connection.
  - .3 Lateral pipes shall be anchored to shore (anchor post apparatus to be supplied under this contract).
  - .4 Floating Laterals: diffuser connection ports shall be thermally fused onto the lateral piping. A length of feeder hose (equal to the maximum water depth taking into account average sludge blanket depths) shall be connected to the connection port with stainless steel clamps. The aeration diffuser shall be connected to the opposite end of the feeder hose.
- .2 The aeration system including diffusers, lateral system, and feeder lines shall ensure that the lagoons do not have to be de-watered or drained for system installation or maintenance.
- .3 Non-retrievable submerged aeration headers/laterals will not be accepted. PVC headers will also not be accepted.

### **1.8 Influent/Effluent Design Values**

- .1 Design aeration system based on the following design values:
  - .1 Average Design Flow 8,114 m<sup>3</sup>/day
  - .2 Cell 1 Influent cBOD<sub>5</sub> 493 mg/L
  - .3 Cell 1 Effluent cBOD<sub>5</sub> 97.7 mg/L (summer), 190.8 mg/L (winter)
  - .4 Cell 2 Effluent cBOD<sub>5</sub> 44.5 mg/L (summer), 120.6 mg/L (winter)
  - .5 Influent TSS: 309 mg/L
  - .6 Influent TKN: 35 mg/L

### **1.9 Aeration Design Criteria**

- .1 Aeration system design is the sole responsibility of the Supplier and shall be stamped and signed by a Professional Engineer registered to practice in the Province of Nova Scotia.

- .2 It is entirely the responsibility of the aeration equipment supplier to verify all design parameters. No allowance will be made for design errors or omissions that occur due to insufficient site investigation.
- .3 Aeration Design Factors
  - .1 Lagoon depth (including sludge): 3.5 m
  - .2 Sludge blanket thickness range: 0.06-1.08 m
  - .3 Average sludge thickness: 0.2 m
  - .4 Alpha: 0.58
  - .5 Beta: 0.95
  - .6 Theta: 1.035
  - .7 Site Elevation: 8.40 m
  - .8 Maximum Water Temperature: 20 °C
  - .9 Minimum Water Temperature: 0.5 °C
  - .10 Minimum air demands:
    - .1 Cell 1: 6,120 scfm
    - .2 Cell 2: 1,920 scfm
  - .11 Maximum Air Demands Cells 1 & 2 Combined: 12,800 scfm. The proposed diffuser system must be capable on conveying the full capacity of the existing blowers (12,800 scfm) between Cells 1 and 2 within their acceptable operating flux ranges.
- .4 Aeration system shall be designed transfer sufficient oxygen to accommodate loads from:
  - .1 cBOD removal
  - .2 Internal benthic sludge digestion
- .5 The average dissolved oxygen content shall be not less than 2.0 mg/L in any part of the aerated lagoons.
- .6 Diffusers shall have a minimum SOTE of 18%.
- .7 Air distribution shall be designed to match the projected oxygen demand. The system shall be designed so that aerator density is higher near Cell #1 influent location. Minimum requirements are as follows:
  - .1 Cell #1: 18 laterals, 510 diffuser assemblies
  - .2 Cell #2: 12 laterals, 160 diffuser assemblies
- .8 Submit complete aeration design calculations and results of ASCE Standard Oxygen Transfer Efficiency (SOTE) tests conducted by an independent laboratory.
- .9 Air shall be supplied to Cell 1 and Cell 2 by the existing blowers listed:

#	Manufacturer	Air Supply	Capacity (cfm)	Design Pressure (psi)
1	-	Cell 1 & 2	-	-
2	Continental Industries	Cell 1 & 2	3,700	6.2
3	Continental Industries	Cell 1 & 2	3,700	6.2
4	Houston Service Industries	Cell 1 & 2	2,700	6.2
5	Hibon (not used)	Cell 1 & 2	-	-

6	Houston Service Industries	Cell 1 & 2	2,700	6.2
7	Aerzen	Cell 3, 4 & 5	2,000	6.2
8	Aerzen	Cell 3, 4 & 5	2,000	6.2

**PART 2 PRODUCTS**

**2.1 Aeration Piping**

- .1 High-Density Polyethylene (HDPE) Pipe: butt-fused joints.
- .2 The polyethylene pipe shall be PE3408, or PE3608, or PE4710, and conform to the requirements of ASTM D3350
- .3 Minimum DR requirements shall be the more stringent of the following:
  - .1 for buried piping: DR17 for heavy traffic areas; DR21 for light traffic areas; DR26 for non-traffic areas
  - .2 for other piping: DR17 for 100 mm (4") piping, DR21 for 150 mm (6") piping, DR26 for 200 mm (8") and larger
- .4 Minimum aeration header pipe size: 100 mm (4") diameter (to be selected by manufacturer).
- .5 Flange assemblies: Polyethylene stub end manufactured to match the pipe, with ductile iron slip-on flange (out of water and buried service), and SS slip-on flange (in-water).
- .6 Provide saddles, tees, reducers, and other fittings required for the installation shown.

**2.2 Diffusers and Feeder Tubing**

- .1 Fine bubble membrane diffuser assemblies consisting of PVC support tubes with EPDM diffuser membranes connected to an HDPE distribution manifold
  - .1 Maximum dry weight of individual diffuser and ballast assembly shall be 55 lb to allow for safe manual retrieval.
  - .2 Each diffuser assembly shall consist of multiple long membranes with a minimum space to expand diffuser capacity in the future.
  - .3 EPDM diffuser membranes shall be fully supported over entire length
  - .4 EPDM diffuser membranes shall have a design life space of not less than 5 years before replacement is required.
- .2 Aeration supplier shall provide precast concrete or other prefabricated diffuser ballast weight assemblies including FRP support brackets with an HDPE cover around perimeter of weight. The diffuser and weight system shall in no way present risk of damage to the existing lagoon liner system. No on-site ballast fabrication will be accepted.
- .3 Each aeration diffuser shall be individually accessible from the water surface by boat with no additional lifting equipment required. Aeration diffuser replacement shall require no more than a crew of two workers to safely remove from the lagoon.
- .4 Diffusers shall have a history of efficient operation, and freedom from clogging, excessive back pressures, or structural failure when applied to service conditions similar to those indicated for this project.
- .5 Provide five (5) complete diffuser assemblies and four (4) additional membrane assemblies as spare parts



- .6 Feeder tubing used as the connection between the fine bubble diffuser and lateral piping shall be flexible PVC material reinforced with spiral polyester yarn; UV and weather resistant.
  - .1 Nominal inside diameter 1”.
  - .2 Service temperature range -15°F to 149°F
  - .3 Feeder tubing to be cut to length in factory based on sludge measurements.

### **2.3 Lateral Anchoring**

- .1 Each end of the floating laterals shall be held in place with a stainless steel cable attached to anchor posts
- .2 If required, a Self-Adjusting Tension assembly shall be located at the free end of the laterals and shall have the follow characteristics:
  - .1 Adjustment range: +/- 20”
  - .2 Tension assembly to provide a minimum constant tension force on lateral of 275 lb
  - .3 Equipped with winch for initial adjustments
- .3 Anchor posts
  - .1 Details to be provided by Supplier
- .4 Concrete Pier
  - .1 Details to be provided by Supplier.

### **2.4 Miscellaneous Components**

- .1 Provide all other miscellaneous process equipment accessories including winches, stainless steel cable, concrete diffuser ballasts, rope, clamps, nuts/bolts, etc. as required for a complete system.

## **PART 3 EXECUTION**

### **3.1 Delivery to Site**

- .1 The equipment shall be packaged in containers constructed for normal shipping, handling and storage.
- .2 The Contractor will provide machinery and labour to unload and store the equipment in accordance to manufacturer’s requirements.

### **3.2 General**

- .1 The Contractor shall install all supplied components in accordance with the manufacturer’s instructions and in conformance with submitted shop drawings.
- .2 The installer of the aeration system shall supply all materials, tools, equipment, and services necessary to install the aeration system.
- .3 The site shall be kept in a neat and orderly manner throughout the duration of the system installation.

### **3.3 Aeration Piping Installation**

- .1 The Contractor shall provide equipment for excavation and backfill for all shallow buried aeration headers. Backfill buried piping with select native excavated material. Backfill buried piping under building foundation or roadways with base course gravel.
- .2 The Contractor shall accurately excavate to the correct grades allowing for sand bedding if/where required. Trench bottom shall be smooth, straight, and free of large rocks. Support piping on undisturbed material along its entire length.
- .3 The Contractor shall provide sufficient labor and equipment to install all aeration header piping and accessories. Install buried piping to the extent shown on the drawings using open-cut trench method.
- .4 The Contractor shall supply and install all air valves, main air header piping, and fittings as necessary to complete the aeration system as shown on the plans.
- .5 Join HDPE pipe and fittings using the butt-fusion method in accordance with the pipe manufacturer's instructions, and under the supervision of certified fusion technologists.
- .6 Keep piping, during the progress of the work and on completion, free from obstructions and thoroughly clean. Remove foreign material from the pipe lines and ensure lines are free from leaks. Remove and replace any defective sections.

### **3.4 Aeration Diffuser and Lateral Installation**

- .1 The Contractor shall provide sufficient labor and equipment to install all in-basin aeration diffuser piping and accessories within the treatment cell(s).
- .2 Join HDPE pipe and fittings using the butt-fusion method in accordance with the pipe manufacturer's instructions, and under the supervision of certified fusion technologists.
- .3 Keep piping free from obstructions and thoroughly clean. Remove foreign material from the pipe lines and ensure lines are free from leaks. Remove and replace any defective sections.
- .4 Install HDPE lateral piping at flange connection locations as shown on the drawings.
- .5 Install diffusers and feeder tubing in accordance with supplier's instructions at locations as shown on the drawings.
- .6 Ensure adequate water levels in cell prior to any in-water equipment installation.

### **3.5 Manufacturers Field Service**

- .1 Provide services of an experienced, competent, and authorized representative of the Manufacturer (Supplier). A minimum of two (2) days onsite shall be provided.
  - .1 Inspect equipment covered by these specifications
  - .2 Supervise any adjustments and installation checks
  - .3 Perform operation checks and tests as outlined below
  - .4 Perform start-up and commissioning of the system
- .2 Perform air flow rate tests
  - .1 Testing shall be performed under full normal lagoon operational conditions
- .3 Visually inspect aeration pattern
  - .1 Pattern shall be uniform at all diffuser locations

- .4 If defects are revealed during testing, the Engineer may issue instructions for removal or correcting defective work and irregularities. If any material, in whole or in part, does not conform to the Specifications or is found to be defective then such material shall be rejected by the Engineer and replaced.

### **3.6 Commissioning**

- .1 Supplier shall provide installation inspection, and start-up and commissioning for the system including on-site training of the Owner's operators.
- .2 Check the installation of all components and provide a detailed, written commissioning report to the Engineer upon completion of installation and commissioning.

### **3.7 Warranty**

- .1 The entire equipment package shall be covered by 2-years warranty following successful commissioning. The supplier shall assume the responsibility for all transport and travel costs arising from warranty work. The warranty statement shall be signed by an Officer of the Company.
- .2 System supplier shall maintain a minimum \$2,000,000 Errors and Omissions insurance policy acceptable to the client.
- .3 The aeration system Supplier shall provide written warranties for the aeration system.
- .4 The Supplier shall repair or replace defective parts without charge to the Owner.
- .5 Lateral Piping and Fittings Warranty
- .1 Lateral piping and fittings shall be warranted to be free from defects in material and workmanship for a period of Twenty-four (24) months from the date of start-up.
- .2 The cost for removal (disposal) and reinstallation of any defective parts during the warrantee period shall be the responsibility of the Owner
- .6 Aeration Diffuser Warranty
- .1 Aeration diffusers shall be warranted to be free from defects in material and workmanship for a period of twenty-four (24) months from the date of start-up.
- .2 The cost for removal (disposal) and reinstallation of any defective parts during the warrantee period shall be the responsibility of the Owner

**END OF SECTION**