Town of Shelburne

Shelburne First Generation Landfill Closure

Specifications and Contract Documents

TENDER No. TOS2025-002

JULY 2025

25-9983

Note: Contract will not be awarded until Final Approval to Construct is obtained from NSECC

Prepared by
Dillon Consulting Limited

PREFACE

THESE PROJECT DOCUMENTS HAVE BEEN PREPARED FOR USE WITH AND REQUIRE BEING READ IN CONJUNCTION WITH THE STANDARD SPECIFICATION FOR MUNICIPAL SERVICES AS PUBLISHED BY THE JOINT COMMITTEE ON CONTRACT DOCUMENTS IN ASSOCIATION WITH NOVA SCOTIA ROADBUILDERS ASSOCIATION, CONSULTING ENGINEERS OF NOVA SCOTIA AND LANDSCAPE NOVA SCOTIA. COPIES OF THE STANDARD SPECIFICATION ARE AVAILABLE FROM SPECTECH LIMITED, 18 LAURIER STREET, DARTMOUTH, NS, B3A 2G7; TELEPHONE: (902) 233-9362; E-MAIL: nsmunicipalservices@gmail.com; OR VISIT: www.standardspec.ca

PROJECT: SHELBURNE FIRST GENERATION LANDFILL CLOSURE
TENDER No. TOS2025-002

LOCATION: 31 Morvan Road
Shelburne, Nova Scotia
B0T 1W0

OWNER: TOWN OF SHELBURNE
162 Mowatt Street
Shelburne, Nova Scotia
B0T 1W0

ENGINEER: DILLON CONSULTING LIMITED
137 Chain Lake Drive, Suite 100
Halifax, Nova Scotia
B3S 1B3

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1.1 A COMPLETE TENDER INCLUDES THE FOLLOWING:

.1 The Tender Form in its entirety, with all pages and spaces for entry of information by Tenderers filled in as instructed.

.2 Acknowledgment of addenda received by the Tenderer during the tendering period.

.3 Tender Security (refer to applicable clause herein).

1.2 ELECTRONIC TENDER SUBMISSION

.1 Tenders shall be submitted exclusively by email to Sarah.Mattatall@shelburnens.ca **until 3:00 p.m., local time, on July 31, 2025, hereinafter** referred to as the Tender Closing. Subject heading of email to read "TOS2025-002– TENDER SUBMISSION." The time stamp of the email received by Sarah.Mattatall@shelburnens.ca will be used to determine if the submission was received on time – not the time it was emailed by the sender. Last minute submissions are not recommended.

1.3 SAFETY CERTIFICATION

.1 Submit with tender a copy of tenderer's current and valid safety accreditation issued by Nova Scotia Workers' Compensation Board or Certificate of Recognition (COR) issued by Construction Safety Nova Scotia.

.2 Out-of-province tenderers with a current and valid COR from a Canadian Federation of Construction Safety Associations member shall obtain and submit, with tender, a current and valid Letter of Good Standing from Construction Safety Nova Scotia.

1.4 WORKERS' COMPENSATION

.1 Submit with tender a copy of tenderer's current and valid clearance letter issued by the Workers' Compensation Board of Nova Scotia.

.2 Out-of-province tenderers shall submit, with tender, a current and valid clearance letter from a government workers' compensation board but must register with the Nova Scotia Workers' Compensation Board prior to being awarded the Contract.

1.5 TENDER OPENING

.1 Tenders will be opened on July 10, 2025, at 3:00 PM at 162 Mowatt Street, Shelburne.

.2 Tender amendments will be disclosed at public openings.

1.6 ACCURACY OF REFERENCING

.1 Indexing and cross-referencing are for convenience only.

1.7 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, Subsection 1.3.8 for a complete list of Contract Documents.

1.8 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 A non-mandatory bidder's meeting will be held to provide interested parties with an opportunity to gain further insight into the project requirements and existing conditions. The meeting will take place on **July 18, 2025 at 10:30 a.m**. at the Shelburne Landfill, located at 31 Morvan Rd.,

Shelburne, NS. Attendees are asked to check-in and meet at the entrance to the landfill. Attendance at this meeting is optional and does not affect the evaluation of tender submissions.

1.9 CLARIFICATION AND ADDENDA

.1 Notify Engineer not less than two (2) 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 issued. All addenda will form part of Contract Documents.

.2 Confirm in the tender form that all addenda have been received. Tenderers are solely responsible to obtain and acknowledge the receipt of addenda at time of tender closing.

1.10 PREPARATION OF TENDER

.1 Legibly complete tender form provided with Project Documents. Tender all items and fill in all blanks. Have corrections initialled by person signing tender.

1.11 TENDER SECURITY

.1 Provide tender security in the minimum amount of ten percent (10%) of total price including HST, shall be in favour of the Owner, and shall be in the form of a Certified Cheque, irrevocable Letter of Credit or a Bid Bond which shall guarantee to the Owner that in the event of the successful Tenderer declining to enter into a formal agreement with the Owner as called for in the Contract Documents, or declining or neglecting to provide the Insurance or Contract Security required by the Contract Documents, then the Owner will be reimbursed the additional cost of accepting another tender or Tender Security amount, whichever is the lesser.

.2 Where a bid bond is submitted it may be submitted in a digital format provided it meets the following criteria:

.1 The version submitted by the Tenderer must be verifiable by the Owner with respect to the totality and wholeness of the bond form, including: the content; all digital signatures; all digital seals; with the Surety Company, or an approved verification service provider of the Surety Company.

.2 The version submitted must be viewable, printable and storable in standard electronic file formats acceptable to the Owner, and in a single file. Allowable formats include pdf.

.3 The verification may be conducted by the Owner immediately or at any time during the life of the bond and at the discretion of the Owner with no requirement for passwords or fees.

.4 The results of the verification must provide a clear, immediate and printable indication of pass or fail regarding the requirements contained herein.

.5 Bonds failing the verification process will NOT be considered to be valid.

.6 Bonds passing the verification process will be treated as original and authentic.

1.12 CONTRACT SECURITY

.1 Refer to Section 00 73 00 – Supplementary General Conditions, GC 14 – CONTRACT SECURITY for form and amount of contract security required.

1.13 INSURANCE

.1 Refer to Section 00 72 45, General Conditions, subsection GC11.1 - INSURANCE, and CCDC 41 for insurance requirements.

1.14 FORM OF AGREEMENT

.1 Form of Agreement is attached for information purposes only until execution of the Contract.

1.15 RETURN OF TENDER SECURITY

.1 Tender security will be returned to:

All except the three lowest acceptable tenderers within five (5) Working Days of tender opening.

Two (2) remaining unsuccessful tenderers within ten (10) Working Days of date of award.

Successful tenderer following receipt by Owner of executed agreement, specified contract security, and insurance documents.

1.16 .1 AMENDMENT OR WITHDRAWAL OF TENDER

.2 1 Tenders may be amended or withdrawn prior to tender closing.

.3

.2 Amendment of individual Unit Prices is the only acceptable price amendment. Amendments shall not disclose either original or revised total price.

.3 Head amendment or withdrawal as follows: "[Amendment/Withdrawal] of tender for [Name of Project/Contract] [Contract number, if applicable]". Sign as required for tender and submit to the address given for receipt of tenders. In order to be considered, submissions shall be received prior to time of tender closing.

1.17 OFFER, ACCEPTANCE, REJECTION

.1 The Owner reserves the right to accept or reject any tender and to cancel the tendering process and reject all tenders at any time prior to the award of Contract without incurring any liability to affected tenderers.

1.18 NSE APPROVAL

.1 Contract will not be awarded until Final Approval to Construct is obtained from NSECC.

END OF SECTION 00 21 00

1.1 SALUTATION

.1 To: Town of Shulburne
162 Mowatt Street
Shelburne, Nova Scotia, B0T 1W0

.2 For: Tender TOS2025-002
Shelburne Landfill Closure

.3 From: [Name of Contractor]
[Address]

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.

.16 That failure to enter into a formal contract and provide specified insurance documents and contract
.2 security within time required will constitute grounds for forfeiture of tender security.
.3

.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:

Standard Specification for Municipal Services listed in Table of Contents Dated 2024.
Tender Form
Form of Agreement

Supplementary Specifications

Drawings

.1 COVER/ SITE LOCATION

.2 SHELBURNE EXISTING CONDITIONS PLAN

.3 SHELBURNE PROPOSED CAP

.4 SHELBURNE SECTIONS 1 TO 5 AND DETAILS

.4 All addenda as issued and as confirmed in subsection 1 of this section.

.5

1.4 SCHEDULE OF QUANTITIES AND UNIT PRICES

.6

Item No.	Description	Unit of Measurement	Estimated Quantity	Unit Price	Item Total
1	Mobilization and Demobilization	LS	1		
2	Site Clearing and Grading	m^2	21,500		
3	Grading Layer	m^3	3,200		
4	Low Permeability Soil	m^3	10,700		
5	Vegetative Soil	m^3	4,300		
6	Side Slope Check Dam	m	220		
7	Geotextile Wrapped Straw Bale Filter System	m	470		
8	Hydroseed	m^2	21,500		
9	Sedimentation and Erosion Control	LS	1		
10				Sub-total (Items 1 through 9)	
11				Contingency Allowance* (10% of Item 9)	
12				Total Price (Item 9 plus 10)	
13				Add HST (14% of Item 11)	
14				**Estimated Price (Item 11 plus 12)**	

*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).

1.5 COMPLETION TIME

.1 Tenderer agrees to complete the work within 2 months 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)

_____
Company Address

_____
Telephone No.

_____ _____
Fax No. Seal

*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 00 41 43

This Agreement made on the _____day of _____ in the year_____.

BY AND BETWEEN

Town of Shelburne

hereinafter called the "Owner"

and

[Contractor]

hereinafter called the "Contractor"

The Owner and the Contractor agree as follows:

ARTICLE A1 – THE WORK

.1 The Contractor shall:

.1 Perform the Work required by the Contract Documents for

Tender TOS2025-002: Shelburne Landfill Closure

Site located at 31 Morvan Road, Shelburne, NS, B0T 1W0

for which the Agreement has been signed by the parties, and for which

Dillon Consulting Limited

.2 is acting as and is hereinafter called the “Engineer”

.3 and

do and fulfill everything indicated by this Agreement, and

commence the Work within 2 weeks of project award and attain Ready-for-Takeover of the work as confirmed by the Engineer 2 months following project award.

ARTICLE A2 – AGREEMENTS AND AMENDMENTS

.1 This 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

.1 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.

Standard Specification for Municipal Services listed in Table of Contents Dated 2024.

Tender Form.

Form of Agreement.

Supplementary Specifications.

Drawings:

COVER/ SITE LOCATION

.1 EXISTING CONDITIONS PLAN

.2 PROPOSED CAP

.3 SECTIONS 1 TO 5 AND DETAILS

Addenda

.5 .1

ARTICLE A4 – CONTRACT PRICE

.6 .1 The estimated Contract Price is the sum of the products of the estimated quantities multiplied by the appropriate Unit Prices in the tender form excluding the amount of Harmonized Sales Tax.

.2 The estimated Contract Price is $_____

.3 All amounts shall be in Canadian funds.

.4 The amounts shall be subject to adjustment as provided in the Contract Documents.

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 the 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 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 3.4 of this Article.

.6 To the amount calculated above, the Harmonized Tax shall 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 GC5.6 –SUBSTANTIAL PERFORMANCE OF THE WORK AND PAYMENT OF HOLDBACK.

.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 GC5.7 – 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 GC11.1 - INSURANCE.

.8 If the Owner fails to make payment to the Contractor as it becomes due under the terms of the Contract, interest shall be payable as follows:

The annual interest rate applicable to the contract is 2.0% compounded monthly.

Interest shall be calculated on the overdue balance from the due date.

ARTICLE A6 – RECEIPT OF AND ADDRESSES FOR NOTICES IN WRITING

.1 Notices in writing shall be addressed to the recipient at the address set out below.

.1 .2 The delivery of a notice in writing shall be by hand, courier, prepaid first class mail, facsimile or e-mail.

.3 A notice in writing delivered by one party in accordance with this Contract shall 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 e-mail 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 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 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 Town of Shelburne

162 Mowatt Street, Shelburne, N.S., B0T 1W0

.2 The Contractor at _____

_____

.3 The Engineer at Dillon Consulting Limited

137 Chain Lake Drive, Suite 100, Halifax, Nova Scotia B3S 1B3

ARTICLE A7 – QUANTITIES AND MEASUREMENT

.1 The quantities shown in Section 00 41 43 Tender Form - Schedule of Quantities and Unit Prices are estimated.

.2 Measurement for the actual quantities used to determine payments and Contract Price shall be in accordance with Section 01 22 00 - Measurement and Payment.

ARTICLE A8 – SUCCESSION

.1 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 inure to the benefit of and be binding upon the parties hereto, their respective heirs, legal representatives, successors and assigns.

ARTICLE A9 – RIGHTS AND REMEDIES

.1 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

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

In witness whereof the parties hereto have executed this Agreement and by the hands of their duly authorized representatives.

SIGNED AND DELIVERED

In the presence of:

OWNER

Town of Shelburne
Name of Owner

Witness

Signature

Name and Title of Person Signing

Witness

Signature

Name and Title of Person Signing

CONTRACTOR

Name of Contractor

Witness

Signature

Name and Title of Person Signing

Witness

Signature

Name and Title of Person Signing

N.B. Where legal jurisdiction, local practice or Owner or Contractor requirements calls for 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.

END OF SECTION 00 53 43

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 72 45 – GENERAL CONDITIONS OF THE CIVIL WORK CONTRACT

GC 5.5 APPLICATIONS FOR PROGRESS PAYMENT

.1 Add the following clause:

"5.5.7 Contractor to submit a Statutory Declaration of Progress Payment Distribution by Contractor with each application for progress payment, following the first application for progress payment, verifying that 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."

GC 5.8 - PAYMENT OF HOLDBACK UPON SUBSTANTIAL PERFORMANCE OF THE WORK

.1 Replace Subsection 5.8.1 with the following:

"Holdback monies shall not be released until the Contractor has submitted the following documents, each in a form satisfactory to the Engineer 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 Engineer.

.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 and record survey information.

.2 Delete Subsection 5.8.3.

.3 Replace Subsection 5.8.4 with the following:

"5.8.4 The *Owner* shall make payment to the *Contractor* on account no later than *30 Days* after the date of a certificate for payment issued by the *Engineer*."

.4 Add the following to Subsection 5.8.4:

"A warranty holdback in the amount of two and one half (2.5) percent of the total Contract Price will be retained by the Owner from each progress claim, until the expiry of the twelve (12) month warranty period".

GC 6.4 - CONCEALED OR UNKNOWN CONDITIONS

.1 Delete Subsections 6.4.1, 6.4.2, 6.4.3, and 6.4.4 and replace with the following:

"6.4.1 Utilities of various types as well as infrastructure immediately adjacent to the line of the work have been shown on the Drawings. The locations of these items 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.

6.4.2 The Contractor shall carefully examine the location of the work and make special enquiry of the companies or individuals owning, controlling or operating any services and structures, and determine to their own satisfaction the location of such services and structures. The Contractor shall not make any claims against the Owner for damages or additions to the Work caused or occasioned by his relying upon such information.

6.4.3 The Contractor shall, at their own cost and expense, sustain in their places and protection from injury any and all services, structures or property in the vicinity of his work, whether over or underground, and they shall assume all costs and expenses for damages which may be occasioned by injury to any of them.

6.4.4 If damage of any infrastructure, utility or improvement occurs, even though special precautions have been employed, the Contractor shall be entirely responsible for such damage and all such damage shall be satisfactorily rectified at the Contractor's expense."

GC 6.5 - DELAYS

.1 Add the following Subsection:

"6.5.6 If, in the opinion of the Engineer, the critical path of the project schedule will be adversely affected by delays in completing the work, the Engineer may order the contractor to employ additional labour and equipment or work overtime at no cost to the owner (except when making up time due to delays of the kinds referred to in clause 6.5.1, 6.5.2 and 6.5.3 hereof) to bring the work back on the contract work schedule. Should the Contractor fail to comply with such orders, the owner shall have the right to employ the required labour and equipment and (except when making up time lost due to delays of the kinds referred to in clauses 6.5.1, 6.5.2 and 6.5.3 hereof) deduct the cost of same from any payment then or thereafter due to the contractor."

GC9.5 - CONSTRUCTION SAFETY

.1 Add the following Subsections:

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

3. SECTION 01 00 10 – GENERAL REQUIREMENTS

SUBSECTION 2 - SUMMARY OF WORK

.1 Add the following:

".2 The work to be completed under this contract is the construction of Shelburne Landfill Closure in Shelburne County, NS. It includes but is not limited to the following:

.1 Closure of Shelburne Landfill.

.2 Reinstatement of all disturbed surfaces and services.

.3 All related work and incidentals associated with the above work."

SUBSECTION 5 - EXISTING SITE CONDITIONS

.1 Add the following new Subsection:

".4 Locations of existing buried utilities as indicated on the Drawings, if any, are approximate only. The Contractor is responsible to confirm actual locations of utilities prior to construction."

SUBSECTION 7 - SUBMITTALS, 7.1 - SHOP DRAWINGS

.1 Add new Subsection 7.1.9 as follows:

".9 Submit for review, shop drawings/laboratory testing results for:

.1 Low permeability soil.

.2 All items specified herein that typically require Shop Drawing Submittal."

.2 Subsection 7.2 Samples:

Add the following:
".1 Provide certificates that materials meet the Contract Specifications.
.2 Provide certifications for:
.1

.1 Low permeability soil, vegetative soil."

SUBSECTION 8 - RECORD DRAWINGS

.1 Delete entire Clause and replace with the following:

".8 Record Drawings

.1 The Engineer will provide up to two (2) sets of full-size whiteprints for Record Drawings purposes if requested by the Contractor.

.2 The Contractor is to retain project records for a minimum of five (5) years after substantial performance of the work.

.3 Maintain Project Record Drawings and record accurately significant deviations from Contract Drawings caused by site conditions and changes ordered by the Engineer.

.4 Mark changes in red on one set of whiteprints or digitally.

.5 Record/survey following significant deviations:

.1 depths of various elements of works (low permeability soil, vegetative soil) in relation to geodetic elevation;

.2 field changes of dimensions;

.3 other significant deviations which are concealed in construction and cannot be identified by visual inspection.

.6 At completion of project and prior to final inspection, compile records digitally and submit Record Drawings to the Engineer with final GPS record survey information. Add at each Drawing Title Block Note: "AS-RECORDED".

.7 The data shall be provided to the Engineer in the form of a CAD file and a PDF.

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."

4. SECTION 01 15 00 – MEASUREMENT AND PAYMENT

.1 Replace Section 01150 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: Health and safety, environmental protection, clearing and grubbing, excavation (except rock), shoring, dewatering, bedding, backfilling, compaction and third-party compaction testing, disposal of surplus materials, laboratory testing, marker stakes, reinstatement, and all incidentals to the work.

.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 33 00 "Tender Form" Schedule of Quantities and Unit Prices.

.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 17 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."

.2 SCHEDULE OF QUANTITIES AND UNIT PRICES

.1 Total Tender Price from Schedule of Quantities and Unit Prices

Item includes the Total Tender Price of all tender amounts listed in Schedule of Quantities and Unit Prices

.3 SCHEDULE ITEMS

Mobilization and Demobilization

Unit of Measurement: Lump Sum

Method of Measurement: Fifty percent (50%) of the lump sum value shall be considered complete once the contractor has completed mobilization to the site. The remaining fifty percent (50%) of the lump sum value shall be considered complete once the contractor has demobilization from the site. No additional payment shall be made for partial mobilization, remobilization, or any other related activities.

.2 Item Includes: Mobilization includes all activities and costs associated with transporting personnel, equipment, and materials to the project site, establishing temporary facilities, and preparing for construction. Demobilization includes all activities and costs associated with removing personnel, equipment, materials, and temporary facilities from the project site upon completion of the project.

Site Clearing and Grading

Unit of Measurement: Cubic Metres (m^2) of Material Removal

Method of Measurement: CAD Area

Item Includes: All labour, equipment, material, supply, transportation, including storage, health and safety, removal, disposal and all else required to clear and grade the closure limits of all vegetation, debris, and obstructions to prepare the surface for construction of

the cap. Complete a topographic survey once the Site Clearing and Grading is completed to establish a basis to verify the thickness and volume of material being placed and send the survey report and CSV file to the Engineer.

Grading Layer

Unit of Measurement: Cubic Metres (m^3) of Compacted Material

Method of Measurement: CAD Volume

.3 Item Includes: All labour, equipment, material, supply, transportation, and placement of grading layer material, including health and safety, storage, grading, compaction, quality control testing and all else required to complete the work as specified and/or as shown on the drawings. Complete a topographic survey once the Grading Layer is completed to verify the thickness and volume of material placed and send the survey report and CSV file to the Engineer.

Low Permeability Soil

.4 Unit of Measurement: Cubic Metres (m^3) of Compacted Material

Method of Measurement: CAD Volume

.5 Item Includes: All labour, equipment, material, supply, transportation, placement, and compaction of imported low permeability soil cover material including storage, health and safety, grading to promote positive drainage, confirmation of 90% compaction, and all else required to complete the work as specified and/or as shown on the drawings. Borrow source must be tested a minimum of two times for permeability, grain size distribution, and soil classification and results are to be sent to the Engineer. The material must have a hydraulic conductivity (k) less than or equal to 1 x 10-6 cm/sec and consist of a homogeneous, well-graded, uniformly compacted soil, with particle sizes 75mm and smaller only. third-party laboratory analysis is required prior to placement. Complete a topographic survey once the Low Permeability Layer is completed to verify the thickness and volume of material placed and send the survey report and CSV file to the Engineer.

Vegetative Soil

Unit of Measurement: Cubic Metres (m^3) of Compacted Material

Method of Measurement: CAD Volume

.6 Item Includes: All labour, equipment, material, supply, transportation, and placement of vegetative topsoil material, including health and safety, storage, grading, compaction, quality control testing and all else required to complete the work as specified and/or as shown on the drawings. Vegetative soil product data must be submitted and confirmed by the Engineer. Complete a topographic survey once the Vegetative Soil Layer is completed to verify the thickness and volume of material placed and send the survey report and CSV file to the Engineer

Side Slope Check Dam

Unit of Measurement: Metres (m)

Method of Measurement: CAD Distance

Item Includes: All labour, equipment, material, supply, transportation, and placement of

check dam material, including clear stone, rip rap, geotextile, health and safety, storage, grading, compaction, quality control testing and all else required to complete the work as specified and/or as shown on the drawings. Complete topographic surveys as required to collect sufficient information to verify the thickness and volume of material placed.

Geotextile Wrapped Straw Bales

Unit of Measurement: Metres (m)

Method of Measurement: CAD Distance

.7 Item Includes: All labour, equipment, material, supply, transportation, and placement of geotextile wrapped straw bales, including hay bales, geotextile, stakes, gravel, silt fence, health and safety, storage, grading, compaction, quality control testing and all else required to complete the work as specified and/or as shown on the drawings. Complete topographic surveys as required to collect sufficient information to verify the thickness and volume of material placed.

Hydroseeding

.8 Unit of Measurement: Square Metres (m^2)

Method of Measurement: CAD Area

Item Includes: All equipment, supply, transport, and application of hydroseed, including any dewatering, disposal of water, two applications of fertilizer; one during placement; and the second in the spring of 2026, seed mix, maintenance until established, and all else required to complete the work as specified and/or as shown on the drawings.

.9

Sedimentation and Erosion Control

Unit of Measurement: Lump Sum (LS)

Method of Measurement: No measurement will be made of items specified under this item. Include all costs incidental to the Lump sum price for items under this.

Item Includes: All equipment, labour, and materials to supply, transport and install sedimentation and erosion control features including siltation fencing as indicated and any other controls deemed necessary during the work. Approximately 250m of siltation fencing is required, as specified in the drawings. Prepare and submit an erosion control plan to the Engineer for review and approval prior to commencing work on site. Sedimentation and erosion control features to be installed prior to ground disturbance or placement of soil materials. Sedimentation and erosion control features to remain in good condition until vegetation has been established.

END OF SECTION 00 73 00

PART 1 GENERAL

1.1 REFERENCE STANDARDS

.1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.

.2 Province of Nova Scotia

Occupational Health and Safety Act, S.N.S. - Updated 2013.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit site-specific Health and Safety Plan a minimum of 5 days prior to commencement of Work.

.12 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.

.3 Submit copies of incident and accident reports.

.4 Submit WHMIS MSDS - Material Safety Data Sheets.

.5 Engineer will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 5 days.

.6 Engineer's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.

1.3 FILING OF NOTICE

.1 File Notice of Project with Provincial authorities prior to beginning of Work.

.2 Contractor shall agree to install proper site separation as required and identification in order to maintain time and space at all times throughout life of project.

1.4 SAFETY ASSESSMENT

.1 Perform site specific safety hazard assessment related to project.

1.5 GENERAL REQUIREMENTS

.1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site.

.2 Engineer may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

1.6 RESPONSIBILITY

.1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.

.2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.7 COMPLIANCE REQUIREMENTS

.1 Comply with Occupational Health and Safety Act, Occupational Safety General Regulations, N.S. Reg. 2013.

1.8 UNFORSEEN HAZARDS

.1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province of Nova Scotia and advise Engineer verbally and in writing.

.2 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, advise Engineer and follow procedures in accordance with Acts and Regulations of Province of Nova Scotia and advise verbally and in writing.

1.9 HEALTH AND SAFETY

.1 Contractor responsible for overall site Health and Safety. Site Foreman must:

Have site-related working experience specific to activities.

Have working knowledge of occupational safety and health regulations.

Be responsible for implementing, enforcing and monitoring Contractor’s site-specific Health and Safety Plan.

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1.10 .3 **POSTING OF DOCUMENTS**

.1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province of Nova Scotia.

1.11 CORRECTION OF NON-COMPLIANCE

.1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Engineer.

.2 Provide Engineer with written report of action taken to correct non-compliance of health and safety issues identified.

.3 Engineer may stop Work if non-compliance of health and safety regulations is not corrected.

1.12 BLASTING

.1 Blasting or other use of explosives is not permitted.

1.13 POWDER ACTUATED DEVICES

.1 Use powder actuated devices only after receipt of written permission from Engineer.

1.14 WORK STOPPAGE

.1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

PART 2 PRODUCTS

2.1 NOT USED

PART 3 EXECUTION

3.1 NOT USED

END OF SECTION 01 35 29.06

PART 1 GENERAL

1.1 REFERENCE DOCUMENTS

.1 The latest edition of the following reference documents available prior to tender closing form a part of this specification and are available at Nova Scotia Department of Environment and Climate Change, Fisheries and Oceans Canada, or the Natural Sciences Library of the Department of Natural Resources and Renewables:

Sulphide Bearing Material Disposal Regulations and Guidelines for Development on Slates in Nova Scotia.

Nova Scotia Watercourse Alterations Standard, as amended from time to time.

.1 Fisheries and Oceans Canada: Interim code of practice: End-of-pipe fish protection screens for small water intakes in freshwater.

.2 Nova Scotia Department of Environment and Climate Change: Pit and Quarry Guidelines.

.3 Nova Scotia Department of Environment and Climate Change: Construction and Demolition Debris Disposal Site Guidelines.

.4 Nova Scotia Department of Environment and Climate Change: Guidelines for the Application and Removal of Structural Steel Protective Coatings.

.5 Nova Scotia Department of Environment and Climate Change: Erosion and Sedimentation Control Handbook for Construction Sites.

.6 Activities Designation Regulations.

.7 Nova Scotia Wetland Conservation Policy.

.8 Nova Scotia Department of Environment and Climate Change: Storm Drainage Works Approval Policy.

.9

.10

.12 Additional Reference Documents

.1 Project-specific Environmental Protection Plan (EPP), where applicable.

.2 Canadian Landscape Standards (CLS) Section 3, Site Preparation and Protection of Existing Site Elements.

1.2 DISPOSAL OF WASTES

.1 Dispose of rubbish and waste materials at authorized site in accordance with local solid waste requirements.

.2 Do not dispose of waste, volatile, or deleterious materials into watercourses, wetlands, storm or sanitary sewers.

1.3 DRAINAGE

.1 Do not pump or drain water containing suspended materials directly into watercourses, wetlands, sewer, or drainage systems.

.2 Control disposal or runoff of water containing suspended materials or other deleterious substances with use of siltation fences, sedimentation ponds, diversion ditches, silt curtains, sedimentation blankets, slope stabilization, and other best management practices, all in accordance with applicable environmental regulations, and required permits or approvals.

1.4 WORK IN OR ADJACENT TO WETLANDS AND WATERCOURSES

.1 Do not operate construction equipment in or adjacent to watercourses or wetlands, or alter or draw water from a watercourse or wetland without first consulting with the Department of Environment and Climate Change, and/or obtaining necessary permits or approvals.

.2 Do not use watercourse beds or banks for borrow material.

.3 Do not dump excavated fill, waste material or debris into watercourses or wetlands.

.4 Design and construct temporary crossings to minimize erosion and sedimentation to watercourses or wetlands.

.5 Do not skid logs or construction materials across watercourses or wetlands.

.6 Avoid spawning beds when constructing temporary crossings of watercourses.

.7 Do not blast near/under watercourses or wetlands without obtaining necessary permits and/or approvals.

.8 Provide a buffer zone in combination with appropriate erosion and sediment control when working adjacent to watercourses and wetlands. Consult with associated regulatory agencies.

1.5 POLLUTION CONTROL

.1 Prior to the commencement of Work, prepare an Environmental Protection Plan to prevent/minimize the Project's environmental footprint and develop a contingency plan which addresses procedures to follow in the event of an environmental incident and ensure all staff are familiar with these plans and procedures. Provide copy of Environmental Protection Plan to the Owner. Keep a copy of the Environmental Protection Plan on site for staff reference.

.2 Immediately report any environmental emergency, such as the spill of a contaminant, to Environmental Emergency Contact at 1-800-565-1633.

.3 Maintain temporary erosion and sediment control and pollution control measures until final site stabilization. Remove temporary erosion and sediment control and pollution control measures prior to project completion unless directed otherwise.

.4 Control emissions from equipment to requirements of authorities having jurisdiction.

.5 Provide temporary enclosures to protect environment from effects of abrasive blasting.

.6 Cover or wet down dry materials and rubbish to prevent blowing dust and debris, and appropriately address associated control waste.

.7 Keep paved surfaces clean. Control dust by application of calcium chloride, magnesium chloride, or water, and appropriately address dust control waste.

1.6 PERMITS AND APPROVALS

.1 Obtain copies of any permits and/or approvals issued by approving agencies. Review and comply with all terms and/or conditions contained in permit and/or approval.

.2 Where permits or approvals associated with environment protection are required and not obtained at time of bidding, obtain permits or approvals specified in the Project Documents. The Activities Designation Regulations made under the Nova Scotia Environment Act list all activities which require approval from or notification to Nova Scotia Department of Environment and Climate Change.

.3 Make all staff and subcontractors familiar with all standards and terms and/or conditions of any permit and/or approval issued. Keep a copy of all permits and approvals on site.

END OF SECTION 01 57 00

PART 1 GENERAL

1.1 DESCRIPTION

.1 This Section specifies requirements for rough and final grading.

1.2 SITE CONDITIONS

.1 Known underground and surface utility lines and buried objects are indicated on the drawings.

1.3 PROTECTION

.1 Prevent damage to trees, natural features, landscaping surface or underground utility lines, piping, manholes and benchmarks. Make good any damage.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Low permeability soil

.1 The material shall have a hydraulic conductivity (k) less than or equal to 1×10^{-6} cm/sec and consist of a homogeneous, well-graded, uniformly compacted soil, with particle sizes 75mm and smaller only. Two third-party laboratory analysis (e.g., falling head permeability test and sieve analysis) is required prior to placement.

.2 Vegetative Soil

.1 Material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding. The material shall consist of a homogeneous, uniform soil free of toxic materials, stones and roots over 50mm in diameter.

PART 3 EXECUTION

3.1 GRADING

.1 Rough grade to levels, profiles and contours allowing for surface treatment as indicated.

.2 Grade ditches and swales to depth as indicated.

.3 Prior to placing fill over existing ground, scarify surface to depth of 50 mm. Moisture content of fill and existing surface to be approximately the same to facilitate bonding.

.4 Compact low permeability soil to 98 per cent Standard Proctor Density. Place material in maximum compacted lifts of 375 mm. Third-party compaction testing required at minimum frequency of 1 test per 1,000 m^2.

.5 Do not disturb soil within branch spread of trees or shrubs to remain.

3.2 SURPLUS MATERIAL

.1 Remove surplus material as directed.

.2 Remove material unsuitable for fill, grading or landscaping as directed.

END OF SECTION 02 21 00

PART 1 GENERAL

1.1 WORK INCLUDED

.1 This section specifies requirements for clearing, grubbing, and disposal.

1.2 RELATED SECTIONS

.1 Environmental Protection: Section 01 57 00

.2 Erosion and Sediment Control: Section 31 15 53

.3 Earthwork: Section 31 20 00

1.3 DEFINITIONS

.1 Clearing: cutting, chipping, and disposal of all designated trees and brush within rights-of-way and other areas as indicated including felled trees, previously up-rooted trees, and surface debris.

.2 Grubbing: excavation and disposal, removal of all stumps, roots, embedded timber, rock fragment, humus, root mat, topsoil, and grass surfaces.

PART 2 PRODUCTS

2.1 NOT USED

.1 Not applicable.

PART 3 EXECUTION

3.1 GENERAL

.1 Obtain permits and/or approvals as required by the authorities having jurisdiction.

.2 Comply with terms and/or conditions of permits and/or approvals.

.3 Do not remove trees or brush from outside limits indicated except for any tree or branch considered unsafe.

.4 Cut trees and brush close to ground leaving no stump higher than 300 mm.

.5 In absence of directions provided either by a geotechnical report or the Project Drawing, remove grubbings to not less than 200 mm below existing ground surface to a maximum of 300 mm.

.6 Grub out visible rock fragments and boulders, greater than 300 mm in any dimension, but less than 0.25 m^3.

3.2 REMOVAL AND DISPOSAL

.1 Remove cleared and grubbed material off-site unless permitted otherwise in writing.

.2 If permitted by Owner, bury in designated areas only. Consolidate and cover with soil and finish surface as shown on the Project Drawings.

.3 Do not burn cleared and grubbed material unless permitted by the authorities having jurisdiction.

.4 If permitted, chip or mulch and stockpile or spread vegetation matter on-site as directed. Dispose of surplus chips off-site at an Engineer approved location.

.5 In areas designated as quarantined by the Canadian Food Inspection Agency (CFIA), comply with all CFIA requirements.

3.3 FINISHED SURFACES

.1 Leave ground surface in condition suitable for immediate grading operation.

END OF SECTION 31 10 00

PART 1 GENERAL

1.1 GENERAL

.1 Prior to construction provide erosion prevention and sediment control measures where required by the project Erosion and Sediment Control Plan, or as directed by the Engineer. Co-ordinate locations with the Engineer as required.

.2 When specified in the project documents, Contractor is to develop a site-specific erosion and sediment control (ESC) plan. Prepare the ESC plan in accordance with the Nova Scotia Department of Environment and Climate Change: Erosion and Sedimentation Control Handbook for Construction Sites, in addition to any specified local requirements.

.3 Maintain erosion prevention and sediment control measures for the duration of the Work. Do not remove any measures until authorized by the Engineer.

.4 All staff and subcontractors to be familiar with the ESC plan, and/or locations and maintenance measures for all ESC measures. Document and keep records of associated ESC maintenance through the duration of the Work, if specified by the project documents.

1.2 REFERENCE DOCUMENTS

.1 Nova Scotia Department of Environment and Climate Change: Erosion and Sedimentation Control Handbook for Construction Sites.

.2 ASTM E449-18, Test Methods for Analysis of Calcium Chloride.

.3 CAN/CGSB 15.1-92, Calcium Chloride.

.4 CSA W208:20, Erosion and Sediment Control Installation and Maintenance.

.5 CAN/CSA-W202-18, Erosion and Sediment Control Inspection and Monitoring.

PART 2 PRODUCTS

2.1 SEDIMENT CONTROL FENCE

.1 Sediment Control fence: preassembled sediment control fence with industrial woven geotextile fabric pre-stapled to wood posts spaced as indicated.

2.2 SEDIMENT CONTROL BERM

.1 Geotextile: non-woven, needle-punched polyester filter fabric.

.2 Construct sediment control berms to the cross sections indicated on the Project Documents.

2.3 .1 SILT CURTAIN

.1 High strength woven geotextile, UV protected, floating boom.

2.4 DUST CONTROL AGENT

.1 Materials:

Calcium chloride, Type I, to CAN/CGSB 15.1, flake, 35% aqueous solution. Magnesium chloride: magnesium liquid meeting the following:

Component	Minimum	Maximum
MgCl2	28	32
Ph	4 to 6	
Specific Gravity	1.29 to 1.3 g/mL	

Solution to contain minimum required percentage by mass concentration of MgCl2 in accordance with ASTM A449.

.2 Water: to Engineer's approval.

PART 3 EXECUTION

3.1 TEMPORARY SOIL COVERS

.1 If blown straw or hay is used as temporary soil cover, provide 100% cover to minimize soil erosion.

.2 Where blown straw or hay is used as mulch to protect new seeding, control the thickness of the application to avoid smothering of the seed. If used in lieu of environmental blanket, uniformly apply straw and hay blown onto the seeded areas. Thickness depends on site conditions, seed mix, slope, and soil type.

3.2 SEDIMENT CONTROL FENCE

.1 Excavate 100 mm x 100 mm trench along length of fence or as indicated by Project Documents. Lay fabric bottom in trench and backfill with selected excavated material.

3.3 MAINTENANCE OF EROSION PREVENTION AND SEDIMENT CONTROL MEASURES

.1 Inspect and monitor erosion and sediment control measures in accordance with CSA W202.

.2 Maintain erosion and sediment control measures in accordance with CSA W208.

.3 Maintain erosion prevention and sediment control measures throughout the construction period. Repair damage to original condition.

.4 Remove accumulated sediment from behind silt fence. Remove flow check berms when and as directed by Engineer.

.5 Maintain vertical alignment of silt fence such that it is always plumb and straight.

3.4 DRAINAGE

.1 Do not pump or drain water containing suspended materials into watercourses, sewer, or drainage systems.

3.5 CATCH BASIN FILTRATION

.1 Install sediment traps on all existing catch basins to prevent sediment from entering stormwater system.

3.6 DUST CONTROL AGENT

.1 Deliver approved dust control agent to site in moisture-proof bags. Indicate name of manufacturer, name of product, net weight or mass and percentage of dust control agent guaranteed by manufacturer.

.2 Store bags of dust control agent in weather-proof enclosures.

.3 Apply dust control agent or water for alleviation and prevention of dust nuisance caused by equipment and traffic movement when directed by Engineer.

.4 Apply dust control agent or water with equipment approved by Engineer, at a rate and in locations approved by Engineer.

.5 Apply water in areas where use of other dust control agent is not permitted. Use distributors equipped with spray system that will promote uniform application and with means of shut-off.

.6 Dust control waste to be appropriately disposed of. Waste from dust control measures is not to enter a watercourse or wetland.

END OF SECTION 31 15 53

PART 1 GENERAL

1.1 WORK INCLUDED

.1 This section specifies requirements for all earthwork operations. Work includes supply of products, excavating, bedding, backfilling, compacting, shoring, dewatering, and disposal of unsuitable and surplus material.

1.2 RELATED SECTIONS

.1 Environmental Protection: Section 01 57 00

.2 Standard Details: Section 39 00 00

1.3 REFERENCE STANDARDS

.1 ASTM C127-15, Standard Test Method for Relative Density (Specific Gravity) and Absorption of Coarse Aggregate.

.2 ASTM C131/C131M-20, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

.3 ASTM D698-12(R2021), Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3)).

.4 ASTM D4253-16E1, Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.

.5 ASTM D4254-16, Test Method for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.

.6 CAN/CSA A23.1:19/A23.2:19, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard for Concrete.

.7 Nova Scotia Department of Transportation and Public Works - Standard Specification - Highway Construction and Maintenance.

1.4 DEFINITIONS

.1 Rock: material which requires drilling, blasting, ripping or breaking up with power-operated tools for its removal, and boulders and pieces of concrete exceeding volume limits below. Frozen material will not be classified as rock.

Volume limits:

.1 Trench excavation: 0.5 m^3

.2 Mass excavation: 1.0 m^3

.2 Topsoil: soil capable of supporting good vegetative growth and suitable for use in top dressing and landscaping.

.3 Borrow: well-graded material originating from approved off-site sources meeting the specification for Selected Backfill.

.4 Common: in situ excavated soil which is not rock, unsuitable, or topsoil, and meeting the specification for Selected Backfill.

.5 Unsuitable material: all material which is not suitable for use in work and must be disposed of.

.6 Contaminated Material: material with exceedances of Provincial and CCME (Canadian Council of Ministers of the Environment) Soil Quality Guidelines and requiring management as mandated by this guideline.

.7 Surplus material: excavated material not required for reuse.

.8 Subgrade: the surface of mass excavation and embankment finished to lines and elevations indicated.

1.5 SUBMITTALS

.1 Submit samples, sieve analysis and mix design in accordance with Section 01 10 00 for items listed in Supplementary Specifications.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Selected Backfill: common which is free from: stumps, trees, roots, sod, organics; rocks, boulders, and masonry larger than 200 mm in any dimension; and other deleterious materials.

.2 Sand: hard, granular, sharp material; well-graded from coarse to fine; free of impurities, chemicals, or organic matter; and graded as follows:

Sieve Designation	Percent Passing
5 mm	100
0.16 mm	0-5

.3 Clear Stone: crushed and screened, hard, durable stone, free from clay and organic matter, and graded as follows:

Sieve Size (µm)	Percent Passing				
	C1	C2	C3 (Surge)	C4	C5
250 000	100				
190 000		100	100		
150 000	20-35	90-100	90-100		
125 000		30-50	40-60		
100 000		0-8	12-30	100	
90 000					
75 000			0-19	85-100	
50 000	0-10				
31 500				10-20	
25 000				0-8	100
19 000			0-10		85-100
9 500					0-40
4 750					0-10

.4 Gravels: crushed and screened pit gravel or crushed and screened rock. Material shall consist of hard and durable stone particles. Gradation shall be dense, well graded and as follows:

Sieve Size (µm)	Percent Passing			
	Type 1	Type 1S	Type 2	Type M
75 000			100	
63 000				
50 000			65-68	
37 500				
31 500				
25 000	100	100	48-78	100
19 000	90-100	98-100		85-100
16 000				
12 500	48-82(3)	48-85	33-63	65-90
9 500				
4 750	20-50	30-55	20-50	30-60
2 360				

Sieve Size (µm)	Percent Passing			
	Type 1	Type 1S	Type 2	Type M
1 180				15-35
600				
300				
150	5-12	7-20(2)	3-10	5-12
75	3-8(1)	5-12(2)	0-7(1)	3-8

(1) For gravel sources not classified as quarries, the allowable percentage passing the 75 µm sieve shall be 3 to 5%.

(2) Where percentages passing the 4 750 µm sieve are between 30 and 45%, the allowable percentage passing the 75 µm sieve shall be 3 to 12% and the allowable percentage passing the 150 µm sieve shall be 5 to 20%.

(3) For gravel sources classified as quarries, the allowable percentage passing the 12,500 µm sieve shall be 50 to 90%.

.5 Crusher Dust: hard, durable, crushed stone particles free from clay lumps, cementation, organic material, frozen material and other deleterious materials, graded as follows:

Sieve Size (µm)	Percent Passing
9 500	100
4 750	50-100
2 000	30-65
425	10-30
75	5-50

.6 Unshrinkable fill: proportioned and mixed to provide:

.1 Maximum compressive strength of 1.0 MPa at 28 days.

.2 Portland cement content of 25 kg/m^3.

.3 Minimum strength of 0.07 MPa at 24 h.

.4 Concrete aggregates: to CAN/CSA A23.1.

.5 Portland cement: Type GU or GU-L.

.6 Slump: 150 mm minimum.

.7 Armour Stone: hard, durable, field or quarry stone, free from splits, seams or defects likely to impair its soundness during handling or by the actions of water and ice. Shale, slate, or rocks with thin foliations are not acceptable. The greatest dimension of each rock must not exceed two times the least dimension. Minimum density of rock to be 2,650 kg/m^3. Physical properties to be as follows:

Property	Test Method	Armour Stone
Absorption, % Maximum	ASTM C127	1.5
Los Angeles Abrasion,	ASTM C131	35
% Maximum		

Size (mm)	Percent Passing	
	R1	R2
1 050	100	
850		100
650	0-50	
550		0-50
300	0-15	
230		0-15

.8 Riprap: hard, dense (with specific gravity not less than 2.65), non-ore bearing, non-toxic to aquatic life, durable quarry stone, free from seams, cracks, or other structural defects, to meet the following size distribution for use intended:

Class 1: at least 70% of the riprap material shall be between 200 mm and 450 mm.

Class 2: at least 70% of the riprap material shall be between 300 mm and 760 mm.

Class 3: at least 70% of the riprap materials shall be between 500 mm and 1200 mm.

.9 Pipe bedding and backfill: as specified in the Project Documents.

.10 Lumber: construction grade stamped by Maritime Lumber Bureau or approved equal.

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PART 3 EXECUTION

3.1 EXCAVATION

.1 Excavate all types of materials to lines and elevations indicated and as necessary for construction.

.2 Notify the Engineer if in doubt as to definition of material before material is excavated.

.3 When rock is encountered, notify the Engineer for measurement.

Where unknown rock is encountered, refer to Section 00 72 45 General Condition 6.4.

.14 Select method of excavation, support, and dewatering unless otherwise indicated or directed. Protect property and structures from damage.

.5 Cut paved surfaces in straight lines.

.6 Extend excavations sufficient distance from footings and walls to allow placing and removal of forms and for placing backfill materials indicated.

.7 Prepare trench bottom so pipe can be laid to required line and grade. Remove any boulders or rock within theoretical trench payment area as shown in Section 39 00 00 – Standard Detail 01 22 00-01.

.8 Handle materials in a manner that will not endanger the public, personnel, property, or the work. Do not reduce sight distances or obstruct roadways or utilities. Do not obstruct flow of surface drainage or natural watercourses.

.9 Protect granular material from the elements.

.10 Stockpile materials a sufficient distance from excavations in such manner to prevent side failure or bottom uplift.

.11 Replace over excavation of trench bottom with selected site material, granular material, or unshrinkable fill as directed.

.12 Refer to subsection 3.3 herein for excavation of unsuitable and contaminated material.

3.2 TOPSOIL EXCAVATION

.1 Strip topsoil to limits and depth indicated or directed by the Engineer.

.2 Stockpile in designated areas or dispose as directed. Minimize loss and wastage.

3.3 UNSUITABLE OR CONTAMINATED EXCAVATION

.1 Where contaminated material is suspected within the limits of excavation, refer to the Owner and Engineer for testing.

.2 When contaminated material is confirmed by testing notify the Engineer for measurement and assist in investigation to determine depth and type of material. Isolate area to minimize entry of water into excavation.

.3 When unsuitable material is encountered notify the Engineer for measurement and assist in investigation to determine depth and type of material.

.4 Excavate unsuitable or contaminated material to extent directed. Handle unsuitable or contaminated material without impacting suitable material on site.

.5 Dispose of contaminated material at a facility as mandated by Provincial and CCME (Canadian Council of Ministers of the Environment) Soil Quality Guidelines and as approved by the Engineer.

.6 Notify the Engineer whenever unsuitable material is encountered, remove to depth and extent directed.

If such Work is due to nature of soil, the Engineer and Contractor will jointly measure work for payment.

If such Work is due to any act or fault of Contractor, remedial work is responsibility of Contractor.

.1 If such Work is required, refer to Section 00 72 45 General Condition 6.4.

.2 .7 Dispose of unsuitable, contaminated, or surplus materials off site unless otherwise indicated by the Project Documents.

.3

3.4 BLASTING

.1 Obtain appropriate permits before proceeding with blasting.

.2 Conduct blasting operations in accordance with the Nova Scotia Occupational Safety Act and NS Blasting Safety Regulations.

.3 Conduct blasting with all possible care to avoid injury to persons and property.

3.5 SUPPORT OF EXCAVATION

.1 Install and maintain shoring and underpinning as required by the Nova Scotia Occupational Health and Safety General Regulations.

.2 When support of excavation is required, use a shielding and shoring system conforming to the Nova Scotia Occupational Health and Safety General Regulations or engage services of a professional engineer licensed to practice in the Province of Nova Scotia to design shoring and inspect its installation.

.3 Provide record copy of drawings signed and sealed by professional engineer responsible for their preparation.

3.6 DEWATERING

.1 Keep bottom of excavation free of water by draining or pumping.

.2 Dewater excavation in a manner which will not endanger stability of the work.

.3 Dispose of water from excavation in accordance with Section 01 57 00 - Environmental Protection, and in a manner that is not injurious to property, public health, or any operation of the work.

.4 Take precautions to prevent uplift of pipe or structures.

.5 Prior to draining water from excavation into sewer, obtain permission from regulatory authorities having jurisdiction.

3.7 BEDDING AND BACKFILLING

.1 Remove all timber, snow, ice, frozen material, and debris from excavation before backfilling. Allow Engineer to inspect excavation prior to backfilling work.

.2 Backfill with materials indicated.

.3 Place and compact foundation layer of bedding to depth indicated, shaped to provide uniform support to pipe and structures.

.4 After installation of pipe, place and compact bedding material in 150 mm layers to horizontal centreline of pipe.

.5 Place and compact remaining bedding material to depth indicated above the top of pipe before further compaction.

.6 Complete backfilling by placing and compacting material indicated in 300 mm layers. Bring backfill up evenly around structures.

.7 Compact all materials to 95% Standard Proctor Density with the following exceptions:

Top 300 mm below subgrade to 98% Standard Proctor Density.

Gravel under asphalt or concrete paved surface to 100% Standard Proctor Density.

Clear Stone to 70% Relative Density.

.1 .2 .3 .8 Density Tests: Standard Proctor in accordance with Method B, ASTM D698. Relative Density in accordance with ASTM D4253 and D4254.

.9 Control moisture content of backfill materials so that specified compaction may be obtained.

.10 Place unshrinkable fill in areas as indicated. Consolidate and level unshrinkable fill with internal vibrators.

.11 In areas of pedestrian and vehicular traffic, maintain surfaces level with existing surface until reinstatement.

3.8 BACKFILLING STRUCTURES

.1 After installation of foundations, clean excavations of trash and debris. Backfill to consist of Selected Backfill material unless otherwise indicated. Place material to meet following requirements and approval of the Engineer.

.1 Place backfill in horizontal layers not more than 300 mm deep.

.2 Compact each layer using rollers, mechanical tampers, or other suitable equipment to obtain a density of not less than 98% Standard Proctor density.

3.9 MASS EXCAVATION AND EMBANKMENT

.1 Establish with the Engineer lead time required to take measurements. Notify the Engineer in accordance with agreed lead time.

.2 Excavate and place fill to lines and grades indicated.

.3 Maintain crowns and cross slopes to provide surface drainage.

.4 When rock or unsuitable material is encountered, notify the Engineer for measurement.

.5 Break rock to a depth 300 mm below subgrade. Excavate broken rock to subgrade or as indicated by the Project Documents. Remove loose rock fragments from slopes.

.6 Remove existing pavement encountered within 300 mm of subgrade elevation.

.7 Do not place material which is frozen or place material on frozen surfaces unless approved by the Engineer.

.8 When constructing embankment with common material place in uniform layers to full width of embankment. Compact to 95% Standard Proctor Density throughout full width and depth. Maximum rock size: 65% of compacted lift thickness.

.9 When constructing embankment with rock fill, place to full width of embankment in layers of sufficient depth to contain maximum sized rocks, but in no case is thickness to exceed 1 metre. Fill

interstices with rock fragments or earth to form compact mass. Fill voids at subgrade level to prevent migration of fine material.

.10 Top 300 mm of subgrade to be free of boulders or broken rock fragments with dimensions greater than 200 mm.

.11 Shape and compact material to within 40 mm of design subgrade elevation, but not uniformly high or low.

.12 Finish side slopes uniformly to lines and elevations indicated. Remove boulders encountered in cut slopes and fill the resulting voids.

3.10 BREAKING ROCK WITHOUT REMOVAL

.1 Break rock without removal to lines and grades indicated.

.2 Break rock below street subgrade such that maximum dimension of rock fragments within 300 mm of subgrade is 200 mm.

.3 Break rock for future removal as follows:

.1 Mass: maximum size of 90 percent of volume of rock broken is less than 0.5 cubic metre with no fragments exceeding one cubic metre.

.2 Trench: maximum size of 90 percent of volume of rock broken is less than 0.3 cubic metre with no fragments exceeding 0.5 cubic metre.

.4 Excavate broken rock to depth indicated at test locations selected by the Engineer in accordance with following criteria:

.1 Mass: one test hole for each 1000 square metres of surface area with a minimum of one test hole in each location.

.2 Trench: one test hole for each 30 metres along trench with a minimum of one test hole at each separate trench.

.5 Should test excavation indicate that breaking techniques do not give required results, do remedial work.

.6 Backfill test excavations after inspection using excavated materials.

3.11 ROAD GRAVELS

.1 Prior to placing gravels, compact top 300 mm to 98% Standard Proctor Density and proof-roll in accordance with the Project Documents.

.2 Place gravels in uniform layers not exceeding 200 mm to thickness indicated. Grade intermediate gravel courses to within 30 mm of elevations and cross-sections indicated, but not uniformly high or low. Compact to 100% Standard Proctor Density.

.3 Before the placement of new material, proof roll the lowest material type by means of a fully loaded tandem dump truck (20 t gross weight). Remove all unsuitable material, as observed by the Engineer, and replace with suitable material.

END OF SECTION 31 20 00

PART 1 GENERAL

1.1 WORK INCLUDED

.1 This section specifies requirements for preparation of subgrade, provision, placement, and fine grading of topsoil for seeded and sodded lawn areas, planting beds, individual planting pits and underground structural soil (non-compressible soil) placement for trees to be grown in pavement areas. Work includes supply and placement of materials, complete with all related components and accessories.

1.2 RELATED SECTIONS

.1 Environmental Protection: Section 01 57 00

.2 Clearing and Grubbing: Section 31 10 00

.3 Earthwork: Section 31 20 00

.4 Protection of Existing Trees: Section 32 91 10

.5 Seeding and Sodding: Section 32 92 00

1.3 REFERENCE STANDARDS

.1 Canadian Nursery Landscape Association – Canadian Standards for Nursery Stock – current edition.

.2 Cornell University (CU)-Soil standards or equivalent.

.3 Canadian Council of Ministers of the Environment, 2005; Guidelines for Compost Quality. ISBN 1-896997-60-0; Canadian Council of Ministers of the Environment.

.4 Agriculture and Agri Food Canada; The Canadian System of Soil Classification, current edition.

.5 Canadian Landscape Standard Section 6 Growing Medium – current edition.

1.4 SOURCE QUALITY CONTROL

.1 Inform Engineer of proposed source of topsoil to be supplied. Conduct topsoil sampling according to NS Department of Agriculture standard recommendations.

.2 Arrange to have topsoil tested. Testing to be carried out by Nova Scotia Department of Agriculture laboratory or other approved laboratory.

.3 Test topsoil from source prior to stripping and stockpiling. Test for clay, sand and silt, coarse fragments, particle size, nitrogen (N), phosphorus (P), potassium (K), magnesium (Mg) and organic matter.

.4 Perform pH test to determine acidity or alkalinity and required treatment to bring pH value of soil as indicated in Project Documents. Test stockpiled soil after it has been spread in place.

.5 Submit soil analysis to Engineer and provide recommendations for corrections.

.6 Implement approved recommendations as required.

1.5 DELIVERY, STORAGE AND PROTECTION

.1 Schedule deliveries to minimize storage at job site without causing delays.

.2 Protect newly graded and filled areas from washouts and settlements caused by rain and water damage. Fill and grade settled or washed out areas to required levels and slopes as specified.

1.6 SCHEDULING

.1 Schedule topsoiling and finish grading operations to coincide with seeding, sodding, and planting operations.

1.7 SAMPLES

.1 Submit samples in accordance with Section 01 10 00 for items listed in Supplementary Specifications.

PART 2 PRODUCTS

2.1 LANDSCAPE FILL

.1 Site excavated material, or selected material from excavation or other sources, unfrozen, free from rocks, roots larger than 75 mm maximum dimension, sods, debris, or other deleterious materials, as approved by Engineer.

2.2 TOPSOIL

.1 Imported, manufactured or site prepared from friable loam that is neither heavy clay nor of very light sandy in nature, free from debris, vegetation, toxic materials and stones and roots over 50 mm maximum dimension and any other deleterious materials that might inhibit plant growth and development. Limit the organic matter to a maximum of 20% by volume.

.2 Topsoil to be rated to Canadian System for Soil Classification. Refer to soil rating chart in Clause 2.2.3. B class soil is recommended as a minimum for sodded areas and an A class soil is recommended for seeded areas, or as specified in the Project Documents. Improve manufactured topsoil or topsoil derived from site sources as necessary to meet topsoil qualifications above.

.13 Topsoil Suitability – Standard Topsoil Triangle:

This rating indicates the kind and severity of limitations if the soil is used without corrective measures to grow “normal” landscaping stock (i.e., excluded rhododendrons, blueberries, and other plants with special soil requirements). It does not account for socio-economic factors such as markets or accessibility that make some materials desirable for development regardless of related development costs.

.2

The degree of limitation or soil suitability is determined by the most restrictive (least suitable) rating assigned to any of the listed soil properties. The cumulative effect of individual soil properties may act to further downgrade a soil.

	Rating			
Soil Class	A	B	C	D
pH	6-7.5	5-7.5	4-7.5	4-7.5
Organic Matter	4.0-8.0	2.0-8.0	1.0-8.0	u/a
Coarse Fragments	<5%	<10%	<20%	20-50 %

Definitions:

pH: as measured in water.

Organic Matter: Walkley Black method or equivalent (% by weight).

Coarse Fragments: Particles over 2 mm in diameter (% by volume).

2.3 NON-COMPRESSIBLE SOIL

.1 Non-compressible soil to be comprised of stone, soil and organics for the purpose of meeting load-bearing engineering requirements for travel ways while at the same time meeting requirements for plant growth and development. Stone structural component must provide stability and non-compressible interconnected voids for root penetration and air and water movement. Soil

component must provide water and nutrient-holding capacity. Organic component must provide water and nutrient-holding capacity and encourage beneficial microbial activity.

.2 Properties of Non-compressible soil:

Stone	75%	20 mm-40 mm uniformly graded, angular
Soil	20%	clay loam or loam with 20% clay
Organics	2-5%	

2.4 MANURE

.1 Well-rotted, unleached livestock manure, not less than eight (8) months or more than two (2) years old, free of harmful chemicals and substances, containing no more than 25% straw, leaves or other materials unsuitable for planting use.

2.5 PEAT MOSS

.1 Derived from partially decomposed fibrous or cellular stems and leaves of species of sphagnum mosses.

.2 Elastic and homogeneous; brown in colour.

.3 Free of wood and deleterious material which could inhibit growth.

.4 Shredded particle minimum size 5 mm.

2.6 BONE MEAL

.1 Raw bone meal, finely ground with a minimum analysis of 2% nitrogen and 20% phosphoric acid.

2.7 FERTILIZER

.1 Ground agricultural limestone containing minimum 85% of total carbonates.

.2 Fertilizer analysis for hydroseeding areas, sodding areas and planting areas as determined from soil sample test.

2.8 LIMESTONE

.1 Mechanically mix: nine (9) parts topsoil with one (1) part well-rotted manure, compost or peat moss.

.2 Gradation requirements: percentage passing by weight, 90% passing 1.0 mm sieve, 50% passing 0.125 mm sieve.

.1
2.9 .2 **PLANTING SOIL MIXTURE**

.1 Mechanically mix: nine (9) parts topsoil with one (1) part well-rotted manure, compost or peat moss.

Incorporate bone meal at rate of 3 kg bone meal per cu. m.

Incorporate fertilizer at rate determined by soil sample test.

2.10 COMPOST

.1 Mixture of soil and decomposing organic matter containing 40% by volume, or more organic matter as determined by the LOI test or its equivalent under the Walkley-Black test.

.2 Product must be sufficiently decomposed (i.e., stable) so that any further decomposition does not adversely affect plant growth C:N ratio below 25:50, and contain no toxic or growth inhibiting contaminates.

.3 Composted bio-solids must meet the requirements of the guidelines for Compost Quality, Category (A), produced by the Canadian Council of the Ministers of the Environment (CCME).

PART 3 EXECUTION

3.1 PREPARATION OF EXISTING GRADE FOR SEEDING, SODDING AND PLANTING

.1 Where required, raise subgrade to rough grade levels with landscape fill, deposit in layers not exceeding 200 mm. Compact each layer to minimum 95% Standard Proctor Density.

.2 Verify subgrade elevations are correct.

.3 Grade soil. Eliminate uneven areas and low spots to provide positive drainage.

.4 Cultivate entire area which is to receive topsoil, where practical, to a depth of 100 mm. Repeat cultivation in those areas where equipment used for hauling and spreading has compacted the soil.

.5 Remove surface debris, roots, vegetation, branches, and stones in excess of 50 mm in diameter.

3.2 PREPARATION OF LAWN AREAS AND PLANTING BEDS

.1 Establish subgrade for lawn areas, planting beds and planting pits.

.2 Excavate or fill, and rough grade to the following depths below finished grades:

150 mm for sodded areas after compaction.

150 mm for seeded areas after compaction.

.1 500 mm minimum for planting beds.

.2 500 mm minimum deep and 1000 mm minimum diameter for individual tree planting pits to ensure minimum 300 mm planting soil around rootball as specified in Section 32 90 00.

.3

.4

3.3 PLACING TOPSOIL

.1 Do not spread approved topsoil until subgrade has been approved by the Engineer.

.2 Spread planting soil mixture with adequate moisture in uniform layers over approved, unfrozen subgrade where planting is indicated.

.3 Place topsoil to the depths indicated in Clause 3.3, and as per Section 32 90 00, Planting of Trees, Shrubs, and Groundcover for individual plant pits.

.4 Lightly compact topsoil. Keep topsoil 25 mm below finished grade for sodded areas. For seeded areas, bring topsoil to finished grade.

3.4 SOIL AMENDMENTS

.1 Apply lime or other soil amendments at specified rate as determined by soil sample test.

.2 Mix soil amendment well into full depth of topsoil prior to fertilizer application.

3.5 FERTILIZER

.1 Fertilizer type and rate of application to be determined from soil test and approved by the Engineer.

.2 Spread fertilizer uniformly over entire area of topsoil.

3.6 FINISH GRADING

.1 Fine grade entire topsoil area to contours and elevations as indicated or directed. Eliminate rough spots and low areas to ensure positive drainage.

.2 Prepare loose friable bed by means of raking prior to sodding.

.3 Leave surface smooth, uniform, and firm against deep foot printing, with a fine loose texture using approved equipment.

3.7 PLACEMENT OF NON-COMPRESSIBLE SOILS

.1 Follow CU-Soil standard specifications for subgrade preparation for areas of trees to be grown in pavement as specified by Engineer or designated consultant.

.2 Place non-compressible soils in lifts not exceeding 300 mm. Compact lifts with a vibrator roller or plate tamper of sufficient size to achieve the equivalent of 98% standard proctor value. In absence of baseline data, compaction on non-compressible soils is to continue until there is no visible lift. When any additional lift is required, loosen the surface of the lower lift to a minimum depth of 25 mm to provide good bonding between lifts.

3.8 ACCEPTANCE

.1 Engineer will inspect and test topsoil in place and determine acceptance of material, depth, and finish grading.

3.9 CLEAN UP

.1 Remove surplus materials upon completion of the Work.

END OF SECTION 32 91 19

PART 1 GENERAL

1.1 WORK INCLUDED

.1 This section specifies requirements for seeding and sodding. Work includes supply and placement of sods, supply, and application of seed, complete with all related components and accessories.

1.2 RELATED SECTIONS

.1 Environmental Protection: Section 01 57 00

.2 Clearing and Grubbing: Section 31 10 00

.3 Earthwork: Section 31 20 00

.4 Topsoiling and Finish Grading: Section 32 91 19

1.3 REFERENCE STANDARDS

.1 Canadian Nursery Landscape Association –Canadian Standards for Nursery Stock –current edition.

.2 Canadian Landscape Standards Section 7.1 General lawns and Grass - current edition.

1.4 SOURCE QUALITY CONTROL

.1 Obtain approval of sod and seed sources.

1.5 DELIVERY, STORAGE AND PROTECTION

.1 Schedule deliveries to minimize storage at job site without causing delays.

.2 Deliver and store grass seed in original containers showing:

.1 Analysis of seed mixture by percentage of mass for each ingredient.

.2 Net mass of the package.

.3 Grade and name of the mixture.

.4 Name and address of the distributor.

.5 Date and viability information of seed.

1.6 SCHEDULING

.1 Schedule seeding and sodding operations to coincide with topsoil operations.

1.7 SAMPLES

.1 Submit samples in accordance with Section 01 10 00 for items listed in Supplementary Specifications.

.2 Provide product data for seed, mulch, tackifier, and fertilizer.

.3 Upon request of the Engineer or designated consultant provide a seed tag for the specified seed mix (for approval before sowing. Seed tag to include the following information:

variety and kind of grass contained in the mix.

percentage by weight of each grass variety and kind.

germination percentage by seed variety.

.4 Submit upon request a 300 mm x 300 mm sample of specified sod to the Engineer or designated consultant for approval prior to harvesting.

1.8 ESTABLISHMENT PERIOD

.1 Establishment Period is that time between seeding, and/or sodding, and Acceptance of the Work.

.2 Maintenance, during the Establishment Period, through continual care and accepted horticultural practices, as well as rectifying any defects that become apparent in the Work, under normal use, shall reflect a healthy and vigorously growing, even and continuous swarth of dense, green, grass vegetation over 100% of the area indicated in the Contract Documents.

1.9 ACCEPTANCE

.1 Grassed areas will be accepted upon completion of the second mowing provided that:

Growth is properly established.

Area is free of bare and dead spots.

Area meets the following criteria:

.1 .1 90% weed free at time of acceptance for sodded areas.

.2 .2 80% weed free at time of acceptance for seeded areas.

.3 Minimal surface soil is visible when grass has been cut to a height of 50 mm.

.2 .4 Areas sodded or seeded in the fall will be accepted the following spring, one (1) month after the start of growing season and the second mowing, provided that acceptance conditions have been met.

.3 Grassed areas will be maintained, including mowing, until Acceptance.

1.10 WARRANTY

.1 Notwithstanding GC 12.3 – WARRANTY, provide warranty that the seeded and sodded areas will be maintained to remain healthy and free of defects or one full year from Acceptance Date, or as specified in Project Documents.

PART 2 PRODUCTS

2.1 SEED

.1 Canada No. 1 Grade to Government of Canada Seeds Act and Seeds regulations where applicable having a minimum germination of 80% and minimum purity of 85%. Seed mixture: turf type varieties: 40% Kentucky Blue Grass; 40% Fescue; 20% Rye Grass or as specified in the Project Documents.

.2 Drought tolerant seed mixture: 100% Rhizomatous Tall Fescue, 45-50% of the blend cultivars certified to produce average rhizome length of 125 mm or greater and average root depth of 1.4m.

2.2 SOD

.1 Number (#1) Kentucky Bluegrass – nursery sod grown from one or more Kentucky Bluegrass cultivars or Kentucky Bluegrass/Fine Fescue Sod – grown from a seed mixture containing 90- 95% by weight of Kentucky Bluegrass cultivars and 5-10% by weight of creeping red chewing or hard fescue cultivars or as specified in the Project Documents.

.2 RTF (Rhizomatous Tall Fescue) Nursery Sod, grown from a blend of advanced generation turftype fall fescue with rhizome developing characteristics. Sod to be free from weeds, with no surface soil visible when mowed to its recommended mowing height. Sod to exhibit a dense uniform turf with a strong rooting structure and free from burned or bare spots. Soil portion of the sod to be of uniform thickness, not to exceed 1.9 cm.

.3 Regenerating Perennial Ryegrass (RPR): self-repairing creeping perennial ryegrass that spreads by pseudo-stolons.

.4 Field sod:

Field sod containing a bio-diverse mix of native and naturalized species containing grasses, wildflowers and other herbaceous plants known to thrive in the local area.

Field sod to be free of diseased plants, pest infestations and noxious or invasive species as listed in the Nova Scotia Weed Control Act (e.g., Purple Loosestrife, Japanese Knotweed and Sweet Clover).

.5 Broken, dry, discoloured pieces of sod will be rejected.

.1

2.3 .2 **WATER**

.1 Free of impurities that would inhibit plant growth.

2.4 SEED FERTILIZER

.1 To Canada “Fertilizers Act” and “Fertilizers Regulations.”

.2 Complete synthetic, slow release with 35% of nitrogen content in water soluble form.

.3 Ratio spring seeding 1:2:2; ratio fall seeding 1:4:4 or as recommended by the Nova Scotia Agricultural College Soils Department, or by an approved soils lab.

2.5 SOD FERTILIZER

.1 Complete synthetic, slow release with maximum 35% water soluble nitrogen.

.2 Ratio for spring sodding: 1:2:2; fall sodding: 1:4:4.

.3 Ratio for year one maintenance applications: May 3:0:0, July 3:1:3, September 1:2:3, or as recommended by the Nova Scotia Agricultural College Soils Department or by an approved soils lab.

2.6 HYDRAULIC SEED MULCH

.1 Fibre: wood or wood-cellulose fibres free of germination or growth-inhibiting ingredients and forming blotter like ground cover allowing absorption and percolation of water.

.2 Capable of dispersing in water to form homogeneous slurry.

.3 Capable of forming an absorptive mat ground cover allowing water percolation.

2.7 HYDRAULIC SEED TACKIFIER

.1 Water diluted liquid dispersion containing polyvinyl acetate polymer emulsion.

2.8 WOODEN PEGS

.1 17 x 17 x 150 mm or approved 150 mm long steel staples.

2.9 WIRE MESH

.1 40 mm, chicken wire, jute, synthetic, plastic.

.1

2.10 HERBICIDE

.1 Type, rate, and method of application subject to approval by the Engineer or designated consultant and applicable government agencies.

2.11 EQUIPMENT

.1 Truck (hydraulic):

Slurry tank: approved commercial hydraulic equipment.

Pumps capable of maintaining continuous non-fluctuating flow of solution.

.2 Seeder (mechanical):

Use mechanical landscape seeder that accurately places seed at specified depth and rate and rolls in single operation.

Use acceptable equipment and method.

.2

PART 3 EXECUTION

.1

3.1 FIELD CONDITIONS

.2

.1 For seeding, do not perform work under adverse field conditions such as wind speeds over 20 km/h, frozen ground or ground covered with snow, ice or standing water, or temperatures which inhibit seed germination unless otherwise approved by the Engineer.

.2 For hydraulic seeding, take reasonable care to prevent spraying items such as structures, signs, guard rails, fences, plant material, and utilities.

.3 Where contamination occurs, remove seeding by approved means.

3.2 PREPARATION OF SURFACES

.1 To Section 32 91 19 – Topsoiling and Finish Grading.

3.3 MECHANICAL SEEDING

.1 Seed during local growing season when natural moisture is available, and temperature is suitable to ensure germination and growth.

.2 Apply fertilizer as specified and according to soil test equipment prior to seeding and work lightly into soil bed.

.3 Use mechanical landscape seeder to place seed at specified depth and rate and roll in single operation.

3.4 SODDING

.1 Topsoiling and finish grading to Section 32 91 19.

.2 Apply fertilizer at rate recommended by soil sample test.

.3 Lay sod as soon as possible after lifting to ensure proper establishment.

.4 Where new sodding abuts existing lawn, cut edge of existing sod with sharp tool in straight line. Lay new sod flush with level of existing lawn.

.5 Lay sod in rows, parallel with contours, smooth and flush with adjoining areas, and with joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Butt sections against curb flush with top of curb, ensure topsoil is well compacted behind curbing. Cut out irregular or thin sections with a sharp knife, edger or equivalent. Where sod abuts concrete curb, compact soil behind curb and lay top of sod flush with top of curb.

.6 Provide close contact between sod and soil by light rolling. Use of heavy roller to correct irregularities in grade is not permitted.

.7 Water sod immediately after laying as dictated by weather conditions to obtain moisture penetration through sod into 100 mm of topsoil.

.8 Roll sod with a roller having a mass of 50 kg/m of width. Repeated rolling to correct irregularities in grade is not permitted.

3.5 SOD PLACEMENT ON SLOPES AND PEGGING

.1 For slopes steeper than (1) horizontal or (2) vertical, install and secure with mesh, in area indicated, in accordance with the manufacturer's instructions.

.2 Start laying sod at bottom of slopes.

.3 Peg sod on slopes steeper than (3) horizontal to (1) vertical, within 1 m of catch basins and within 1 m of drainage channels and ditches to the following pattern:

100 mm below top edge at 200 mm on center for first sod sections along contours of slopes.

Not less than 3-6 pegs per square metre.

Not less than 6-9 pegs per square metre in drainage structures.

.1 Adjust pattern as directed by the Engineer.

.2 Drive pegs to 20 mm above soil surface of sod section.

.3

3.6 .4 **HYDRAULIC SEEDING**

.5

.1 Seed during local growing season when natural moisture is available, and temperature is suitable to promote germination and growth.

.2 Measure quantities of material by weight or by weight-calibrated volume measurement.

.3 Charge seeder with water, and while agitating, slowly add mulch, seed, fertilizer, and lime until all components are thoroughly mixed.

.4 When required, add erosion control agent to seed and mix thoroughly to complete seeding slurry.

.5 Slurry application per 100 m^2:

.1

.2 Seed - 2.0 kg or as recommended by seed supplier.

.3 Fertilizer – Not less than 1650 g of phosphorus per 100 m^2.

.4

.5 Mulch - 10 kg.

.6 Erosion control agent - as recommended by manufacturer.

Water - minimum 100 litres.

.1 Lime - as determined by soil analysis.

.6 Slurry application RFT and hydraulic seed per 100 m^2.

Hydroseed at 5.3 kg/100 m^2.

.7 Apply slurry uniformly, blending into existing grassed areas. Slurry to be thick enough to prevent grass seed from drying and blowing but not to impact germination and growth. Reshoot areas where application is not uniform.

.18 Remove slurry from items and areas not designated to be sprayed.

.2

3.7 .3 **MAINTENANCE DURING ESTABLISHMENT PERIOD**

.4

.1 Perform the following maintenance operations during the Establishment Period (from time of seeding, and or sodding, to Acceptance:

Repair dead or bare spots to allow establishment of seed and sod prior to Acceptance.

Water to maintain soil moisture conditions for optimum establishment, growth, and health of grass plants without causing shrinkage or erosion.

Cut and mulch grass to 50 mm, a minimum of twice, when it reaches a height of 70 mm.

Fertilize seeded areas after first cutting in accordance with fertilizing program. Spread half the required amount of fertilizer in one direction and the remainder at right angles.

Fertilize sodded areas one (1) month after sodding. Spread evenly at manufacturer's suggested rate. Postpone fertilizing until next spring if application falls within a four (4)-week period prior to expected end of growth season.

Control weeds utilizing acceptable integrated pest management practices.

Where continued maintenance is required after Acceptance, commence maintenance immediately following installation of work. Continue it for one year following Acceptance at Project completion.

.5 Notify Engineer upon completion of Maintenance Period to arrange inspection and transfer of maintenance responsibility to Owner.

.6 Where Municipal (By-laws) Regulations prohibit the use of Federally or Provincially approved pesticides, and the available (alternative) non-pesticide controls are not acceptable to the Contractor, the application of pesticides to control weeds, insects, fungus, and disease will be deemed to be removed from Maintenance during Establishment Period.

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3.8 MAINTENANCE DURING WARRANTY PERIOD

.1 Perform the following maintenance operations from time of Acceptance to end of Warranty Period:

Repair dead or bare spots to allow establishment of seed and sod prior to acceptance.

.1 Water to maintain soil moisture conditions for optimum establishment, growth, and health of grass plants without causing shrinkage or erosion.

.2 Cut and mulch grass to 50 mm, a minimum of twice, when it reaches a height of 70 mm.

.3 Fertilize seeded areas after first cutting in accordance with fertilizing program. Spread half the required amount of fertilizer in one direction and the remainder at right angles.

.4 Fertilize sodded areas one (1) month after sodding. Spread evenly at manufacturer's suggested rate. Postpone fertilizing until next spring if application falls within a four (4)-week period prior to expected end of growth season.

.5 Control weeds utilizing acceptable integrated pest management practices.

.6 Where continued maintenance is required after Acceptance, commence maintenance immediately following installation of work.

.7 Continue it for one year following final acceptance at Project completion.

.8 Notify Engineer upon completion of maintenance period to arrange inspection and transfer of maintenance responsibility to Owner.

.9 Where Municipal (By-laws) Regulations prohibit the use of Federally or Provincially approved pesticides, and the available (alternative) non-pesticide controls are not acceptable to the Contractor, the application of pesticides to control weeds, insects, fungus, and disease will be deemed to be removed from Maintenance during Establishment Period.

.10

3.9 CLEAN UP

.1 Remove surplus materials upon completion of the Work.

END OF SECTION 32 98 00