Town of Saint Andrews

Wharf Approach Replacement

Issued for Tender

August 2025

Contract No. TSA 2024-03

Town of Saint Andrews

Wharf Approach Replacement

0	Issued for Tender	Kori MacPherson	15-Aug-2025	David Morgan
Rev.	Issue	Reviewed By:	Date	Issued By:

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REGISTERED PROFESSIONAL ENGINEER
Province of New Brunswick
M7127
David L. Morgan
Signature
2025-08-15
Date
Province du Nouveau-Brunswick
INGÉNIEUR IMMATRICULÉ

CBCL Project No. 242835.00

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PART 1 - GENERAL

The project is located in the Town of Saint Andrews, NB. The Work includes but is not necessarily limited to:

.1 Demolition and disposal of existing timber wharf approach structure and associated infrastructure, including timber cribs, ballast rock, bracing, stringers, decking, curbing, ladders, lights, electrical, water piping, sanitary force main piping.

.2 Construction of infill revetment structure including rock fill, armour rock, filter stone, aggregate base, aggregate subbase and asphalt restoration.

.3 Construction of new steel pile supported wharf structure complete with reinforced concrete pile caps, precast concrete deck complete with topping slab and light pole bases, ladders, wheel guard, and timber fender piles.

.4 Installation of new water and sanitary force main piping including corrosion resistant fittings and mounting hardware as shown on the drawings.

.5 Removal and replacement of the timber bracing on the existing Intermediate Trestle structure.

.6 Installation of pile wrap corrosion protection on the existing H-piles of the pier head.

.7 Supply/placement of granular materials to adjust surrounding grades and incorporate new infill revetement into existing.

.8 Disconnect and remove existing electrical equipment and steel poles as identified on the drawings.

.9 Installation of new electrical service equipment, lighting and wiring. Coordinate with local utility as required, arrange all permits and carry all costs. Provide all necessary mounting hardware, accessories, conduits, trenching, etc. to facilitate a complete installation.

1. List of Drawings

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C01 Water, Sanitary, Storm Services
C02 Grading Plan
C03 Details

Electrical
E-01 Electrical Demolition
E-02 Electrical New Construction
E-03 Details
E-04 Single Line Diagram and Schedules

END OF SECTION

END

1. A complete Tender is comprised of the following:

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

   b) Acknowledgment of addenda received by the Tenderer during the tendering period.

   c) Tender Security (refer to clause 12 herein).

   d) WorkSafe NB clearance letter.

2. The tender shall be submitted in a sealed envelope marked as follows:

   TENDER FOR:

   Town of Saint Andrews
   Wharf Approach Replacement
   Contract No. TSA 2024-03

   and must be delivered to the following address **up until 2:00 p.m.,** local time, on **10 September 2025**, hereinafter referred to as the Tender Closing.

   Town of Saint Andrews
   212 Water Street
   Saint Andrews NB, E5B 1B4
   Attention: Chris Spear, CAO

3. Tender opening will be public. Tender opening will occur promptly following Tender Closing at the W.C. O'Neill Arena Complex, 24 Reed Avenue, Saint Andrews NB.

4. Before tendering, Tenderers shall have examined the *Site* of the Work and shall have satisfied themselves as to the working conditions, including labour conditions and labour rules, the nature and kind of work to be done, any special risks associated therewith and all other matters which may be necessary in order to form a proper conception under which the work will be required to be performed. Tenderers shall not be entitled to claim at any time after closing of tenders that there was any misunderstanding in regard to all such conditions.

5. When forming their estimates and preparing their tenders, Tenderers shall take full cognizance of the content of all the Contract Documents listed in Section 00 41 43 – Tender Form – Unit Rate.

6. Any ambiguities, inconsistencies, or uncertainties in the Contract Documents which may become apparent to Tenderers when tendering shall be advised via email to the David Morgan, P.Eng. davidmo@cbcl.ca, by **Tuesday September 2, 2025**. Tenderers will be advised simultaneously of any decisions on such matters as necessary by means of addenda (which will be serially numbered) and all addenda issued shall be incorporated into the Contract Documents.

7. Tenderer shall fill in the Completion Time and is notified that the completion date based on this may be taken into account in considering the tenders.

8. All tenders shall be valid for acceptance for sixty (60) calendar days from the Closing Date.

9. The Agreement is included in the Contract Documents at the time of tendering and is provided for information only and shall not be completed at the time of tendering.

10. The appending of any qualifying clauses to the tender or failure to comply with these instructions and with all other relevant provisions contained in the documents in the completing of any tender may render such tender liable to disqualification as determined by the *Owner*.

11. Contract Price to exclude HST. Harmonized sales tax shall be indicated as a separate amount and included in the *Total Amount Payable*.

12. Each tender shall be accompanied by Tender Security in the amount of ten percent (10%) of the *Total Amount Payable* (inclusive of *Value Added Taxes*) in evidence of the bona fide nature of the tender. Tender security must satisfy the same requirements of Contract Security as set forth in clause 13 herein.

13. Tender and Contract Security shall be in favour of the Owner and shall be in the form of a Certified Cheque, irrevocable Letter of Credit or a Bond. Tender Security 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.
    .1 The bonds shall be issued by a company whose guarantee bonds are acceptable to the Government of Canada. Use the latest edition of CCDC Form 220.

14. The Tender Security of the unsuccessful Tenderers will be returned to them after the *Owner* enters into a formal agreement with the successful Tenderer or the expiration of validity of their tenders, whichever occurs first.

15. On the written acceptance by the *Owner* of a tender, that tender becomes the Contract and the Tenderer who has submitted it becomes the Contractor. The Contractor will be required to enter into a formal agreement with the *Owner* following receipt of a written notice of acceptance from the *Owner*. The written notice of acceptance forms a Contract Agreement until the formal “Agreement” included herein is executed.

16. Within seven (7) days of written acceptance of a tender, the Contractor shall provide Contract Security in the amount and form as specified in Section 00 73 00 – Supplementary General Conditions, and Insurance as specified in CCDC 18-2023, GC 11.1 and supplemented in CCDC 41-2020.

17. Complete the Tender Form and have corrections initialled by the individual signing the tender.

18. Where manufactured articles are described or specified in the Contract Documents by name, catalogue number of a manufacturer or supplier, Tenderers shall tender on the basis of using only such articles. Procedure concerning substitution of a specified article with another shall be in accordance with equivalents and alternates in Section 01 25 00 – Substitution Procedures.

21. Tenders, which in the opinion of the *Owner* are considered to be informal or unbalanced, may be rejected.

22. Tenders may be amended or withdrawn without penalty, by email prior to Tender Closing. Amendments shall not disclose either original or revised total price.
    .1 Subject line of amendment or withdrawal to read as follows: “[Amendment]/[Withdrawal] of Tender for Wharf Approach Replacement, TSA 2024-03". Sign and seal as required for tender and submit at address given for receipt of tenders. All Submissions must be received prior to Tender Closing.

.2 For response submitted by fax, responders may revise their bid by facsimile or letter, provided that the revision is received prior to Closing. Revisions by facsimile must be sent to the facsimile number as indicated above. The Owner will not be responsible for any failure attributable to the mechanical or electronic transmission or reception of the facsimile.

END OF SECTION

1. SALUTATION:

.1 To: Town of Saint Andrews
212 Water Street
Saint Andrews NB, E5B 1B4

.2 For: Wharf Approach Replacement
Contract No. TSA 2024-03

.3 From: _____

2. TENDERER DECLARES:

.1 That this tender was made without collusion or fraud.

.2 That the proposed work was carefully examined.

.3 To have personal knowledge of the location of the proposed Work and is informed as to the actual conditions and requirements, including labour conditions and labour rules and shall not claim at any time after execution of the Agreement that there was any misunderstanding in regard to such conditions and requirements.

.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.

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 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 4 hereunder.

.3 That this Tender is valid for acceptance for thirty (30) calendar days from the time of Tender Closing.

.4 That measurement and payment for items listed in Subsection 4 hereunder shall be in accordance with corresponding items in Section 01 22 00 Measurement and Payment.

.5 Upon request to provide evidence of ability and experience within seven (7) calendar days of request, including experience in similar work, work currently under contract, senior supervisory staff available for the project, equipment available for use on the Work, and financial resources.

.6 To execute in triplicate the Agreement and forward same together with the specified contract security and insurance documents to the Owner within fourteen (14) calendar days of written notice of award.

.7 That failure to enter into a formal contract and give specified insurance documents and contract security within time required will constitute grounds for forfeiture of certified cheque or enforcement of bid bond.

.8 That if certified cheque 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.

.9 Declares to have carefully examined the documents and Addenda No. __ to _____ referred to in the first paragraph of this Tender Form, and the Tenderer hereby accepts and agrees to the same as forming a part of the Contract.

.10 Understands that in the event that the tendered Contract Price is not within the project budget, the Owner has the right to negotiate the Contract with the low bidder or reject all tenders received.

.11 Agrees that the Warranty Period defined in the Contract Documents shall be for a period of one (1) year from the date of Ready-for-Takeover.

.12 Understands that Substantial Performance of the Work will be established in accordance with General Conditions of the Contract and applicable lien legislation.

.13 Understands that after the issuance of the certificate of Substantial Performance of the Work by the Consultant, provided that the Contractor has relieved the Owner from any and all claims, demands and lien claims for and in respect of the Contract, and has completed all outstanding items and corrected all deficiencies, the Contractor shall submit an application for Final Payment and the Consultant will thereafter prepare the Final Certificate for payment in accordance with the General Conditions of the Contract and applicable lien legislation

.14 Understands that the payment of holdback will be in accordance with the General Conditions of the Contract and subject to the provisions of the lien legislation applicable to the Place of Work.

.15 Understands the occupational Health and Safety Legislation and any Workers or Workplace compensation legislation applicable to the Place of the Work and declares that they are in good standing and have all necessary certification as required by such legislation.

.16 Agrees that time shall be construed as being of the essence of the Contract.

.17 That the Contract Documents include:
- .1 Standard Specifications for Municipal Services listed in Table of Contents Page Dated July 2025.
- .2 Tender Form
- .3 Form of Agreement
- .4 General Conditions of the Civil Work Contract
- .5 Supplementary General Conditions
- .6 Supplementary Specifications
- .7 Drawings

Dwg. No.	Title
000	Cover Sheet and Key Plan

Structural

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.8 Addenda as issued and as confirmed in subsection 2.4 of this section.

4. SCHEDULE OF QUANTITIES AND UNIT PRICES

Division No.	Description	Unit of Measurement	Estimated Quantity	Unit Price	Total Price
1.	**GENERAL REQUIREMENTS**	LS	1.0		
3.	**CONCRETE**				
.1	Precast Concrete Panel (Type 1) - 4.95m x 2.71m x 225mm thk.	Ea	4.0		
.2	Precast Concrete Panel (Type 2) - 4.20m x 2.16m x 225mm thk.	Ea	2.0		
.3	Precast Concrete Panel (Type 3) - 5.10 m x 3.80m x 225mm thk.	Ea	6.0		
.4	Precast Concrete Panel (Type 4) - 4.95 m x 2.71m x 250mm thk.	Ea	4.0		
.5	Precast Concrete Panel (Type 5) - 4.20m x 2.16m x 250 mm thk.	Ea	2.0		
.6	Reinforced Concrete Topping Slab	m^2	313.0		
.7	Reinforced Concrete Pile Cap Bent 1,3,4,5,8	m^3	16.0		
.8	Reinforced Concrete Pile Cap Bent 2 beam	m^3	5.0		
.9	Reinforced Concrete Pile Cap Bent 2 cluster	m^3	6.0		
.10	Reinforced Concrete Pile Cap Bent 7 beam	m^3	5.0		
.11	Reinforced Concrete Pile Cap Bent 7 cluster	m^3	6.0		
.12	Reinforced Concrete Pile Cap Bent 6	m^3	5.0		
.13	Reinforced Pre-cast Concrete Abutment Retaining Wall	m^3	4.0		
.14	Light Standard Foundation (Type 1)	Ea	1.0		
.15	Precast Concrete Access (Type 1A)	Ea	2.0		

.16	Precast Concrete Access (Type 1B)	Ea	2.0		
.17	Precast Concrete Access (Type 2A)	Ea	2.0		
.18	Precast Concrete Access (Type 2B)	Ea	2.0		
.20	Precast Concrete Access (Type 3)	Ea	2.0		
.21	Concrete Foundation bases for Light poles	Ea	10.0		
5.	**METAL**				
.1	Handrails (Access Stairs)	m	30.0		
6.	**WOOD, PLASTICS, AND COMPOSITES**				
.1	Timber Wales -Supply and Install (300 mm x 300 mm) New Approach (connecting the timber fender)	m^3	7.0		
.2	New Timber Cross Bracing & Wale Supply and Install (100mm x 200mm) -Int. Trestle	m^3	48.0		
.3	Timber Hand Rail (Approach Structure)	m	41.0		
.4	Timber Ladder	Ea	2.0		
.5	Timber Pile Repairs	Ea	21.0		
26.	**ELECTRICAL**	LS	1.0		
31.	**EARTHWORK**				
.1	Approach Wharf Removal	LS	1.0		
.2	Intermediate Trestle – Timber Bracing Removal	LS	1.0		
.3	Timber/Concrete Boat Platform Removal	LS	1.0		
.4	Pipe Pile - Supply (406 mm Dia.)	m	183.0		

.5	Pipe Pile - Install (406 mm Dia.)	Ea	22.0		
.6	Pipe Piles - Supply (508 mm Dia.)	m	87.0		
.7	Pipe Piles - Install (508mm Dia.)	Ea	8.0		
.8	Wood Piles – Supply	m	150.0		
.9	Wood Piles – Install	Ea	18.0		
.10	Rock Sockets (3.5 m + 3.5 m Drill)	Ea	8.0		
.11	Pile Corrosion Protection (Pile wrap) Approach Structure - Vertical Piles	m	105.0		
.12	Pile Corrosion Protection (Pile wrap) Approach Structure - Batter Piles	m	41.0		
.13	H-Pile Corrosion Protection (pier Head)	m	196.0		

32. EXTERIOR IMPROVEMENTS

.1	Aggregate Base	Tonne	1,200.0		
.2	Aggregate Subbase	Tonne	2,400.0		
.3	Asphalt NBDTI Type C Lower Course	Tonne	440.0		

33. UTILITIES

.1	Water Service piping – 50mm dia.	m	98.0		
.2	Sanitary Force Main Piping – 50mm dia.	m	105.0		
.3	1500 dia. Precast Concrete Storm Manhole	Ea	1.0		
.4	1050dia. Precast Concrete Storm Manhole	Ea	1.0		
.5	Storm Sewer - 750 mm dia.	m	23.0		
.6	Storm Sewer - 450mm dia.	m	11.0		

35. WATERWAY AND MARINE CONSTRUCTION

.1	Armour Rock	Tonne	8,000.0		
.2	Filter Stone	Tonne	4,000.0		
.3	Rock Fill Core Stone	Tonne	26,800.0		
12.	**Contingency**	PS	1.00		$700,000.00

SUBTOTAL $_____

TENDER SUMMARY

ESTIMATED CONTRACT PRICE (Excluding HST) **$**_____

Add HST (15% of the Estimated Contract Price) $_____

TOTAL AMOUNT PAYABLE **$**_____

TENDERER'S HST REGISTRATION NO. _____

5. COMPLETION TIME

1. Tenderer agrees to achieve Ready-for-Takeover of the Work no later than May 22, 2026.

6. SIGNATURE *

DATED THIS _____ DAY OF_____ , 2025__.

[Seal]

_____
Name of Firm Tendering

_____
Signature of Signing Officer

_____
Witness

_____
Name and Title (Printed)

_____
Witness

_____
Signature of Signing Officer

_____

_____
Name and Title (Printed)

_____
Company Address

_____
Telephone No.

_____
Fax No.

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

END

FORM OF AGREEMENT - CIVIL WORKS CONTRACT
CCDC 18-2023

CCDC
Canadian Construction Documents Committee

Civil Works Contract
CCDC 18 — 2023

Name of the Work

Apply a CCDC 18 copyright seal here.
The application of the seal demonstrates the intention of the party proposing the use of this document that it be an accurate and unamended form of CCDC 18 — 2023 except to the extent that any alterations, additions or modifications are set forth in supplementary conditions.

CCDC 18 CIVIL WORKS CONTRACT

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CCDC 18 is the product of a consensus-building process aimed at balancing the interests of all parties on the construction project. It reflects recommended industry practices. The CCDC and its constituent member organizations do not accept any responsibility or liability for loss or damage which may be suffered as a result of the use or interpretation of CCDC 18.

CCDC Copyright 2023
Must not be copied in whole or in part without the written permission of the CCDC.

AGREEMENT BETWEEN OWNER AND CONTRACTOR

This Agreement made on day of in the year .
by and between the parties

hereinafter called the "*Owner*"

and

hereinafter called the *"Contractor"*

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

ARTICLE A-1 THE WORK

The *Contractor* shall:

1.1 perform the *Work* required by the *Contract Documents* for *(insert below the description or title of the Work)*

located at *(insert below the Place of the Work)*

for which the Agreement has been signed by the parties, and for which *(insert below the name of the Consultant)*

is acting as and is hereinafter called the "*Consultant*" and

1.2 do and fulfill everything indicated by the *Contract Documents*, and

1.3 commence the *Work* by the day of in the year and, subject to adjustment in *Contract Time* as provided for in the *Contract Documents*, attain *Ready-for-Takeover*, by the day of in the year .

ARTICLE A-2 AGREEMENTS AND AMENDMENTS

2.1 The *Contract* supersedes all prior negotiations, representations or agreements, either written or oral, relating in any manner to the *Work*, including the bid documents that are not expressly listed in Article A-3 of the Agreement – CONTRACT DOCUMENTS.

2.2 The *Contract* may be amended only as provided in the *Contract Documents*.

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ARTICLE A-3 CONTRACT DOCUMENTS

3.1 The following are the *Contract Documents* referred to in Article A-1 of the Agreement – THE WORK:

- Agreement between *Owner* and *Contractor*
- Definitions
- General Conditions
- *

* *(Insert here, attaching additional pages if required, a list identifying all other Contract Documents e.g. supplementary conditions; Schedule of Prices; Division 01 of the Specifications – GENERAL REQUIREMENTS; Project information that the Contractor may rely upon; technical Specifications, giving a list of contents with section numbers and titles, number of pages and date; material finishing schedules; Drawings, giving drawing number, title, date, revision date or mark; addenda, giving title, number, date; time schedule)*

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ARTICLE A-4 CONTRACT PRICE

4.1 * *Unit Prices* form the basis for payment of the *Contract Price*. Quantities in the *Schedule of Prices* are estimated. The estimated *Contract Price*, which is the total extended amount indicated in the *Schedule of Prices*, is:

OR

* A lump sum stipulated price forms the basis for payment of the *Contract Price*. The *Contract Price* is:

/100 dollars $

* *Strike out inapplicable paragraph.*

4.2 These amounts shall be subject to adjustments as provided in the *Contract Documents*.

4.3 All amounts are in Canadian funds and exclude *Value Added Taxes*.

ARTICLE A-5 PAYMENT

5.1 Subject to the provisions of the *Contract Documents* and *Payment Legislation*, and in accordance with legislation and statutory regulations respecting holdback percentages, the *Owner* shall:

.1 make progress payments to the *Contractor* on account of the *Contract Price* when due in the amount certified by the *Consultant* unless otherwise prescribed by *Payment Legislation* together with such *Value Added Taxes* as may be applicable to such payments,

.2 upon *Substantial Performance of the Work*, pay to the *Contractor* the unpaid balance of the holdback amount when due together with such *Value Added Taxes* as may be applicable to such payment, and

.3 upon the issuance of the final certificate for payment, pay to the *Contractor* the unpaid balance of the *Contract Price* when due together with such *Value Added Taxes* as may be applicable to such payment.

5.2 Interest

.1 Should either party fail to make payments as they become due under the terms of the *Contract* or in an award by adjudication, arbitration or court, interest at the following rates on such unpaid amounts shall also become due and payable until payment:

(1) 2% per annum above the prime rate for the first 60 days.

(2) 4% per annum above the prime rate after the first 60 days.

Such interest shall be compounded on a monthly basis. The prime rate shall be the rate of interest quoted by

(Insert name of chartered lending institution whose prime rate is to be used)

for prime business loans as it may change from time to time.

.2 Interest shall apply at the rate and in the manner prescribed by paragraph 5.2.1 of this Article on the settlement amount of any claim in dispute that is resolved either pursuant to Part 8 of the General Conditions – DISPUTE RESOLUTION or otherwise, from the date the amount would have been due and payable under the *Contract*, had it not been in dispute, until the date it is paid.

ARTICLE A-6 RECEIPT OF AND ADDRESSES FOR NOTICES IN WRITING

6.1 *Notices in Writing* will be addressed to the recipient at the address set out below.

6.2 The delivery of a *Notice in Writing* will be by hand, by courier, by prepaid first class mail, or by other form of electronic communication during the transmission of which no indication of failure of receipt is communicated to the sender.

6.3 A *Notice in Writing* delivered by one party in accordance with this *Contract* will be deemed to have been received by the other party on the date of delivery if delivered by hand or courier, or if sent by mail it will be deemed to have been received five calendar days after the date on which it was mailed, provided that if either such day is not a *Working Day*, then the *Notice in Writing* will be deemed to have been received on the *Working Day* next following such day.

6.4 A *Notice in Writing* sent by any form of electronic communication will be deemed to have been received on the date of its transmission provided that if such day is not a *Working Day* or if it is received after the end of normal business hours on the date of its transmission at the place of receipt, then it will be deemed to have been received at the opening of business at the place of receipt on the first *Working Day* next following the transmission thereof.

6.5 An address for a party may be changed by *Notice in Writing* to the other party setting out the new address in accordance with this Article.

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Owner

*name of Owner**

address

email address

Contractor

*name of Contractor**

address

email address

Consultant

*name of Consultant**

address

email address

** If it is intended that a specific individual must receive the notice, that individual's name shall be indicated.*

ARTICLE A-7 LANGUAGE OF THE CONTRACT

7.1 When the *Contract Documents* are prepared in both the English and French languages, it is agreed that in the event of any apparent discrepancy between the English and French versions, the English / French # language shall prevail.
 # Complete this statement by striking out inapplicable term.

7.2 This Agreement is drawn in English at the request of the parties hereto. La présente convention est rédigée en anglais à la demande des parties.

ARTICLE A-8 SUCCESSION

8.1 The *Contract* shall enure to the benefit of and be binding upon the parties hereto, their respective heirs, legal representatives, successors, and assigns.

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

SIGNED AND DELIVERED
in the presence of:

WITNESS

signature

name of person signing

OWNER

name of Owner

signature

name and title of person signing

WITNESS

signature

name of person signing

CONTRACTOR

name of Contractor

signature

name and title of person signing

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

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DEFINITIONS

The following Definitions shall apply to all *Contract Documents*.

Change Directive

A *Change Directive* is a written instruction prepared by the *Consultant* and signed by the *Owner* directing the *Contractor* to proceed with a change in the *Work* within the general scope of the *Contract Documents* prior to the *Owner* and the *Contractor* agreeing upon adjustments in the *Contract Price* and the *Contract Time*.

Change Order

A *Change Order* is a written amendment to the *Contract* prepared by the *Consultant* and signed by the *Owner* and the *Contractor* stating their agreement upon:

- a change in the *Work*;
- the method of adjustment or the amount of the adjustment in the *Contract Price*, if any; and
- the extent of the adjustment in the *Contract Time*, if any.

Construction Equipment

Construction Equipment means all machinery and equipment, either operated or not operated, that is required for preparing, fabricating, conveying, erecting, or otherwise performing the *Work* but is not incorporated into the *Work*.

Consultant

The *Consultant* is the person or entity engaged by the *Owner* and identified as such in the Agreement. The *Consultant* is the Architect, the Engineer or entity licensed to practise in the province or territory of the *Place of the Work*.

Contract

The *Contract* is the undertaking by the parties to perform their respective duties, responsibilities and obligations as prescribed in the *Contract Documents* and represents the entire agreement between the parties.

Contract Documents

The *Contract Documents* consist of those documents listed in Article A-3 of the Agreement – CONTRACT DOCUMENTS and amendments agreed upon between the parties.

Contract Price

When *Unit Prices* form the basis of payment, the *Contract Price* is the sum of the products of the actual final quantities that are incorporated in or made necessary by the *Work*, multiplied by the appropriate *Unit Prices* stated in the *Schedule of Prices*, plus lump sums and allowances, if any. When a lump sum stipulated price forms the basis of payment, the *Contract Price* is the amount stipulated in Article A-4 of the Agreement – CONTRACT PRICE.

Contract Time

The *Contract Time* is the time from commencement of the *Work* to the date of *Ready-for-Takeover* as stipulated in paragraph 1.3 of Article A-1 of the Agreement – THE WORK .

Contractor

The *Contractor* is the person or entity identified as such in the Agreement.

Drawings

The *Drawings* are the graphic and pictorial portions of the *Contract Documents*, wherever located and whenever issued, showing the design, location and dimensions of the *Work*, generally including plans, schedules, elevations, sections, details, and diagrams.

Notice in Writing

A *Notice in Writing*, where identified in the *Contract Documents*, is a written communication between the parties or between them and the *Consultant* that is transmitted in accordance with the provisions of Article A-6 of the Agreement – RECEIPT OF AND ADDRESSES FOR NOTICES IN WRITING.

Owner

The *Owner* is the person or entity identified as such in the Agreement.

Other Contractor

Other Contractor means a contractor, other than the *Contractor* or a *Subcontractor*, engaged by the *Owner* for the *Project*.

Payment Legislation

Payment Legislation means such legislation, if any, in effect at the *Place of the Work* which governs payment under construction contracts.

Place of the Work

The *Place of the Work* is the designated site or location of the *Work* identified in the *Contract Documents*.

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Product

Product or *Products* means material, machinery, equipment, and fixtures forming part of the *Work*, but does not include *Construction Equipment*.

Project

The *Project* means the total construction contemplated of which the *Work* may be the whole or a part.

Ready-for-Takeover

Ready-for-Takeover shall have been attained when the conditions set out in paragraph 12.1.1 of GC 12.1 – READY-FOR-TAKEOVER have been met, as verified by the *Consultant* pursuant to paragraph 12.1.4.2 of GC 12.1 – READY-FOR-TAKEOVER.

Schedule of Prices

The *Schedule of Prices* is the schedule listed in Article A-3 – CONTRACT DOCUMENTS identifying items of work, units of measure, estimated quantities, and *Unit Prices*.

Shop Drawings

Shop Drawings are drawings, diagrams, illustrations, schedules, performance charts, brochures, *Product* data, and other data which the *Contractor* provides to illustrate details of portions of the *Work*.

Specifications

The *Specifications* are that portion of the *Contract Documents*, wherever located and whenever issued, consisting of the written requirements and standards for *Products*, systems, workmanship, quality, and the services necessary for the performance of the *Work*.

Subcontractor

A *Subcontractor* is a person or entity having a direct contract with the *Contractor* to perform a part or parts of the *Work* at the *Place of the Work*.

Substantial Performance of the Work

Substantial Performance of the Work is as defined in the lien legislation applicable to the *Place of the Work*.

Supplemental Instruction

A *Supplemental Instruction* is an instruction, not involving adjustment in the *Contract Price* or *Contract Time*, in the form of *Specifications*, *Drawings*, schedules, samples, models, or written instructions, consistent with the intent of the *Contract Documents*. It is to be issued by the *Consultant* to supplement the *Contract Documents* as required for the performance of the *Work*.

Supplier

A *Supplier* is a person or entity having a direct contract with the *Contractor* to supply *Products*.

Temporary Work

Temporary Work means temporary supports, structures, facilities, services, and other temporary items, excluding *Construction Equipment*, required for the execution of the *Work* but not incorporated into the *Work*.

Unit Price

A *Unit Price* is the amount payable for a single unit of *Work* as stated in the *Schedule of Prices*.

Value Added Taxes

Value Added Taxes means such sum as shall be levied upon the *Contract Price* by the Federal or any Provincial or Territorial Government and is computed as a percentage of the *Contract Price* and includes the Goods and Services Tax, the Quebec Sales Tax, the Harmonized Sales Tax, and any similar tax, the collection and payment of which have been imposed on the *Contractor* by tax legislation.

Work

The *Work* means the total construction and related services required by the *Contract Documents*.

Working Day

Working Day means a day other than a Saturday, Sunday, statutory holiday, or statutory vacation day that is observed by the construction industry in the area of the *Place of the Work*.

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GENERAL CONDITIONS

PART 1 GENERAL PROVISIONS

GC 1.1 CONTRACT DOCUMENTS

1.1.1 The intent of the *Contract Documents* is to include the labour, *Products* and services necessary for the performance of the *Work* by the *Contractor* in accordance with these documents. It is not intended, however, that the *Contractor* shall supply products or perform work not consistent with, not covered by, or not properly inferable from the *Contract Documents*.

1.1.2 The *Contract Documents* are complementary, and what is required by one shall be as binding as if required by all. Performance by the *Contractor* shall be required only to the extent consistent with the *Contract Documents*.

1.1.3 The *Contractor* shall review the *Contract Documents* for the purpose of facilitating co-ordination and execution of the *Work* by the *Contractor*.

1.1.4 The *Contractor* is not responsible for errors, omissions or inconsistencies in the *Contract Documents*. If there are perceived errors, omissions or inconsistencies discovered by or made known to the *Contractor*, the *Contractor* shall promptly report to the *Consultant* and shall not proceed with the work affected until the *Contractor* has received corrected or additional information from the *Consultant*.

1.1.5 If there is a conflict within the *Contract Documents*:

.1 the order of priority of documents, from highest to lowest, shall be

- the Agreement between *Owner* and *Contractor*,
- the Definitions,
- Supplementary Conditions,
- the General Conditions,
- Division 01 of the *Specifications*,
- technical *Specifications*,
- material and finishing schedules,
- the *Drawings*.

.2 *Drawings* of larger scale shall govern over those of smaller scale of the same date.

.3 dimensions shown on *Drawings* shall govern over dimensions scaled from *Drawings*.

.4 amended or later dated documents shall govern over earlier documents of the same type.

.5 noted materials and annotations shall govern over graphic indications.

1.1.6 Nothing contained in the *Contract Documents* shall create any contractual relationship between:

.1 the *Owner* and a *Subcontractor*, a *Supplier*, or their agent, employee, or other person performing any portion of the *Work*.

.2 the *Consultant* and the *Contractor*, a *Subcontractor*, a *Supplier*, or their agent, employee, or other person performing any portion of the *Work*.

1.1.7 Words and abbreviations which have well known technical or trade meanings are used in the *Contract Documents* in accordance with such recognized meanings.

1.1.8 References in the *Contract Documents* to the singular shall be considered to include the plural as the context requires.

1.1.9 Neither the organization of the *Specifications* nor the arrangement of *Drawings* shall control the *Contractor* in dividing the work among *Subcontractors* and *Suppliers*.

1.1.10 *Specifications*, *Drawings*, models, and copies thereof furnished by the *Consultant* are and shall remain the *Consultant*'s property, with the exception of the signed *Contract* sets, which shall belong to each party to the *Contract*. All *Specifications*, *Drawings* and models furnished by the *Consultant* are to be used only with respect to the *Work* and are not to be used on other work. These *Specifications*, *Drawings* and models are not to be copied or altered in any manner without the written authorization of the *Consultant*.

1.1.11 Physical models furnished by the *Contractor* at the *Owner*'s expense are the property of the *Owner*.

GC 1.2 LAW OF THE CONTRACT

1.2.1 The law of the *Place of the Work* shall govern the interpretation of the *Contract*.

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GC 1.3 RIGHTS AND REMEDIES

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

1.3.2 No action or failure to act by the *Owner*, the *Consultant* or the *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.

GC 1.4 ASSIGNMENT

1.4.1 Neither party to the *Contract* shall assign the *Contract* or a portion thereof without the written consent of the other, which consent shall not be unreasonably withheld.

PART 2 ADMINISTRATION OF THE CONTRACT

GC 2.1 AUTHORITY OF THE CONSULTANT

2.1.1 The *Consultant* will have authority to act on behalf of the *Owner* only to the extent provided in the *Contract Documents*, unless otherwise modified by written agreement as provided in paragraph 2.1.2.

2.1.2 The duties, responsibilities and limitations of authority of the *Consultant* as set forth in the *Contract Documents* shall be modified or extended only with the written consent of the *Owner*, the *Consultant* and the *Contractor*.

GC 2.2 ROLE OF THE CONSULTANT

2.2.1 The *Consultant* will provide administration of the *Contract* as described in the *Contract Documents*.

2.2.2 The *Consultant* will visit the *Place of the Work* at intervals appropriate to the progress of construction to:
- .1 become familiar with the progress and quality of the *Work*,
- .2 determine if the *Work* is proceeding in general conformity with the *Contract Documents*,
- .3 verify quantities of *Work* performed under a *Schedule of Prices* where *Unit Prices* form the basis for payment, and
- .4 verify amounts claimed under schedule of values where lump sum stipulated price forms the basis for payment of the *Contract Price*.

2.2.3 If the *Owner* and the *Consultant* agree, the *Consultant* will provide at the *Place of the Work*, one or more project representatives to assist in carrying out the *Consultant*'s responsibilities. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in writing to the *Contractor*.

2.2.4 Based on the *Consultant*'s observations and evaluation of the *Contractor*'s applications for payment, the *Consultant* will determine the amounts owing to the *Contractor* under the *Contract* and will issue certificates for payment as provided in Article A-5 of the Agreement – PAYMENT, GC 5.5 – PAYMENT and GC 5.7 – FINAL PAYMENT.

2.2.5 The *Consultant* will not be responsible for and will not have control, charge or supervision of construction means, methods, techniques, sequences, or procedures, or for safety precautions and programs required in connection with the *Work* in accordance with the applicable construction safety legislation, other regulations or general construction practice. The *Consultant* will not be responsible for the *Contractor*'s failure to perform the *Work* in accordance with the *Contract Documents*.

2.2.6 Except with respect to GC 5.1 – FINANCING INFORMATION REQUIRED OF THE OWNER, the *Consultant* will be, in the first instance, the interpreter of the requirements of the *Contract Documents*.

2.2.7 Matters in question relating to the performance of the *Work* or the interpretation of the *Contract Documents* shall be initially referred in writing to the *Consultant* by the party raising the question for interpretations and findings and copied to the other party.

2.2.8 Interpretations and findings of the *Consultant* shall be consistent with the intent of the *Contract Documents*. In making such interpretations and findings the *Consultant* will not show partiality to either the *Owner* or the *Contractor*.

2.2.9 The *Consultant*'s interpretations and findings will be given in writing to the parties within a reasonable time.

2.2.10 With respect to claims for a change in *Contract Price*, the *Consultant* will make findings as set out in GC 6.6 – CLAIMS FOR A CHANGE IN CONTRACT PRICE.

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2.2.11 The *Consultant* will have authority to reject work which in the *Consultant*'s opinion does not conform to the requirements of the *Contract Documents*. Whenever the *Consultant* considers it necessary or advisable, the *Consultant* will have authority to require inspection or testing of work, whether or not such work is fabricated, installed or completed. However, neither the authority of the *Consultant* to act nor any decision either to exercise or not to exercise such authority shall give rise to any duty or responsibility of the *Consultant* to the *Contractor*, *Subcontractors*, *Suppliers*, or their agents, employees, or other persons performing any of the *Work*.

2.2.12 During the progress of the *Work* the *Consultant* will furnish *Supplemental Instructions* to the *Contractor* with reasonable promptness or in accordance with a schedule for such instructions agreed to by the *Consultant* and the *Contractor*.

2.2.13 The *Consultant* will review and take appropriate action upon *Shop Drawings*, samples and other submittals by the *Contractor*, in accordance with the *Contract Documents*.

2.2.14 The *Consultant* will prepare *Change Orders* and *Change Directives* as provided in GC 6.2 – CHANGE ORDER and GC 6.3 – CHANGE DIRECTIVE.

2.2.15 The *Consultant* will conduct reviews of the *Work* to determine the date of *Substantial Performance of the Work* and verify that *Ready-for-Takeover* has been attained.

2.2.16 All certificates issued by the *Consultant* will be to the best of the *Consultant*'s knowledge, information and belief. By issuing any certificate, the *Consultant* does not guarantee the *Work* is correct or complete.

2.2.17 The *Consultant* will receive and review written warranties and related documents required by the *Contract* and provided by the *Contractor* and will forward such warranties and documents to the *Owner* for the *Owner*'s acceptance.

2.2.18 If the *Consultant*'s engagement is terminated, the *Owner* shall immediately engage a *Consultant* against whom the *Contractor* makes no reasonable objection and whose duties and responsibilities under the *Contract Documents* will be that of the former *Consultant*.

GC 2.3 REVIEW AND INSPECTION OF THE WORK

2.3.1 The *Owner* and the *Consultant* shall have access to the *Work* at all times. The *Contractor* shall provide sufficient, safe and proper facilities at all times for the review of the *Work* by the *Consultant* and the inspection of the *Work* by authorized agencies. If parts of the *Work* are in preparation at locations other than the *Place of the Work*, the *Owner* and the *Consultant* shall be given access to such work whenever it is in progress.

2.3.2 If work is designated for measurement for payment, tests, inspections or approvals in the *Contract Documents*, by the *Consultant*'s instructions, or by the laws or ordinances of the *Place of the Work*, the *Contractor* shall give the *Consultant* reasonable notification of when the work will be ready for measurements, tests, inspections, and approvals. The *Contractor* shall arrange for and shall give the *Consultant* reasonable notification of the date and time of inspections by other authorities.

2.3.3 The *Contractor* shall furnish promptly to the *Consultant* two copies of certificates and inspection reports relating to the *Work*.

2.3.4 If the *Contractor* covers, or permits to be covered, work that has been designated for measurement for payment, special tests, inspections, or approvals before such measurements, special tests, inspections, or approvals are made, given or completed, the *Contractor* shall, if so directed, uncover such work, have the measurements, special tests, inspections, and approvals satisfactorily completed, and make good covering work at the *Contractor*'s expense.

2.3.5 The *Consultant* may order any portion or portions of the *Work* to be examined to confirm that such work is in accordance with the requirements of the *Contract Documents*. If the work is not in accordance with the requirements of the *Contract Documents*, the *Contractor* shall correct the work and pay the cost of examination and correction. If the work is in accordance with the requirements of the *Contract Documents*, the *Owner* shall pay the cost of examination and restoration.

2.3.6 The *Contractor* shall pay the cost of making any test or inspection, including the cost of samples required for such test or inspection, if such test or inspection is designated in the *Contract Documents* to be performed by the *Contractor* or is required by the laws or ordinances applicable to the *Place of the Work*.

2.3.7 The *Contractor* shall pay the cost of samples required for any test or inspection to be performed by others if such test or inspection is designated in the *Contract Documents*.

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GC 2.4 DEFECTIVE WORK

2.4.1 The *Contractor* shall promptly correct defective work that has been rejected by the *Consultant* as failing to conform to the *Contract Documents* whether or not the defective work was incorporated in the *Work* or the defect is the result of poor workmanship, use of defective products or damage through carelessness or other act or omission of the *Contractor*.

2.4.2 The *Contractor* shall make good promptly *Other Contractors*' work destroyed or damaged by such corrections at the *Contractor*'s expense.

2.4.3 If in the opinion of the *Consultant* it is not expedient to correct defective work or work not performed as provided in the *Contract Documents*, the *Owner* may deduct from the amount otherwise due to the *Contractor* the difference in value between the work as performed and that called for by the *Contract Documents*. If the *Owner* and the *Contractor* do not agree on the difference in value, they shall refer the matter to the *Consultant* for a finding.

PART 3 EXECUTION OF THE WORK

GC 3.1 CONTROL OF THE WORK

3.1.1 The *Contractor* shall have total control of the *Work* and shall effectively direct and supervise the *Work* so as to ensure conformity with the *Contract Documents*.

3.1.2 The *Contractor* shall be solely responsible for construction means, methods, techniques, sequences, and procedures and for co-ordinating the various parts of the *Work* under the *Contract*.

GC 3.2 CONSTRUCTION BY THE OWNER OR OTHER CONTRACTORS

3.2.1 The *Owner* reserves the right to award separate contracts in connection with other parts of the *Project* to *Other Contractors* and to perform work with own forces.

3.2.2 When separate contracts are awarded for other parts of the *Project*, or when work is performed by the *Owner*'s own forces, the *Owner* shall:

.1 provide for the co-ordination of the activities and work of *Other Contractors* and the *Owner*'s own forces with the *Work* of the *Contract*;

.2 enter into separate contracts with *Other Contractors* under conditions of contract which are compatible with the conditions of the *Contract*;

.3 ensure that insurance coverage is provided to the same requirements as are called for in GC 11.1 – INSURANCE and co-ordinate such insurance with the insurance coverage of the *Contractor* as it affects the *Work*; and

.4 take all reasonable precautions to avoid labour disputes or other disputes on the *Project* arising from the work of *Other Contractors* or the *Owner*'s own forces.

3.2.3 When separate contracts are awarded for other parts of the *Project*, or when work is performed by the *Owner*'s own forces, the *Contractor* shall:

.1 afford the *Owner* and *Other Contractors* reasonable opportunity to store their products and execute their work;

.2 co-ordinate and schedule the *Work* with the work of *Other Contractors* or the *Owner*'s own forces that are identified in the *Contract Documents*;

.3 participate with *Other Contractors* and the *Owner* in reviewing their construction schedules when directed to do so; and

.4 report promptly to the *Consultant* in writing any apparent deficiencies in the work of *Other Contractors* or of the *Owner*'s own forces, where such work affects the proper execution of any portion of the *Work*, prior to proceeding with that portion of the *Work*.

3.2.4 Where a change in the *Work* is required as a result of the co-ordination and integration of the work of *Other Contractors* or *Owner*'s own forces with the *Work*, the changes shall be authorized and valued as provided in GC 6.1 – OWNER'S RIGHT TO MAKE CHANGES, GC 6.2 – CHANGE ORDER and GC 6.3 – CHANGE DIRECTIVE.

3.2.5 Disputes and other matters in question between the *Contractor* and *Other Contractors* shall be dealt with as provided in Part 8 of the General Conditions – DISPUTE RESOLUTION provided the *Other Contractors* have reciprocal obligations. The *Contractor* shall be deemed to have consented to arbitration of any dispute with any *Other Contractor* whose contract with the *Owner* contains a similar agreement to arbitrate. In the absence of *Other Contractors* having reciprocal obligations, disputes and other matters in question initiated by the *Contractor* against *Other Contractors* will be considered disputes and other matters in question between the *Contractor* and the *Owner*.

3.2.6 Should the *Owner*, the *Consultant*, *Other Contractors*, or anyone employed by them directly or indirectly be responsible for ill-timed work necessitating cutting or remedial work to be performed, the cost of such cutting or remedial work shall be valued as provided in GC 6.1 – OWNER'S RIGHT TO MAKE CHANGES, GC 6.2 – CHANGE ORDER and GC 6.3 – CHANGE DIRECTIVE.

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GC 3.3 TEMPORARY WORK

3.3.1 The *Contractor* shall have the sole responsibility for the design, erection, operation, maintenance, and removal of *Temporary Work* unless otherwise specified in the *Contract Documents*.

3.3.2 The *Contractor* shall engage and pay for registered professional engineering personnel skilled in the appropriate disciplines to perform those functions referred to in paragraph 3.3.1 where required by law or by the *Contract Documents* and in all cases where such *Temporary Work* is of such a nature that professional engineering skill is required to produce safe and satisfactory results.

3.3.3 Notwithstanding the provisions of GC 3.1 – CONTROL OF THE WORK, paragraphs 3.3.1 and 3.3.2 or provisions to the contrary elsewhere in the *Contract Documents* where such *Contract Documents* include designs for *Temporary Work* or specify a method of construction in whole or in part, such designs or methods of construction shall be considered to be part of the design of the *Work* and the *Contractor* shall not be held responsible for that part of the design or the specified method of construction. The *Contractor* shall, however, be responsible for the execution of such design or specified method of construction in the same manner as for the execution of the *Work*.

GC 3.4 CONSTRUCTION SCHEDULE

3.4.1 The *Contractor* shall:

.1 prepare and submit to the *Owner* and the *Consultant* prior to the first application for payment, a construction schedule that indicates the timing of the major activities of the *Work* and provides sufficient detail of the critical events and their inter-relationship to demonstrate the *Work* will be performed in conformity with the *Contract Time*;

.2 monitor the progress of the *Work* relative to the construction schedule and update the schedule on a monthly basis or as stipulated by the *Contract Documents*; and

.3 advise the *Consultant* of any revisions required to the schedule as the result of extensions of the *Contract Time* as provided in Part 6 of the General Conditions – CHANGES IN THE WORK.

GC 3.5 SUPERVISION

3.5.1 The *Contractor* shall provide all necessary supervision and appoint a competent representative who shall be in attendance at the *Place of the Work* while the *Work* is being performed. The appointed representative shall not be changed except for valid reason.

3.5.2 The appointed representative shall represent the *Contractor* at the *Place of the Work*. Information and instructions provided by the *Consultant* to the *Contractor*'s appointed representative shall be deemed to have been received by the *Contractor*, except with respect to Article A-6 of the Agreement – RECEIPT OF AND ADDRESSES FOR NOTICES IN WRITING.

GC 3.6 LAYOUT OF THE WORK

3.6.1 The *Owner* shall, in consultation with the *Consultant* and the *Contractor*, establish reference points for construction which are necessary for the *Contractor* to proceed with the *Work*.

3.6.2 The *Contractor* shall be responsible for laying out the *Work*, shall preserve and protect the established reference points, and shall not change or relocate the established reference points without the approval of the *Consultant*.

3.6.3 The *Contractor* shall advise the *Consultant* whenever any established reference point is lost, destroyed, damaged, or requires relocation as a result of the *Contractor*'s operations. The cost to reestablish any reference point that is lost, destroyed, damaged, or requires relocation as a result of the *Contractor*'s operations, shall be at the *Contractor*'s expense.

GC 3.7 SUBCONTRACTORS AND SUPPLIERS

3.7.1 The *Contractor* shall preserve and protect the rights of the parties under the *Contract* with respect to work to be performed under subcontract, and shall:

.1 enter into contracts or written agreements with *Subcontractors* and *Suppliers* to require them to perform their work as provided in the *Contract Documents*;

.2 incorporate the applicable terms and conditions of the *Contract Documents* into all contracts or written agreements with *Subcontractors* and *Suppliers*; and

.3 be as fully responsible to the *Owner* for acts and omissions of *Subcontractors*, *Suppliers* and any persons directly or indirectly employed by them as for acts and omissions of persons directly employed by the *Contractor*.

3.7.2 The *Contractor* shall indicate in writing, if requested by the *Owner*, those *Subcontractors* or *Suppliers* whose bids have been received by the *Contractor* which the *Contractor* would be prepared to accept for the performance of a portion of the *Work*. Should the *Owner* not object before signing the *Contract*, the *Contractor* shall employ those *Subcontractors* or *Suppliers* so identified by the *Contractor* in writing for the performance of that portion of the *Work* to which their bid applies.

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3.7.3 The *Owner* may, for reasonable cause, at any time before the *Owner* has signed the *Contract*, object to the use of a proposed *Subcontractor* or *Supplier* and require the *Contractor* to employ one of the other subcontract bidders.

3.7.4 If the *Owner* requires the *Contractor* to change a proposed *Subcontractor* or *Supplier*, the *Contract Price* and *Contract Time* shall be adjusted by the difference occasioned by such required change.

3.7.5 The *Contractor* shall not be required to employ as a *Subcontractor* or *Supplier*, a person or firm to which the *Contractor* may reasonably object.

3.7.6 The *Owner*, through the *Consultant*, may provide to a *Subcontractor* or *Supplier* information as to the percentage of the *Subcontractor*'s or *Supplier*'s work which has been certified for payment.

GC 3.8 LABOUR AND PRODUCTS

3.8.1 The *Contractor* shall maintain good order and discipline among the *Contractor*'s employees engaged on the *Work* and employ only workers that are skilled in the tasks assigned.

3.8.2 The *Contractor* shall provide and pay for labour, *Products*, tools, *Construction Equipment*, water, heat, light, power, transportation, and other facilities and services necessary for the performance of the *Work* in accordance with the *Contract*.

3.8.3 Unless otherwise specified in the *Contract Documents*, *Products* provided shall be new. *Products* which are not specified shall be of a quality consistent with those specified and their use acceptable to the *Consultant*.

GC 3.9 SHOP DRAWINGS

3.9.1 The *Contractor* shall provide *Shop Drawings* as required in the *Contract Documents*.

3.9.2 The *Contractor* shall provide *Shop Drawings* to the *Consultant* to review in accordance with an agreed schedule, or in the absence of an agreed schedule, in orderly sequence and sufficiently in advance so as to cause no delay in the *Work* or in the work of *Other Contractors* or the *Owner*'s own forces.

3.9.3 The *Contractor* shall review all *Shop Drawings* before providing them to the *Consultant*. The *Contractor* represents by this review that:

.1 the *Contractor* has determined and verified all applicable field measurements, field construction conditions, *Product* requirements, catalogue numbers and similar data, or will do so, and

.2 the *Contractor* has checked and co-ordinated each *Shop Drawing* with the requirements of the *Work* and of the *Contract Documents*.

3.9.4 The *Consultant*'s review is for conformity to the design concept and for general arrangement only.

3.9.5 At the time of providing *Shop Drawings*, the *Contractor* shall expressly advise the *Consultant* in writing of any deviations in a *Shop Drawing* from the requirements of the *Contract Documents*. The *Consultant* shall indicate the acceptance or rejection of such deviation expressly in writing.

3.9.6 The *Consultant*'s review shall not relieve the *Contractor* of responsibility for errors or omissions in the *Shop Drawings* or for meeting all requirements of the *Contract Documents*.

3.9.7 The *Consultant* will review and return *Shop Drawings* in accordance with the schedule agreed upon, or, in the absence of such schedule, with reasonable promptness so as to cause no delay in the performance of the *Work*.

PART 4 ALLOWANCES

GC 4.1 CASH ALLOWANCES

4.1.1 The *Contract Price* includes the cash allowances, if any, stated in the *Contract Documents*. The scope of the *Work* or costs included in such cash allowances shall be as described in the *Contract Documents*.

4.1.2 The *Contract Price*, and not the cash allowances, includes the *Contractor*'s overhead and profit in connection with such cash allowances.

4.1.3 Expenditures under cash allowances shall be authorized by the *Owner* through the *Consultant*.

4.1.4 Where the actual cost of the *Work* under any cash allowance exceeds the amount of the allowance, any unexpended amounts from other cash allowances shall be reallocated, at the *Consultant*'s direction, to cover the shortfall, and, in that case, there shall be no additional amount added to the *Contract Price* for overhead and profit. Only where the actual cost of the *Work* under all cash allowances exceeds the total amount of all cash allowances shall the *Contractor* be compensated for the excess incurred and substantiated, plus an amount for overhead and profit on the excess only, as set out in the *Contract Documents*.

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4.1.5 The net amount of any unexpended cash allowances, after providing for any reallocations as contemplated in paragraph 4.1.4, shall be deducted from the *Contract Price* by *Change Order* without any adjustment for the *Contractor*'s overhead and profit on such amount.

4.1.6 The value of the *Work* performed under a cash allowance is eligible to be included in progress payments.

4.1.7 The *Contractor* and the *Consultant* shall jointly prepare a schedule that shows when the items called for under cash allowances must be ordered to avoid delaying the progress of the *Work*.

GC 4.2 CONTINGENCY ALLOWANCE

4.2.1 The *Contract Price* includes the contingency allowance, if any, stated in the *Contract Documents*.

4.2.2 The contingency allowance includes the *Contractor*'s overhead and profit in connection with such contingency allowance.

4.2.3 Expenditures under the contingency allowance shall be authorized and valued as provided in GC 6.1 – OWNER'S RIGHT TO MAKE CHANGES, GC 6.2 – CHANGE ORDER and GC 6.3 – CHANGE DIRECTIVE.

4.2.4 The *Contract Price* shall be adjusted by *Change Order* to provide for any difference between the expenditures authorized under paragraph 4.2.3 and the contingency allowance.

PART 5 PAYMENT

GC 5.1 FINANCING INFORMATION REQUIRED OF THE OWNER

5.1.1 The *Owner* shall, at the request of the *Contractor*, before signing the *Contract*, and promptly from time to time thereafter, furnish to the *Contractor* reasonable evidence that financial arrangements have been made to fulfill the *Owner*'s obligations under the *Contract*.

5.1.2 The *Owner* shall give the *Contractor Notice in Writing* of any material change in the *Owner*'s financial arrangements to fulfil the *Owner*'s obligations under the *Contract* during the performance of the *Contract*.

GC 5.2 BASIS OF PAYMENT FOR UNIT PRICE WORK

5.2.1 Payment for *Unit Price Work* shall be based on the *Unit Prices* in the *Contract*.

5.2.2 The *Contractor* shall measure the *Work* and the *Consultant* will verify such measurements to determine payment to the *Contractor* in accordance with the measurement provisions of the *Contract Documents*.

GC 5.3 BASIS OF PAYMENT FOR LUMP SUM WORK

5.3.1 Payment for lump sum *Work* shall be based on the stipulated price(s) in the *Contract*.

GC 5.4 APPLICATIONS FOR PAYMENT

5.4.1 Applications for payment on account as provided in Article A-5 of the Agreement – PAYMENT shall be submitted monthly to the *Owner* and the *Consultant* simultaneously as the *Work* progresses.

5.4.2 Applications for payment shall be dated the last day of each payment period, which is the last day of the month or an alternative day of the month agreed in writing by the parties.

5.4.3 Where the basis of payment of the *Contract Price* is *Unit Prices*, applications for payment shall include quantity measurements and any other data requested by the *Consultant* to assist the *Consultant* in evaluating the application and verifying quantity measurements.

5.4.4 Where the basis of payment of the *Contract Price* is a lump sum stipulated price:

.1 the *Contractor* shall submit to the *Consultant*, at least 15 calendar days before the first application for payment, a schedule of values for the parts of the *Work*, aggregating the total amount of the *Contract Price*, so as to facilitate evaluation of applications for payment;

.2 the schedule of values shall be made out in such form as specified in the *Contract* and supported by such evidence as the *Consultant* may reasonably require;

.3 applications for payment shall be based on the schedule of values accepted by the *Consultant*, and

.4 the amount claimed shall be for the value, proportionate to the amount of the *Contract*, of *Work* performed and *Products* delivered to the *Place of the Work* as of the last day of the payment period.

5.4.5 Applications for payment shall comply with the provisions of *Payment Legislation*.

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5.4.6 Each application for payment shall include evidence of compliance with workers' compensation legislation at the *Place of the Work* and after the first payment, a declaration by the *Contractor* as to the distribution made of the amounts previously received using document CCDC 9A 'Statutory Declaration'.

5.4.7 Applications for payment for *Products* delivered to the *Place of the Work* but not yet incorporated into the *Work* shall be supported by such evidence as the *Consultant* may reasonably require to establish the value and delivery of the *Products*.

GC 5.5 PAYMENT

5.5.1 After receipt by the *Consultant* and the *Owner* of an application for payment submitted by the *Contractor* in accordance with GC 5.4 – APPLICATIONS FOR PAYMENT:

.1 The *Consultant* will issue to the *Owner* and copy to the *Contractor*, no later than 10 calendar days after the receipt of the application for payment, a certificate for payment in the amount applied for, or in such other amount as the *Consultant* determines to be properly due. If the *Consultant* certifies a different amount, or rejects the application or part thereof, the *Owner* shall promptly issue a written notice to the *Contractor* giving reasons for the revision or rejection, such written notice to be in compliance with *Payment Legislation*,

.2 The *Owner* shall make payment to the *Contractor* on account as provided in Article A-5 of the Agreement – PAYMENT on or before 28 calendar days after the receipt by the *Owner* and the *Consultant* of the application for payment, and in any event, in compliance with *Payment Legislation*.

5.5.2 Where the basis of payment for an item is by *Unit Price*, quantities in progress payments shall be considered estimate until all *Work* required by that *Unit Price* item is complete.

GC 5.6 SUBSTANTIAL PERFORMANCE OF THE WORK AND PAYMENT OF HOLDBACK

5.6.1 The *Consultant* will review the *Work* to certify or verify the validity of the application for *Substantial Performance of the Work* and will promptly, and in any event, no later than 20 calendar days after receipt of the *Contractor*'s application:

.1 advise the *Contractor* in writing that the *Work* or the designated portion of the *Work* is not substantially performed and give reasons why, or

.2 state the date of *Substantial Performance of the Work* or a designated portion of the *Work* in a certificate and issue a copy of that certificate to each of the *Owner* and the *Contractor*.

5.6.2 Where the holdback amount required by the applicable lien legislation has not been placed in a separate lien holdback account, the *Owner* shall, no later than 10 calendar days prior to the expiry of the holdback period stipulated in the lien legislation applicable to the *Place of the Work*, place the holdback amount in a bank account in the joint names of the *Owner* and the *Contractor*.

5.6.3 Subject to the requirements of any *Payment Legislation*, all holdback amount prescribed by the applicable lien legislation for the *Work* shall become due and payable to the *Contractor* no later than 10 *Working Days* following the expiration of the holdback period stipulated in the lien legislation applicable to the *Place of the Work*.

5.6.4 The *Contractor* shall submit an application for payment of the lien holdback amount in accordance with GC 5.5 –PAYMENT.

5.6.5 Where legislation permits progressive release of the holdback for a portion of the *Work* and the *Consultant* has certified or verified that the part of the *Work* has been performed prior to *Substantial Performance of the Work*, the *Owner* hereby agrees to release, and shall release, such portion to the *Contractor* in accordance with such legislation.

5.6.6 Notwithstanding any progressive release of the holdback, the *Contractor* shall ensure that such parts of the *Work* are protected pending the issuance of a final certificate for payment and be responsible for the correction of defects or work not performed regardless of whether or not such was apparent when the holdback was released.

GC 5.7 FINAL PAYMENT

5.7.1 When the *Contractor* considers that the *Work* is completed, the *Contractor* shall submit an application for final payment.

5.7.2 The *Consultant* will, no later than 10 calendar days after the receipt of an application from the *Contractor* for final payment, review the *Work* to verify the validity of the application and when the *Consultant* finds the *Contractor*'s application for final payment valid, the *Consultant* will promptly issue a final certificate for payment to the *Owner*, with a copy to the *Contractor*.

5.7.3 If the *Consultant* rejects the application or part thereof, the *Owner* will promptly issue a written notice to the *Contractor* giving reasons for the revision or rejection, such written notice to be in compliance with *Payment Legislation*.

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5.7.4 Subject to the provision of paragraph 10.4.1 of GC 10.4 – WORKERS' COMPENSATION, and any legislation applicable to the *Place of the Work*, the *Owner* shall, no later than 5 calendar days after the issuance of a final certificate for payment, pay the *Contractor* as provided in Article A-5 of the Agreement – PAYMENT and in any event, in compliance with *Payment Legislation*.

GC 5.8 DEFERRED WORK

5.8.1 If because of climatic or other conditions reasonably beyond the control of the *Contractor*, or if the *Owner* and the *Contractor* agree that, there are items of work that must be deferred, payment in full for that portion of the *Work* which has been performed as certified by the *Consultant* shall not be withheld or delayed by the *Owner* on account thereof, but the *Owner* may withhold, until the remaining portion of the *Work* is finished, only such an amount that the *Consultant* determines is sufficient and reasonable to cover the cost of performing such deferred *Work*.

GC 5.9 NON-CONFORMING WORK

5.9.1 No payment by the *Owner* under the *Contract* nor partial or entire use or occupancy of the *Work* by the *Owner* shall constitute an acceptance of any portion of the *Work* or *Products* which are not in accordance with the requirements of the *Contract Documents*.

PART 6 CHANGES IN THE WORK

GC 6.1 OWNER'S RIGHT TO MAKE CHANGES

6.1.1 The *Owner*, through the *Consultant*, without invalidating the *Contract*, may make:
- .1 changes in the *Work* consisting of additions, deletions or other revisions to the *Work* by *Change Order* or *Change Directive*, and
- .2 changes to the *Contract Time* for the *Work*, or any part thereof, by *Change Order*.

6.1.2 The *Contractor* shall not perform a change in the *Work* without a *Change Order* or a *Change Directive*.

GC 6.2 CHANGE ORDER

6.2.1 When a change in the *Work* is proposed or required, the *Consultant* will provide the *Contractor* with a written description of the proposed change in the *Work*. The *Contractor* shall promptly present to the *Consultant*, in a form that can be reasonably evaluated, a method of adjustment or an amount of adjustment for the *Contract Price*, if any, and the adjustment in the *Contract Time*, if any, for the proposed change in the *Work*.

6.2.2 The method of adjustment of the *Contract Price* presented by the *Contractor* may be:
- .1 *Unit Prices* listed in the *Schedule of Prices* that are applicable to the change in the *Work* or, if *Unit Prices* listed in the *Schedule of Prices* are not directly applicable, by unit prices deduced or extrapolated from such *Unit Prices*,
- .2 a lump sum or unit price quotation, or
- .3 the cost plus method.

6.2.3 When the *Owner* and the *Contractor* agree to the adjustments in the *Contract Price* and *Contract Time* or to the method to be used to determine the adjustments, such agreement shall be effective immediately and shall be recorded in a *Change Order*. The value of the work performed as the result of a *Change Order* shall be included in the applications for progress payment.

GC 6.3 CHANGE DIRECTIVE

6.3.1 If the *Owner* requires the *Contractor* to proceed with a change in the *Work* prior to the *Owner* and the *Contractor* agreeing upon the corresponding adjustment in *Contract Price* and *Contract Time*, the *Owner*, through the *Consultant*, shall issue a *Change Directive*.

6.3.2 A *Change Directive* shall only be used to direct a change in the *Work* which is within the general scope of the *Contract Documents*.

6.3.3 A *Change Directive* shall not be used to direct a change in the *Contract Time* only.

6.3.4 Upon receipt of a *Change Directive*, the *Contractor* shall proceed promptly with the change in the *Work*.

6.3.5 For the purpose of valuing *Change Directives*, changes in the *Work* that are not substitutions or otherwise related to each other shall not be grouped together in the same *Change Directive*.

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6.3.6 The adjustment in the *Contract Price* for a change carried out by way of a *Change Directive* shall be determined on the basis of the cost of the *Contractor*'s actual expenditures and savings attributable to the *Change Directive*, valued in accordance with paragraph 6.3.7 and as follows:

.1 If the change results in a net increase in the *Contractor*'s cost, the *Contract Price* shall be increased by the amount of the net increase in the *Contractor*'s cost, plus the *Contractor*'s percentage fee on such net increase.

.2 If the change results in a net decrease in the *Contractor*'s cost, the *Contract Price* shall be decreased by the amount of the net decrease in the *Contractor*'s cost, without adjustment for the *Contractor*'s percentage fee.

.3 The *Contractor*'s fee shall be as specified in the *Contract Documents* or as otherwise agreed by the parties.

6.3.7 The cost of performing the work attributable to the *Change Directive* shall be limited to the actual cost of the following in as much as it contributes directly to the implementation of the *Change Directive*:

Labour

.1 rates that are listed in the schedule or as agreed by the *Owner* and the *Contractor* including wages, benefits, compensation, contributions, assessments, or taxes incurred for such items as employment insurance, provincial or territorial health insurance, workers' compensation, and Canada or Quebec Pension Plan for:

(1) trade labour in the direct employ of the *Contractor*;

(2) the *Contractor*'s personnel when stationed at the field office;

(3) the *Contractor*'s personnel engaged at shops or on the road, in expediting the production or transportation of materials or equipment; and

(4) the *Contractor*'s office personnel engaged in a technical capacity, or other personnel identified in Article A-3 of the Agreement – CONTRACT DOCUMENTS for the time spent in the performance of the *Work*.

Products, Construction Equipment and Temporary Work

.2 cost of all *Products* including cost of transportation thereof;

.3 in the absence of agreed rates, cost less salvage value of *Construction Equipment*, *Temporary Work* and tools, exclusive of hand tools under $1,000 owned by the *Contractor*;

.4 rental cost of *Construction Equipment*, *Temporary Work* and tools, exclusive of hand tools under $1,000;

.5 cost of all equipment and services required for the *Contractor*'s field office;

Subcontract

.6 subcontract amounts of *Subcontractor* with pricing mechanism approved by the *Owner*;

Others

.7 travel and subsistence expenses of the *Contractor*'s personnel described in paragraph 6.3.7.1;

.8 deposits lost provided that they are not caused by negligent acts or omissions of the *Contractor*;

.9 cost of quality assurance such as independent inspection and testing services;

.10 charges levied by authorities having jurisdiction at the *Place of the Work*;

.11 royalties, patent license fees, and damages for infringement of patents and cost of defending suits therefor subject always to the *Contractor*'s obligations to indemnify the *Owner* as provided in paragraph 10.3.1 of GC 10.3 – PATENT FEES;

.12 premium for all contract securities and insurance for which the *Contractor* is required, by the *Contract Documents*, to provide, maintain and pay in relation to the performance of the *Work*;

.13 losses and expenses sustained by the *Contractor* for matters which are the subject of insurance under the policies prescribed in GC 11.1 – INSURANCE when such losses and expenses are not recoverable because the amounts are in excess of collectible amounts or within the deductible amounts;

.14 taxes and duties, other than *Value Added Taxes*, income, capital, or property taxes, relating to the *Work* for which the *Contractor* is liable;

.15 charges for voice and data communications, courier services, expressage, transmittal and reproduction of documents, and petty cash items;

.16 cost for removal and disposal of waste products and debris;

.17 legal costs, incurred by the *Contractor*, in relation to the performance of the *Work* provided that they are not:

(1) relating to a dispute between the *Owner* and the *Contractor* unless such costs are part of a settlement or awarded by arbitration or court,

(2) the result of the negligent acts or omissions of the *Contractor*, or

(3) the result of a breach of this *Contract* by the *Contractor*;

.18 cost of auditing when requested by the *Owner*; and

.19 cost of *Project* specific information technology in accordance with the method determined by the parties.

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6.3.8 Notwithstanding any other provisions contained in the General Conditions of the *Contract*, it is the intention of the parties that the cost of any item under any cost element referred to in paragraph 6.3.7 shall cover and include any and all costs or liabilities attributable to the *Change Directive* other than those which are the result of or occasioned by any failure on the part of the *Contractor* to exercise reasonable care and diligence in the *Contractor*'s attention to the *Work*. Any cost due to failure on the part of the *Contractor* to exercise reasonable care and diligence in the *Contractor*'s performance of the *Work* attributable to the *Change Directive* shall be borne by the *Contractor*.

6.3.9 The *Contractor* shall keep full and detailed accounts and records necessary for the documentation of the cost of performing the *Work* attributable to the *Change Directive* and shall provide the *Consultant* with copies thereof.

6.3.10 For the purpose of valuing *Change Directives*, the *Owner* shall be afforded reasonable access to all of the *Contractor*'s pertinent documents related to the cost of performing the *Work* attributable to the *Change Directive*.

6.3.11 Pending determination of the final amount of a *Change Directive*, the undisputed value of the *Work* performed as the result of a *Change Directive* is eligible to be included in progress payments.

6.3.12 If the *Owner* and the *Contractor* do not agree on the proposed adjustment in the *Contract Time* attributable to the change in the *Work*, or the method of determining it, the adjustment shall be referred to the *Consultant* for a finding.

6.3.13 When the *Owner* and the *Contractor* reach agreement on the adjustment to the *Contract Price* and to the *Contract Time*, this agreement shall be recorded in a *Change Order*.

GC 6.4 CONCEALED OR UNKNOWN CONDITIONS

6.4.1 If the *Owner* or the *Contractor* discover conditions at the *Place of the Work* which are:

.1 subsurface or otherwise concealed physical conditions which existed before the commencement of the *Work* and differ materially from those indicated in the *Contract Documents*; or

.2 physical conditions, other than conditions due to weather, that are of a nature which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the *Contract Documents*,

then the observing party shall give *Notice in Writing* to the other party of such conditions before they are disturbed and in no event later than 5 *Working Days* after first observance of the conditions.

6.4.2 The *Consultant* will promptly investigate such conditions and make a finding. If the finding is that the conditions differ materially and this would cause an increase or decrease in the *Contractor*'s cost or time to perform the *Work*, the *Owner*, through the *Consultant*, shall issue appropriate instructions for a change in the *Work* as provided in GC 6.2 – CHANGE ORDER or GC 6.3 – CHANGE DIRECTIVE.

6.4.3 If the *Consultant* finds that the conditions at the *Place of the Work* are not materially different or that no change in the *Contract Price* or the *Contract Time* is justified, the *Consultant* will promptly inform the *Owner* and the *Contractor* in writing.

6.4.4 The *Contractor* shall not be entitled to an adjustment in the *Contract Price* or the *Contract Time* if such conditions were reasonably apparent prior to the time of bid closing.

GC 6.5 DELAYS

6.5.1 If the *Contractor* is delayed in the performance of the *Work* by the *Owner*, the *Consultant*, or anyone employed or engaged by them directly or indirectly, contrary to the provisions of the *Contract Documents*, then the *Contract Time* shall be extended for such reasonable time as the *Consultant* may recommend in consultation with the *Contractor*. The *Contractor* shall be reimbursed by the *Owner* for reasonable costs incurred by the *Contractor* as the result of such delay.

6.5.2 If the *Contractor* is delayed in the performance of the *Work* by a stop work order issued by a court or other public authority and providing that such order was not issued as the result of an act or fault of the *Contractor* or any person employed or engaged by the *Contractor* directly or indirectly, resulting in the failure of the *Contractor* to attain *Ready-for-Takeover* by the date stipulated in Article A-1 of the Agreement – THE WORK, then the *Contract Time* shall be extended for such reasonable time as the *Consultant* may recommend in consultation with the *Contractor*. The *Contractor* shall be reimbursed by the *Owner* for reasonable costs incurred by the *Contractor* as the result of such delay.

6.5.3 If the *Contractor* is delayed in the performance of the *Work* by:

.1 labour disputes, strikes, lock-outs (including lock-outs decreed or recommended for its members by a recognized contractors' association, of which the *Contractor* is a member or to which the *Contractor* is otherwise bound),

.2 fire, unusual delay by common carriers or unavoidable casualties,

.3 abnormally adverse weather conditions, or

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.4 any cause beyond the *Contractor*'s control other than one resulting from a default or breach of *Contract* by the *Contractor*, then the *Contract Time* shall be extended for such reasonable time as the *Consultant* may recommend in consultation with the *Contractor*. The extension of time shall not be less than the time lost as the result of the event causing the delay, unless the *Contractor* agrees to a shorter extension. The *Contractor* shall not be entitled to payment for costs incurred by such delays unless such delays result from actions by the *Owner*, the *Consultant* or anyone employed or engaged by them directly or indirectly.

6.5.4 No extension shall be made for delay unless *Notice in Writing* of the cause of delay is given to the *Consultant* not later than 10 *Working Days* after the commencement of the delay. In the case of a continuing cause of delay only one *Notice in Writing* shall be necessary.

6.5.5 If no schedule is made under paragraph 2.2.12 of GC 2.2 – ROLE OF THE CONSULTANT, then no request for extension shall be made because of failure of the *Consultant* to furnish instructions until 10 *Working Days* after demand for such instructions has been made.

GC 6.6 CLAIMS FOR A CHANGE IN CONTRACT PRICE

6.6.1 If the *Contractor* intends to make a claim for an increase to the *Contract Price*, or if the *Owner* intends to make a claim against the *Contractor* for a credit to the *Contract Price*, the party that intends to make the claim shall give timely *Notice in Writing* of intent to claim to the other party and to the *Consultant* but no later than 10 *Working Days* after commencement of the event or series of events giving rise to the claim. Failure to provide such *Notice in Writing* shall invalidate the claim.

6.6.2 Upon commencement of the event or series of events giving rise to a claim, the party intending to make the claim shall:
.1 take all reasonable measures to mitigate any loss or expense which may be incurred as a result of such event or series of events, and
.2 keep such records as may be necessary to support the claim.

6.6.3 Within 30 *Working Days* after commencement of the event or series of events giving rise to the claim, or such other reasonable time as may be agreed by the *Consultant*, the party making the claim shall submit to the *Consultant* a detailed account of the amount claimed and the grounds upon which the claim is based and the *Consultant* will make a finding upon such claim.

6.6.4 Where the event or series of events giving rise to the claim has a continuing effect, the detailed account submitted under paragraph 6.6.3 shall be considered to be an interim account and the party making the claim shall, at such intervals as the *Consultant* may reasonably require, submit further interim accounts giving the accumulated amount of the claim and any further grounds upon which it is based. The party making the claim shall submit a final account after the end of the effects resulting from the event or series of events.

6.6.5 The *Consultant*'s findings, with respect to a claim made by either party, will be given by *Notice in Writing* to both parties within 30 *Working Days* after receipt of the claim by the *Consultant*, or within such other time period as may be agreed by the parties.

6.6.6 If such finding is not acceptable to either party, the claim shall be settled in accordance with Part 8 of the General Conditions – DISPUTE RESOLUTION.

GC 6.7 QUANTITY VARIATIONS

6.7.1 The *Owner* or the *Contractor* may request an adjustment to a *Unit Price* contained in the *Schedule of Prices* provided that the actual quantity of the item in the *Schedule of Prices* exceeds or falls short of the estimated quantity by more than 15%.

6.7.2 Where the actual quantity exceeds the estimated quantity by more than 15%, a *Unit Price* adjusted pursuant to paragraph 6.7.1 shall apply only to the quantity that exceeds 115% of the estimated quantity.

6.7.3 Where the actual quantity falls short of the estimated quantity by more than 15%, a *Unit Price* adjusted pursuant to paragraph 6.7.1 shall not exceed the *Unit Price* that would cause the extended amount to equal the original extended amount derived from the original *Unit Price* and estimated quantity.

6.7.4 If either party requests adjustment of a *Unit Price*, both parties shall make all reasonable efforts to agree on a revised *Unit Price*. The agreed revised *Unit Price* shall be recorded in a *Change Order*.

6.7.5 If agreement on a revised *Unit Price* is not reached, the matter shall be subject to final determination in accordance with Part 8 of the General Conditions – DISPUTE RESOLUTION. Pending determination of the revised *Unit Price*, payment for the *Work* performed shall be included in progress payments based on the unrevised *Unit Price*.

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PART 7 DEFAULT NOTICE

GC 7.1 OWNER'S RIGHT TO PERFORM THE WORK, TERMINATE THE CONTRACTOR'S RIGHT TO CONTINUE WITH THE WORK OR TERMINATE THE CONTRACT

7.1.1 If the *Contractor* is adjudged bankrupt, or makes a general assignment for the benefit of creditors because of the *Contractor*'s insolvency, or if a receiver is appointed because of the *Contractor*'s insolvency, the *Owner* may, without prejudice to any other right or remedy the *Owner* may have, terminate the *Contractor*'s right to continue with the *Work*, by giving the *Contractor* or receiver or trustee in bankruptcy *Notice in Writing* to that effect.

7.1.2 If the *Contractor* neglects to perform the *Work* properly or otherwise fails to comply with the requirements of the *Contract* to a substantial degree and if the *Consultant* has given a written statement to the *Owner* and *Contractor* which provides the detail of such neglect to perform the *Work* properly or such failure to comply with the requirements of the *Contract* to a substantial degree, the *Owner* may, without prejudice to any other right or remedy the *Owner* may have, give the *Contractor Notice in Writing*, containing particulars of the default including references to applicable provisions of the *Contract*, that the *Contractor* is in default of the *Contractor*'s contractual obligations and instruct the *Contractor* to correct the default in the 5 *Working Days* immediately following the receipt of such *Notice in Writing*.

7.1.3 If the default cannot be corrected in the 5 *Working Days* specified or in such other time period as may be subsequently agreed in writing by the parties, the *Contractor* shall be in compliance with the *Owner*'s instructions if the *Contractor*:

.1 commences the correction of the default within the specified time,
.2 provides the *Owner* with an acceptable schedule for such correction, and
.3 corrects the default in accordance with the *Contract* terms and with such schedule.

7.1.4 If the *Contractor* fails to correct the default in the time specified or in such other time period as may be subsequently agreed in writing by the parties, without prejudice to any other right or remedy the *Owner* may have, the *Owner* may by giving *Notice in Writing*:

.1 correct such default and deduct the cost thereof from any payment then or thereafter due the *Contractor* for the *Work* provided the *Consultant* has certified such cost to the *Owner* and the *Contractor*, or
.2 terminate the *Contractor*'s right to continue with the *Work* in whole or in part or terminate the *Contract*.

7.1.5 If the *Owner* terminates the *Contractor*'s right to continue with the *Work* as provided in paragraphs 7.1.1 and 7.1.4, the *Owner* shall be entitled to:

.1 take possession of the *Work* and *Products* at the *Place of the Work*; subject to the rights of third parties, utilize the *Construction Equipment* at the *Place of the Work*; finish the *Work* by whatever method the *Owner* may consider expedient, but without undue delay or expense,
.2 withhold further payment to the *Contractor* until a final certificate for payment is issued,
.3 charge the *Contractor* the amount by which the full cost of finishing the *Work* as certified by the *Consultant*, including compensation to the *Consultant* for the *Consultant*'s additional services and a reasonable allowance as determined by the *Consultant* to cover the cost of corrections to work performed by the *Contractor* that may be required under GC 12.3 – WARRANTY, exceeds the unpaid balance of the *Contract Price*; however, if such cost of finishing the *Work* is less than the unpaid balance of the *Contract Price*, the *Owner* shall pay the *Contractor* the difference, and
.4 on expiry of the warranty period, charge the *Contractor* the amount by which the cost of corrections to the *Contractor*'s work under GC 12.3 – WARRANTY exceeds the allowance provided for such corrections, or if the cost of such corrections is less than the allowance, pay the *Contractor* the difference.

7.1.6 The *Contractor*'s obligation under the *Contract* as to quality, correction and warranty of the work performed by the *Contractor* up to the time of termination shall continue in force after such termination of the *Contract*.

GC 7.2 CONTRACTOR'S RIGHT TO SUSPEND THE WORK OR TERMINATE THE CONTRACT

7.2.1 If the *Owner* is adjudged bankrupt, or makes a general assignment for the benefit of creditors because of the *Owner*'s insolvency, or if a receiver is appointed because of the *Owner*'s insolvency, the *Contractor* may, without prejudice to any other right or remedy the *Contractor* may have, terminate the *Contract* by giving the *Owner* or receiver or trustee in bankruptcy *Notice in Writing* to that effect.

7.2.2 If the *Work* is suspended or otherwise delayed for a period of 20 *Working Days* or more under an order of a court or other public authority and providing that such order was not issued as the result of an act or fault of the *Contractor* or of anyone directly or indirectly employed or engaged by the *Contractor*, the *Contractor* may, without prejudice to any other right or remedy the *Contractor* may have, terminate the *Contract* by giving the *Owner Notice in Writing* to that effect.

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7.2.3 The *Contractor* may give *Notice in Writing* to the *Owner*, with a copy to the *Consultant*, that the *Owner* is in default of the *Owner*'s contractual obligations if:

.1 the *Owner* fails to furnish, when so requested by the *Contractor*, reasonable evidence that financial arrangements have been made to fulfill the *Owner*'s obligations under the *Contract*,

.2 the *Consultant* fails to issue a certificate as provided in Part 5 of the General Conditions – PAYMENT,

.3 the *Owner* fails to pay the *Contractor* when due the amounts certified by the *Consultant* or awarded by adjudication, arbitration or court, or

.4 the *Owner* fails to comply with the requirements of the *Contract* to a substantial degree and the *Consultant*, except for GC 5.1 – FINANCING INFORMATION REQUIRED OF THE OWNER, gives a written statement to the *Owner* and the *Contractor* that provides detail of such failure to comply with the requirements of the *Contract* to a substantial degree.

7.2.4 The *Contractor*'s *Notice in Writing* to the *Owner* provided under paragraph 7.2.3 shall advise that if the default is not corrected within 5 *Working Days* following the receipt of the *Notice in Writing*, the *Contractor* may, without prejudice to any other right or remedy the *Contractor* may have, suspend the *Work* or terminate the *Contract*.

7.2.5 If the *Contractor* terminates the *Contract* by giving a *Notice in Writing* to the *Owner* under the conditions set out above, the *Contractor* shall be entitled to be paid for all work performed including reasonable profit, for loss sustained upon *Products* and *Construction Equipment*, and such other damages as the *Contractor* may have sustained as a result of the termination of the *Contract*.

PART 8 DISPUTE RESOLUTION

GC 8.1 AUTHORITY OF THE CONSULTANT

8.1.1 Differences between the parties to the *Contract* as to the interpretation, application or administration of the *Contract* or any failure to agree where agreement between the parties is called for, herein collectively called disputes, which are not resolved in the first instance by findings of the *Consultant* as provided in GC 2.2 – ROLE OF THE CONSULTANT, shall be settled in accordance with the requirements of Part 8 of the General Conditions – DISPUTE RESOLUTION.

8.1.2 If a dispute arises under the *Contract* in respect of a matter in which the *Consultant* has no authority under the *Contract* to make a finding, the procedures set out in paragraph 8.1.3 and paragraphs 8.3.3 to 8.3.8 of GC 8.3 – NEGOTIATION, MEDIATION AND ARBITRATION, and in GC 8.4 – RETENTION OF RIGHTS apply to that dispute with the necessary changes to detail as may be required.

8.1.3 If a dispute is not resolved promptly, the *Consultant* will give such instructions as in the *Consultant*'s opinion are necessary for the proper performance of the *Work* and to prevent delays pending settlement of the dispute. The parties shall act immediately according to such instructions, it being understood that by so doing neither party will jeopardize any claim the party may have. If it is subsequently determined that such instructions were in error or at variance with the *Contract Documents*, the *Owner* shall pay the *Contractor* costs incurred by the *Contractor* in carrying out such instructions which the *Contractor* was required to do beyond what the *Contract Documents* correctly understood and interpreted would have required, including costs resulting from interruption of the *Work*.

GC 8.2 ADJUDICATION

8.2.1 Nothing in this *Contract* shall be deemed to affect the rights of the parties to resolve any dispute by adjudication as may be prescribed by applicable legislation.

GC 8.3 NEGOTIATION, MEDIATION AND ARBITRATION

8.3.1 In accordance with the rules for mediation as provided in CCDC 40 'Rules for Mediation and Arbitration of Construction Industry Disputes' in effect at the time of bid closing, the parties shall appoint a Project Mediator

.1 within 20 *Working Days* after the *Contract* was awarded, or

.2 if the parties neglected to make an appointment within the 20 *Working Days*, within 10 *Working Days* after either party by *Notice in Writing* requests that the Project Mediator be appointed.

8.3.2 A party shall be conclusively deemed to have accepted a finding of the *Consultant* under GC 2.2 – ROLE OF THE CONSULTANT and to have expressly waived and released the other party from any claims in respect of the particular matter dealt with in that finding unless, within 15 *Working Days* after receipt of that finding, the party sends a *Notice in Writing* of dispute to the other party and to the *Consultant*, which contains the particulars of the matter in dispute and the relevant provisions of the *Contract Documents*. The responding party shall send a *Notice in Writing* of reply to the dispute within 10 *Working Days* after receipt of such *Notice in Writing* setting out particulars of this response and any relevant provisions of the *Contract Documents*.

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8.3.3 The parties shall make all reasonable efforts to resolve their dispute by amicable negotiations and agree to provide, without prejudice, frank, candid and timely disclosure of relevant facts, information and documents to facilitate these negotiations.

8.3.4 After a period of 10 *Working Days* following receipt of a responding party's *Notice in Writing* of reply under paragraph 8.3.2, the parties shall request the Project Mediator to assist the parties to reach agreement on any unresolved dispute. The mediated negotiations shall be conducted in accordance with the rules for mediation as provided in CCDC 40 in effect at the time of bid closing.

8.3.5 If the dispute has not been resolved at the mediation or within such further period as is agreed by the parties, the Project Mediator will terminate the mediated negotiations by giving *Notice in Writing* to the *Owner*, the *Contractor* and the *Consultant*.

8.3.6 By giving a *Notice in Writing* to the other party and the *Consultant*, not later than 10 *Working Days* after the date of termination of the mediated negotiations under paragraph 8.3.5, either party may refer the dispute to be finally resolved by arbitration under the rules of arbitration as provided in CCDC 40 in effect at the time of bid closing. The arbitration shall be conducted in the jurisdiction of the *Place of the Work*.

8.3.7 On expiration of the 10 *Working Days*, the arbitration agreement under paragraph 8.3.6 is not binding on the parties and, if a *Notice in Writing* is not given under paragraph 8.3.6 within the required time, the parties may refer the unresolved dispute to the courts or to any other form of dispute resolution, including arbitration, which they have agreed to use.

8.3.8 If neither party, by *Notice in Writing*, given within 10 *Working Days* of the date of *Notice in Writing* requesting arbitration in paragraph 8.3.6, requires that a dispute be arbitrated immediately, all disputes referred to arbitration as provided in paragraph 8.3.6 shall be:

.1 held in abeyance until:
(1) *Ready-for-Takeover*,
(2) the *Contract* has been terminated, or
(3) the *Contractor* has abandoned the *Work*,
whichever is earlier; and

.2 consolidated into a single arbitration under the rules governing the arbitration under paragraph 8.3.6.

GC 8.4 RETENTION OF RIGHTS

8.4.1 It is agreed that no act by either party shall be construed as a renunciation or waiver of any rights or recourses, provided the party has given the *Notice in Writing* required under Part 8 of the General Conditions – DISPUTE RESOLUTION and has carried out the instructions as provided in paragraph 8.1.3 of GC 8.1 – AUTHORITY OF THE CONSULTANT.

8.4.2 Nothing in Part 8 of the General Conditions – DISPUTE RESOLUTION shall be construed in any way to limit a party from asserting any statutory right to a lien under applicable lien legislation of the jurisdiction of the *Place of the Work* and the assertion of such right by initiating judicial proceedings is not to be construed as a waiver of any right that party may have under paragraph 8.3.6 of GC 8.3 – NEGOTIATION, MEDIATION AND ARBITRATION to proceed by way of arbitration to adjudicate the merits of the claim upon which such a lien is based.

PART 9 PROTECTION OF PERSONS AND PROPERTY

GC 9.1 PROTECTION OF WORK AND PROPERTY

9.1.1 The *Contractor* shall protect the *Work*, the *Owner*'s property and property adjacent to the *Place of the Work* from damage which may arise as the result of the *Contractor*'s operations under the *Contract*, and shall be responsible for such damage, except damage which occurs as the result of:

.1 errors or omissions in the *Contract Documents*; or

.2 acts or omissions by the *Owner*, the *Consultant*, *Other Contractors*, or their agents and employees.

9.1.2 Before commencing any work, the *Contractor* shall determine the location of all underground utilities and structures indicated in the *Contract Documents* or that are reasonably apparent in an inspection of the *Place of the Work*.

9.1.3 Should the *Contractor* in the performance of the *Contract* damage the *Work*, the *Owner*'s property or property adjacent to the *Place of the Work*, the *Contractor* shall be responsible for making good such damage at the *Contractor*'s expense.

9.1.4 Should damage occur to the *Work* or the *Owner*'s property for which the *Contractor* is not responsible, as provided in paragraph 9.1.1, the *Contractor* shall make good such damage to the *Work* and, if the *Owner* so directs, to the *Owner*'s property. The *Contract Price* and *Contract Time* shall be adjusted as provided in GC 6.1 – OWNER'S RIGHT TO MAKE CHANGES, GC 6.2 – CHANGE ORDER and GC 6.3 – CHANGE DIRECTIVE.

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GC 9.2 TOXIC AND HAZARDOUS SUBSTANCES

9.2.1 For the purposes of applicable legislation related to toxic and hazardous substances, the *Owner* shall be deemed to have control and management of the *Place of the Work* with respect to existing conditions.

9.2.2 Prior to the *Contractor* commencing the *Work*, the *Owner* shall,
- .1 take all reasonable steps to determine whether any toxic or hazardous substances are present at the *Place of the Work*, and
- .2 provide the *Consultant* and the *Contractor* with a written list of any such substances that are known to exist and their locations.

9.2.3 The *Owner* shall take all reasonable steps to ensure that no person's exposure to any toxic or hazardous substance exceeds the time weighted levels prescribed by applicable legislation at the *Place of the Work* and that no property is damaged or destroyed as a result of exposure to, or the presence of, toxic or hazardous substances which were at the *Place of the Work* prior to the *Contractor* commencing the *Work*.

9.2.4 Unless the *Contract* expressly provides otherwise, the *Owner* shall be responsible for taking all necessary steps, in accordance with applicable legislation in force at the *Place of the Work*, to dispose of, store or otherwise render harmless any toxic or hazardous substance which was present at the *Place of the Work* prior to the *Contractor* commencing the *Work*.

9.2.5 If the *Contractor*
- .1 encounters toxic or hazardous substances at the *Place of the Work*, or
- .2 has reasonable grounds to believe that toxic or hazardous substances are present at the *Place of the Work*,

which were not brought to the *Place of the Work* by the *Contractor* or anyone for whom the *Contractor* is responsible and which were not disclosed by the *Owner* or which were disclosed but have not been dealt with as required under paragraph 9.2.4, the *Contractor* shall
- .3 take all reasonable steps, including stopping the *Work*, to ensure that no person's exposure to any toxic or hazardous substance exceeds any applicable time weighted levels prescribed by applicable legislation at the *Place of the Work*, and
- .4 immediately report the circumstances to the *Consultant* and the *Owner* in writing.

9.2.6 If the *Owner* and the *Contractor* do not agree on the existence, significance of, or whether the toxic or hazardous substances were brought onto the *Place of the Work* by the *Contractor* or anyone for whom the *Contractor* is responsible, the *Owner* shall retain and pay for an independent qualified expert to investigate and determine such matters. The expert's report shall be delivered to the *Owner* and the *Contractor*.

9.2.7 If the *Owner* and the *Contractor* agree or if the expert referred to in paragraph 9.2.6 determines that the toxic or hazardous substances were not brought onto the *Place of the Work* by the *Contractor* or anyone for whom the *Contractor* is responsible, the *Owner* shall promptly at the *Owner*'s own expense:
- .1 take all steps as required under paragraph 9.2.4;
- .2 reimburse the *Contractor* for the costs of all steps taken pursuant to paragraph 9.2.5;
- .3 extend the *Contract Time* for such reasonable time as the *Consultant* may recommend in consultation with the *Contractor* and the expert referred to in paragraph 9.2.6 and reimburse the *Contractor* for reasonable costs incurred as a result of the delay; and
- .4 indemnify the *Contractor* as required by GC 13.1 – INDEMNIFICATION.

9.2.8 If the *Owner* and the *Contractor* agree or if the expert referred to in paragraph 9.2.6 determines that the toxic or hazardous substances were brought onto the *Place of the Work* by the *Contractor* or anyone for whom the *Contractor* is responsible, the *Contractor* shall promptly at the *Contractor*'s own expense:
- .1 take all necessary steps, in accordance with applicable legislation in force at the *Place of the Work*, to safely remove and dispose the toxic or hazardous substances;
- .2 make good any damage to the *Work*, the *Owner*'s property or property adjacent to the *Place of the Work* as provided in paragraph 9.1.3 of GC 9.1 – PROTECTION OF WORK AND PROPERTY;
- .3 reimburse the *Owner* for reasonable costs incurred under paragraph 9.2.6; and
- .4 indemnify the *Owner* as required by GC 13.1 – INDEMNIFICATION.

9.2.9 If either party does not accept the expert's findings under paragraph 9.2.6, the disagreement shall be settled in accordance with Part 8 of the General Conditions – DISPUTE RESOLUTION. If such disagreement is not resolved promptly, the parties shall act immediately in accordance with the expert's determination and take the steps required by paragraph 9.2.7 or 9.2.8 it being understood that by so doing, neither party will jeopardize any claim that party may have to be reimbursed as provided by GC 9.2 – TOXIC AND HAZARDOUS SUBSTANCES.

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GC 9.3 ARTIFACTS AND FOSSILS

9.3.1 Fossils, coins, articles of value or antiquity, structures and other remains or things of scientific or historic interest discovered at the *Place of the Work* shall, as between the *Owner* and the *Contractor*, be deemed to be the absolute property of the *Owner*.

9.3.2 The *Contractor* shall take all reasonable precautions to prevent removal or damage to discoveries as identified in paragraph 9.3.1, and shall advise the *Consultant* upon discovery of such items.

9.3.3 The *Consultant* will investigate the impact on the *Work* of the discoveries identified in paragraph 9.3.1. If conditions are found that would cause an increase or decrease in the *Contractor*'s cost or time to perform the *Work*, the *Owner*, through the *Consultant*, shall issue appropriate instructions for a change in the *Work* as provided in GC 6.2 – CHANGE ORDER or GC 6.3 – CHANGE DIRECTIVE.

GC 9.4 CONSTRUCTION SAFETY

9.4.1 The *Contractor* shall be responsible for establishing, initiating, maintaining, and supervising all health and safety precautions and programs in connection with the performance of the *Work* in accordance with the applicable health and safety legislation.

9.4.2 The *Owner* and the *Contractor* shall comply with all health and safety precautions and programs established at the *Place of the Work*.

9.4.3 The *Owner* and the *Contractor* shall comply with the rules, regulations and practices required by the applicable health and safety legislation.

9.4.4 The *Owner* shall cause the *Consultant*, *Other Contractors* and the *Owner*'s own forces to comply with all health and safety precautions and programs established by the *Contractor* at the *Place of the Work*.

9.4.5 Nothing in this Contract shall affect the determination of liability under the applicable health and safety legislation.

GC 9.5 MOULD

9.5.1 If the *Contractor* or the *Owner* observes or reasonably suspects the presence of mould at the *Place of the Work*, the remediation of which is not expressly part of the *Work*,

.1 the observing party shall promptly report the circumstances to the other party in writing,

.2 the *Contractor* shall promptly take all reasonable steps, including stopping the *Work* if necessary, to ensure that no person suffers injury, sickness or death and that no property is damaged as a result of exposure to or the presence of the mould, and

.3 if the *Owner* and the *Contractor* do not agree on the existence, significance or cause of the mould or as to what steps need be taken to deal with it, the *Owner* shall retain and pay for an independent qualified expert to investigate and determine such matters. The expert's report shall be delivered to the *Owner* and the *Contractor*.

9.5.2 If the *Owner* and the *Contractor* agree, or if the expert referred to in paragraph 9.5.1.3 determines that the presence of mould was caused by the *Contractor*'s operations under the *Contract*, the *Contractor* shall promptly, at the *Contractor*'s own expense:

.1 take all reasonable and necessary steps to safely remediate or dispose of the mould,

.2 make good any damage to the *Work*, the *Owner*'s property or property adjacent to the *Place of the Work* as provided in paragraph 9.1.3 of GC 9.1 – PROTECTION OF WORK AND PROPERTY,

.3 reimburse the *Owner* for reasonable costs incurred under paragraph 9.5.1.3, and

.4 indemnify the *Owner* as required by GC 13.1 – INDEMNIFICATION.

9.5.3 If the *Owner* and the *Contractor* agree, or if the expert referred to in paragraph 9.5.1.3 determines that the presence of mould was not caused by the *Contractor*'s operations under the *Contract*, the *Owner* shall promptly, at the *Owner*'s own expense:

.1 take all reasonable and necessary steps to safely remediate or dispose of the mould,

.2 reimburse the *Contractor* for the cost of taking the steps under paragraph 9.5.1.2 and making good any damage to the *Work* as provided in paragraph 9.1.4 of GC 9.1 – PROTECTION OF WORK AND PROPERTY,

.3 extend the *Contract Time* for such reasonable time as the *Consultant* may recommend in consultation with the *Contractor* and the expert referred to in paragraph 9.5.1.3 and reimburse the *Contractor* for reasonable costs incurred as a result of the delay, and

.4 indemnify the *Contractor* as required by GC 13.1 – INDEMNIFICATION.

9.5.4 If either party does not accept the expert's finding under paragraph 9.5.1.3, the disagreement shall be settled in accordance with Part 8 of the General Conditions – DISPUTE RESOLUTION. If such disagreement is not resolved promptly, the parties shall act immediately in accordance with the expert's determination and take the steps required by paragraphs 9.5.2 or 9.5.3, it being understood that by so doing neither party will jeopardize any claim the party may have to be reimbursed as provided by GC 9.5 – MOULD.

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PART 10 GOVERNING REGULATIONS

GC 10.1 TAXES AND DUTIES

10.1.1 The *Contract Price* shall include all taxes and customs duties in effect at the time of the bid closing except for *Value Added Taxes* payable by the *Owner* to the *Contractor* as stipulated in Article A-4 of the Agreement – CONTRACT PRICE.

10.1.2 Any increase or decrease in costs to the *Contractor* due to changes in taxes and duties after the time of the bid closing shall increase or decrease the *Contract Price* accordingly.

GC 10.2 LAWS, NOTICES, PERMITS, AND FEES

10.2.1 The laws of the *Place of the Work* shall govern the *Work*.

10.2.2 The *Owner* shall obtain and pay for development approvals, building permit, permanent easements, rights of servitude, and all other necessary approvals and permits, except for the permits and fees referred to in paragraph 10.2.3 or for which the *Contract Documents* specify as the responsibility of the *Contractor*.

10.2.3 The *Contractor* shall be responsible for the procurement of permits, licences, inspections, and certificates, which are necessary for the performance of the *Work* and customarily obtained by contractors in the jurisdiction of the *Place of the Work* after the issuance of the building permit. The *Contract Price* includes the cost of these permits, licences, inspections, and certificates, and their procurement.

10.2.4 The *Contractor* shall give the required notices and comply with the laws, ordinances, rules, regulations, or codes which are or become in force during the performance of the *Work* and which relate to the *Work*, to the preservation of the public health, and to construction safety.

10.2.5 The *Contractor* shall not be responsible for verifying that the *Contract Documents* are in compliance with the applicable laws, ordinances, rules, regulations, or codes relating to the *Work*. If the *Contract Documents* are at variance therewith, or if, subsequent to the time of bid closing, changes are made to the applicable laws, ordinances, rules, regulations, or codes which require modification to the *Contract Documents*, the *Contractor* shall advise the *Consultant* in writing requesting direction immediately upon such variance or change becoming known. The *Consultant* will issue the changes required to the *Contract Documents* as provided in GC 6.1 – OWNER'S RIGHT TO MAKE CHANGES, GC 6.2 – CHANGE ORDER and GC 6.3 – CHANGE DIRECTIVE.

10.2.6 If the *Contractor* fails to advise the *Consultant* in writing; fails to obtain direction as required in paragraph 10.2.5; and performs work knowing it to be contrary to any laws, ordinances, rules, regulations, or codes; the *Contractor* shall be responsible for and shall correct the violations thereof; and shall bear the costs, expenses and damages attributable to the failure to comply with the provisions of such laws, ordinances, rules, regulations, or codes.

10.2.7 If, subsequent to the time of bid closing, changes are made to applicable laws, ordinances, rules, regulations, or codes of authorities having jurisdiction which affect the cost of the *Work*, either party may submit a claim in accordance with the requirements of GC 6.6 – CLAIMS FOR A CHANGE IN CONTRACT PRICE.

GC 10.3 PATENT FEES

10.3.1 The *Contractor* shall pay the royalties and patent licence fees required for the performance of the *Contract*. The *Contractor* shall hold the *Owner* harmless from and against claims, demands, losses, costs, damages, actions, suits, or proceedings arising out of the *Contractor*'s performance of the *Contract* which are attributable to an infringement or an alleged infringement of a patent of invention by the *Contractor* or anyone for whose acts the *Contractor* may be liable.

10.3.2 The *Owner* shall hold the *Contractor* harmless against claims, demands, losses, costs, damages, actions, suits, or proceedings arising out of the *Contractor*'s performance of the *Contract* which are attributable to an infringement or an alleged infringement of a patent of invention in executing anything for the purpose of the *Contract*, the physical model, plan or design of which was supplied to the *Contractor* as part of the *Contract*.

GC 10.4 WORKERS' COMPENSATION

10.4.1 Prior to commencing the *Work*, and again with the *Contractor*'s applications for payment, the *Contractor* shall provide evidence of compliance with workers' compensation legislation at the *Place of the Work*.

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PART 11 INSURANCE

GC 11.1 INSURANCE

11.1.1 Without restricting the generality of GC 13.1 – INDEMNIFICATION, the *Contractor* shall provide, maintain and pay for the following insurance coverages, the requirements of which are specified in CCDC 41 'CCDC Insurance Requirements' in effect at the time of bid closing except as hereinafter provided:

.1 General liability insurance in the name of the *Contractor* and include, or in the case of a single, blanket policy, be endorsed to name, the *Owner* and the *Consultant* as insureds but only with respect to liability, other than legal liability arising out of their sole negligence, arising out of the operations of the *Contractor* with regard to the *Work*. General liability insurance shall be maintained from the date of commencement of the *Work* until one year from the date of *Ready-for-Takeover*. Liability coverage shall be provided for completed operations hazards from the date of *Ready-for-Takeover*, as set out in the certificate of *Ready-for-Takeover*, on an ongoing basis for a period of 6 years following *Ready-for-Takeover*.

.2 Automobile Liability Insurance from the date of commencement of the *Work* until one year after the date of *Ready-for-Takeover*.

.3 Unmanned aerial vehicle aircraft, manned aircraft or watercraft Liability Insurance when owned or non-owned manned or unmanned aircraft or watercraft are used directly or indirectly in the performance of the *Work*.

.4 "Broad form" property insurance in the joint names of the *Contractor*, the *Owner* and the *Consultant*. The policy shall include as insureds all *Subcontractors*. The "Broad form" property insurance shall be provided from the date of commencement of the *Work* until the earliest of:

(1) 10 calendar days after the date of *Ready-for-Takeover*;

(2) on the commencement of use or occupancy of any part or section of the *Work* unless such use or occupancy is for construction purposes, habitational, office, banking, convenience store under 465 square metres in area, or parking purposes, or for the installation, testing and commissioning of equipment forming part of the *Work*; and

(3) when left unattended for more than 30 consecutive calendar days or when construction activity has ceased for more than 30 consecutive calendar days.

.5 Boiler and machinery insurance in the joint names of the *Contractor*, the *Owner* and the *Consultant*. The policy shall include as insureds all *Subcontractors*. The coverage shall be maintained continuously from commencement of use or operation of the boiler and machinery objects insured by the policy and until 10 calendar days after the date of *Ready-for-Takeover*.

.6 The "Broad form" property and boiler and machinery policies shall provide that, in the case of a loss or damage, payment shall be made to the *Owner* and the *Contractor* as their respective interests may appear. In the event of loss or damage:

(1) the *Contractor* shall act on behalf of the *Owner* for the purpose of adjusting the amount of such loss or damage payment with the insurers. When the extent of the loss or damage is determined, the *Contractor* shall proceed to restore the *Work*. Loss or damage shall not affect the rights and obligations of either party under the *Contract* except that the *Contractor* shall be entitled to such reasonable extension of *Contract Time* relative to the extent of the loss or damage as the *Consultant* may recommend in consultation with the *Contractor*;

(2) the *Contractor* shall be entitled to receive from the *Owner*, in addition to the amount due under the *Contract*, the amount which the *Owner*'s interest in restoration of the *Work* has been appraised, such amount to be paid as the restoration of the *Work* proceeds in accordance with the progress payment provisions. In addition the *Contractor* shall be entitled to receive from the payments made by the insurer the amount of the *Contractor*'s interest in the restoration of the *Work*; and

(3) to the *Work* arising from the work of the *Owner*, the *Owner*'s own forces or *Other Contractors*, the *Owner* shall, in accordance with the *Owner*'s obligations under the provisions relating to construction by the *Owner* or *Other Contractors*, pay the *Contractor* the cost of restoring the *Work* as the restoration of the *Work* proceeds and as in accordance with the progress payment provisions.

.7 Contractors' Equipment Insurance from the date of commencement of the *Work* until one year after the date of *Ready-for-Takeover*.

.8 Contractors' Pollution Liability Insurance from the date of commencement of the *Work* until one year after the date of *Ready-for-Takeover*.

11.1.2 Prior to commencement of the *Work* and upon the placement, renewal, amendment, or extension of all or any part of the insurance, the *Contractor* shall promptly provide the *Owner* with confirmation of coverage and, if required, a certified true copy of the policies certified by an authorized representative of the insurer together with copies of any amending endorsements applicable to the *Work*.

11.1.3 The parties shall pay their share of the deductible amounts in direct proportion to their responsibility in regards to any loss for which the above policies are required to pay, except where such amounts may be excluded by the terms of the *Contract*.

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11.1.4 If the *Contractor* fails to provide or maintain insurance as required by the *Contract Documents*, then the *Owner* shall have the right to provide and maintain such insurance and give evidence to the *Contractor* and the *Consultant*. The *Contractor* shall pay the cost thereof to the *Owner* on demand or the *Owner* may deduct the cost from the amount which is due or may become due to the *Contractor*.

11.1.5 All required insurance policies shall be with insurers licensed to underwrite insurance in the jurisdiction of the *Place of the Work*.

11.1.6 If a revised version of CCDC 41 is published, which specifies reduced insurance requirements, the parties shall address such reduction, prior to the *Contractor*'s insurance policy becoming due for renewal, and record any agreement in a *Change Order*.

11.1.7 If a revised version of CCDC 41 is published, which specifies increased insurance requirements, the *Owner* may request the increased coverage from the Contractor by way of a *Change Order*.

11.1.8 A *Change Directive* shall not be used to direct a change in the insurance requirements in response to the revision of CCDC 41.

PART 12 OWNER TAKEOVER

GC 12.1 READY-FOR-TAKEOVER

12.1.1 The prerequisites to attaining *Ready-for-Takeover* of the *Work* are limited to the following:

.1 The *Consultant* has certified or verified the *Substantial Performance of the Work*.

.2 Evidence of compliance with the requirements for occupancy or occupancy permit as prescribed by the authorities having jurisdiction.

.3 Final cleaning and waste removal at the time of applying for *Ready-for-Takeover*, as required by the *Contract Documents*.

.4 The delivery to the *Owner* of such operations and maintenance documents reasonably necessary for immediate operation and maintenance, as required by the *Contract Documents*.

.5 Make available a copy of the as-built drawings completed to date on site.

.6 Startup, testing required for immediate occupancy, as required by the *Contract Documents*.

.7 Ability to secure access to the *Work* has been provided to the *Owner*, if required by the *Contract Documents*.

.8 Demonstration and training, as required by the *Contract Documents*, is scheduled by the *Contractor* acting reasonably.

12.1.2 If any prerequisites set forth in paragraphs 12.1.1.3 to 12.1.1.6 must be deferred because of conditions reasonably beyond the control of the *Contractor*, or by agreement between the *Owner* and the *Contractor* to do so, *Ready-for-Takeover* shall not be delayed.

12.1.3 When the *Contractor* considers that the *Work* is *Ready-for-Takeover*, the *Contractor* shall deliver to the *Consultant* and to the *Owner* a comprehensive list of items to be completed or corrected, together with a written application for *Ready-for-Takeover* for review. Failure to include an item on the list does not alter the responsibility of the *Contractor* to complete the *Contract*.

12.1.4 The *Consultant* will review the *Work* to verify the validity of the application and will promptly, and in any event, no later than 10 calendar days after receipt of the *Contractor*'s list and application:

.1 advise the *Contractor* in writing that the *Work* is not *Ready-for-Takeover* and give reasons why, or

.2 confirm the date of *Ready-for-Takeover* in writing to each of the *Owner* and the *Contractor*.

12.1.5 Immediately following the confirmation of the date of *Ready-for-Takeover*, the *Contractor*, in consultation with the *Consultant*, shall establish a reasonable date for finishing the *Work*.

12.1.6 The provision of GC 12.1 – READY-FOR-TAKEOVER shall be subject to GC 12.2 – EARLY OCCUPANCY BY THE OWNER.

GC 12.2 EARLY OCCUPANCY BY THE OWNER

12.2.1 The *Owner* may take occupancy of a part or the entirety of the *Work* before *Ready-for-Takeover* has been attained only as agreed by the *Contractor* which agreement shall not be unreasonably withheld.

12.2.2 The *Owner* shall not occupy a part or the entirety of the *Work* without prior approval by authorities having jurisdiction.

12.2.3 If the *Owner* takes occupancy of a part of the *Work* before *Ready-for-Takeover* has been attained:

.1 The part of the *Work* which is occupied shall be deemed to have been taken over by the *Owner* as from the date on which it is occupied.

.2 The *Contractor* shall cease to be liable for the care of such part as from this date, when responsibility shall pass to the *Owner*.

.3 The warranty period specified in paragraph 12.3.1 of GC 12.3 – WARRANTY for that part of the *Work* shall start from the date on which it is occupied.

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12.2.4 If the *Owner* takes occupancy of the entirety of the *Work* before all the prerequisites are met as described in paragraph 12.1.1 of GC 12.1 – READY-FOR-TAKEOVER, the *Work* shall, subject to the requirements of the applicable lien legislation, be deemed to achieve *Ready-for-Takeover*. This shall not relieve the *Contractor*'s responsibility to complete the *Work* in a timely manner.

GC 12.3 WARRANTY

12.3.1 Except for extended warranties as described in paragraph 12.3.6, the warranty period under the *Contract* is one year from the date when *Ready-for-Takeover* has been attained.

12.3.2 The *Contractor* shall be responsible for the proper performance of the *Work* to the extent that the design and *Contract Documents* permit such performance.

12.3.3 The *Owner*, through the *Consultant*, shall promptly give the *Contractor Notice in Writing* of observed defects and deficiencies which occur during the one year warranty period.

12.3.4 Subject to paragraph 12.3.2, the *Contractor* shall correct promptly, at the *Contractor*'s expense, defects or deficiencies in the *Work* which appear prior to and during the one year warranty period.

12.3.5 The *Contractor* shall correct or pay for damage resulting from corrections made under the requirements of paragraph 12.3.4.

12.3.6 Any extended warranties required beyond the one year warranty period as described in paragraph 12.3.1, shall be as specified in the *Contract Documents*. Extended warranties shall be issued by the warrantor to the benefit of the *Owner*. The *Contractor*'s responsibility with respect to extended warranties shall be limited to obtaining any such extended warranties from the warrantor. The obligations under such extended warranties are solely the responsibilities of the warrantor.

PART 13 INDEMNIFICATION AND WAIVER

GC 13.1 INDEMNIFICATION

13.1.1 Without restricting the parties' obligation to indemnify respecting toxic and hazardous substances, patent fees and defect in title claims all as described in paragraphs 13.1.4 and 13.1.5, the *Owner* and the *Contractor* shall each indemnify and hold harmless the other from and against all claims, demands, losses, costs, damages, actions, suits, or proceedings whether in respect to losses suffered by them or in respect to claims by third parties that arise out of, or are attributable in any respect to their involvement as parties to this *Contract*, provided such claims are:

.1 caused by:

(1) the negligent acts or omissions of the party from whom indemnification is sought or anyone for whose negligent acts or omissions that party is liable, or

(2) a failure of the party to the *Contract* from whom indemnification is sought to fulfill its terms or conditions; and

.2 made by *Notice in Writing* within a period of 6 years from the *Ready-for-Takeover* date or within such shorter period as may be prescribed by any limitation statute of the Province or Territory of the *Place of the Work*.

The parties expressly waive the right to indemnity for claims other than those provided for in this *Contract*.

13.1.2 The obligation of either party to indemnify as set forth in paragraph 13.1.1 shall be limited as follows:

.1 In respect to losses suffered by the *Owner* and the *Contractor* for which insurance is to be provided by either party pursuant to GC 11.1 – INSURANCE, the minimum liability insurance limit for one occurrence, of the applicable insurance policy, as referred to in CCDC 41 in effect at the time of bid closing.

.2 In respect to losses suffered by the *Owner* and the *Contractor* for which insurance is not required to be provided by either party in accordance with GC 11.1 – INSURANCE, the greater of the *Contract Price* as recorded in Article A-4 – CONTRACT PRICE or $2,000,000, but in no event shall the sum be greater than $20,000,000.

.3 In respect to indemnification by a party against the other with respect to losses suffered by them, such obligation shall be restricted to direct loss and damage, and neither party shall have any liability to the other for indirect, consequential, punitive or exemplary damages.

.4 In respect to indemnification respecting claims by third parties, the obligation to indemnify is without limit.

13.1.3 The obligation of either party to indemnify the other as set forth in paragraphs 13.1.1 and 13.1.2 shall be inclusive of interest and all legal costs.

13.1.4 The *Owner* and the *Contractor* shall indemnify and hold harmless the other from and against all claims, demands, losses, costs, damages, actions, suits, or proceedings arising out of their obligations described in GC 9.2 – TOXIC AND HAZARDOUS SUBSTANCES.

13.1.5 The *Owner* shall indemnify and hold harmless the *Contractor* from and against all claims, demands, losses, costs, damages, actions, suits, or proceedings:

.1 as described in paragraph 10.3.2 of GC 10.3 – PATENT FEES, and

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.2 arising out of the *Contractor*'s performance of the *Contract* which are attributable to a lack of or defect in title or an alleged lack of or defect in title to the *Place of the Work*.

13.1.6 In respect to any claim for indemnity or to be held harmless by the *Owner* or the *Contractor*:

.1 *Notice in Writing* of such claim shall be given within a reasonable time after the facts upon which such claim is based become known; and

.2 should any party be required as a result of its obligation to indemnify another to pay or satisfy a final order, judgment or award made against the party entitled by this contract to be indemnified, then the indemnifying party upon assuming all liability for any costs that might result shall have the right to appeal in the name of the party against whom such final order or judgment has been made until such rights of appeal have been exhausted.

GC 13.2 WAIVER OF CLAIMS

13.2.1 Subject to any lien legislation applicable to the *Place of the Work*, the *Contractor* waives and releases the *Owner* from all claims which the *Contractor* has or reasonably ought to have knowledge of that could be advanced by the *Contractor* against the *Owner* under the *Contract*, including, without limitation, those arising from negligence or breach of contract in respect to which the cause of action is based upon acts or omissions which occurred prior to or on the *Ready-for-Takeover* date, except as follows:

.1 claims arising prior to or on the *Ready-for-Takeover* date for which *Notice in Writing* of claim has been received by the *Owner* from the *Contractor* no later than 5 calendar days before the expiry of the lien period provided by the lien legislation applicable at the *Place of the Work* or 20 calendar days following the *Ready-for-Takeover* date, whichever is later;

.2 indemnification for claims advanced against the *Contractor* by third parties for which a right of indemnification may be asserted by the *Contractor* against the *Owner* pursuant to the provisions of this *Contract*;

.3 claims respecting toxic and hazardous substances, patent fees and defect in title matters for which a right of indemnity could be asserted by the *Contractor* pursuant to the provisions of paragraphs 13.1.4 or 13.1.5 of GC 13.1 – INDEMNIFICATION; and

.4 claims resulting from acts or omissions which occur after the *Ready-for-Takeover* date.

13.2.2 The *Contractor* waives and releases the *Owner* from all claims resulting from acts or omissions which occurred after the *Ready-for-Takeover* date except for:

.1 indemnification respecting third party claims, and claims respecting toxic and hazardous substances, patent fees and defect in title matters, all as referred in paragraphs 13.2.1.2 and 13.2.1.3; and

.2 claims for which *Notice in Writing* of claim has been received by the *Owner* from the *Contractor* within 395 calendar days following the *Ready-for-Takeover* date.

13.2.3 Subject to any lien legislation applicable to the *Place of the Work*, the *Owner* waives and releases the *Contractor* from all claims which the *Owner* has or reasonably ought to have knowledge of that could be advanced by the *Owner* against the *Contractor* under the *Contract*, including, without limitation, those arising from negligence or breach of contract in respect to which the cause of action is based upon acts or omissions which occurred prior to or on the *Ready-for-Takeover* date, except as follows:

.1 claims arising prior to or on the *Ready-for-Takeover* date for which *Notice in Writing* of claim has been received by the *Contractor* from the *Owner* no later than 20 calendar days following the *Ready-for-Takeover* date;

.2 indemnification for claims advanced against the *Owner* by third parties for which a right of indemnification may be asserted by the *Owner* against the *Contractor* pursuant to the provisions of this *Contract*;

.3 claims respecting toxic and hazardous substances for which a right of indemnity could be asserted by the *Owner* against the *Contractor* pursuant to the provisions of paragraph 13.1.4 of GC 13.1 – INDEMNIFICATION;

.4 damages arising from the *Contractor*'s actions which result in substantial defects or deficiencies in the *Work*. "Substantial defects or deficiencies" mean those defects or deficiencies in the *Work* which affect the *Work* to such an extent or in such a manner that a significant part or the whole of the *Work* is unfit for the purpose intended by the *Contract Documents*;

.5 claims arising pursuant to GC 12.3 – WARRANTY; and

.6 claims arising from acts or omissions which occur after the *Ready-for-Takeover* date.

13.2.4 Respecting claims arising upon substantial defects and deficiencies in the *Work*, as referenced in paragraph 13.2.3.4, and notwithstanding paragraph 13.2.3.5, the *Owner* waives and releases the *Contractor* from all claims except claims for which *Notice in Writing* of claim has been received by the *Contractor* from the *Owner* within a period of six years from the *Ready-for-Takeover* date, provided that any limitation statute of the Province or Territory of the *Place of the Work* permit such agreement. If the applicable limitation statute does not permit such agreement, the time within which any such claim may be brought shall be such shorter period as may be prescribed by any limitation statute of the Province or Territory of the *Place of the Work*.

13.2.5 The *Owner* waives and releases the *Contractor* from all claims arising from acts or omissions which occur after the *Ready-for-Takeover* date, except for:

.1 indemnification for claims advanced against the *Owner* by third parties, as referenced in paragraph 13.2.3.2;

.2 claims respecting toxic and hazardous substances for which a right of indemnity could be asserted by the *Owner* against the *Contractor*, as referenced in paragraph 13.2.3.3;

.3 claims arising under GC 12.3 – WARRANTY; and

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.4 claims for which *Notice is Writing* has been received by the *Contractor* from the *Owner* within 395 calendar days following the *Ready-for-Takeover* date.

13.2.6 "*Notice in Writing* of claim" as provided for in GC 13.2 – WAIVER OF CLAIMS to preserve a claim or right of action which would otherwise, by the provisions of GC 13.2 – WAIVER OF CLAIMS, be deemed to be waived, must include the following:

.1 a clear and unequivocal statement of an intention to claim;

.2 a statement as to the nature of the claim and the grounds upon which the claim is based; and

.3 a statement of the estimated quantum of the claim.

13.2.7 A claim for lien asserted under the lien legislation prevailing at the *Place of the Work* shall qualify as notice of claim for the purposes of this *Contract*.

13.2.8 The party giving the *Notice in Writing* of claim as provided for in GC 13.2 – WAIVER OF CLAIMS shall submit within a reasonable time a detailed account of the amount claimed.

13.2.9 Where the event or series of events giving rise to a claim made under paragraphs 13.2.1 or 13.2.3 has a continuing effect, the detailed account submitted under paragraph 13.2.8 shall be considered to be an interim account and the party making the claim shall submit further interim accounts, at reasonable intervals, giving the accumulated amount of the claim and any further grounds upon which such claim is based. The party making the claim shall submit a final account after the end of the effects resulting from the event or series of events.

13.2.10 Nothing in GC 13.2 – WAIVER OF CLAIMS shall be deemed to affect the rights of the parties under any lien legislation or limitations legislation prevailing at the *Place of the Work*.

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GENERAL CONDITIONS OF THE CIVIL WORKS CONTRACT CCDC 18 – 2023

These Supplementary Conditions amend the Stipulated Price Contract – CCDC 18 – 2023. Where a portion of the Contract is modified or deleted by these Supplementary General Conditions, the unaltered portions of the Contract shall remain in effect.

AGREEMENT BETWEEN *OWNER* AND CONTRACTOR

Page 1, add the following to Article A-1 after: "is acting as and is hereafter called the "*Consultant*":

and Consultant is acting as and is hereafter called the "Payment Certifier" and

Page 4, delete the first bullet point within Article 4.1 and replace with the following:

*Unit Prices from the basis for payment of the *Contract Price*. Quantities in the Schedule of Unit Prices within Section 00 41 43 – Tender Form are estimated. The estimated *Contract Price*, which is the total extended amount indicated in the Schedule of Unit Prices within Section 00 41 43 – Tender Form, exclusive of taxes is:

Page 4, after Article A-8 insert the following new Articles A-9 and A-10:

"ARTICLE A-9 SEVERABILITY

9.1 Each and every paragraph, section, clause, sub-clause or other component of the *Contract* is severable one from the other. Should it be found by a court of competent jurisdiction that any one or more paragraphs or parts thereof are null and void, the validity of the remaining paragraphs or parts thereof shall not be affected.

ARTICLE A-10 TIME OF THE ESSENCE

10.1 Time shall be deemed to be of the essence of the *Contract*."

DEFINITIONS

Page 6, Add the following new Definitions:

Approved or Approval

Approved or *Approval* means acceptance by the *Consultant* in accordance with the *Consultant's* responsibilities described in Clause GC 2.2 ROLE OF THE *CONSULTANT*.

Period of Delay

The period of time from *Ready-for-Takeover* date specified in Article A-1, subclause 1.3, and the actual Ready-for-Takeover date; if any.

Site

The *Site* means the geographical location of the *Work* identified in the *Contract Documents*

Total Amount Payable

Total Amount Payable means the sum of the Contract Price as stipulated in Article A-4, subclause 4.3 subject to adjustments made in accordance with the provisions of the Contract Documents plus the amount of *Value Added Taxes*.

GENERAL CONDITIONS OF THE STIPULATED PRICE CONTRACT

PART 2 – ADMINISTRATION OF THE CONTRACT

GC 2.3 REVIEW AND INSPECTION OF THE WORK

Page 10, delete clause 2.3.3 and replace with the following:

2.3.3 The *Contractor* shall furnish promptly to the *Consultant* one (1) electronic file, in pdf file format, of certificates and inspection reports related to the *Work*. The *Contractor* will be required to provide hard copies, in the quantity requested, only upon request of the *Consultant* or *Owner*.

Page 10, within clause 2.3.5, add the following sentence at the end of the clause:

"If the *Consultant's* determination is not accepted by either party, then the matter shall be settled in accordance with the requirements of Part 8 of the General Conditions – DISPUTE RESOLUTION."

PART 3 – EXECUTION OF THE *WORK*

GC 3.4 CONSTRUCTION SCHEDULE

Page 12, in Clause 3.4.1.1, delete "prior to the first application for payment" and replace with "not later than two (2) weeks after receipt of the notice of award".

Page 12, add new clause 3.4.2 as follows:

"3.4.2 If, at any time, it should appear to the *Owner* or the *Consultant* that the actual progress of the *Work* is behind schedule or is likely to become behind schedule, or if the *Contractor* has given notice of such to the Owner or the *Consultant* pursuant to clause 3.4.1.3, the *Contractor* shall take appropriate steps to cause the actual progress of the Work to conform to the schedule or minimize the resulting delay and shall produce and present to the *Owner* and the *Consultant* a recovery plan demonstrating how the *Contractor* will achieve the recovery of the schedule. If the *Contractor* intends to apply for a change in the *Contract Price* in relation to a schedule recovery plan, then the *Contractor* shall proceed in accordance with General Condition 6.6 – CLAIMS FOR A CHANGE IN CONTRACT PRICE."

GC 3.5 SUPERVISION

Page 12, add new clause 3.5.3 as follows:

"3.5.3 The *Owner* may, at any time during the course of the *Work*, request the replacement of the appointed representative(s), where the grounds for the request involve conduct which jeopardizes the safety and security of the Site or the *Owner's* operations. Immediately upon receipt of the request, the *Contractor* shall make arrangements to appoint a replacement acceptable to the *Owner* and *Consultant*."

GC 3.6 – LAYOUT OF THE WORK

Page 12, delete clause 3.6.1 in its entirety and replace with the following:

"3.6.1 The *Contractor* shall have all reference points established on site by a licensed surveyor, at the *Place of the Work*, at no additional cost to the *Owner*."

GC 3.8 LABOUR AND PRODUCTS

Page 13, delete clause 3.8.2 and replace with the following:

"3.8.2 The *Contractor* shall provide and pay for labour, *Products*, tools, *Construction Equipment*, transportation, and other facilities and services necessary for the performance of the *Work* in accordance with the *Contract*. Water, heat, light, and power will be provided by the party identified in Division 01 of these *Specifications*.

GC 3.9 SHOP DRAWINGS

Page 13, delete Clause 3.9.2 and replace with the following:

"3.9.2 Prepare and submit to the *Consultant* for review, a schedule of the dates for provision, review and return of Shop Drawings. Provide this submission a minimum of two (2) working days prior to the project start-up meeting."

PART 4 - ALLOWANCES

GC 4.1 CASH ALLOWANCES

Page 14, delete Clause 4.1.7 and replace with the following:

"4.1.7 The *Contractor* shall prepare a schedule, acceptable to the *Consultant*, that shows when the *Consultant* and *Owner* must authorize ordering of items called for under cash allowances to avoid delaying the progress of the *Work*."

Page 14, add the following new Clause:

"4.1.8 The *Owner* reserves the right to call, or to have the *Contractor* call, for competitive bids for portions of the Work, to be paid for from cash allowances."

PART 5 - PAYMENT

GC 5.5 – PAYMENT

Page 15, delete clause 5.5.1.2 in its entirety and replace with the following:

"5.5.1.2 The *Owner* shall make payment to the Contractor on account as provided in Article A-5 of the Agreement – PAYMENT on or before twenty (20) calendar days after the later of:

.1 receipt by the *Consultant* of the application for payment; or
.2 the last day of the monthly payment period covered by the application for payment."

Page 15, after clause 5.5.1,2 add the following new clauses:

"5.5.1.3 The Contractor shall agree interim quantities with the *Consultant* for the purposes of progress payment claims, prior to submission of progress payment application.

"5.5.1.4 The *Contractor* shall pay promptly any and all accounts for labour, services and materials used for the purpose of the fulfillment of this Contract as and when such accounts become due and payable and shall furnish the *Consultant* with proof of payment of such accounts in such form and as often as the *Consultant* may request."

GC 5.5 SUBSTANTIAL PERFORMANCE OF THE *WORK* AND PAYMENT OF HOLDBACK

Page 15, delete clause 5.6.1 and replace with the following:

"5.6.1 The *Consultant* will review the *Work* to verify the validity of the application for *Substantial Performance of the Work* and will promptly, and in any event, no later than seven (7) calendar days after receipt of the *Contractors* application:
.1 advise the *Contractor* in writing that the *Work* or the designated portion of the Work is not substantially performed and give reasons why , or
.2 state the date of *Substantial Performance* of the *Work* or a designated portion of the *Work* in a certificate and issue a copy of that certificate (Form 7 as set forth in the Construction Remedies Act regulations) to each of the *Owner* and the *Contractor*."

Page 15, after Clause 5.6.1.2, add the following:

"5.6.1.3 Submit a certificate by lien search to the Owner by a solicitor licensed to practice law in the Province of the Place of Work, certifying that no lien associated with the Work exists against the Owner's property or *Work*;

5.6.1.4 Submit a clearance letter from the Workers' Compensation Board or provincially equivalent regulatory body; and

5.6.1.5 All such documents shall be dated not earlier than the expiry of the lien period as stipulated by the lien legislation in the *Place of the Work*."

"5.6.1.6 The *Consultant* will provide an electronic copy of the Certificate of *Substantial Performance* and instruct the *Contractor* to post the certificate at the Site and to website indicated by the lien legislation of the place of *Work*. "

Page 15, delete Clause 5.6.3 and replace with the following:.

5.6.3 Subject to the requirements of the Payment Legislation of the *Place of the Work*, all holdback prescribed by the applicable lien legislation for completed *Work* shall become due and payable to the *Contractor* no later than ten (10) Working Days following the expiration of the sixty (60) holdback period. If, within sixty (60) calendar days after the issue of the certificate of

Substantial Performance of Work, the *Contractor* has not corrected all the documented deficiencies, the *Owner* shall retain sufficient monies, as determined by the *Consultant*, to cover the cost of completing said deficiencies. These monies shall be held in addition to holdback monies retained in accordance with the provisions of the Contract and subject to the terms of the lien legislation in the *Place of the Work*."

GC 5.7 FINAL PAYMENT

Page 16, Clause 5.7.4, in line 2, change "5 calendar days" to "20 calendar days".

PART 6 – CHANGES IN THE *WORK*

Page 16, add new clause 6.1.1.3 as follows:

6.1.1.3 Changes that do not affect the Contract Price and time by Supplemental Instruction.

Page 16, within clause 6.2.2.1 after "the Work" add "to the limits set forth in GC 6.7 – Quantity Variations".

GC 6.2 CHANGE ORDER

Page 16, after Clause 6.2.3, add the following:

"6.2.4 The mark-up on agreed upon changes are as follows:
.1 *Work* performed by the *Contractor's* own forces will be the cost of the *Work* plus ten (10%) percent overhead and profit.
.2 Work performed by the subcontractor's force will be the cost of *Work* plus 15% overhead and profit. Where the *Work* can be done by the *Contractor's* forces, as solely determined by the *Consultant*, but is done by the Subcontractor's forces, the mark-up for overhead and profit will be limited to ten (10%) percent.

6.2.5 Before the approval of any *Change Order* over $1,000 in value the *Consultant* is entitled to receive, upon request, at a minimum, the following breakdown of cost associated with such *Change Order*:
.1 Labour rates, excluding operators.
.2 Equipment rates including operators.
.3 Supervisory staff rates.
.4 Subcontractor and material or equipment invoices where applicable.
.5 Overhead costs including worker's compensation, *site* trailer cost as applicable, insurance, bonding, small tool expenses, CPP, and EI contributions.

6.2.6 No compensation for extra Work or material shall be allowed unless the Consultant issues a Notice in Writing authorizing such Work or material to be ordered in the form of a *Change Order, Change Directive* or *Supplemental Instruction*.

6.2.7 No compensation will be allowed for the cost of repairs to equipment or in respect of construction equipment of any kind idle on the Site except as directed by the *Consultant* in writing or for damage to anything used in performing any such extra *Work* or making any such alteration.

6.2.8 The price applicable to any Work deleted from the Contract, shall be deducted from the *Contract Price* and shall be mutually agreed upon by the Contractor and the *Consultant*. The price shall be comparable to prices quoted on Work of similar nature.

GC 6.3 – CHANGE DIRECTIVE

Page 18, in clause 6.3.12, add the following sentence at the end of the paragraph:

"If such determination by the *Consultant* is not accepted by either party, then the decision shall be made in accordance with Part 8 of the General Conditions – DISPUTE RESOLUTION."

GC 6.4 – CONCEALED OR UNKNOWN CONDITIONS

Page 18, add a new clause 6.4.5 and 6.4.6 as follows:

"6.4.5 If the *Contractor* was given access to the Place of Work and/or professional reports relating thereto (including, without limitation, environmental, geotechnical, and structural reports) prior to the submission of the bid on which the Contract was awarded, then the *Contractor* confirms that they have investigated the *Place of the Work* and, in doing so, applied to that investigation the degree of care and skill required. In those circumstances, notwithstanding the provisions of clause 6.4.1, the *Contractor* is not entitled to an adjustment to the *Contract Price* or to an extension of the Contract Time for conditions which could reasonably have been ascertained by the *Contractor* by such investigation, or which could have been reasonably inferred from the material provided with the Contract Documents. In those circumstances, should a claim arise, the Contractor will have the burden of establishing that it could not have discovered the materially different conditions from an investigation because of restrictions placed on its access or inferred the existence of the conditions from the material provided with the *Contract Documents*.

6.4.6 If such concealed or unknown conditions relate to toxic and hazardous substances and materials, artifacts and fossils, or mould, the parties will be governed by the provisions of GC 9.2 – TOXIC AND HAZARDOUS SUBSTANCES, GC 9.3 – ARTIFACTS AND FOSSILS, and GC 9.5 – MOULD."

GC 6.5 DELAYS

Page 18, clause 6.5.2, delete last sentence of paragraph and replace with the following sentence:

"The *Contractor* will not be reimbursed by the Owner for costs incurred by the *Contractor* as a result of such delay."

Page 19, after Clause 6.5.5, add the following new Clauses:

"6.5.6 Should the *Contractor* fail to attain *Ready-for-Takeover* for the *Work* by the date indicated in Article A-1, Clause 1.3 in the AGREEMENT BETWEEN OWNER AND CONTRACTOR, the period of time from this agreed date to the actual date when the *Consultant* confirms the *Work* is *Ready-for-Takeover*, shall be termed the *Period of Delay*.

6.5.7 In the event there is a *Period of Delay*, the *Contractor* shall be liable for and shall pay to the Owner the cost of continuance of supervision during the *Period of Delay*, and all additional fees,

disbursements and costs incurred by the *Owner* as a result of the Period of Delay, such charges hereby termed as Delay Charges. The Owner may deduct the amount of such Delay Charges from further progress payments."

GC 6.6 CLAIMS FOR A CHANGE IN CONTRACT PRICE

Page 18, add the following new Clause as 6.6.6 and renumber the subsequent clause:

"6.6.6 The *Owner* may make claims arising out of the costs incurred for additional services provided by the Consultant resulting from the *Contractor's* failure to reasonably perform the Work in accordance with the terms and conditions of the Contract, including the Contractor's issuance of unnecessary Requests for Information (RFI's). The *Consultant* will notify the *Owner* and *Contractor* where it has been determined that additional services will be required or have been provided in order not to cause a delay. The *Owner* shall make claims based on the *Consultant's* invoices."

PART 9 - PROTECTION OF PERSONS AND PROPERTY

GC 9.4 – CONSTRUCTION SAFETY

Page 24, after GC 9.4.5, add the following:

"9.4.6 The *Contractor* shall indemnify and save harmless the *Owner*, its agents, officers, directors, employees, *Consultant*, successors, appointees and assigns from and against the consequences of any and all safety infractions committed by the *Contractor* under the applicable occupational health and safety legislation in the *Place of the Work*, including the payment of legal fees and disbursements on a solicitor and client basis. Such indemnity shall apply to the extent to which the *Owner* is not covered by insurance, provided that the indemnity contained in this clause shall be limited to costs and damages resulting directly from such infractions and shall not extend to any consequential, indirect, or special damages."

PART 10 - GOVERNING REGULATIONS

GC 10.1 TAXES AND DUTIES

Page 25, after Clause 10.1.2, add new Clause 10.1.3 as follows:

"10.1.3 Indicate on each application for payment as a separate amount, the appropriate *Value Added Tax* the *Owner* is legally obliged to pay. This amount will be paid to the *Contractor* in addition to the amount certified for payment under the *Contract*."

GC 10.2 – LAWS, NOTICES, PERMITS AND FEES

Page 25, add the following to clause 10.2.3 after the first sentence:

"Various jurisdictions have requirements for posting non-refundable fees before excavations are carried out within public rights-of-way. The *Contractor* is responsible for the determination of the requirement for each specific project and for any required deposits. The *Contractor* shall obtain all permits, such as those from the Department of Highways; licenses; letters of approval and certificates and pay the fees required for the performance of the *Work* which are in force at the date of tender closing, but this shall not include

the obtaining of permanent easements or rights-of-way."

PART 12 – *OWNER* TAKEOVER

Page 25, add new clause 12.1.1.9 as follows:

.9 Any other documentation identified as a closeout or Ready-for-Takeover document as specified in Section 01 78 00.

GC 12.3 WARRANTY

Page 26, add new clause 12.3.5 as follows and renumber subsequent clauses:

"12.3.5 All W*ork* of repair or replacement carried out during the Warranty Period shall be maintained for a period of one (1) year from the date of the *Consultant's* acceptance of the *Work* of repair or replacement notwithstanding that the Warranty Period expires before the expiration of the said year. This clause shall not apply to normal operation maintenance, which shall be carried out by the *Owner*."

PART 13 – INDEMNIFICATION AND WAIVER

GC 13.1 INDEMNIFICATION

Page 26, Clause 13.1.1, in line 2, after "hold harmless the other" replace with "hold harmless the other and the *Consultant*.

PART 14 – CONTRACT SECURITY

GC 14.1 CONTRACT SECURITY

Page 28, add new clause 14.1 as follows:

"14.1 The *Contractor* shall, prior to commencement of the *Work*, provide to the *Owner* a Performance Bond and a Labour and Materials Bond, each in the amount of 50% of the Total Amount Payable. Should it become apparent that the final cost of the project will exceed the Total Amount Payable by more than 10%, the Contractor shall arrange to have his bonds or Irrevocable Letter of Credit reissued, based on the projected final cost."

"14.2 The Labour and Material Bond must be accompanied by Form 18 and the Performance bond must be accompanied by Form 19. Both of these forms can be found at **https://www.canlii.org/en/nb/laws/stat/snb-2020-c-29/latest/snb-2020-c-29.html**

"14.3 The Contract Security will be retained until the expiration of the Warranty Period."

END OF SECTION

PART 1 - GENERAL

1.1 DOCUMENTS REQUIRED

.1 Maintain at job site, one copy each of the following:

.1 Contract drawings.
.2 Specifications.
.3 Addenda.
.4 Reviewed shop drawings/submissions.
.5 Change Orders.
.6 Other modifications to Contract.
.7 Field test reports.
.8 Copy of approved work schedule.
.9 Manufacturer's installation and application instructions.

1.2 SITE CONDITIONS

.1 Examine the geotechnical report in Appendix A titled:

.1 "222828.00 - Geotechnical Investigation Report - Market Wharf Approach Trestle Replacement", dated March 24, 2022, by CBCL Limited. Any interpretations or extrapolations of its contents is at the sole discretion of the Contractor and the Consultant assumes no liability for its content.

1.3 WORK SCHEDULE AND COMPLETION DATES

.1 Prepare and submit to the Consultant with five (5) days of notification of Contract award, one (1) copy of the construction schedule, in the form of a bar chart, showing the dates for commencement and completion of each major activity of the work, including the work of subcontractors; dates of submissions, review and return of all drawings, etc.; the dates of Substantial Completion; and intended man hours of labour and equipment for each major items of work. If the schedule as submitted is unacceptable in any way, submit without delay a revised schedule satisfactory to the Consultant.

.2 The Consultant will notify the Contractor in writing of acceptance of the Construction Schedule. Comply with the Dates of the Construction Schedule at all times. If, for any reason the Construction Schedule is not followed, immediately notify the Consultant of the changes and submit a revised schedule for acceptance. Upon written acceptance by the Consultant this schedule will become the Construction Schedule.

.3 Whenever required, give further written particulars concerning this schedule. The submission to and acceptance by the Consultant of the Contractor's Construction Schedule or the furnishing of details and particulars thereto will not relieve the Contractor of any duties and responsibilities under the Contract.

1.4 MEASUREMENT RESPONSIBILITIES

.1 Notify Consultant sufficiently in advance of operations to permit required measurements for payment purposes.

1.5 CONTRACTOR'S USE OF SITE

.1 Co-operate with users of existing facilities and as per direction of the Consultant.

.2 Should interferences occur, take directions from Consultant.

.3 Do not unreasonably encumber site with materials or equipment.

.4 Move stored products or equipment which interfere with operations of Consultant or other Contractors.

.5 Obtain and pay for use of additional storage or work areas needed for operations.

.6 Comply with all regulations and authorities having jurisdiction over the work, whether on land or on water.

.7 Do not damage existing structures as a result of operations associated with this work. Repair any damage at no additional expense to the Contract.

.8 Provide temporary barriers and warning signs in location where work is adjacent to areas used by public.

1.6 CODES AND STANDARDS

.1 Perform work in accordance with National Building Code of Canada (NBC) and any other code of provincial or local application provided that in any case of conflict or discrepancy, the more stringent requirements will apply.

.2 Meet or exceed requirements of specified standards, codes and referenced documents. When a standard or code is outdated, the latest edition will supersede the referenced date.

.3 Observe and enforce construction safety measures by Canadian Construction Safety Code and Construction Safety Code of New Brunswick. In the event of conflict between any provisions of above authorities, the most stringent provision will apply.

1.7 PROJECT MEETING

.1 Consultant will arrange project meetings and assume responsibility for setting times and recording and distributing minutes.

1.8 SETTING OUT OF WORK

.1 Do all detail surveys necessary for the work, including locating and maintaining working points, and establishing lines and elevations. Perform all layout work, and carefully preserve benchmarks, reference points and stakes.

.2 Provide such masts, scaffolds, batter boards, lines, straight edges, templates, and other devices as may be necessary to facilitate layout, construction, and inspection of the work. Whenever necessary, suspend work for such reasonable time as may be necessary to permit the Consultant or Owner to check or inspect any portion of the work. The contractor will not be allowed any extra compensation or time for completion because of this suspension of work.

.3 Reference elevations for the various features of the specified works to be referenced and properly related to a benchmark, which will be approved by the Consultant.

.4 Verify all grades, lines, levels, and dimensions shown on the drawings and report any errors or inconsistencies to the Consultant before commencing work. Establish all grades, lines, levels required to facilitate the work.

1.9 CONTRACT DOCUMENTS

.1 Contract Drawings:

.1 The drawings listed in these "Plans and Specifications" and any additional drawings issued at a later date by the Consultant.
.2 Consultant may furnish additional drawings to assist in proper execution of work. These drawings will be issued for clarification only. Such drawings will have same meaning and intent as if they were included with plans referred to in Contract Documents.
.3 The drawings indicate the extent and general dimensions of the work. Make all necessary measurements to ensure that the result of the work is in accordance with the intent.
.4 Verify all existing conditions in field prior to proceeding with work.

.2 Contract Specifications:

.1 The general requirements and technical specifications are written solely for the General Contractor. They are organized into the NMS format of separate divisions and sections.
.2 Specification language is the "Short Form Type", for example, where the word "provide" occurs, interpret it to mean "the Contractor shall furnish all labour, material and equipment necessary to complete the work".
.3 These Specifications and accompanying drawings are intended to describe and provide for a finished project. They are intended to be complementary, and what is called for by either will be as binding as if called for by both. The Contractor shall understand that the work herein described will be complete in every detail, notwithstanding that every item necessarily involved is not particularly mentioned, and Contractor will be held to provide all labour, materials and equipment necessary for the entire completion of the work and will not avail himself of any errors or omissions.

1.10 PERMITS AND REGULATIONS

.1 Apply for, obtain and pay for all necessary permits, approvals and other authorizations required for the work.

.2 Comply with all by-laws, ordinances and regulations of all authorities having jurisdiction.

.3 Pay for any Municipal permits as required.

1.11 CUTTING, FITTING & PATCHING

.1 Execute cutting (including excavation), fitting and patching required to make work fit properly.

.2 Make cuts with clean, true, smooth edges. Make patched inconspicuous in final assembly.

.3 Where new work connects with existing and where existing work is altered, cut, patch and make good to match existing work.

.4 Obtain Consultant's approval before cutting, boring or sleeving, or excavating adjacent to load-bearing members.

1.12 RECORD OF CONSTRUCTION

.1 As work progresses, maintain accurate records to show all deviations from the contract drawings, with particular reference to work which will be concealed. Prior to the inspection of the work for the issuance of the Final Certificate of Completion, provide the Consultant with one set of white prints of the drawings with all deviations shown neatly thereon.

.2 Provide "as built" cross sections of any excavation, dredging or fill work.

1.13 PAYMENT

.1 No separate payment will be made for work specified under General Conditions, Supplementary Conditions or any sections of Specification under Division 01. The cost of this work is to be considered as overhead and to be included in the unit prices of the Contract.

.2 Dimensional changes are directed by the Consultant to suit existing conditions, but not resulting in additional work or materials, will not be considered as extra to the Contract.

1.14 MAINTENANCE OF SHIPPING

.1 Liaise with the local port officials to coordinate activities such that any interference is minimized.

1.15 COOPERATION AND ASSISTANCE TO CONSULTANT

.1 Co-operate with Consultant on inspection of work.

.2 Provide assistance when requested.

1.16 DATUM

.1 The datum referred to in this Specification is Geodetic NAD83 CGVD28. As the rise, fall and range of tides varies daily, the Canadian Tide and Current Tables, as issued by the Canadian Hydrographic Service, should be consulted for tidal predictions and other tidal information relating to work. Interpretation of tide levels produced on Canadian Tide tables compared to project datum shall be responsibility of the contractor.

1.17 CONTRACTOR'S REPRESENTATIVE

.1 Continuously maintain on the site an authorized representative to whom communication may be addressed and who will be competent to speak for the Contractor in discussing work methods.

1.18 WORKERS' COMPENSATION

.1 Contractor and all sub-contractors must be registered under the Workers Compensation Act and provide evidence of good standing.

.2 At completion of Contract and before final payment is made, the Contractor will present to the Consultant a Letter of Certification from the Workers Compensation Board, showing that all required assessments are paid in connection with all trades.

1.19 LAWS, STANDARDS TAXES AND FEES

.1 Comply with all laws and standards governing all or any part of the work, pay all applicable taxes and pay for all permits and certificates required in respect of the execution of the work. Where variances exist between the requirements of agencies governing all or any part of the work, the most restrictive will govern, but in no instance will the standards established by the drawings and this Specification, which exceed such requirements, be reduced.

1.20 PROTECTION AND REPAIR

.1 Repair any damage resulting from operations under this contract.

1.21 LOCATION OF EQUIPMENT FIXTURES

.1 Location of equipment, fixtures or any and appurtenances indicated are to be considered approximate.

1.22 INSPECTION AND TESTING

.1 The Consultant may employ an Inspector and/or Testing Company to ensure work conforms with contracts.

1.23 EXISTING SOILS CONDITIONS

.1 Any information pertaining to soils and all boreholes logs are furnished by the Consultant as a matter of general information only and borehole descriptions or logs are not to be interpreted as descriptive of conditions at locations other than those described by the boreholes themselves.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 NOT USED

END OF SECTION

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

.1 The Work includes the replacement of Saint Andrews wharf approach structure in Saint Andrews, New Brunswick. Work specifically includes, but is not limited to:

.1 Demolition and disposal of existing timber wharf approach structure and associated infrastructure, including timber cribs, ballast rock, bracing, stringers, decking, curbing, ladders, lights, electrical, water piping, sanitary force main piping.

.2 Construction of infill revetment structure including rockfill, armour rock, filter stone, aggregate base, aggregate subbase and asphalt restoration.

.3 New steel pile supported wharf Structure complete with reinforced concrete pile caps, precast concrete deck complete with a topping slab and light pole bases, ladders, cleats, wheel guard, timber fender piles.

.4 Installation of new water and sanitary force main piping including corrosion resistant fittings and mounting hardware as shown to the drawings.

.5 Removal and replacement of the timber bracing on the existing Intermediate trestle structure.

.6 Installation of pile wrap corrosion protection on the existing H-piles of the Pier head.

.7 Supply/placement of granular materials to adjust surrounding grades and incorporate new infill revetment into existing.

.8 Disconnect and remove existing electrical equipment and steel poles as identified on the drawings.

.9 Installation of new electrical service equipment, lighting, and wiring. Coordinate with local utility as required, arrange all permits and carry all costs. Provide all necessary mounting hardware, accessories, conduits, trenching, etc. to facilitate a complete installation. All components shall be corrosion resistant 316 stainless steel where possible.

1.2 PRODUCT MEASURMENT GENERAL

.1 This section details the measurement method to be used for payment purposes. Incidental items covered in the various sections of the specification are to be allowed for in the pricing of each pay item.

1.3 MEASUREMENT FOR PAYMENT

.1 Lump Sum Items: the following items are to be measured separately for costing purposes, then combined and submitted in as one item under the Lump Sum items in the tender documents:

Division 01:

.1 Site Orientation, Mobilization and Demobilization: Project Management, construction site control and coordination, plan and schedule submissions, assistance to the Consultant, mobilization and demobilization, Contractor's site offices. This item also includes the disassembly and removal of the site office at the time of completion of the work. Permitting and/or permissions in accordance with requirements of Authorities having jurisdiction, regulatory requirements, coordination of work by external utilities (ex – NB Power), safety, environmental protection, pollution and sedimentation control, water quality monitoring, Quality Control, Independent laboratory testing and reporting, Preconstruction Condition Survey and Post-Construction Condition Survey, reports as specified, inspections as specified, security provisions and allowances, traffic control, temporary works, temporary roads and access as required, snow clearing, any site modifications including temporary power/utilities, filling, grading, site improvements and reinstatement required to perform the work, construction hoarding, shoring, dewatering, disposal of surplus materials, disposal of wastes, marker tape, marker stakes, geotextile fabrics, geogrid, abandonment of any affected underground utilities and works, reinstatement of disturbed surfaces with matching materials and thicknesses, interim record and topographic survey data submissions, field records and topographic survey, record drawings, warranties, cleaning, and all incidentals.

.2 Unit Price Items: the following outlines the unit of measurement of the unit price items as indicated in the tender documents:

Division 03:

.1 Reinforced Concrete Pile Caps (All types): supply and construction of the reinforced concrete pile caps will be paid by the cubic meter place measurement (CMPM) and be measured by the plan and section dimensions indicated on the Drawings. Price to include all costs associated with supplying and installing the pile caps complete with concrete, formwork, reinforcement, concrete quality testing and all supplementary materials considered incidental to the work.

.2 Reinforced Precast Concrete Deck Panels (All types): supply and construction, delivery, and installation of precast reinforced concrete deck panels for the approach structure will be measured per each. Price to include all costs associated with construction, delivery, placement, field

grouting, design of lifting components and design for lifting operations and all supplementary materials considered incidental to the work.

.3 Reinforced Concrete Topping Slab: supply and construction of the cast-in-place reinforced concrete topping slab of the new approach structure will be paid by the square metre place measurements based on the plan dimensions indicated on the drawings. Concrete placed beyond the dimensions shown will not be measured for payment. Formwork, reinforcement, concrete, quality testing, concrete curbs, expansion joint materials and all supplementary materials considered incidental to the work.

.4 Light Standard Base (TYPE 1): supply and construction of concrete light pole bases on new approach structure will be measured per each. Price to include all costs associated with supplying and installing the light pole bases complete with concrete, formwork, reinforcement, anchors, concrete quality testing and all supplementary materials considered incidental to the work.

.5 Light Standard Base (Type 2): supply and construction of concrete light pole bases within the infill area will be measured per each. Price to include all costs associated with excavation, concrete, formwork, reinforcement, anchors, concrete quality testing, backfilling and all supplementary materials considered incidental to the work.

.6 Precast reinforced concrete access stairs (All types): supply and construction, delivery, and installation of precast concrete access stairs will be measured per each. Price to include all costs associated with construction, delivery, placement, preparation of base materials, and design for of lifting components and lifting operations and all supplementary materials considered incidental to the work.

Division 05:

.1 Access Stair Guardrails and Handrails: fabrication supply and installation of guardrails and handrails will be measured for payment in linear meter. Price to include all steel sections, plates, anchor bolts, welding, hardware, hot-dipped galvanizing and all other supplementary materials considered incidental to the work.

Division 06:

.1 Timber Wales (New Approach Structure): supply and installation of new timber wales for the new approach structure will be measured for payment per cubic metre place measurement (CMPM). Price to include all dimension timber, preservative treatment, bolts, hardware and all other supplementary materials considered incidental to the work.

.2 Timber Bracing (Intermediate Structure: supply and installation of new timber bracing for the existing intermediate trestle structure will be measured for payment per cubic metre place measurement (CMPM). Price to include all dimension timber, preservative treatment, bolts, hardware and all other supplementary materials considered incidental to the work.

.3 Timber Wales (Intermediate Structure); supply and installation of new timber wales for the existing intermediate trestle structure will be measured for payment per cubic metre place measurement (CMPM). Price to include all dimension timber, preservative treatment, bolts, hardware and all other supplementary materials considered incidental to the work.

.4 Timber Guard Rail (Approach Structure): supply and installation of new timber guard rail on the new approach structure will be measured for payment per linear metre. Price to include all dimension timber, preservative treatment, bolts, hardware and all other supplementary materials considered incidental to the work.

.5 Timber Ladders: supply and installation of timber ladders at will be measured per each. Price to include all dimension timber, preservative treatment, steel rungs and holdfast, bolts, hardware, and all other supplementary materials considered incidental to work.

.6 Timber Pile Repairs: Timber Pile repairs will be measured per each. This item to inlcude all equipment and labour to fabricate, supply, and install fibre reinforced polymer (FRP) wraps, supply and install repair grout, and includes all hardware and supplementary materials considered to be incidental to the work.

Division 26:

.1 Electrical: this item includes all Work as indicated on electrical Drawings and as specified in Division 26 herein.

Division 31:

.1 Demolition and Waste Disposal: Items designated for removal and off-site disposal are included in this lump sum item. These items include but are not necessarily limited to: full demolition of the existing approach trestle structure, and boat platform Disposal of timber, concrete, steel and any other materials at an approved construction and demolition waste disposal site.

.2 Removal and Disposal of Existing Timber Bracing/Wales: This item includes all labour, equipment and materials to remove and dispose of offsite the existing timber bracing and timber wales of the intermediate trestle. Dispose of timber materials at an approved construction and demolition waste disposal site.

.3 Steel Pipe Pile- Supply: supply of steel pipe piles will be paid per linear meter as indicated on the project drawings. Price to include the supply and transport of the piles to the site. This item also includes the supply and installation of driving shoes, and additional length for installation methods and cutoff requirements.

.4 Steel Pipe Pile (Vertical) - Install: installation of vertical steel pipe piles will be measured per each. Price to include the installation of bearing piles complete with pile template, supply and construction of reinforced concrete infilland all accessories and hardware and all supplementary materials. Concrete pile infill complete with concrete, formwork, reinforcement, concrete quality testing, and all supplementary materials considered incidental to the work.

.5 Steel Pipe Pile (Batter) -Install: installation of battered steel pipe plies will be measured per each. Price to include the installation of batter piles complete with pile template, supply and construction of reinforced concrete infill and all accessories and hardware all supplementary materials. Concrete pile infill complete with concrete ,formwork, reinforcement, concrete quality testing, and all supplementary materials considered incidental to the work. This item does not include concrete infill related to installation of rock sockets.

.6 Rock Sockets: Supply and installation of rock sockets will be measured per each. This item includes all labour, equipment and materials to drill rock sockets to length indicated on contract drawings including but not limited to cleaning out of bedrock to pile tip, supply fabrication and installation of steel reinforcing cage, placement of concrete, concrete quality testing, socket inspection and all supplementary materials considered incidental to the work.

.7 Timber Fender Piles: supply and installation of timber fender piles will be measured per each. Price to include timber pile, preservative treatment, bolts, hardware, and all other supplementary materials considered incidental to work. This item also includes the supply and installation of driving shoes, and additional length for installation methods and cutoff requirements.

.8 Pipe Pile Corrosion Protection Wraps: Supply and installation of corrosion protection wraps for the new Approach Structure will be measured for payment by the linear metre. Price to include supply and installation of protection on each pile from the underside of pile cap to harbour bottom, including but not limited to full length integrated corrosion resistant closure flange, stainless steel closure fasteners, corrosion inhibiting gel and incidentals necessary to complete the work to the satisfaction of the Consultant and all supplementary materials considered to incidental to the work.

.9 Steel H-Pile Corrosion Protection Wraps: Supply and installation of corrosion protection wraps for the existing pier head structure will be measured for

payment by the linear metre. Price to include supply and installation of protection on each H-pile from the underside of pile cap to elevation +2.15, including but not limited to full length integrated corrosion resistant closure flange, stainless steel closure fasteners, corrosion inhibiting gel and incidentals necessary to complete the work to the satisfaction of the Consultant and all supplementary materials considered to be incidental to the work.

Division 32:

.1 Excavation and Off-Site Disposal of any Unsuitable Material: excavation and disposal of excavated material will be incidental to the installation of any new buried infrastructure and shall be included in the new infrastructure associated unit rates. This includes the supply, transportation, disposal, of all excavated unsuitable materials. Disposal to meet requirements of the Department of Environment and Local Government and any other authority having jurisdiction.

.2 75mm Minus Aggregate Subbase Crushed Rock: supply and installation of the 75mm minus aggregate material will be paid by the tonne based on weigh scale tickets provided by the Contractor and approved by the Consultant. This item includes: production of 75mm minus aggregate material and transport to the site; placement and compaction of material to the lines and elevations indicated on the Project Drawings.

.3 31.5mm Minus Aggregate Base Crushed Rock: supply and installation of the aggregate base crushed rock material will be paid by the tonne based on weigh scale tickets provided by the Contractor and approved by the Consultant. This item includes: production of aggregate base crushed rock material and transport to the site; placement and compaction of material to the lines and elevations indicated on the Project Drawings.

.4 Asphalt: supply and installation of asphalt will be paid by the scaled tonne measurement based on weigh scale tickets to the plan dimensions indicated on the drawings. Asphalt placed beyond the dimensions shown will not be measured for payment. This item includes: production of asphalt material and transport to the site; machine place or, if required, hand place and roll to the compacted thicknesses shown on the Drawings or as indicated by the Consultant. Tack coat, keyways, milling, sawcutting straight edges and any handwork for driveway aprons or adjoining surfaces will be considered incidental to the unit price for asphalt concrete paving and will not be paid for separately. All costs for asphalt liquid binder shall be incidental to the unit price for the asphalt and will not be paid for separately.

Division 33:

.1 Precast Concrete Structures: The unit of measurement for storm manholes will be measured by the number each installed. The price will include excavation, backfilling, compaction and the supply and installation of concrete grade rings and one (1) rubber grade ring to bring the frame and cover/grate to the finish asphalt surface.

.2 Water Main: The unit of measurement for water main and service piping will be lineal metres. The price will include the supply and installation of the piping, excavation, bedding, backfilling, connection compaction or mounting on structures and any required connection fittings as indicated on the Drawings. Measurement will be taken along the centreline of the pipe.

.3 Sanitary Sewer or Force Main: The unit of measurement for sanitary sewer or force main piping will be lineal metres. The price includes the supply and installation of sanitary sewer piping including excavation, bedding, backfilling compaction or mounting on structures and any required connection fittings as indicated on the Drawings. Measurement will be taken along the centreline of the pipe.

.4 Storm Utility Drainage Piping: The unit of measurement for storm sewer piping will be lineal metres. The price includes the supply and installation of storm sewer including excavation, bedding, installation of rubber gasket at each joint, connections to new or existing piping, manholes and catch basins, backfilling and compaction. Measurements will be taken along the centreline of the pipe continuously through manholes.

Division 35:

.1 300mm Minus Rock Fill Corestone: supply and installation of rock fill material will be paid by the tonne based on weigh scale tickets provided by the Contractor and approved by the Consultant. This item includes: production of rock fill material and transport to the site; placement of material to the lines and elevations indicated on the Project Drawings.

.2 Filter Stone 50-150kg: supply and installation of the filter stone will be paid by the tonne based on weigh scale tickets provided by the Contractor and approved by the Consultant. This item includes: production of filter stone material and transport to the site; placement of filter stone to the lines and elevations indicated on the Project Drawings.

.3 Armour Stone 500-1500kg: supply and installation of the armour stone will be paid by the tonne based on weigh scale tickets provided by the Contractor and approved by the Consultant. This item includes: production of armour stone material and transport to the site; placement of armour stone to the lines and elevations indicated on the Project Drawings.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 NOT USED

END OF SECTION

PART 1 - GENERAL

1.1 GENERAL

.1 Submit to Consultant, for review, shop drawings, product data, samples and other information specified.

.2 Until submission is reviewed, work involving relevant product may not proceed.

.3 Provide all submittals electronically, in pdf file format.

1.2 SHOP DRAWINGS

.1 Drawings to be originals prepared by the Contractor, Subcontractor, supplier, or distributor, which illustrate appropriate portion of work, showing fabrication, layout, setting or erection details as specified in appropriate sections.

.2 Identify details by reference to sheet and detail numbers shown on Contract Drawings.

1.3 PRODUCT DATA

.1 Certain specification sections specify that manufacturer's standard schematic drawings, catalogue sheets, diagrams schedules, performance chart, illustrations and other standard descriptive data will be accepted in lieu of shop drawings.

1.4 SAMPLES

.1 Submit samples in sizes and quantities specified.

.2 Construct field samples and mock-ups at locations acceptable to Consultant.

.3 Accepted samples will become standards of workmanship and material against which, installed work will be checked on project.

1.5 MISCELLANEOUS DATA

.1 Provide certificates, methodologies, design and test results as required.

1.6 COORDINATION OF SUBMISSIONS

.1 Review shop drawings, product data, samples and miscellaneous data prior to submissions.

.2 Verify:

.1 Field Measurements.
.2 Field Construction Criteria.
.3 Catalogue numbers and similar data.

.3 Coordinate each submission with requirements of work and contract documents. Individual submissions will not be reviewed until all related information is available.

.4 Contractor's responsibility for errors and omissions in submission is not relieved by Consultant's review of submissions.

.5 Contractor's responsibility for deviations in submission from requirements in Contract documents is not relieved by Consultant's review of submission, unless Consultant gives written acceptance of specified deviations.

.6 Notify Consultant, in writing at time of submission, of deviations from requirements of contract documents stating reasons for deviations.

.7 After Consultant's review, distribute copies.

1.7 SUBMISSION REQUIREMENTS

.1 Schedule submissions at least 14 days before dates reviewed submissions will be needed.

.2 Submit all shop drawings and product data electronically in pdf file format. Files must be legible and below 10Mb in size or broken into multiple pdf files.

.3 Accompany submissions with transmittal letter, in duplicate, containing:

.1 Date.
.2 Project title and number.
.3 Contractor's name and address.
.4 Identification and quantity of each shop drawing, product data and sample submitted.
.5 Other pertinent data.

.4 Submissions shall include:

.1 Date and revision dates.
.2 Project title and number.
.3 Name and address of:

.1 Subcontractor.

.2 Supplier.

.3 Manufacturer.

.4 Separate details when pertinent.

.4 Identification of product or material.
.5 Relation to adjacent structure or materials.
.6 Field dimensions, clearly identified as such.
.7 Specification Section Number.
.8 Applicable standards such as CSA or CGSB numbers.
.9 Contractor's stamp, initialed or signed, certifying review of submission, verification of field measurements and compliance with contract documents.

1.8 SHOP DRAWINGS REVIEW

.1 The review of shop drawings by Consultant, is for the sole purpose of ascertaining conformance with the general concept. This review shall not mean that Consultant approves the detail design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same, and such review shall not relieve the Contractor of responsibility for errors or omissions in the shop drawings or of responsibility for meeting all requirements of the construction and contract documents. Without restricting the generality of the foregoing, the Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of the work of all sub-trades.

1.9 OTHER REVIEWS

.1 As for shop drawings above, other reviews are for the sole purpose of ascertaining the general concept.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 NOT USED

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK

.1 Fire Safety Requirements.

.2 Hot Work Permit.

.3 Existing Fire Protection and Alarm Systems.

1.2 DEFINITIONS

.1 Hot Work: applies to hot works involving open flames or producing heat or sparks, including without being limited to: cutting, welding, soldering, brazing, grinding, adhesive bonding, thermal spraying and sodding pipes.

1.3 SUBMITTALS

.1 Submit copy of Hot Work Procedures and sample of Hot Work permit to Consultant for review, within 14 days of Contract award.

.2 Submit in accordance with Section 01 33 00 - Submissions/Shop Drawing.

1.4 FIRE SAFETY REQURIEMENTS AND REFERENCE STANDARDS

.1 Implement and follow fire safety measures during Work. Comply with following:

.1 National Fire Code (NFC) 2020.
.2 National Building Code (NBC) 2020.
.3 Fire Protection Standards FCC 301 and FCC 302.
.4 CSA W117.2:25, Safety in Welding, Cutting, and Allied Processes.
.5 NFPA 51-2023, Design and Installation of Oxygen-Fuel Gas Systems for Welding, Cutting, and Allied Processes
.6 Federal and Provincial Occupational Health and Safety Acts and Regulations.

.2 In event of conflict between any provisions of above authorities the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, Consultant will advise on the course of action to be followed.

1.5 HOT WORK AUTHORIZTION

.1 Obtain Consultant's written "Authorization to Proceed" before conducting any form of Hot Work on site.

.2 To obtain authorization, submit to Consultant:

.1 Contractor's typewritten Hot Work Procedures to be followed on site as specified below.
.2 Description of the type and frequency of Hot Work required.
.3 Sample Hot Work Permit to be used.

.3 Upon review and confirmation that effective fire safety measures will be implemented and followed during performance of Hot Work, Consultant will give authorization to proceed as follows:

.1 Issue one written "Authorization to Proceed" covering the entire project for duration of work or;
.2 Subdivide the work into pre-determined, individual activities, each activity requiring a separately written authorization to proceed.

.4 Requirement for individual authorization will be based on:

.1 Nature or phasing of work;
.2 Risk to Facility operations;
.3 Quantity of various trades needing to perform Hot Work on project or;
.4 Other situation deemed necessary by Consultant to ensure fire safety on premises.

.5 Do not perform any Hot Work until receipt of Consultant's written "Authorization to Proceed" for that portion of work.

.6 In tenant occupied Facility, coordinate performance of Hot Work with Facility Manager through the Consultant. When directed, perform Hot Work only during non-operative hours of the Facility. Follow Consultant's direct supervision this regard.

.7 Hot Works shall be performed only by personnel trained in the safe use of equipment.

1.6 HOT WORK EQUIPMENT

.1 Maintenance:

.1 Hot Work Equipment shall be maintained in good operating condition.

.2 Inspection:

.1 Hot Work Equipment shall be examined for leakage or defects prior to each use.
.2 Leaks or defects found in Hot Work Equipment shall be repaired prior to use.

.3 Equipment Not in Use:

.1 All valves shall be closed and gas lines bled when Class 2 gas Hot Work Equipment is not in use.
.2 Electric Hot Work Equipment shall be de-energized when not in use.

.4 Compressed Gas Equipment:

.1 The design and installation of oxygen-fuel gas equipment shall conform to NFPA 51.
.2 Unalloyed copper piping shall not be used for acetylene gas.
.3 Oil or grease shall not be used with equipment for oxygen.

.4 Cylinders of Class 2 gases shall conform to Part 3.

1.7 PREVENTION OF FIRES

.1 Location of Operations:

.1 Except as provided in Sentence (2), Hot Work shall be carried out in an area free of combustible and flammable contents, with walls, ceilings and floors of noncombustible construction or aligned with noncombustible materials.

.2 When it is not practicable to undertake Hot Work in an area described in Sentence (1):

.1 Combustible and flammable materials within a 15 m distance from the Hot Work shall be protected against ignition in conformance with Article 4 below.

.2 A fire watch shall be provided during the Hot Work and for a period of not less than 60 min after its completion.

.3 A final inspection of the Hot Work area shall be conducted 4 hours after completion of work.

.3 When there is a possibility of sparks leaking onto combustible materials in areas adjacent to the area where Hot Work is carried out:

.1 Openings in walls, floors or ceilings shall be covered or closed to prevent the passage of sparks to such adjacent areas, or;

.2 Sentence (2) shall apply to such adjacent areas.

.4 Protection of Combustible and Flammable Materials:

.1 Any combustible and flammable material, dust or residues shall be:

.1 Removed from the area where Hot Work is carried out, or;

.2 Protected against ignition by the use of noncombustible materials.

.2 Combustible materials or building surfaces that cannot be removed or protected against ignition as required in Sentence (1) shall be thoroughly wetted where Hot Work is carried out. Any process or activity that produces flammable gases or vapours, combustible dusts or combustible fibers in quantities sufficient to create a fire or explosion hazard, shall be interrupted and the hazardous conditions shall be removed before any Hot Work is carried out.

1.8 HOT WORK PROCEDURES

.1 Develop and implement safety procedures and work practices to be followed during the performance of Hot Work.

.2 Hot Work Procedures to include:

.1 Requirement to perform hazard assessment of site and immediate work area beforehand for each hot work event in accordance with Safety Plan specified in Section 01 35 29 - Health and Safety Requirements.
.2 Use of a Hot Work Permit system with individually issued permit by Contractor's Superintendent to worker or subcontractor granting permission to proceed with Hot Work.
.3 Permit required for each Hot Work event.
.4 Designation of a person on site as a Fire Safety Watcher responsible to conduct a fire safety watch for a minimum duration of 60 minutes immediately following the completion of the Hot Work.
.5 Compliance with fire safety codes, standards and occupational health and safety regulations specified.
.6 Site specific rules and procedures in force at the site as provided by the Facility Manager.

.3 Generic procedures, if used, must be edited and supplemented with pertinent information tailored to reflect specific project conditions. Label document as being the Hot Work Procedures for this contract.

.4 Procedures shall clearly establish responsibilities of:

.1 Worker performing hot work,
.2 Person issuing the Hot Work Permit,
.3 Fire Safety Watcher,
.4 Subcontractor(s) and Contractor.

.5 Brief all workers and subcontractors on Hot Work Procedures and of Permit system. Stringently enforce compliance.

1.9 HOT WORK PERMIT

.1 Hot Work Permit to include the following:

.1 Project name and project number;
.2 Building name and specific room or area where hot work will be performed;
.3 Date of issue;
.4 Description of hot work type needed;

.2 Special precautions to be followed, including type of fire extinguisher needed;

.1 Name and signature of permit issuer.
.2 Name of worker to which the permit is issued.
.3 Permit validity period not to exceed 8 hours. Indicate start time/date and termination time/date.
.4 Worker's signature with time/date of hot work completion.
.5 Stipulated time period of safety watch.
.6 Fire Safety Watcher's signature with time/date.

.3 Permit to be typewritten form. Industry Standard forms shall only be used if all data specified above is included on form.

.4 Each Hot Work Permit to be completed in full, signed and returned to Contractor's Superintendent for safe keeping on site.

1.10 FIRE PROTECTION AND ALARM SYSTEMS

.1 Fire protection and alarm systems shall not be:

.1 Obstructed.
.2 Shut-off, unless approved by Consultant.
.3 Left inactive at the end of a working day or shift.

.2 Do not use fire hydrants, standpipes and hose systems for purposes other than firefighting.

.3 Costs incurred, from the fire department, Facility Owner and tenants, resulting from negligently setting off false alarms will be charged to the Contractor in the form of financial progress payment reductions and holdback assessments against the Contract.

1.11 DOCUMENTS ON SITE

.1 Keep Hot Work Permits and Hazard Assessment documentation on site for duration of Work.

.2 Upon request, make available to Consultant or to authorized safety Representative for inspection.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 NOT USED

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 01 35 24: Special Procedures on Fire Safety Requirements.

.2 Section 01 35 25: Special Procedures on Lockout Requirements.

1.2 REFERENCE STANDARDS

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

.2 Canadian Standards Association Group (CSA):

.1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.
.2 CSA Z180.1:19, Compressed Breathing Air and Systems.
.3 CSA Z275.2:20, Occupational Safety Code for Diving Operations.
.4 CSA Z275.4:22, Competency Standard for Diving, Hyperbaric Chamber, and Remotely Operated Vehicle Operations.

.3 National Building Code 2020 (NBC):

.1 NBC 2020, Division B, Part 8 Safety Measures at Construction and Demolition Sites.

.4 National Fire Code 2020 (NFC):

.1 NFC 2020, Division B, Part 5 Hazardous Processes and Operations, subsection 5.6.1.3 Fire Safety Plan.

.5 Treasury Board of Canada Secretariat (TBS):

.1 Treasury Board, Directive on the Management of Real Property, modified 2022-11-18, Article 4.1.7, https://www.tbs-sct.canada.ca/pol/doc-eng.aspx?id=326 91.

1.3 DEFINITIONS

.1 Competent Person means a person who is:

.1 Qualified by virtue of personal knowledge, training and experience to perform assigned work in a manner that will ensure the health and safety of persons in the workplace.
.2 Knowledgeable about the provisions of occupational health and safety statutes and regulations that apply to the Work.
.3 Knowledgeable about potential or actual danger to health or safety associated with the Work.

.2 Medical Aid Injury: any injury for which medical treatment was provided and the cost of which is covered by the Workers Compensation Board of the province in which the injury was incurred.

.3 PPE: personal protective equipment.

.4 Work Site: where is used in this section it shall mean areas, located at the premises where Work is undertaken, used by the Contractor to perform all the activities associated with the performance of the Work.

.5 Incident: occurrence, condition or situation arising in the course of the Work that resulted in or could have resulted in injury, illness, property damage, environmental issues for fatality.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submissions/Shop Drawing.

.2 Develop and submit (digital copy) a site-specific Health and Safety Plan within 14 days after Contract award and prior to commencement of Work. Health and Safety Plan must include:

.1 Results of site-specific safety hazard assessment.
.2 Results of safety and health risk or hazard analysis for site tasks and operations.
.3 Measures and controls to be implemented to address identified safety hazards and risks.
.4 Name of the designated Site Safety Representative showing proof his/her competence and reporting relationship in Contractor's company. This person is expected to be on site during all work execution.
.5 Copy of current WCB Letter of Good of Standing.
.6 Details as to how WHMIS/GHS will be managed on site
.7 Project specific details as to how the Project work areas will be delineated/protected from other areas of the premises (fences, signs).
.8 Details as to how Safety orientations will be managed. Include a summary of what topics are covered in the safety orientation described in this section.
.9 Copy of Notice of Project that was sent to the Prevention OHS regulator.
.10 Project site specific hazard assessment.
.11 Details as to how tool box and safety meetings will be held and recorded.
.12 Organization chart illustrating supervision and subs (if available) that are assigned to this Project.
.13 On-site Emergency Response Plans that cover all the potential emergency situations that could arise.
.14 Emergency Contacts: name and telephone number of officials from:

.1 Contractor and subcontractors. (key personnel)

.2 Pertinent Federal and Provincial Departments and Authorities Having Jurisdiction.

.3 Local emergency resource organizations.

.15 List of critical work activities which have a risk of endangering health and safety of Facility users and/or others.
.16 Details as to how the subcontractors documented safety program will be reviewed and managed prior to allowing them to work on site.
.17 Details as to how the site safety inspection program will be managed. Include frequency, assignment of responsibility, as well as standard inspection form to be used.
.18 Base requirements as well as specialized PPE requirements; minimum being hardhat, safety footwear, safety glasses and high visibility vest.
.19 General safety rules as well as the disciplinary protocols to be taken for non-compliance.
.20 Details as to how Incident investigations are to be managed. Include procedure and incident form.

.3 Provide a Fire Safety Plan, specific to the Work location, in accordance with NBC, Division B, Article 8.1.1.1.3 prior to commencement of work. The plan shall be coordinated with, and integrated into, the existing Facility Emergency Procedures and Evacuation Plan in place at the site. Owner will provide Facility Emergency Procedures and Evacuation Plan. Deliver two copies of the Fire Safety Plan to the Consultant not later than 14 days before commencing Work.

.4 Contractor's and Sub-contractors' Safety Communication Plan.

.5 Contingency and Emergency Response Plan addressing standard operating procedures specific to the project site to be implemented during emergency situations. Coordinate plan with existing Facility Emergency Response requirements and procedures provided by Owner.

.6 Consultant will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 5 days after receipt of plan. Revise plan as appropriate and resubmit plan to Consultant within 5 days after receipt of comments from Consultant.

.7 Consultant'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.

.8 Submit names of personnel and alternates responsible for site safety and health, including designated Health and Safety Site Representative specified in the Health and Safety Plan.

.9 Submit records of Contractor's Health and Safety meetings and Work site health and safety inspection reports when requested.

.10 Submit copies of incident reports (incident, accident, injury, near miss, fire, explosion, chemical spill or property damage at the work site) within 24 hours after the event to Consultant. Ensure the Authority Having Jurisdiction is notified in accordance with applicable legislation.

.11 Submit WHMIS/GHS Safety Data Sheets (SDS).

.12 Submit copy of Letter of Good Standing from Provincial Worker Compensation or other Department of Labour organization.

.1 Submit updated Letter of Good Standing whenever expiration date of existing letter occurs during the period of Work.

.13 Medical Surveillance: where prescribed by legislation or regulation, obtain and maintain worker medical surveillance documentation.

1.5 REGULATORY REQUIREMENTS

.1 Comply with the Acts and regulations of the Province of Work.

.2 Comply with specified standards and regulations to ensure safe operations at site.

1.6 COMPLIANCE REQUIREMENTS

.1 Observe construction safety measures of NBC, Division B, Part 8, NFC, Municipal by-laws and ordinances.

.2 Comply with Occupational Health and Safety Act for Province of New Brunswick Occupational Health and Safety Regulations made pursuant to the Act.

.3 Comply with Provincial/Federal Public Health requirements, directions and declarations. Prepare documented plans prescribed by Public Health and/or industry best practices in consultation with the Consultant.

.4 Comply with Municipal statutes and authorities.

.5 Do demolition in accordance with CSA S350.

.6 In case of conflict or discrepancy between above specified requirements, the most stringent requirement shall apply.

.7 Maintain Workers Compensation Coverage in good standing for the duration of Contract. Provide proof of clearance through submission of Letter in Good Standing.

1.7 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.

.3 Where applicable the Contractor shall be designated "Constructor", as defined by Occupational Health and Safety Act and Regulations for Construction Projects for the Province of Work

1.8 FILING OF NOTICE

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

1.9 HOT WORK PERMIT

.1 Be responsible to pay all fees and obtain all permits required to conduct the Work in accordance with Section 01 10 10 - General Instructions.

.2 Be responsible to provide authorities with plans and information for acceptance certificates and the costs arising from same.

.3 Be responsible to provide inspection's certificates as evidence that work conforms to requirements of Authorities Having Jurisdiction (AHJ).

.4 Post permits, licenses, and compliance certificates, specified in Section 01 10 10 - General Instructions.

.5 Where a particular permit or compliance certificate cannot be obtained, notify Consultant in writing and obtain approval to proceed before carrying out applicable portion of Work.

1.10 SAFETY HAZARD ASSESSMENT

.1 Perform site specific safety hazard assessment related to project. Include site/hazards/concerns identified arising from the site visit that must be considered.

.2 Conduct initial assessment prior to commencement of Work with further assessments completed and documented as needed during progress of Work, including when new trades and subcontractors arrived on site.

.3 Record results and address in Health and Safety Plan.

.4 Share information and controls identified from original and updated Project Hazard Assessments with project workers. Record this information sharing complete with names and dates. Keep documentation on site for entire duration of the Work.

1.11 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. Health and Safety Plan must address project specifications.

.2 Consultant may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns either accepting or requesting improvements.

1.12 MEETINGS

.1 Schedule and administer Health and Safety meeting with Consultant prior to commencement of Work.

.2 Attend pre-construction health and safety meeting, convened and chaired by Consultant, prior to commencement of Work, at time, date and location determined by the Consultant. Ensure attendance of:

.1 Superintendent of Work.
.2 Designated Health and Safety Site Representative.
.3 Subcontractors.

.3 Conduct pre-shift toolbox talks with the crew and conduct regularly scheduled (minimum bi-weekly) safety meetings during the Work.

.4 Keep documents on site for review by Consultant or the Consultant's authorized representative

1.13 PROJECT/SITE CONDITIONS

.1 Following are potential health, environmental and safety hazards at the site for which Work may involve contact with:

.1 Existing hazardous and controlled products stored on site:

.1 Work near/over/in water.

.2 Electrical infrastructure, including overhead power lines.

.2 Existing hazardous substances or contaminated materials:

.1 Creosote/preservative treated timber.

.2 Contaminated soils.

.3 Known latent site and environmental conditions:

.1 Structurally unsound structures/components.

.2 Unstable soil slopes.

.3 Wildlife activity.

.4 Exposure to waves/currents.

.4 Facility ongoing operations:

.1 Operational fishing harbour.

.2 Above items shall not be construed as being complete and inclusive of potential health and safety hazards encountered during Work.

.3 Include above items in the hazard assessment of the Work.

.4 WHMIS SDS safety data sheets pertinent hazardous and control products stored on site can be obtained from Consultant.

1.14 SITE CONTROL AND ACCESS

.1 Control the Work and entry points to Work Site. Approved and granted access only to workers and authorized persons. Immediately stop and remove non-authorized persons.

.1 Consultant will provide names of those persons authorized by Consultant to enter onto Work Site and will ensure that such authorized persons have the required knowledge and training on Health and Safety pertinent to their reason for being at the site, however, Contractor remains responsible for the health and safety of authorized persons while at the Work Site.

.2 Isolate Work Site from other areas of the premises by use of appropriate means.

.1 Erect fences, boarding, barricades, and temporary lighting as required to effectively delineate the Work Site, stop non-authorized entry, and to protect pedestrians and vehicular traffic around and adjacent to the Work and create a safe environment in accordance with Section 01 50 00 - Temporary Facilities.

.2 Post signage at entry points and other strategic locations indicating restricted access and conditions for access.

.3 Use professionally made signs with bilingual message in the two official languages or international known graphic symbols.

.3 Provide safety orientation session to persons granted access to Work Site. Advise of hazards and safety rules to be observed while on site. Maintain records of such orientation on-site, available for review and audit by Consultant or their authorized inspector.

.4 Ensure persons granted site access wear appropriate PPE. Supply PPE to inspection authorities who require access to conduct tests or perform inspections.

.5 Secure Work Site against entry when inactive or unoccupied and to protect persons against harm. Provide security guard where adequate protection cannot be achieved by other means.

1.15 TRAINING

.1 Use only skilled workers on Work Site where deemed competent and or trained in Occupational Health & Safety procedures and practices pertinent to their assigned task.

.2 Permit employees registered in Provincial apprenticeship program to perform specific tasks only if under direct supervision of qualified licensed workers. Determine permitted activities and tasks by apprentices, based on level of training attended and demonstration of ability to perform specific duties.

.3 Maintain employee records and evidence of training received. Make data available to Consultant upon request.

.4 When unforeseen or peculiar safety related hazard, or condition occurs during performance of Work, follow procedures in place for Employees Right To Refuse Work in accordance with Acts and Regulations of Province having jurisdiction and advise Consultant verbally and in writing.

1.16 MINIMUM SITE SAFETY RULES

.1 Notwithstanding requirements to abide by Federal and provincial health and safety regulations; Contractor shall establish rules to govern the conduct and actions of their employees. These rules should leave no room for discretion and/or argument. The rules must be enforced and action should be taken every time a rule is violated.

.2 Brief persons of the documented disciplinary protocols to be taken for noncompliance. Post rules on site.

1.17 UNFORESEEN HAZARDS

.1 Should any unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of Work, immediately stop work and advise Consultant verbally and in writing.

.2 Follow procedures in place for Employees Right to Refuse Work as specified in the Occupational Health and Safety Act for the Province. Advise Consultant verbally and in writing of any refusal to Work.

1.18 SAFETY SUPERVISION

.1 Employ Health and Safety Site Representative responsible for daily supervision of health and safety of the Work.

.2 Health and Safety Site Representative may be the Superintendent of the Work or other person designated by Contractor and shall be assigned the responsibility and authority to:

.1 Implement, monitor and enforce daily compliance with health and safety requirements of the Work.
.2 Monitor and enforce Contractor's site specific Health and Safety Plan.
.3 Conduct site safety orientation session to persons granted access to the Work Site.
.4 Ensure that persons allowed site access are knowledgeable and trained in health and safety pertinent to their activities at the site or are escorted by a competent person while on the Work Site.
.5 Stop the Work as deemed necessary for reasons of health and safety.

.3 Health and Safety Site Representative must:

.1 Be a qualified and competent person in Occupational Health and Safety.
.2 Have site-related working experience specific to activities of the Work.
.3 Be on Work Site at all times during execution of the Work.

.4 All supervisory personnel assigned to the Work shall also be competent persons.

.5 Inspections:

.1 Conduct regularly scheduled inspections of the Work on a minimum weekly basis. Record deficiencies and remedial action taken.
.2 Follow-up and ensure corrective measures are taken.
.3 Share inspection reports with crews/subs.

.6 Cooperate with the Facility's Occupational Health and Safety Representative.

.7 Keep inspection reports and supervision related documentation on site.

1.19 POSTING OF DOCUMENTS

.1 Maintain on Work Site copy of safety related documentation and reports stipulated to be produced in compliance with Acts and Regulations of authorities having jurisdiction and of those documents specified herein.

.2 Upon request, make available to Consultant or authorized Safety Officer for inspection.

.3 Post applicable items, articles, notices and orders in a conspicuous location on the Work Site in accordance with Acts and Regulations of Province of Work. See local legislation for specifics.

.4 Post other documents as specified herein, including:

.1 Site specific Health and Safety Plan.
.2 WHMIS safety data sheets.

1.20 CORRECTION OF NONCOMPLIANCE

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

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

.3 Consultant through the Owner will stop Work if non-compliance of health and safety regulations is not corrected in a timely manner.

1.21 BLASTING

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

1.22 POWDER ACTUATED DEVICES

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

1.23 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

PART 1 - GENERAL

1.1 GENERAL

.1 All Environmental In-Water Environment Mitigation Measures are the Contractor's Responsibility under this contract. All measures to mitigate hazardous material from entering the watercourse, and all acts and regulations and mitigation measures listed under this section are the Contractor's responsibility to follow for the duration of this contract.

.2 Construction work will be monitored daily and establish mitigation measures as required, and adjust and upgrade items as required to meet the Municipal, Provincial and Federal Acts as required.

1.2 REFERENCES

.1 Canada Shipping Act, Transport Canada, 2001, amended 2023-06-22.

.2 Canadian Coast Guard Regulations, Fisheries and Oceans Canada.

.3 Canadian Environmental Protection Act (CEPA), 1999, amended 2023-06-22.

.4 Canadian Navigable Waters Act, 1985, Transport Canada, amended 2024-11-27.

.5 Fisheries Act, 1985, Fisheries and Oceans Canada, amended 2019-06-2

.6 Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters, 1998.

.7 Impact Assessment Act, 2019, amended 2025-06-02.

.8 Migratory Birds Convention Act, 1994, Environment Canada, amended 2024-11-27.

.9 New Brunswick - Archaeology Act and Archaeology Act regulations.

.10 New Brunswick – Environmental Protection Act.

.11 New Brunswick - Heritage Places Protection Act.

.12 Species at Risk Act, 2002, amended 2024-11-27.

.13 The Federal Policy on Wetland Conservation, 1991, Environment Canada.

.14 Transportation of Dangerous Goods Act, 1992, Transport Canada, amended 2019-08-28.

.15 Equipment and heavy machinery:

.1 On-road vehicles to: CEPA-SOR/2003-2, On-Road Vehicle and Engine Emission Regulations, amended 2022-10-03.
.2 Off-road vehicles to: EPA CFR 86.098-10 and EPA CFR 86.098-11.

.16 Work activities must comply with all / any conditions of the Canadian Navigable Waters Act (CNWA) approval issued by Transport Canada.

1.3 DEFINITIONS

.1 Archaeological Resources: all tangible evidence of human activity that is of historical, cultural or scientific interest. Examples include features, structures, archaeological objects (artifacts) or remains at or from an archaeological site, or an object recorded as an isolated archaeological find. An “artifact” is any object manufactured, used, moved or otherwise modified by human beings, including all waste materials and by-products of these processes.

.2 Buffer zone: a vegetated land that protects watercourses from adjacent land uses. It refers to the land adjacent to watercourses, such as streams, rivers, lakes, ponds, oceans, and wetlands, including the floodplain and the transitional lands between the watercourse and the drier upland areas.

.3 Deleterious substance: any substance that, if added to any water, would degrade or alter or form part of a process of degradation or alteration of the quality of that water so that it is rendered or is likely to be rendered deleterious to fish or fish habitat or to the use by man or fish that frequent that water,

.4 Fish habitat: spawning grounds and any other areas, including nursery, rearing, food supply and migration areas, on which fish depend directly or indirectly in order to carry out their life processes.

.5 Hazardous material: product, substance, or organism that is used for its original purpose; and that is either dangerous goods or a material that may cause adverse impact to the environment or adversely affect health of persons, animals, or plant life when released into the environment.

.6 Invasive or alien species: refers to a species or subspecies introduced outside its normal distribution whose establishment and spread threaten ecosystems, habitats or species with economic or environmental harm.

.7 Navigable water: a canal and any other body of water created or altered as a result of the construction of any work.

.8 Surface watercourse: refers to the bed and shore of a river, stream, lake, creek, pond, marsh, estuary or salt-water body that contains water for at least part of each year.

.9 Wetlands: land where the water table is at, near or above the surface or which is saturated for a long enough period to promote such features as wet-altered soils and water tolerant vegetation. Wetlands include organic wetlands or "peatlands", and mineral wetlands or mineral soil areas that are influenced by excess water but produce little or no peat.

1.4 SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submissions/Shop Drawing.

.2 Submit site-specific In-Water Mitigation Protection Plan within 14 days of Contract award and prior to commencement of Work.

.1 Mitigation Measures to prevent sedimentation.
.2 Mitigation Measures to prevent hazardous material to cause water contamination.
.3 Dredged Material Disposal Plan.
.4 Consultant will review In-Water Mitigation Protection Plan and provide comments to Contractor within 5 days after receipt of plan. Revise plan as appropriate and resubmit plan to Consultant within 5 days after receipt of comments from Consultant.
.5 Consultant's review of final In-Water Mitigation Protection Plan should not be construed as approval and does not reduce the Contractor's overall responsibility for In-Water Environmental Mitigation Measures during the construction of this contract.

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

.4 Advise the Canadian Coast Guard, Marine Communication and Traffic Services (MCTS) at (902)564-7751 or toll free at 1-800-686-8676 sufficiently in advance of commencement of work or when deploying or removing site markings in order to allow for appropriate Notices to Shipping/Mariners action.

.5 Develop and submit to the Consultant an Emergency Response Plan that is to be implemented immediately in the event of a sediment release or spill of a deleterious substance. Include Provincial Environmental Emergency Contact information, and Consultant’s contact information.

.6 Provide a minimum of 48-hour notice to the Consultant before commencing dredging activities.

.7 Before commencing construction activities or delivery of materials to site, submit an Environmental Protection Plan (EPP) for review and approval by Consultant. The EPP must include a comprehensive overview of known or potential environmental issues to be addressed during construction/the project.

1.5 TRANSPORTATION

.1 Transport hazardous materials and hazardous waste in compliance with Federal Transportation of Dangerous Goods Act.

.2 Any tools, equipment, vehicles, temporary structures or parts thereof used to carryout work in navigable water shall not be permitted to remain in place after the completion of the project.

.3 Secure contents against free board spillage when excavating, loading, and hauling material, including dredged material. Do not overload trucks when hauling material and avoid potential release of contents, including dredged material, and of any foreign matter onto highways, roads and access routes used for the work. Immediately clean any ground spills and soils to extent as directed by authority having jurisdiction.

.4 Maintain trucks clean and free of mud, dirt, and other foreign matter.

.5 All trucks transporting dredged material are to have watertight boxes.

.6 Vessels must be permitted safe access through the worksite at all times.

.7 All materials and equipment used in construction must be marked in accordance with the Collision Regulations of the Canada Shipping Act, when located on the waterway.

.8 Temporary causeways, upon approval from the Consultant, to be constructed in isolation from the waterbody using filter fabric/silt curtain or cofferdam.

1.6 OPERATION OF MACHINERY

.1 Ensure that machinery arrives on site in a clean condition and is maintained free of fluid leaks, invasive species and noxious weeds.

.2 Whenever possible, operate machinery on land above the high-water mark, on ice, or from a floating barge in a manner that minimizes disturbance to the banks and bed of the water body.

.3 Wash, refuel and service machinery and store fuel and other materials for the machinery in such a way as to prevent any deleterious substances from entering the water.

.4 Biodegradable fluids should be considered for use in place of petroleum products whenever possible, as a standard for best practices.

.5 All in-water activities should be conducted during low wind, wave and suitable weather conditions.

.6 Wash down stations are to be employed prior to leaving dredge/Construction site (harbour); and also at disposal site. Arrange for sufficient space adjacent to project site for conduct of operations. Exercise care so as not to obstruct or damage public or private property in area. Do not interfere with normal day-to-day operations in progress at site. All arrangements for space and access will be made by Contractor and submitted for review to the Consultant. Co-ordinate use of premises with the Harbour Authority and Consultant.

.7 Leave machinery running only while in use, except where extreme temperatures prohibit shutting machinery down.

.8 Do not perform cleaning and wash down within a 30-metre buffer zone of a wetland, watercourse or other identified environmentally sensitive area. Abide by requirements and recommendations from Fisheries and Oceans Canada – Fisheries Protection Program in cleaning and wash down of equipment.

1.7 TEMPORARY STORAGE

.1 No staging of vehicles or equipment/material is to take place on any beach, dune, wetland or other environmentally sensitive areas.

1.8 CONTAINMENT AND SPILL MANAGEMENT

.1 Comply with Federal (CEPA Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations) and Provincial regulations, codes, standards and guidelines for the storage of fuel and allied petroleum products on site.

.2 Submit Spill Response Plan for approval to the Consultant within 14 days of Contract award.

.3 Biodegradable fluids should be considered for use in place of petroleum products whenever possible, as a standard for best practices.

.4 Do not place fuel storage tanks and store fuel or other petroleum products within a 30-metre buffer zone of watercourses and wetlands. Do not fuel or lubricate equipment within this 30-metre buffer zone. Obtain approval from Consultant of acceptable location on site for fuel storage and equipment service.

.5 Do not dump petroleum products or any other deleterious substances on ground or in the water.

.6 Maintain vehicles and equipment in good working order to prevent leaks on site.

.7 Materials such as paint, primers, blasting abrasives, rust solvents, degreasers, grout, or other chemicals are not to enter the watercourse.

.8 Develop and submit to the Consultant an Emergency Response Plan that is to be implemented immediately in the event of a sediment release or spill of a deleterious substance. Include Provincial Environmental Emergency Contact information, and Consultant’s contact information.

.9 Material used in a watercourse is to be been handled and treated in a manner to prevent the release or leaching of substances into the water that may be deleterious to fish.

.10 Be diligent and take all necessary precautions to avoid spills and contamination of soil and water (both surface and subsurface) when handling petroleum products on site and during fueling and servicing of vehicles and equipment.

.11 Protect all catch basins, drains and watercourses from contamination in the event of a spill.

.12 All equipment must be free of fluid leaks and in good working order. Equipment to be inspected for fluid leaks before each use and at regular intervals during use. Equipment not in good repair to be immediately removed from use.

.13 Onsite crews must have emergency spill cleanup equipment, adequate for the activity involved, on-site. Spill equipment to include, as a minimum, at least one 250L (i.e., 55 gallon) overpack spill kit containing items to prevent a spill from spreading; absorbent booms, pillows, and mats; rubber gloves; and plastic disposal bags. Onsite crews to be trained in the use of spill control kits and the equipment they contain.

.14 In the event of a petroleum spill, immediately notify the Consultant and the Canadian Coast Guard (CCG) at 1-800-565-1633 (24 hour report line). Perform clean-up in accordance with all regulations and procedures stipulated by authority having jurisdiction.

1.9 HAZARDOUS MATERIAL HANDLING

.1 Store and handle hazardous materials in accordance with applicable federal and provincial regulations, codes, standards and guidelines. Store in location that will prevent spillage into the environment.

.2 Label containers to WHMIS requirements and keep SDS data sheets on-site for all hazardous materials.

.3 Maintain written inventory of all hazardous materials kept on-site. List product name, quantity and storage date.

.4 Store and handle flammable and combustible materials in accordance with National Fire Code.

.5 Workers in contact with hazardous materials must be provided with, and use regulated personal protective equipment and must have the necessary training to know how to handle the different hazardous materials for Health and Safety and according to Environmental Regulations.

1.10 SITE-SPECIFIC EROSION AND SEDIMENT CONTROL PLAN

.1 Develop a site-specific Erosion and Sediment Control Plan that minimizes risk of sediment entering the water body during all phases of the work. Plan is to be submitted as per Section 01 33 00, for review by the Consultant. Erosion and sediment control measures should be maintained until all disturbed ground has been permanently stabilized, suspended sediment has resettled to the bed of the water body or settling basin and runoff water is clear. The plan should, where applicable, include:

1.11 WASTE MANAGEMENT AND DISPOSAL

.1 Do not bury rubbish, demolition debris and waste materials on site.

.2 Dispose and recycle construction and demolition debris and waste materials in accordance with Provincial Waste Management Regulations.

.3 Do not dispose of hazardous waste, volatile materials (such as mineral spirits, paints, thinners, etc.) and petroleum products into waterways, storm or sanitary sewers or in waste landfill sites.

.4 Dispose of hazardous waste in accordance with applicable federal and provincial laws, regulations, codes and guidelines.

.5 Concrete waste:

.1 Do not discharge residual or rejected concrete on-site.
.2 Immediately clean any accidental release of concrete on-site prior to solidification.
.3 Do not wash and clean concrete vehicles on-site.
.4 Perform dumping of residual material and truck cleaning operations only at the concrete plant. Follow environmental regulations and good practices as approved by the Provincial Department of the Environment and other authorities having jurisdiction.

.6 All salvageable stockpiles of creosote timbers must be situated a minimum of 500 meters from any dwelling or water well and a minimum of 100 meters from any watercourse/wetland or environmentally sensitive area. Any stockpile must be contained, off the ground and must be contained on federal land, unless approved by Consultant.

.7 Debris entering the marine environment should be immediately retrieved when it is safe to do so.

.8 Provide waste manifests of the deconstruction material, to the Consultant with the progress claim.

.9 Wild animals are not to be fed on-site to prevent habituation issues for local homeowners.

1.12 WATER QUALITY

.1 Conduct work, dredging, and work in or near a watercourse in such a manner to limit turbidity and reduce sediment suspension in the water to an absolute minimum at all times:

.1 Maintain appropriate production speed and momentum of the excavation equipment. Make adjustments as required and as approved by Consultant.
.2 Strategically position excavation equipment and haul vehicles to avoid over the water swings of finer dredged materials whenever possible.
.3 Restrict the amount of material dredged to the area and depth required for construction.

.2 There is to be no bottom stockpiling, dragging or side casting of material during construction on the ocean floor outside of the wharf footprint.

.3 Conduct visual monitoring for suspended solids daily during periods of in-water works, and other related works. If any changes occur in the turbidity of the water in the vicinity of the work area as a result of construction activities, the work should immediately stop and the Department of Fisheries and Oceans – Fisheries Protection Program contacted at (902) 426-3909 to determine if additional mitigation measures are required.

.4 Do not wash down equipment within a 30-metre buffer zone of a watercourse, wetland, or other identified environmentally sensitive area.

.5 Develop and implement an Erosion and Sediment Control Plan for the site that minimizes risk of sedimentation of the water body during all phases of the work. Erosion and sediment control measures should be maintained until all disturbed ground has been permanently stabilized, suspended sediment has resettled to the bed of the water body or settling basin and runoff water is clear. The plan should, where applicable, include:

.1 Installation of effective erosion and sediment control measures before starting work to prevent sediment from entering the water body.
.2 Measures for managing water flowing onto the site, as well as water being pumped/diverted from the site such that sediment is filtered out prior to the water entering a water body (via settling basin or other filtration system).
.3 Site isolation measure (e.g., silt boom or silt curtain) for containing suspended sediment where in-water work is required (e.g., pile driving, drilling, etc.).
.4 Measures for containing and stabilizing waste material (e.g., construction waste and materials, accumulated debris) above the high-water mark of nearby water bodies to prevent re-entry.
.5 Regular inspection and maintenance of erosion and sediment control measures and structures during the course of the work.
.6 Repairs to erosion and sediment control measures and structures if damage occurs.
.7 Removal of non-biodegradable erosion and sediment control materials once site is stabilized.

.6 Debris entering the marine environment should be immediately retrieved when it is safe to do so.

.7 Where work may affect the water quality adjacent to water intake lines used by lobster holding facilities, fish processing facilities and other harbour users, schedule work in cooperation with the Small Craft Harbour, Harbour Authority, Plant owners as directed by Consultant to minimize interference and impact to harbour users.

.8 Where required, install effective sediment control measures before starting work to prevent the entry or re-suspension of sediment in the water body. Inspect sediment control measures regularly to ensure they are functioning properly, and make all

necessary repairs if any damage occurs. Upon completion of use, remove these control measures in a way that prevents the escape of settled sediment.

1.13 MITIGATION MEASURES WHEN USING TREATED TIMBER

.1 Water contamination by preservative treated wood:

.1 Preservative treated lumber and timber, whether plant or site treated, shall be cured for a minimum of 30 days from date of the treatment application before their installation in areas which will be in contact with the water.
.2 Do not cut treated wood lumber over the surface of a watercourse or wetland.
.3 Do not use liquid applied preservative products over the surface of a watercourse or wetland.
.4 Wood treated with Chromate Copper Arsenate (CCA) or Ammoniac Copper Zinc Arsenate (ACZA) must be CSA or American Wood Protection Association (AWPA) approved.
.5 Do not use timber and lumber treated with creosote, petroleum and pentachlorophenol for any part of the work.

1.14 MITIGATION MEASURES DURING CONCRETE POURS

.1 Concrete pouring should stop in moderate to heavy rain (2.6-7.6 mm/hr or more) to prevent leaching contaminants into aquatic environment.

.2 When concrete work is necessary on structures, timber staging will be placed next to the face to prevent concrete from falling into the water, or a cofferdam will be constructed to enclose the work area.

.3 During underwater concrete work, concrete shall be fully cured before forms are removed and exposed to current.

.4 Forms to have caulked/sealed corners to prevent leakage.

.5 Splash panels to be used during the pour to prevent material from entering the aquatic environment.

.6 Any accidental release of concrete is to be removed prior to solidification.

.7 Work to cease until the spill is contained and the source of the leak can be identified.

.8 Contractor must inform the Consultant of all accidental spills of concrete into fish bearing waters and contact Federal Regulators immediately.

1.15 SOCIOECONOMIC RESTRICTIONS

.1 Abide by municipal and provincial regulations for any restrictions on work performed during the nighttime and on flood lighting of the site. Obtain applicable permits.

.2 Place flood lights in opposite direction of adjacent residential and business areas.

.3 Work equipment and machinery must be equipped with purposely designed mufflers to reduce noise on site to lowest possible level. Maintain mufflers in good operating condition at all times.

.4 The use of solid-burning or slow pulsing warning lights at night must be avoided. The use of strobe lights at night, at the minimum intensity and minimum number of flashes per minute (longest duration between flashes) allowable by Transport Canada, is recommended. Lights should completely turn off between flashes.

.5 LED lights must be used instead of other types of lights where possible. LED light fixtures are less prone to light trespass (i.e., are better at directing light where it needs to be, and do not bleed light into the surrounding area).

.6 Sounds such as whistle blasts and horns to be limited or replaced, to the extent possible, with radio communication.

1.16 ARCHEOLOGIST

.1 All construction personnel are responsible for reporting any cultural materials, which may be archaeological resources, unearthed during construction to the Construction Supervisor. If the find is believed to be an archaeological resource, the Construction Supervisor will immediately stop work in the vicinity of the find and notify the Consultant.

.2 If an archaeological and / or historically significant item (an archaeological resource) is discovered during the work activities, work in the area will be stopped immediately and the Consultant will be contacted as well as the provincial Archaeological Services unit.

New Brunswick Indigenous Affairs, General Information 506-462-5846, email indigenousaffairs-affairesautochtones@gnb.ca

.3 Work can only resume in the vicinity of the archaeological find when authorized by the Consultant, after approval has been granted by the provincial Archaeological Services unit.

.4 In the event of the discovery of possible human remains of or possible evidence of human burials, the work will immediately cease. If the discovery is potential, but not positively human remains, contact the Consultant as well as the provincial Archaeological Services unit. If the materials discovered are undoubtedly human remains, the nearest law enforcement agency will be contacted immediately by the Consultant and/or the Construction Supervisor. Until determined otherwise, the possible human remains should be treated as evidence in a criminal investigation. If the possible human remains are found in the bucket of heavy equipment, the bucket should not be emptied as physical evidence may be destroyed by that action. The area should immediately be designated as “Out of Bounds” to all personnel and the public. Depending on the weather and other conditions, the potential human remains should be provided with non-intrusive protection, such as covering with a

cloth or canvas tarp (non-plastic preferred). Curiosity seekers should be kept off the site.

1.17 BIRD AND BIRD HABITAT

.1 Comply with Federal and Provincial laws, Migratory Birds Convention Act (MBCA) in regards to the protection of migratory birds, their eggs, nests and their young encountered on site and in the vicinity.

.2 Minimize disturbance to all birds on site and adjacent areas during the entire course of the Work.

.3 Do not approach concentrations of seabirds, waterfowl and shorebirds when anchoring equipment, accessing wharves, or ferrying supplies.

.4 During nighttime work, position flood lights in opposite direction of nearby bird nesting habitat.

.5 All machinery must be well muffled. If necessary, trucks may be required to avoid the use of “hammer” braking along specific sections of the route.

.6 Food scraps and garbage are not to be left at the work site.

.7 All equipment to be used in or over the marine environment is to be free from leaks or coating of hydrocarbon based fluids and/or lubricants harmful to the environment. Hoses and tanks are to be inspected on a regular basis to prevent fractures and breaks.

.8 Construction activities will be carried out during times acceptable to local authorities.

.9 Do not use beaches, dunes, coastal wetlands and other natural previously undisturbed areas of the site to conduct work unless specifically approved by the Consultant.

.10 To avoid the risk of nest destruction, avoid vegetation clearing during the most critical period of the migratory bird breeding season, which is May 1st through August 31st. In the event that vegetation clearing is to take place inside the May 1st to August 31st window, a qualified biologist must inspect the area prior to potential disturbance or loss of habitat activities to ensure there will be no adverse impacts to birds and wildlife.

.11 Should nests or chicks of migratory birds or raptors be encountered during work, immediately stop work in that area and notify Consultant for directives to be followed.

.1 Do not disturb nest site and neighbouring vegetation until nesting is completed.
.2 Minimize work immediately adjacent to such areas until nesting is completed.

.3 If a nest or chick of a migratory bird is detected within the project area, work in the area shall be halted and Canadian Wildlife Service shall be consulted at (506) 364-5044.

.4 Should a migratory bird or raptor nest be encountered during work, activity in the vicinity of the nest should be halted. The nest location should be protected until chicks have naturally fledged from the area, with a buffer zone appropriate to the species as determined in consultation with the appropriate regulators (ECCC-CWS for species protected under the MBCA; provincial department of natural resources for raptors). As a general guideline, for small landbirds, an appropriate buffer for clearing activities may be 10 - 50 m, or even more depending on the level of activity and on the species. The buffer shall stay in place until August 31st or the time when chicks have naturally fledged from the area. A nest shall not be marked, or the tree/shrub in which it is situated, using flagging tape or other similar material; this increases the visibility of the nest and the risk of predation.

.5 Protect these areas by following recommendations of Canadian Wildlife Service.

.12 Vessel movement in the vicinity of nesting islands for seabirds and waterbirds should take place at steady speeds, moving parallel to the shore, rather than approaching the island directly.

.13 Dredge disposal sites may provide habitat suitable for ground-nesting and burrowing birds, including species of conservation concern such as the Common Nighthawk and Bank Swallow. During the breeding season, it is important that nests not be disturbed by erosion prevention and control measures or by excavation and construction activities. If stockpiles are on-site or will be on-site, any disturbance to such dredge stockpiles undertaken during the regional nesting period for migratory birds, nest searches must be undertaken by an experienced observer prior to construction activities, and any nests that are discovered must be protected with an appropriate buffer for the species. Intrusive work conducted in potential migratory bird nesting habitat should be scheduled to avoid the regional migratory bird nesting period. In the Maritime Provinces, the regional nesting period is from mid-April to late August, with the exception of southwest Nova Scotia where it extends from early April to late August.

1.18 FISH AND FISH HABITAT

.1 Avoid wet, windy and rainy periods that may increase erosion and sedimentation.

.2 Confirm in-water activities, or associated in-water structures, do not interfere with fish passage.

.3 Screen any water intakes or outlet pipes to prevent entrainment or impingement of fish. Entrainment occurs when a fish is drawn into a water intake and cannot escape. Impingement occurs when an entrapped fish is held in contact with the intake screen and is unable to free itself.

.4 Be aware of the risk for contamination of the fish habitat at the site as a result of alien species being introduced in the water.

.5 Do not perform cleaning and washdown within a 30-metre buffer zone of a watercourse, wetland, or other identified environmentally sensitive area.

.6 Abide by requirements and recommendations of Environment Canada and the Department of Fisheries and Oceans – Oceans and Habitat Branch in cleaning and washdown of equipment.

.7 Marine equipment may be inspected by the Consultant or designated representative of Consultant to ensure alien and invasive species are not introduced to the marine environment.

.8 The introduction of deleterious substances into the watercourse is not permitted.

.9 Work activities must comply with all/any conditions of the Fisheries Act Authorization or Letter of Advice issued by Fisheries and Oceans Canada. A copy of the Fisheries Act Authorization must be kept on site at all times.

1.19 INVASIVE SPECIES

.1 To minimize the possibility of fish habitat contamination and the spread of aquatic invasive species, all construction equipment which will be immersed into the water of a watercourse, or has the possibility of coming into contact with such water during the course of the work, must be cleaned and washed to ensure that they are free of marine growth and alien species prior to mobilization to the site.

.1 Equipment shall include boats, barges, cranes, excavators, haul trucks, pumps, pipelines and all miscellaneous tools and equipment previously used in a marine environment.

.2 Cleaning and washing of equipment shall be performed immediately upon their arrival at the site and before use in or over the body of water.

.3 Do not perform cleaning and washdown within a 30 meter buffer zone of a watercourse, wetland, or other identified environmentally sensitive area.

.4 Conduct cleaning and washing operations as follows:

.1 Scrape and remove heavy accumulation of mud and dispose appropriately.

.2 Wash all surfaces of equipment by use of a pressurized fresh water supply.

.3 Immediately follow with application of a heavy sprayed coating of undiluted vinegar or other environmentally approved cleaning agent to thoroughly remove all plant matter, animals and sediments.

.4 Check and remove all plant, animal and sediment matter from all bilges and filters.

.5 Drain standing water from equipment and let fully dry before use.

.6 Upon removal from the water, drain standing water from equipment and let fully dry before removal off the site.

.5 Record of Assurance Logbook:

.1 Maintain an on-going log of past and present usage and washdowns of all equipment to illustrate mitigation measures undertaken against fish habitat contamination by alien species.

.2 Write data in a hard cover bound logbook to include the following:

.1 Date and location where equipment was previously used in a watercourse or wetland.

.2 Type of work performed.

.3 Dates of wash down for each piece of equipment.

.4 Cleaning method and cleaning agent(s) used.

.3 Keep Record of Assurance Logbook updated from project to project. Upon request, submit logbook to Consultant for review.

.2 The Consultant has the right to request a video inspection of the equipment, including hulls, to ensure that they are free of marine growth and alien species prior to mobilization to the site.

1.20 AIR QUALITY

.1 Keep airborne dust and dirt resulting from the work on site to an absolute minimum.

.2 Employ dust suppression by the application of water or other environmentally approved product when required. Apply dust control measures to work areas.

.3 Spray surfaces with water or other environmentally approved product. Use purposely suited equipment or machinery and apply in sufficient quantity and frequency to provide effective result and continued dust control during the entire course of the work.

.4 To reduce emissions of air contaminants and Greenhouse Gas, implement an idling policy which includes:

.1 Diesel construction equipment will be turned off when not in active use.
.2 Vehicles idling more than 5 minutes will be turned off. Morning vehicle warm-ups will be restricted to 3-5 minutes. A staging zone will be established for trucks that are waiting to load/unload to minimize public exposure to emissions.

Idling restrictions will not apply when:

.1 The engine is required to power auxiliary equipment (e.g., hoist, lift, computers, safety lights, etc.).
.2 Extreme weather conditions (-10 degrees Celsius or below / +30 degrees Celsius or above) or any other circumstance where heating or air conditioning is required for worker's health and safety.
.3 The original equipment manufacturer specifically recommends a longer idling period for normal and efficient operation of the motor vehicle in which case such recommended period shall not be exceeded.
.4 Vehicle/equipment maintenance and diagnostic purposes.
.5 Where the unit is not expected to restart due to mechanical issues.

.5 Do not use oil or any other petroleum products for dust control.

.6 Construction activities must be carried out during times acceptable to local authorities and smaller, less disturbing equipment will be used where possible.

1.21 FIRES

.1 Fires and burning of rubbish on site is not permitted.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 NOT USED

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Particular requirements for inspection and testing to be carried out by testing laboratory designated by Consultant are specified under various sections.

1.2 APPOINTMENT AND PAYMENT

.1 Owner or designated Owner's representative will appoint and pay for services of testing laboratory as part of their own Quality Assurance program. However, the Contractor is responsible for the payment and coordination of all Quality Control testing, including:

.1 All field Quality Control testing and inspection items relating to the Contractor's work. The Contractor will be responsible for all testing as part of their work to ensure Quality Control. All results must be forwarded to the Consultant for review.
.2 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
.3 Inspection and testing performed exclusively for Contractor's convenience.
.4 Testing, adjustment and balancing of electrical equipment and systems.
.5 Mill tests and certificates of compliance.
.6 Tests specified to be carried out by the Contractor under the supervision of Consultant.

.2 Where tests or inspections by designated testing laboratory reveal work not in accordance with contract requirements, Contractor to pay costs for additional tests or inspections as Consultant may require to verify acceptability of corrected work.

1.3 CONTRACTOR'S RESPONSIBILITIES

.1 Furnish labour and facilities to:

.1 Provide access to work to be inspected and tested.
.2 Facilitate inspections and tests.
.3 Make good work disturbed by inspection and test.
.4 Provide storage on site for laboratory's exclusive use to store equipment and cure test samples.

.2 Notify Consultant sufficiently in advance of operations to allow for assignment of laboratory personnel and scheduling of test.

.3 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.

.4 Pay costs for uncovering and making good work that is covered before required inspection or testing is completed and approved by Consultant.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 NOT USED

END OF SECTION

PART 1 - GENERAL

1.1 ACCESS

.1 Provide and maintain adequate access to project site.

.2 If authorized to use existing roads or structures for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractor's use of roads.

.3 Maintain full access to the work site. Should a court injunction be required ordering a person or group to refrain from impeding access to the site, such as a demonstration, picketing or union action, then obtaining the injunction and any associated costs will be considered incidental to this Contract. Any delays associated with such activity will be considered incidental to this Contract.

1.2 STORAGE SHEDS

.1 Contractor to make own arrangements for on-site storage areas.

1.3 SANITARY FACILITIES

.1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.

.2 Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.4 PARKING

.1 Contractor to make own arrangements to provide parking space for work force.

1.5 POWER

.1 Arrange, pay for and maintain temporary electrical power supply in accordance with governing regulations and ordinances.

.2 Install temporary facilities for power such as pole lines and cables to approval of local power supply authority.

1.6 BARRICADES

.1 Provide and maintain sufficient barricades, fencing, notices, warning signs, light signals, etc. for the protection of adjoining property and to warn others and workers engaged on the job of the dangers caused by the work.

.2 Types and location of barricades, etc. to be in accordance with local regulations and to the satisfaction of Consultant.

.3 The presence of such barricades, lights, etc. shall not relieve the Contractor of the responsibility for any damages.

1.7 SECURITY

.1 Contractor to make own arrangements for security of equipment, materials, damages resulting from fire and theft.

1.8 SITE SIGNS AND NOTICES

.1 Only Project Identification and Consultant / Contractor signboards and notices for safety or instruction are permitted on site.

.2 Format, location and quantity of site signs and notices to be accepted by Consultant.

.3 Signs and notices for safety or instruction to be in English and French languages, or commonly understood graphic symbols.

1.9 REMOVAL OF TEMPORARY FACILITIES

.1 Remove temporary facilities from site when directed by Consultant.

.2 When project is closed down for a period of time, keep temporary facilities operational until no longer required by Consultant.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 NOT USED

END OF SECTION

PART 1 - GENERAL

1.1 GENERAL

.1 Use new material and equipment unless otherwise specified.

.2 Submit following information for any or all materials and products proposed for supply within seven (7) days of request by Consultant:

.1 Name and address of manufacturer
.2 Trade name, model and catalogue number
.3 Performance, descriptive and test data
.4 Manufacturer's installation or application instructions
.5 Evidence of arrangements to procure.

.3 Provide material and equipment of specified design and quality, performing to published ratings and for which replacement parts are readily available.

.4 Use products of one manufacturer for equipment or material of same type or classification unless otherwise specified.

1.2 MANUFACTURER'S INSTRUCTIONS

.1 Unless otherwise specified, comply with manufacturer's latest printed instructions for materials and installation methods.

.2 Notify Consultant in writing of any conflict between these specifications and manufacturers' instructions. Consultant will designate which document is to be followed.

1.3 FASTENINGS - GENERAL

.1 All fastenings are to be the sizes indicated on the contract plans and are to be hot dipped galvanized to CSA G164 unless otherwise noted.

1.4 DELIVERY AND STORAGE

.1 Deliver, store and maintain packaged material and equipment with manufacturer's seal and labels intact.

.2 Prevent damage, adulteration and soiling of material and equipment during delivery, handling and storage. Immediately remove rejected material and equipment from site.

.3 Store material and equipment in accordance and Storage with supplier's instructions.

1.5 CONFORMANCE

.1 When material or equipment is specified by standard or performance specifications, upon request of Consultant, obtain from manufacturer an independent testing

laboratory report, stating that material or equipment meets or exceeds specified requirements.

1.6 SUBSTITUTION

.1 Proposals for substitution may be submitted only after award of Contract. Such requests must include statements of respective costs of items originally specified and proposed substitutions.

.2 Proposals will be considered by Consultant if:

.1 Products selected by tenderer from those specified, are not available, or
.2 Delivery date of products from those specified would unduly delay completion of Contract, or
.3 Alternative products to those specified, which are brought to attention of, and considered by Consultant as equivalent to those specified and will result in a credit to Contract amount.

.3 Should proposed substitution be accepted either in part or in whole, assume full responsibility and costs when substitution affects other work on project. Pay for design or drawing changes required as result of substitution.

.4 Amounts of all credits arising from approval of substitutions will be determined by Consultant. No substitutions will be permitted without prior written approval of Consultant.

.5 Consultant reserves the right for acceptance or rejection of substitution of materials.

1.7 CONSTRUCTION EQUIPMENT AND PLANT

.1 On request, prove to the satisfaction of Consultant that the construction equipment and plant are adequate to manufacture, transport, place and finish work to quality and production rates specified. If inadequate, replace or provide additional equipment or plant as directed.

.2 Maintain construction equipment and plant in good operating order.

1.8 DAMAGED AND REJECTED MATERIALS

.1 Immediately replace, repair or otherwise make good any material damaged, broken or defaced during construction to the satisfaction of Consultant.

.2 Remove rejected materials from site.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXEUCTION

3.1 NOT USED

END OF SECTION

PART 1 - GENERAL

1.1 RECORD DRAWINGS

.1 Consultant will provide two (2) sets of white prints for record drawing purposes.

.2 Maintain project record drawings and accurately record deviations from contract documents caused by site conditions and changes ordered by Consultant.

.3 Mark changes in red coloured ink.

.4 Record following information:

.1 Elevations of various elements in relation to Geodetic CGVD28.
.2 Field changes in dimensions and details.
.3 Changes made by Change Order.

.5 At completion of project and prior to final inspection, neatly transfer notations to second set and submit both sets to Consultant.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXEUCTION

3.1 NOT USED

END OF SECTION

PART 1 - GENERAL

1.1 GENERAL

.1 Conduct cleaning and disposal operations to comply with local ordinances and antipollution laws.

.2 Store volatile waste in covered metal containers and remove from premises at end of each working day.

.3 Prevent accumulation of waste which creates hazardous conditions.

1.2 RELATED WORK

.1 Section 01 35 44: Environmental Protection Procedures for Marine Work

1.3 CLEANING DURING CONSTRUCTION

.1 Maintain the work, at least on a daily basis free from accumulations of waste material and debris.

.2 Provide on-site containers for collection of waste materials, and debris.

.3 Remove waste materials, and debris from site.

.4 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces.

1.4 FINAL CLEANING

.1 In preparation for acceptance of the project on an interim or final certificate of completion perform final cleaning.

.2 Remove grease, dust, dirt, stains, and other foreign materials, from exterior finished surfaces.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 NOT USED

END OF SECTION

PART 1 - GENERAL

1.1 DEFINITIONS

.1 Recyclable: ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse.

.2 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.

.3 Recycling: process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.

.4 Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:

.1 Salvaging reusable materials from re-modelling projects, before demolition stage, for resale, reuse on current project.
.2 Returning reusable items including pallets or unused products to vendors.

.5 Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.

.6 Separate Condition: refers to waste sorted into individual types.

.7 Source Separation: acts of keeping different types of waste materials separate beginning from first time they became waste.

.8 Waste Management Coordinator (WMC): Contractor representative responsible for supervising waste management activities.

1.2 WASTE MANAGEMENT WORKPLAN

.1 Prior to commencement of work, prepare a Waste Management Workplan.

.2 Workplan to include:

.1 Waste reduction practices.
.2 Material source separation process.
.3 Procedures for sending recyclables to recycling facilities.
.4 Procedures for sending non-salvageable items and waste to approved waste processing facility or landfill site.
.5 Training and supervising workforce on waste management at site.
.6 Descriptions of and anticipated quantities in percentages of materials to be salvaged reused, recycled and landfilled.
.7 Schedule of selective demolition.
.8 Number and location of dumpsters.
.9 Anticipated frequency of tippage.

.10 Name and address of haulers, waste facilities and waste receiving organizations.

.3 Develop Workplan in collaboration with all subcontractors to ensure all waste management issues and opportunities are addressed.

.4 Implement and manage all aspects of Waste Management Workplan for duration of work.

.5 Revise Workplan as work progresses addressing new opportunities for diversion of waste from landfill.

.6 Workplan to identify a Waste Management Coordinator. This individual will be the Contractor's representative responsible for supervising all waste management activities as well as coordinating related required submittals and reporting.

1.3 SUBMITTALS

.1 Provide submittals, including the Waste Management Work Plan, in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit copies of certified receipts from authorized disposal sites and reuse and recycling facilities for material removed from site on a weekly basis.

.1 Written authorization from the Consultant is required to deviate from haulers, facilities and receiving organizations listed in Waste Management Workplan.
.2 Include copy of weigh bills, scale tickets and disposal receipts for all waste disposed.

1.4 STORAGE, HANDLING AND PROTECTION

.1 Store materials to be reused, recycled and salvaged in locations as directed by the Consultant.

.2 Unless specified otherwise, materials for removal become Contractor's property.

.3 Handle, stockpile and protect material destined for removal off Site in accordance with Section 01 35 44.

1.5 DISPOSAL REQUIREMENTS

.1 Burying or burning of waste materials on site is prohibited.

.2 Disposal of waste, volatile materials, mineral spirits, oil, paint, paint thinner or unused preservative material into waterways, storm, or sanitary sewers is prohibited.

.3 Do not dispose of preservative treated wood through incineration.

.4 Do not dispose of preservative treated wood with other materials destined for recycling or reuse.

.5 Dispose of treated wood, end pieces, wood scraps and sawdust at a construction and demolition waste approved facility.

.6 Dispose of waste only at approved waste processing facility or landfill sites approved by authority having jurisdiction.

.7 Contact the authority having jurisdiction prior to commencement of work, to determine what, if any, demolition and construction waste materials have been banned from disposal in landfills and at transfer stations. Take appropriate action to isolate such banned materials at site of work and dispose in strict accordance with provincial and municipal regulations.

.8 Transport waste intended for landfill in separated condition, following rules and recommendations of Landfill Operator in support of their effort to divert, recycle and reduce amount of solid waste placed in landfill.

.9 Sale of salvaged items is not permitted on site.

.10 Remove materials from deconstruction as deconstruction/disassembly work progresses.

1.6 TIPPING FEES

.1 All tipping fees are to be covered in the contract unit prices provided. No additional payments will be made to cover waste disposal.

1.7 SCHEDULING

.1 Co-ordinate Work with other activities at site to ensure timely and orderly progress of Work.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 APPLICATION

.1 Dispose of all materials as required by regulatory codes, regulations, acts and municipal by-laws.

.2 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes

3.2 CLEANING

.1 Remove tools and waste materials on completion of Work and leave work area in clean and orderly condition.

.2 Clean-up work area as work progresses.

.3 Separate materials to be reused/recycled into specified sort areas.

3.3 DIVERSION OF MATERIALS

.1 Separate materials from general waste stream and stockpile in separate piles or containers, consistent with applicable fire regulations.

.1 Mark containers or stockpile areas.
.2 Provide instruction on disposal practices.

END OF SECTION

PART 1 - GENERAL

1.1 INSPECTION AND DECLARATION

.1 Contractor's Inspection: Coordinate and perform, in concert with subcontractors, an inspection and check of all Work. Identify and correct deficiencies, defects, repairs and perform outstanding items as required to complete work in conformance with Contract Documents.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 NOT USED

END OF SECTION

PART 1 - GENERAL

1.1 PROJECT RECORD DOCUMENTS

.1 Maintain at site one (1) set of the contract drawings and specifications to record actual as-built site conditions.

.2 Maintain up-to-date, real time as-built drawings and specifications in good condition and make available for inspection by the Consultant upon request.

.3 As-Built Drawings:

.1 Record changes in red ink on the prints. Mark only on one set of prints and at completion of work, neatly transfer notations to second set (also by use of red ink).
.2 Submit both sets to Consultant prior to application for Certificate of Substantial Performance.
.3 Stamp all drawings with "As-Built Drawings". Label and place Contractor's signature and date.
.4 Show all modifications, substitutions and deviations from what is shown on the contract drawings or in specifications.
.5 Record following information:

.1 Horizontal and vertical location of exterior underground utilities and appurtenances referenced to permanent surface improvements.

.2 Vertical location of various elements in relation to Chart Datum.

.3 Location of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of structure.

.4 Field changes of dimension and detail.

.5 Location of all capped or terminated services and utilities.

.6 Any details produced in the course of the contract by the Consultant to supplement or to change existing design drawings.

.7 All change orders issued over the course of the contract must be documented on the finished as-built documents, accurately and consistently depicting the changed condition as it applies to all affected drawing details.

.4 As-built Specifications: legibly mark in red each item to record actual construction, including:

.1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly items substituted from that specified.
.2 Changes made by Addenda and Change Orders.

.3 Mark up both copies of specifications; stamp "as-built", sign and date similarly to drawings as per above clause.

.5 Maintain As-built documents current as the contract progresses. Consultant may conduct reviews and inspections of the documents. Failure to maintain as-builts current and complete to satisfaction of the Consultant shall be subject to financial penalties in the form of progress payment reductions and holdback assessments.

1.2 REVIEWED SHOP DRAWINGS

.1 Provide a complete set of all shop drawings reviewed for project to incorporate into each copy of the Operations & Maintenance manuals.

1.3 RECORD DOCUMENTATION

.1 Record data including detailed technical information, documents and records describing individual products or systems as specified in individual sections of the specifications.

.2 Manual Language: final manuals to be in English.

.3 Number of copies required:

.1 Submit interim pdf digital copy and one (1) hard copy binder of the manual for review and inspection by Consultant. Make revisions and additions as directed and resubmit.
.2 Upon review and acceptance by Consultant, submit final pdf digital copy and one (1) hard copy binder. Interim copies are not to be considered as part of the final copies unless they have been fully revised and are identical to the final approved version.

.4 Submission Date: submit complete operation and maintenance manual to Consultant 3 weeks prior to application for Certificate of Substantial Performance of the work.

.5 Binding:

.1 Assemble, coordinate, bind and index required data into Operation and Maintenance Manual.
.2 Use vinyl, hard covered, 3” "D" ring binders, loose leaf, sized for 215 x 280 mm paper, with spine pocket.
.3 Where multiple binders are needed, correlate data into related consistent groupings.
.4 Identify contents of each binder on spine.
.5 Organize and divide data following same numerical system as the section numbers of the Specification Manual.
.6 Dividers: separate each section by use of cardboard dividers and labels. Provide tabbed fly leaf for each individual product and system and give description of product or component.
.7 Type lists and notes. Do not hand write.

.8 Drawings, diagrams and manufacturers' literature must be legible. Provide with reinforced, punched binder tab. Bind in with text; fold larger drawings to size of text pages.

.6 Manual Contents:

.1 Cover sheet containing:

.1 Date submitted.

.2 Project title, location and project number.

.3 Names and addresses of Contractor, and all Sub-contractors.

.2 Table of Contents: provide full table of contents in each binder(s), clearly indicate which contents are in each binder.
.3 Original or certified copy of warranties and product guarantees.
.4 Copy of approval documents and certificates issued by Inspection Authorities.
.5 Copy of reports and test results performed by Contractor as specified.

.7 Shop drawings:

.1 Include complete set of reviewed shop drawings into each copy of the operations and maintenance manual.
.2 Fold and bind material professionally in a manner that corresponds with the specification section numbering system.
.3 When large quantity of data is submitted, place into separate binders of same size as O&M binders.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 NOT USED

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK

.1 Section 03 20 00 – Concrete Reinforcement

.2 Section 03 30 00 - Concrete

1.2 REFERENCE STANDARDS

.1 CSA A23.1:24/CSA A23.2:24, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

.2 CSA S269.1-16(R2021), Falsework and Formwork.

1.3 SUBMISSIONS

.1 Shop Drawings:

.2 Submit formwork and falsework shop drawings to Consultant for review, in accordance with Section 01 33 00, at least four (4) weeks prior to erection. All such drawings to be stamped and signed by a Professional Engineer registered in the Province of New Brunswick.

.3 Clearly indicate method and schedule of construction, materials, arrangement of joints, ties, shores, liners, and locations of temporary embedded parts.

.1 Design and construct formwork and falsework to resist severe exposed wave conditions.

.4 Provide submissions in accordance with Section 01 33 00.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Formwork materials: to CSA S269.1.

.2 Falsework materials: to CSA S269.1.

.3 Form release agent: chemically active release agents containing compounds that react with free lime present in concrete to provide water insoluble soaps, preventing concrete from sticking to forms.

.4 Form ties: removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm dia. in concrete surface. When forms are removed, no metal is to be less than 50 mm from the surface of the concrete.

PART 3 - EXECUTION

3.1 ERECTION

.1 Verify lines and levels before proceeding with formwork and ensure dimensions agree with drawings.

.2 Construct forms to produce finished concrete conforming to shape, dimensions, locations, and levels indicated within tolerances required by CSA A23.1

.3 Line forms with material only as approved by Consultant.

.4 Construct falsework in accordance with CSA S269.1.

.5 Align form joints and make watertight. Keep form joints to minimum.

.6 Use 25 mm chamfer strips on external corners.

.7 Clean formwork in accordance with CSA A23.1, before placing concrete.

.8 Leave formwork in place for at least seven (7) days, exclusive for days when temperature falls below 5ºC, unless otherwise directed by Consultant.

.9 Re-use of formwork and falsework subject to requirements of CSA S269.1.

.10 Plug all holes from form ties and rods with non-shrink grout suitable for marine applications. When forms are removed, no metal is to be less than 50 mm from the surface of the concrete.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK

.1 Section 03 10 00 – Concrete Formwork and Falsework.

.2 Section 03 30 00 – Concrete.

.3 Section 31 63 19 – Rock Sockets for Piles

1.2 REFERENCE STANDARDS

.1 ASTM A1064/A1064M:24, Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.

.2 CSA A23.1:24/A23.2:24, Concrete Materials and Methods of Concrete Construction/ Test Methods and Standard Practices for Concrete.

.3 CSA G30.18:21, Carbon Steel Bars for Concrete Reinforcement.

.4 Reinforcing Steel Manual of Standard Practice (latest edition) by Reinforcing Steel Institute of Ontario.

1.3 SOURCE SAMPLING

.1 Upon request, provide Consultant with certified copy of mill test of steel supplied showing physical and chemical analysis not less than two (2) weeks prior to commencement of work.

1.4 SUBMISSIONS

.1 Shop Drawings:

.1 Clearly indicate bar sizes, spacing, location and quantities of reinforcement and mesh with identifying code marks to permit correct placement without reference to structural drawings; to Reinforcing Steel Manual of Standard Practice.
.2 Detail placement of reinforcing where special conditions occur.
.3 Design and detail lap lengths and bar development lengths to CSA standard A23.1, unless otherwise specified on drawings.

.2 Product Data/Samples:

.1 Provide product data for supports and spacers.

.3 Test Results:

.1 Provide Mill Test Certificates cross referenced to the product supplied to the site.

.4 Provide submissions in accordance with Section 01 33 00.

.5 Provide manufacturer’s data sheets of fibres to be used.

1.5 STORAGE

.1 Store reinforcing steel on racks or sills that will permit easy access for identification and handling and prevent it from becoming coated with material which would adversely affect bond.

.2 Do not store reinforcing steel in direct contact with the ground.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Reinforcing steel: to CSA G30.18; billet steel grade 400 (weldable) deformed bars.

.2 Wire ties: to ASTM A1064 plain, cold drawn annealed steel wire.

.3 Spacers: PVC, fabricated to suit site dimensions.

.4 Reinforcing Steel f .1 Fabricate reinforcing to CSA standard A23.1.

.5 Fabricate reinforcing to CSA standard A23.1.

.6 Fabrication tolerances for reinforcing steel to Reinforcing Steel Manual of standard Practice.

.7 Obtain Consultant's acceptance for locations of reinforcement splices other than shown on steel placing drawings.

.8 Ship bundles of bar reinforcement, clearly identified in accordance with bar list.

PART 3 - EXECUTION

3.1 PLACING

.1 Accurately place reinforcing in positions indicated and hold firmly during placing, compacting and setting of concrete.

.2 Tie reinforcement where spacing in each direction is:

.1 Less than 300 mm: tie at alternate intersections.
.2 300 mm or more: tie at each intersection.

3.2 FIELD BENDING

.1 Do not field bend reinforcement except where indicated or authorized by Consultant.

.1 When authorized, bend reinforcement without heat, by applying slow and steady pressure.
.2 Replace bars which develop cracks or splits.

3.3 CLEANING

.1 Clean reinforcing before placing concrete.

3.4 INSPECTION

.1 Do not place concrete until Consultant has inspected and accepted reinforcement work in place.

3.5 SURFACE CONDITIONS

.1 Reinforcement, at time concrete is placed, to be free from mud, oil or other non-metallic coatings that adversely affect bonding capacity.

.2 Reinforcement, with rust, mill scale, or combination of both to be considered as satisfactory, provided minimum dimensions, including height of deformations, and mass of hand wire brushed test specimen are not less than specified requirements in applicable CSA Standards.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK

.1 Section 03 10 00 – Concrete Formwork and Falsework

.2 Section 03 20 00 – Concrete Reinforcement

.3 Section 03 37 26 – Underwater Concreting

.4 Section 31 63 19 – Rock Sockets for Piles

1.2 REFERENCE STANDARDS

.1 Do concrete work in accordance with CSA A23.1:24/A23.2:24, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete, except where more stringent standards specify otherwise.

.2 ACI Code 318-25, Building Code Requirements for Structural Concrete and Commentary.

.3 ASTM C309-19, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

.4 ASTM C494/C494M-24, Standard Specification for Chemical Admixtures for Concrete.

.5 ASTM C881/C881M-20a, Standard Specification for Epoxy–Resin-Base Bonding Systems for Concrete.

.6 ASTM E1399/E1399M-97(R2022), Standard Test Method for Cyclic Movement and Measuring the Minimum and Maximum Joint Widths of Architectural Joint Systems.

.7 ASTM D3574-17, Standard Test Methods for Flexible Cellular Materials-Slab, Bonded, and Molded Urethane Foams.

.8 ASTM D545-23, Standard Test Methods for Preformed Expansion Joint Fillers for Concrete Construction (Nonextruding and Resilient Types).

.9 ASTM G155-21, Standard Practice for Operating Xenon Arc Lamp Apparatus for Exposure of Materials.

.10 ASTM C711-22, Standard Test Method for Low-Temperature Flexibility and Tenacity of One-Part, Elastomeric, Solvent-Release Type Sealants.

.11 CSA A3000-23, Cementitious Materials Compendium.

1.3 SUBMISSIONS

.1 Provide submissions in accordance with Section 01 33 00.

.2 Product Data/Samples:

.1 Provide technical data for curing compounds, evaporation retardant and finishing aids, expansion joint materials, sealants, grouts and proposed adhesive anchor system.

.3 Certificates:

.1 Minimum four (4) weeks prior to starting concrete work submit to Consultant manufacturer's test data and certification by qualified independent inspection and testing laboratory that the following materials will meet specified requirements:

.1 Portland cement.

.2 Admixtures.

.3 Aggregates.

.4 Water.

.2 Provide certification that plant, equipment, and materials to be used in concrete work comply with requirements of CSA A23.1.
.3 Provide certification that mix proportions selected will produce concrete of specified quality and yield and that strength will comply with CSA A23.1.
.4 Provide certification that concrete will not include alkali - reactivity aggregates.

.4 Methodology:

.1 Submit methodology for cold weather concreting.
.2 Submit methodology for hot weather concreting.
.3 Submit methodology for concrete placement operations.
.4 Submit methodology for concrete deck finishing operations.
.5 Submit methodology for supporting reinforcing steel.

.5 Test Results:

.1 Provide design mix tests results.

1.4 STORAGE OF MATERIALS

.1 Store all materials to prevent contamination or deterioration, whether at the plant or at the job site.

.2 Store cement in watertight bins or silos that provide protection from dampness and easy access for inspection and identification of each shipment whether at the plant or at the job site.

.3 Prevent stored liquid admixtures and compounds from freezing and powdered admixtures and compounds from absorbing moisture.

.4 Use storage methods which prevent damage and straining of cast concrete elements.

1.5 SOURCE SAMPLING

.1 At least four (4) weeks prior to commencing work, inform Consultant of proposed source of aggregates and provide access for sampling.

1.6 READY-MIX CONCRETE SUPPLY

.1 Provide, with each load of concrete delivered to site, duplicate delivery slips containing following:

.1 Name of ready-mix batch plant.

.2 Serial number of ticket.

.3 Date and truck number.

.4 Project identification.

.5 Class of concrete or mix.

.6 Amount of concrete in cubic metres.

.7 Time of loading or first mixing of aggregate, cement and water.

.8 Time of discharge of concrete.

.9 Admixtures added at plant.

.10 Amount of water added at plant.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Aggregates: to CSA A23.1.

.2 Portland cement and supplementary cementing materials: to CSA A3000.

.3 Water: to CSA A23.1.

.4 Admixtures:

.1 Air entraining admixtures: to CSA A3000.
.2 Chemical admixtures: to CSA A3000 and ASTM C494.
.3 Pozzolanic mineral admixtures: to CSA A3000.

.5 Non-shrink grout: premixed compound consisting of non-metallic aggregate, Portland cement, additives, suitable for marine applications, capable of developing compressive strength of 40 MPa at 28 days.

.6 Curing compound: To ASTM C309 and CSA A23.1 type 1, ID, or 2.

.7 Adhesive Anchors: Two component, tube injected system conforming to ASTM C881/C881M, Types I, II, IV, and V, Grade 3, Class B, and C. Adhesive to be tested in accordance with the ICC-ES acceptance criteria for Post-Installed Adhesive Anchors in Concrete Elements (AC308). Technical data to be published in an ICC-ES Evaluation Service Report showing compliance with ACI 318 and/or CSA A23.3. Installation of adhesive anchors, including drilling of holes, preparation, storage, usage and curing to be in accordance with the manufacturer's written instructions.

.1 Acceptable products:

.1 Hilti HIT-RE 500 V3, as manufactured by Hilti (Canada) Corporation.

.2 Pure220+ as manufactured by Dewalt Industrial Tool Co.

.3 Epcon C6+, as manufactured by ITW Red Head.

.4 Approved equivalent.

.8 Bonding Agent/Corrosion Inhibitor: fresh concrete to existing concrete bonding agent and corrosion inhibitor coating for existing reinforcing steel.

.1 Acceptable products:

.1 Duralprep A.C. as manufactured by the Euclid Chemical Company.

.2 MasterEmaco P124 as manufactured by Master Builders Solutions.

.3 SikaTop Armatec - 110 EpoCem as manufactured by Sika Canada.

.4 Approved equivalent.

.9 Joint Sealant: Two component, polysulphide sealant, suitable for exterior applications, complete with backer rod and primer. Install in accordance with manufacturer's specifications and written instructions.

.10 Expansion Joint System: watertight, UV stable, epoxy adhered expansion joint system with silicone face and cellular foam backing, suitable for use on bridges and roads, AASHTO approved. System to have the following minimum properties:

.1 Thermal Movement: 500 cycles at -60%, +60% Movement, Pass, to ASTM E1399
.2 Acrylic impregnation: 100%, Microsphere Modified, Water-based Base Material Min 5.65 kg/m³ Cellular, High Density, Polyurethane Foam, to ASTM D3574.
.3 Density: 6 lbs/cu ft to ASTM D545
.4 Tensile Strength: 124.11 kPa ASTM D3574
.5 Elongation: 150% to ASTM D3574
.6 UV/moisture resistance: No Changes - 2000 hours, Pass ASTM G155.
.7 Compression: Set Max 3% ASTM D3574
.8 Temperature Service Range: -40°C to 85°C to ASTM C711

2.2 CONCRETE MIXES

.1 Prior to starting concrete work, submit to the Consultant the proposed mix design(s) stamped and signed by a Professional Engineer licensed to practice in the Province of New Brunswick for approval. Mix design(s) to be in accordance with Alternative 1 of Table 5 CSA A23.1. Comply with additional requirements of CSA A23.1, Clause 4.1.1.5 for concrete that will be exposed to sea water or sea water spray.

.1 For concrete pile caps, deck, curbs, anchor blocks and retaining walls use concrete mix designed to provide concrete meeting the following requirements with consolidation characteristics:

.1 Minimum compressive strength at 56 days: 35 MPa.

.2 Exposure: Class C-1 and S-3.

.3 Maximum aggregate size: 20mm.

.4 Chemical admixtures: type as approved and in accordance with ASTM C494.

.2 For reinforced concrete rock sockets and concrete inside steel pipe piles use concrete mix designed to provide concrete meeting the following requirements with consolidation, anti-washout and shrinkage compensating characteristics:

.1 Minimum compressive strength at 28 days: 40MPa.

.2 Exposure class: C-3 and S-3.

.3 Maximum aggregate size: 20mm.

.4 Chemical admixtures:

.1 Type as approved and in accordance with ASTM C494.

.2 Provide consolidation, anti-washout and shrinkage compensating admixtures.

.3 Modify concrete mix to the approval of the Consultant to accommodate pumping.

.4 Admixtures to the approval of the Consultant and the recommendation of the manufacturer. Admixtures must be dispersed separately into mixing water.

.5 Do not use calcium chloride or compounds containing calcium chloride.

.6 Weigh aggregates, cement, water and admixtures separately when batching. Inspect and test scales for accuracy as directed. Accuracy

to be such that successive quantities can be measured to within one percent of desired amounts. Test certificates to be submitted to Consultant upon request.

.7 Where seven-day strength is less than 70% of specified 28 day strength, provide additional protection for curing and make changes to mix proportions to the satisfaction of the Consultant.

.8 Provide certification that plant, equipment and all materials to be used in concrete comply with the requirements of CSA A23.1.

.9 Provide certification from independent testing and inspection company that mix proportions selected will produce concrete of specified quality and can be effectively placed and finished for all work under this Contract.

PART 3 - EXECUTION

3.1 GENERAL

.1 Obtain the Consultant's approval before placing concrete. Provide 24 hours' notice of intended placement. Concrete to be placed in dry form condition.

.2 Place, consolidate, finish, cure and protect concrete to CSA A23.1 except where specified otherwise.

.3 Prior to placing of concrete, obtain Consultant's approval of proposed method for protection of concrete during placing and curing in adverse weather.

.4 Comply with additional requirements of CSA A23.1 except where specified otherwise, for concrete exposed to seawater environment.

.5 Do not commence placing concrete until the Consultant has inspected/reviewed forms, inserts, dowels, reinforcing steel, joints, conveying, consolidation and protective methods.

.6 Do not disturb reinforcement and anchorage during placement.

.7 Maintain accurate records of placed concrete items to indicate date, location of pour, quality, air temperature and test samples taken.

.8 Comply with additional requirements of CSA A23.1, for concrete exposed to seawater environments during placement and curing.

.9 Install expansion joint product in accordance with manufacturer's specifications and written instructions.

3.2 REINFORCING STEEL

.1 Place reinforcing steel according to Section 03 20 00.

.2 Provide 75 mm minimum cover for all reinforcing steel unless indicated otherwise on drawings.

3.3 FORMWORK

.1 Verify field dimensions to determine applicable sizes of formwork.

.2 Design and construct formwork to allow adequately for proper placement and consolidation while conforming to shape and dimensions shown on plans.

.3 Formwork design will include closures at both top and bottom of form, and all necessary hardware to support the forms.

3.4 PLACEMENT OF CONCRETE

.1 Place and consolidate concrete to CSA A23.1. Concrete to be placed in dry form condition, by coordinating pour with low tide.

.2 If allowed by Consultant, pump concrete to following requirements:

.1 Arrange equipment so that no vibrations result which might damage freshly placed concrete.
.2 Where concrete is conveyed and placed by mechanically applied pressure, provide suitable equipment.
.3 Operate pump so that concrete, without air pockets, is produced.
.4 When pumping is discontinued and concrete remaining in pipeline is to be used, void pipeline in a manner that prevents contamination of concrete or separation of ingredients.

.3 Deposit concrete as neatly as practicable, directly in its final position, and do not allow to flow in a manner to permit or cause segregation.

.4 Vibrate and tamp each layer of concrete with an appropriate vibrator as allowed by the Consultant. Compact the concrete to the maximum practicable density, free of air pockets, and until it is in complete contact with the reinforcement and formwork.

3.5 INSERTS

.1 Set galvanized sleeves and other inserts and openings as indicated or specified elsewhere. Sleeves and openings greater than 100 x 100mm not indicated on the structural drawings must be approved by the Consultant.

.2 Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain approval of all modifications from the Consultant before placing of concrete.

.3 Any galvanized items embedded in concrete shall be completely separated from reinforcing steel.

.4 Anchor bolts:

.1 Set anchor bolts to templates under supervision of appropriate trade prior to placing concrete.

3.6 FINISHING

.1 Finish concrete in accordance with CSA A23.1.

.2 Grind off fins, nibs, and other raised protuberances with an approved hand stone.

.3 When concrete has hardened sufficiently, give deck surface a uniform finish free from porous spots, irregularities, depressions, small pockets or rough spots.

.4 Provide coarse broom finish to the wharf deck surface using steel wire or stiff, coarse, fibre broom. Use broom with transverse ridges satisfactory to Consultant. Delay brooming until concrete is sufficiently hard to retain ridges.

.5 Rub exposed sharp edges of concrete with carborundum to produce 3 mm radius edges unless otherwise detailed.

3.7 PROTECTION AND CURING

.1 Provide protection and curing in accordance with CSA A23.1.

.2 Protect concrete with windproof shelter(s) to allow free circulation of inside air around fresh concrete. Do not let walls of shelter touch formwork. Provide sufficient space in shelters for removal of formwork.

.3 Keep concrete surfaces continuously moist during concrete curing and protection stage and allow concrete to dry gradually before removal of protection.

.4 Protect freshly deposited concrete from premature drying and excessively hot and cold temperatures and maintain concrete without drying at a relatively constant temperature for the period of time necessary for hydration of the cement and proper hardening of the concrete. Protect freshly deposited concrete from the harmful effects of sunshine, drying winds, cold and hot weather, running or surface water, mechanical shock, vandalism, etc.

.5 When the air temperature is at or below 10°C or when there is a probability of falling below 10°C within 24 hours of placing, as forecast by the nearest official meteorological office, keep all materials and equipment needed for adequate protection and curing during cold weather on hand and ready for use before concrete placement is started. Extent of such preparation to be in accordance with the requirements of CSA A23.1 and to the approval of the Consultant.

.6 When placing concrete during cold weather, adequate protection of concrete shall be provided for the duration of the curing and protection period as defined in CSA A23.1. Protection shall be provided by means of heated enclosures, coverings, insulation, or a suitable combination of these methods.

.7 Enclosures:

.1 Construct to withstand wind and snow loads.

.2 Make reasonably airtight.
.3 Housing to provide sufficient space between the concrete and the enclosure to permit free circulation of warmed air.
.4 Supply heat to the enclosure by live steam, forced hot air, stationary heaters, or other heaters of various types. Exhaust fumes from enclosures so there is no build-up of exhaust fumes within heated enclosures.

.8 Take extreme care with curing methods during cold or hot weather concreting and supply approved equipment in order to maintain inside air within the following temperatures.

.1 For initial three (3) consecutive days at not less than 10°C and not more than 25°C, at surfaces.
.2 Wet cure concrete for an additional four (4) consecutive days (minimum) at not less than 10°C and not more than 35°C, and for the time necessary to attain 70% of the specified strength.
.3 Maintain temperature of concrete as close as possible to suggested minimum temperature of 10°C during the curing period.
.4 If using silica fume in concrete, use additional curing procedures and extend cure time, as necessary.
.5 Reduce temperature at end of curing period at rate not exceeding 20°C per day.
.6 No salt or other chemical shall be used to lower the freezing point of the concrete as a substitute for the specific curing and protection.
.7 Do not overheat concrete.

3.8 FIELD QUALITY CONTROL

.1 Arrange and pay for inspection and testing of concrete and concrete materials by Testing Laboratory in accordance with CSA A23.1 and as specified in Section 01 41 00.

.2 Test cylinders:

.1 For compressive testing of concrete a minimum of 4-100mm x 200mm cylinders are required for:

.1 Each day's pour.

.2 Each mix design change.

.3 Each change of supplier.

.4 Each 20 cubic meters.

.2 Take additional cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.

.3 If tests do not meet requirements of the Consultant take such measures as indicated in CSA A23.1 and CSA A23.2. Additional testing required due to defective materials or failed test shall be at Contractor's cost.

.4 Arrange and pay for inspection and testing when necessary for production control to meet requirements.

.5 Inspection and testing by Consultant will not augment Contractor's Quality Control or relieve Contractor of contractual responsibility.

3.9 DEFECTIVE WORK

.1 Concrete is defective when:

.1 Failing to meet any requirement of this specification.
.2 Concrete contains honeycombing or embedded debris.
.3 28 or 56-day strength in any area is less than 95% of specified minimum.
.4 Concrete test results fail any other aspect/test of CSA A23.1.

.2 Repair or remove and replace defective work as directed by the Consultant.

.3 Take corrective measures as directed by the Consultant to prevent occurrence of further defective concrete.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 03 30 00 - Concrete

1.2 REFERENCE STANDARDS

.1 CSA A23.1:24/A23.2:24, Concrete Materials and Methods of Concrete Construction / Test Methods and Standard Practices for Concrete.

1.3 DEFINITIONS

.1 Tremie concrete is placed underwater through a tube called a tremie pipe. Tremie pipe has a hopper at upper end and may be open ended or may have a foot valve, plug or travelling plug to control flow of concrete. Concrete is placed in hopper and a sufficient head of concrete is maintained in tremie pipe to provide desired rate of flow.

.2 Pumped concrete method of placing concrete underwater uses a concrete pump with a discharge line used in a similar manner to a tremie pipe.

1.4 SUBMISSIONS

.1 Submit shop drawings in accordance with Section 01 33 00.

PART 2 - PRODUCTS

2.1 CONCRETE MIXES

.1 Concrete mixes: to Section 03 30 00 – Concrete.

2.2 ADMIXTURES

.1 Admixtures will be subject to approval of Consultant. Admixtures will only be permitted to correct deficiencies in mix or to improve placement of concrete.

.2 Do not use calcium chloride or materials containing calcium chloride.

PART 3 - EXECUTION

3.1 GENERAL

.1 Concrete work in accordance with CSA A23.1.

3.2 PREPARATION

.1 Notify Consultant at least 24 hours in advance of intention to commence underwater work.

.2 Place concrete in one continuous operation to full depth required. Provide sufficient supply of concrete to complete pour without interruption and supply complete equipment for every phase of operation.

.3 Where concrete must bond to existing surfaces, clean surfaces just prior to starting concrete placement. Use water jets, mechanical scraper or other means.

3.3 TREMIE METHOD

.1 Provide tremie pipe which is watertight and sufficiently large to allow free flow of concrete. Diameter of tremie pipe to be not less than 8 times maximum size of coarse aggregate.

.2 Provide hopper at top of tremie pipe and means to raise and lower tremie.

.3 Provide plug or foot valve at end of tremie pipe to permit filling pipe with concrete initially.

.4 Do not move tremie pipes laterally by dragging through concrete.

.5 Start pour with tremie pipe full of concrete and keep end of pipe buried in freshly placed concrete at least 300 mm. Control rate of flow by increasing or decreasing depth of end in concrete.

.6 If seal is lost, allowing water to enter pipe, withdraw pipe immediately.

.7 If tremie operation is interrupted so that a horizontal construction joint has to be made, cut surface laitance by jetting, within 24 to 36 hours and remove loose material by pumping or air lifting before placing next lift.

.8 Do not place concrete in flowing water. Do not vibrate, disturb or puddle concrete after it has been placed.

3.4 PUMPED CONCRETE METHOD

.1 Follow procedures as for tremie method in placing concrete using discharge line from concrete pump as tremie pipe.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCE STANDARDS

.1 ASTM A307-21, Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60,000 psi Tensile Strength.

.2 ASTM A780/A780M-20, Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.

.3 CSA G40.20-13/G40.21-13(R2023), General Requirements for Rolled or Welded Structural Quality Steel / Structural Quality Steel.

.4 CSA S16:24, Design of Steel Structures.

.5 CSA W59:24, Welded Steel Construction.

.6 CSA G164-18 (R2023), Hot Dip Galvanizing of Irregularly Shaped Articles.

1.2 SHOP DRAWINGS

.1 Shop Drawings:

.1 Clearly indicate the following items:

.1 General arrangements, dimensions, clearance locations and directions of assemblies as installed on structures.

.2 Locations, sizes and installation tolerances of anchor bolts, and embedded parts.

.3 Types of materials used, finishes and core thickness.

.4 All other pertinent details and accessories.

.2 Test Results:

.1 Provide test results for galvanized items.

.3 Submissions

.1 Provide submissions in accordance with Section 01 33 00.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Steel Sections: to CSA G40.20/G40.21, Grade 350W.

.2 Steel rod, plate, and angles: to CSA G40.20/G40.21, Grade 300W.

.3 Welding materials: to CSA W59.

.4 Bolts and anchor bolts: to ASTM A307.

.5 Galvanizing: hot dip galvanized steel components and assemblies with minimum zinc coating of 705 g/m² to CSA G164.

2.2 FABRICATION

.1 Build work square, true, straight, and accurate to required size, with joints closely fitted and properly secured.

.2 Fabricate items from steel unless otherwise noted.

.3 Where possible, fit and shop assemble work, ready for installation.

.4 Confirm exposed welds are continuous for length.

2.3 MISCELLANEOUS METAL WORK ITEMS

.1 Miscellaneous anchors, bolts, and inserts:

.1 Where size, spacing and the like are not indicated, provide as necessary for the purpose.
.2 Hot-dip galvanize all miscellaneous anchors, bolts and inserts.

.2 Miscellaneous Steel:

.1 Provide miscellaneous steel as required to the shape, size and details required.
.2 Hot-dip galvanize all miscellaneous steel.

PART 3 - EXECUTION

3.1 ERECTION

.1 Install metalwork square, plumb, straight, and true, accurately fitted with tight joints and intersections.

.2 Isolate galvanized steel anchors and other items from bare reinforcing steel and other steel components to avoid contact of dissimilar metals.

.3 Make field connections with bolts to CSA S16, or weld.

.4 Touch-up bolts and scratched galvanized surfaces after completion of erection in accordance with ASTM A780/A780M.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCE STANDARDS

.1 ASTM A307-21, Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60,000 psi Tensile Strength.

.2 CAN/CSA 080 Series-15 (R2020), Wood Preservation.

.3 CSA G164-18 (R2023), Hot Dip Galvanizing of Irregularly Shaped Articles.

.4 NLGA Standard Grading Rules for Canadian Lumber, most recent edition at time of tendering.

1.2 SUBMISSIONS

.1 At least two (2) weeks prior to finalizing timber order, submit drawings, clearly indicating installation details. Show splice locations, splice details, fastening arrangements.

.2 Submit methodology for field treatment.

.3 Provide submissions in accordance with Section 01 33 00.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Softwood Timber: Graded and stamped to National Lumber Grading Authority (NLGA) No. 1 Structural. Eastern Hemlock, Western Hemlock or Douglas Fir Species only will be used.

.2 Timber Treatment:

.1 All softwood timber to receive Chromated Copper Arsenate (CCA) preservative treatment to CAN/CSA-O80 Series for use in Coastal Waters. Timber which will be periodically submerged in salt water is to be treated per Use Category UC5A; all other timber is to be treated per Use Category UC4.1. Where assay retentions are not indicated, they are to be taken as 1.5 times the indicated gauge retention.

.2 Make arrangements for testing of timber by:

.1 Plant Inspection: Provide treatment plant identification, date of treatment, list of various pieces in the charge, charge number, plant assay testing results, concentration and type of preservative used, duration of treatment, gauge retention, species of wood; and make arrangements with the treatment plant to locate bundles, move bundles, break open bundles and carry out other measures to facilitate the inspection.

.2 Filling in and submitting a preprinted form, agreed to by the Consultant, containing the above information.

.3 Miscellaneous Hardware must meet the following specifications:

.1 Machine bolts, lag bolts, drift bolts, anchor bolts, nuts, round plate washers: to ASTM A307.
.2 Spikes: galvanized, to CSA G164.
.3 Hot dip galvanized hardware, bolts, nuts, washers and spikes to CSA G164, with minimum zinc coating of 705 g/m².
.4 All hardware will be galvanized unless otherwise noted otherwise.

PART 3 - EXECUTION

3.1 GENERAL

.1 Supply and install dimension timbers to details shown on drawings or as specified. Treated timber to be supplied in pre-cut lengths to suit. Install lag bolts in sound timber.

.2 Boreholes for drift bolts to be 1.5mm smaller in diameter than bolt and for full length of bolt. Boreholes for machine bolts to be same diameter as bolts. Boreholes for lag bolts to be same diameter as shank for unthreaded portion and 0.70 times the shank diameter for the threaded portion. Threaded portion of lag bolts will be installed using a wrench, not by driving.

.3 Recess countersunk holes 25 mm and provide two (2) coats of Copper naphthenate, allowing sufficient time between applications to permit total absorption.

3.2 HANDLING TIMBER

.1 Protect timber during handling, shipping, offloading and field handling, by use of suitable equipment and procedures. Use rope or fabric strap slings on site for moving bundles or individual timbers, rather than metal grabs, chains or cables.

.2 Field test tops of vertical untreated timber with minimum two (2) liberal coats of Copper naphthenate.

3.3 HANDLING TREATED TIMBER

.1 Handle treated material to avoid damage causing alteration in original treatment.

.2 Treat in field, spike holes, boreholes, plugged holes, cuts and any damage to treated material, using Copper naphthenate, as specified herein, regardless of plant treatment type. Fill all unused bored holes and any other holes with tight fitting treated wooden plugs prior to any exposure to water containing marine borers.

.3 Provide methodology pertaining to heating and application. Apply to dry surfaces, wherever possible.

.4 Treat boreholes, using a pressurized container with an extension rod, to produce a fine spray in the holes with one application. Alternately a cylindrical brush may be used.

.5 Treat field cuts and any abrasions with minimum of two (2) liberal applications of preservative, using either spray or brush.

.6 Environmental Concern: allow for no spillage or excess application of field preservative. Provide personnel with sufficient training and protective gear to properly and safely handle the treated materials and to apply field treatment, so as to prevent undue hazard to themselves, others, or the environment.

.7 Contain all debris and leachates (films on water surface) within the area of the work by using containment facilities such as floating booms or screens.

END OF SECTION

PART 1 - GENERAL

1.1 GENERAL

.1 This Section covers items common to Sections of Division 26. This section supplements requirements of Division 1.

1.2 REFERENCE STANDARDS

.1 CSA C22.1:24, Canadian Electrical Code.

.2 CSA C22.3 No.1:25, Overhead Systems, Includes Errata (2025).

.3 CSA C22.3 No.7:25, Underground Systems, Includes Errata (2025).

.4 CSA C235:19, Preferred Voltage Levels for AC Systems, 0 to 50,000V.

1.3 CARE, OPERATION AND START-UP

.1 Instruct operating personnel in the operation, care, and maintenance of all equipment.

.2 Arrange and pay for services of manufacturer's factory service engineer to supervise start-up of installation, check, adjust, balance, and calibrate components.

.3 Provide these services for such period, and for as many visits as necessary to put equipment in operation, and make operating personnel conversant with all aspects of its care and operation.

1.4 VOLTAGE RATINGS

.1 Operating voltages: to CSA C235.

.2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard. Equipment to operate in extreme operating conditions established in above standard without damage to equipment.

1.5 PERMITS, FEES AND INSPECTION

.1 Submit to the Electrical Inspection Department, Municipal Authority and supply authority the necessary number of drawings and specifications, for examination and approval prior to commencement of work. Submit this information within twenty (20) working days of the award of Tender and provide the Consultant with written notice at the time this has been submitted.

.2 Provide the Consultant with a copy of the electrical Inspection Department and supply Authority Plans Review Report, immediately upon receipt. No shop drawings will be reviewed prior to receipt of the Plans Review Report from the Contractor.

.3 Obtain all necessary permits including an Electrical Wiring Permit for electrical work and Communications Cabling Permit for communications cabling work from the

authority having jurisdiction, prior to commencement of work. Provide a copy of each permit to the Consultant upon receipt. The permits are to be properly displayed on the work site.

.4 Upon specific request, the Consultant will provide, to the Contractor, up to a maximum of three (3) copies of the drawings and specifications required for submittal to the Electrical Inspection Department and Supply Authority. These drawings and specifications will be provided to the Contractor at no cost, unless specified otherwise.

.5 Arrange for all required inspections to be conducted by the authority having jurisdiction. Provide a copy of all inspection reports to the Consultant immediately upon receipt. Notify the Consultant immediately of changes required by the authority having jurisdiction.

.6 Furnish Certificates of Acceptance from authorities having jurisdiction upon completion of work. Include a copy in the Operation and Maintenance Manual.

.7 Pay all associated fees, including necessary inspections and inspection department representation occurring outside normal working hours.

1.6 MATERIALS AND EQUIPMENT

.1 Provide materials and equipment in accordance with the specifications, drawings and all applicable certification organizations.

.2 Equipment and material to be CSA certified. Where there is no alternative to supplying equipment which is not CSA certified, obtain special approval from the authority having jurisdiction.

.3 Factory assemble control panels and component assemblies.

.4 Unless otherwise indicated, the equipment listed on the project equipment schedules and shown on the drawings is the "basis of design equipment", the Contractor may utilize the alternates listed in the project documents or submit alternates for approval to this equipment that meet the technical and quality requirements of the project specifications. If there are necessary changes to any system to accommodate these alternates, coordinate the changes and provide at no additional cost to the Contract.

1.7 FINISHES

.1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two (2) coats of finish enamel.

.1 Paint outdoor electrical equipment "equipment green" finish to EEMAC Y1-1.
.2 Paint indoor switchgear and distribution enclosures light grey to EEMAC 2Y-1.

.2 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.

.3 Clean and prime exposed non- galvanized hangers, racks, and fastenings to prevent rusting.

1.8 EQUIPMENT IDENTIFICATION

.1 Identify electrical equipment with nameplates and labels as specified herein.

.2 Identification:

.1 Provide panels, disconnect switches, receptacles, transformers, etc. with "lamicoid" nameplates as further described herein. Take care to affix plates true and level, and plumb in all instances.
.2 Affix nameplates to all "metal" surfaces with steel type "pop- rivets".
.3 Affix nameplates to other types of surfaces with contact type cement.
.4 Affix nameplates to building "exterior" surfaces with nylon inserts and self-tapping screws unless specifically indicated otherwise.
.5 Apply contact type cement to complete rear side of plate, as opposed to several locations or areas on same.
.6 Lamicoid nameplates installed on distribution panelboards, splitter troughs and transformers must indicate the following:

.1 Designated name of equipment.

.2 Amperage of overcurrent protection device.

.3 Voltages, number of phases and wires.

.4 Designation of power source.

Example:
PANEL H - 150 AMPS
120/208V - 3PH - 4W
FED FROM MAIN SWITCHBOARD #QMS-1

.7 Install an additional "lamicoid" nameplate on all, or any piece of electrical equipment, or apparatus (i.e., Panelboards, etc.), that may contain overcurrent devices (i.e., circuit breakers and/or fuses), that have been designed for, and incorporate interrupting capacity sized "larger" than 10 KAIC.

Example:
Min, interrupting capacity of breakers
installed in this panel to be not less
than 22 KAIC
Example:
Min. interrupting capacity of fuses
installed in this MCC to be not less
than 100 KAIC

.8 Install lamicoid nameplates above all types of receptacles and abutted directly to tops of their respective device plates. Identification is to indicate respective panel source complete with associated circuit breaker number(s) as per the following:

.1 1.5mm x 13mm high complete with 6 mm white letters on black face, directly above all receptacles. Plate to be identical width as finish device plate.

Example: PANEL H - 20

.9 Identify lamicoid nameplates above 120V receptacles protected by GFCI circuit breakers, or GFCI type receptacles as per the following:

.1 1.5mm thick x 19mm wide complete with 6 mm white letters on black face above all receptacles. Identical width as finish device plate (EXAMPLE: GFCI Protected Panel H-26).

.10 Lamicoid 3mm thick plastic engraving sheet, white letters on black face, for all electrical systems except fire alarm which shall have red face with white letters.

.1 1.5mm thick nameplates above receptacles as previously indicated, with top left and right corners to be rounded off.

.2 Lettering on lamicoid nameplates are not to "start", nor "end" nearer than 13mm from either, or both ends of said plates. Size of lettering, including overall lengths of various plates to be as indicated in the following chart:

Nameplate Sizes			
Size 1	10mm x50mm	1 line	5mm high letters
Size 2	13mm x75mm	1 line	6mm high letters
Size 3	16mm x75mm	2 lines	5mm high letters
Size 4	19mm x90mm	1 line	9mm high letters
Size 5	38mm x90mm	2 lines	13mm high letters
Size 6	25mm x100mm	1 line	13mm high letters
Size 7	25mm x100mm	2 lines	6mm high letters
Size 8	50mm x150mm	2 lines	13mm high letters

.11 Wording on nameplates and labels to be approved by Consultant prior to manufacture.
.12 Allow for average of forty (40) letters per nameplate and label.
.13 Identification to be English.
.14 Junction and pull boxes: indicate system and voltage.
.15 Co-ordinate names of equipment and systems with other trades to ensure that equipment identification is consistent.

.16 In addition to required nameplates and colour coding, junction boxes to have the panel and circuit numbers of all wiring contained within listed on the coverplate. Neatly write list using black indelible marker.
.17 Colour code all electrical junction boxes, pull boxes and conduit fittings as follows:
.18 Apply colour coding prior to installation of boxes/equipment.
.19 Where primary colour only is indicated:

.1 Colour inside and outside of box.

.2 Colour all cover plates.

.3 Where primary and secondary colours are indicated:

.1 Paint inside and outside of box with the primary colour.

.2 Diagonally apply to each half of the cover plate the primary and secondary colours.

1.9 WIRING IDENTIFICATION

.1 Identify wiring with self-laminating, permanently mechanically imprinted labels on both ends of each conductor and cable utilized. Identify conductors and cables in each junction or pull box through which they pass. Install labels in a "flagged" manner around individual conductors.

.2 Maintain phase sequence and colour coding throughout.

.3 All conductors are to have their insulation colors identified as follows:

.1 Phase A - Red
.2 Phase B - Black
.3 Phase C - Blue
.4 Neutral - White
.5 Bond - Green
.6 Ground – Green

.4 Colour code conductor insulation as per the following:

.1 All sizes of phase conductors up to and including #2AWG.
.2 All sizes of neutral, bond and/or ground conductors up to and including #3/0AWG.
.3 Approved colored tapes in lieu of insulation coloring may be used to identify conductors that exceed sizes as previously indicated. Labelling is to take place at both ends of all runs at a minimum of 300mm from terminations, in addition to within all boxes between both ends of the run.

.5 Use colour coded wires in communication cables, matched throughout system.

.6 Indicate panel and circuit number of all phase conductors i.e.: "Panel "A" - cct 3". Identify all neutral conductors bonding and ground conductors to indicate the phase conductor with which they are associated.

1.10 CONDUIT AND CABLE IDENTIFICATION

.1 Colour code conduits, boxes and metallic sheathed cables. Colour boxes inside and outside where one colour is required. Colour boxes on inside only where two colours are required. Metal cover plates are to have both colours applied diagonally where two colours are required. Paint entire cover plate where one colour is required.

.2 Code with paint at points where conduit or cable enters wall, ceiling, or floor, and at 15m intervals.

.3 Colours: 25mm wide prime colour and 19mm wide auxiliary colour.

1.11 WIRING TERMINATIONS

.1 Lugs, terminals, screws used for termination of wiring to be suitable for either copper or aluminum conductors.

.2 Label all branch circuit wiring including phase conductors, neutral, ground and/or bonding conductors to be done on both ends of all circuit wires plus in any junction and pull boxes located between ends. Use write-on self-laminating labels. Wrap around conductor in a "U" fashion.

1.12 MANUFACTURERS AND CSA LABELS

.1 Visible and legible after equipment is installed.

1.13 WARNING SIGNS

.1 As specified and to meet requirements of Electrical Inspection Department and Consultant.

.2 Porcelain enamel decal signs, minimum size 170mm x 250mm.

1.14 LOCATION OF EQUIPMENT

.1 Change location of equipment at no extra cost or credit, providing distance does not exceed 3m, and information is given before installation.

1.15 MOUNTING HEIGHTS

.1 Mounting height of equipment is from finished grade/floor to centreline of equipment unless specified or indicated otherwise.

.2 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.

.3 Install electrical equipment at following heights unless otherwise indicated.

.1 Panelboards: as required by Code or as indicated.

1.16 LOAD BALANCE

.1 Measure phase current to panelboards with normal loads (lighting) operating at time of acceptance. Adjust branch circuit connections as required to obtain best balance of current between phases and record changes.

.2 Measure phase voltages at loads and adjust transformer taps to within 2% of rated voltage of equipment.

.3 Submit, at completion of Work, report listing phase and neutral currents on panelboards, dry-core transformers, operating under normal load. State hour and date on which each load was measured, and voltage at time of test.

1.17 CONDUIT AND CABLE INSTALLATION

.1 Install conduit and sleeves prior to pouring of concrete.

.2 If plastic sleeves are used in fire rated walls or floors, remove before conduit installation.

.3 Arrange and pay for holes through exterior walls and roof to be flashed and made weatherproof.

1.18 FIELD QUALITY CONTROL

.1 Conduct and pay for following tests:

.1 Circuits originating from branch distribution panels.
.2 Lighting and its control.

.2 Furnish manufacturer's certificate or letter confirming that entire installation as it pertains to each system has been installed to manufacturer's instructions.

.3 Insulation resistance testing:

.1 Megger circuits, feeders and equipment up to 350 V with a 500 V instrument.
.2 Megger 350-600 V circuits, feeders and equipment with a 1000 V instrument.
.3 Check resistance to ground before energizing.

.4 Carry out tests in presence of Consultant.

.5 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.

.6 Submit typed test results for Consultant's review and inclusion in the Operation and Maintenance Manual.

1.19 DEMONSTRATION,OPERATING AND MAINTENANCE INSTRUCTIONS

.1 Supply tools, equipment, and personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, troubleshooting, and servicing all systems and equipment, during regular work hours, prior to acceptance.

.2 Use as-built drawings, operation and maintenance manual, audio visual aids, etc. as part of instruction materials.

.3 Allow for a minimum of two (2) eight hour working days to provide instruction and demonstration. This is in addition to training specified elsewhere.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 NOT USED

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 CSA C22.2 No.65- 25, Wire Connectors.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Pressure type wire connectors with current carrying parts of copper sized to fit copper conductors as required. Provide for all panels.

.2 Spring type pressure wire connectors: with current carrying parts of copper and copper alloy sized to fit copper conductors 10 AWG or less. Connectors to be complete with appropriate size insulating cap.

.3 Clamps or connectors for armoured cable, liquid tight flexible metal conduit.

.4 Bushing stud connectors are not acceptable.

PART 3 - EXECUTION

3.1 MATERIALS

.1 Make all connections and terminations electrically and mechanically secure. Sizes of connectors to be as per manufacturer's recommendations for various sizes and combinations of wire sizes.

.2 Make all joints required in branch wiring #10 and smaller utilizing spring type pressure wire connectors. Plier tighten wire connectors. Cap to completely fit or cover all enclosed conductors as required.

.3 Make connections in exterior junction boxes with mechanically bolted connectors and heat shrink tape.

.4 Make joints for all other wiring utilizing colour keyed compression type connectors complete with compression tools. Apply an initial layer of compound type tape followed by an additional layer of vinyl tape. Approved alternative for wire connections up to and including #6 may be colour coded wing-nut.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 CSA C22.2 No.0.3-09(R2023), Test Methods for Electrical Wires and Cables.

1.2 PRODUCT DATA

.1 Submit product data in accordance with Section 01 33 00.

1.3 OPERATION AND MAINTENANCE DATA

.1 Submit operation and maintenance data for incorporation into manual specified in Section 01 78 00.

PART 2 - PRODUCTS

2.1 BUILDING WIRES

.1 Conductors: soft drawn copper of 98% conductivity; stranded for 12 AWG and larger. Minimum size: 12 AWG.

.2 Copper conductors sized as indicated or as required by C.E.C., with 600 V insulation of chemically cross-linked thermosetting polyethylene material rated RW90-XLPE.

.3 Grounding and bonding conductors sized up to and including #10 AWG are to have green coloured RW90 cross linked insulation. Type TW75 green coloured insulation is acceptable for sizes #8 AWG and larger.

2.2 TECK 90 CABLES

.1 Conductors:

.1 Grounding conductor: stranded copper.
.2 Circuit conductors: stranded copper, size and quantity as indicated.

.2 Insulation: chemically cross-linked thermosetting polyethylene rated type RW90, 1000V.

.3 Inner jacket: polyvinyl chloride material.

.4 Armour: interlocking aluminum.

.5 Overall covering: Polyvinyl chloride (PVC), heat, flame, and moisture resistant material, FT4 rated, UV resistant, black colour.

.6 Connectors:

.1 Thomas & Betts Star TECK aluminum connectors or Crouse-Hinds or Appleton approved equivalent complete with aluminum locknut.

.7 Supports to be as per Section 26 05 29 – Fastenings and Supports.

PART 3 - EXECUTION

3.1 INSTALLATION OF BUILDING WIRES

.1 Install wiring as follows:

.1 In conduit systems in accordance with Section 26 05 34 - Conduits, Conduit Fasteners and Fittings.

3.2 INSTALLATION OF ARMOURED CABLES

.1 Group cables wherever possible on surface mounted channels.

.2 Terminate cables and provide connectors as required.

.3 On walls, secure armoured cables so surface mounted u-shaped supports or in vertical cable tray.

.4 De-rate TECK 90 cables in accordance with the Canadian Electrical Code for installation in any cable tray.

.5 Do not install 600V armoured power cables in the same cable tray as instrumentation and control cables.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK

.1 Wires and Cables 0-1000V: Section 26 05 21

1.2 REFERENCES

.1 IEEE 837-2024, Qualifying Permanent Connections Used in Substation Grounding.

.2 CSA C22.2 No.41:22, Grounding and Bonding Equipment.

PART 2 - PRODUCTS

2.1 EQUIPMENT

.1 Clamps for grounding of conductor: size as required and suitable for application.

.2 Electrodes: Copper ground plates or copper clad steel rods 19mm dia by 3m long.

.3 Direct buried grounding conductors: bare stranded copper of 98% conductivity, soft annealed, size as indicated.

.4 Insulated grounding and bonding conductors: soft drawn stranded copper of 98% conductivity, type RW90 (green coloured insulation as indicated in Section 26 05 00).

.5 Non-corroding accessories necessary for grounding system, type, size, material as indicated, including but not necessarily limited to:

.1 Grounding and bonding bushings.
.2 Protective type clamps.
.3 Bolted type conductor connectors.

.6 Thermit welded type conductor connectors.

.1 Bonding jumpers, straps.
.2 Pressure wire connectors.

.7 Copper compression type connectors (cable to cable, cable to ground rod, etc.).

PART 3 - EXECUTION

3.1 INSTALLATION GENERAL

.1 nstall complete permanent, continuous grounding system including, electrodes, conductors, connectors, accessories. Conform to the requirements of the Consultant, applicable codes and the local electrical inspection authority having jurisdiction.

.2 Install connectors in accordance with manufacturer's instructions.

.3 Protect exposed grounding and bonding conductors from mechanical injury.

.4 Make buried connections, and connections to electrodes using inspectable copper crimp type compression connectors.

.5 Use mechanical connectors for grounding and bonding connections to equipment provided with lugs.

.6 Soldered joints not permitted.

.7 Install separate insulated bonding conductor to outdoor lighting standards.

.8 Make grounding connections in radial configuration only, with connections terminating at single grounding point. Avoid loop connections.

.9 Bond single conductor, metallic armoured cables to cabinet at supply end, and provide non-metallic entry plate at load end.

.10 Ground secondary service pedestals.

.11 Secure the 'feed' bonding conductor (wrapped around unbroken) to the grounding screw of each outlet/device box, before connecting to the other grounding conductors and/or providing a "pig-tail" lead for device terminations.

.12 Twist together all ground/bond wires with a screw-on type wire connector, and then place in the rear of the outlet box.

.13 Bond all conduits containing insulated ground conductor(s) at both ends.

.14 Bend radius of all grounding/bonding conductors to a minimum of 200mm diameter.

3.2 ELECTRODES

.1 Install electrodes and make grounding connections.

.2 Bond separate, multiple electrodes together.

.3 Make special provision for installing electrodes that will give acceptable resistance to ground value where rock or sand terrain prevails. Ground as indicated.

3.3 SYSTEM AND CIRCUIT GROUNDING

.1 Install system and circuit grounding connections to neutral of secondary systems.

.2 The main incoming ground conductor is to run unbroken to the main electrical service entrance overcurrent device ground bus.

3.4 EQUIPMENT GROUNDING

.1 Install grounding/bonding connections to typical equipment included in, but not necessarily limited to: service equipment, transformers, distribution panels and outdoor lighting.

3.5 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 00 - Electrical General Requirements.

.2 Perform ground continuity and resistance tests using method appropriate to site conditions and to approval of Consultant and local authority having jurisdiction over installation.

.3 Perform tests before energizing electrical system.

.4 Where applicable, disconnect ground fault indicator during tests.

END OF SECTION

PART 1 - GENERAL

1.1 NOT APPLICABLE

PART 2 - PRODUCTS

2.1 SUPPORT CHANNELS

.1 U shape, size 41mm x 41mm, stainless steel, surface mounted, suspended or set in poured concrete walls and ceilings unless otherwise indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Secure equipment to solid masonry, tile and plaster surfaces with lead anchors or nylon shields.

.2 Secure equipment to poured concrete with expandable inserts.

.3 Secure equipment to hollow masonry walls or suspended ceilings with toggle bolts.

.4 Support equipment, conduit or cables using clips, spring loaded bolts, cable clamps designed as accessories to basic channel members.

.5 Fasten exposed conduit or cables within 1m of each outlet box, junction box, pull box, cabinet, or conduit fittings with spacing between supports as per CEC to building construction or support system using straps.

.1 One-hole zinc plated steel straps to secure surface conduits and cables smaller than 41mm.
.2 Two-hole zinc plated steel straps for conduits and cables 41mm and larger.
.3 Beam clamps to secure conduit to exposed steel work.

.6 For surface mounting of two or more conduits use channels at 1.5m oc spacing.

.7 Provide metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.

.8 Verify there is adequate support for raceways and cables dropped vertically to equipment where there is no wall support.

.9 Do not use wire lashing or perforated strap to support or secure raceways or cables.

.10 Do not use supports or equipment installed for other trades for conduit or cable support.

.11 Install fastenings and supports as required for each type of equipment, cables and conduits, and in accordance with manufacturer's installation recommendations.

.12 Various suspended types of junction, pull and/or outlet boxes as well as conduits, are to be supported with minimum size 9mm threaded rod, nuts and flat washers. Secure threaded rods to boxes with one flat washer and nut installed on both sides of box.

.1 One (1) rod required for all type boxes sized 150mm x 150mm and smaller (22,500mm² and smaller).
.2 Two (2) rods required for boxes sized 22,500mm2 and larger, up to and including those sized 300mm x 300mm (90,000mm2).
.3 Minimum of four (4) rods required for all boxes sized larger than 90,000mm2.

.13 Cut off all excess rod within 13mm of channel bottom. In addition to C.E.C. minimum conduit spacing requirements, all suspended conduit runs containing horizontal or vertical elbows are to have one additional support rod installed not greater than 300mm and mid-point of "all" 90 bends. Maximum spacing's between conduit support channels will be as dictated by smallest size conduit(s) being supported and/or secured to the same.

END OF SECTION

PART 1 - GENERAL

1.1 SHOP DRAWINGS AND PRODUCT

.1 Submit shop drawings and product data for cabinets in accordance with Section 01 33 00.

PART 2 - PRODUCTS

2.1 SPLITTERS

.1 Sheet metal enclosure, welded corners and formed hinged cover suitable for locking in closed position. Interior units to be CSA Type 1 enclosure.

.2 Exterior units to be CSA Type 4X, 316 stainless steel.

.3 Main and branch lugs or Connection bars to match required size and number of incoming and outgoing conductors as indicated.

.4 Provide at least three (3) spare terminals on each set of lugs in splitters.

2.2 JUNCTION AND PULL BOXES

.1 Type C: welded steel construction, hinged cover, catch with hasp. Provision for locking. Surface mounting.

.2 Type D: welded steel construction with screw-on flat covers for surface mounting. Surface or flush mounting as indicated. Covers with 25mm minimum extension all around, for flush-mounted pull and junction boxes.

.3 Junction and pull boxes larger than 125mm x 125mm to be Type "E", complete with continuously hinged door. Junction and pull boxes 125mm x 125mm and smaller to be complete with screw cover.

.4 Single gang "sectional" type devices boxes being used in steel stud walls for the installation of both metallic and non-metallic type cables, not to be sized smaller than 250cm, complete with wrap around type bracket.

.5 Two (2) or more flush installed sectional boxes, ganged together on boxes sized 100mm² and larger (intended for devices), are to have an additional support bracket installed on opposite side of box, not presently secured to metal stud.

.6 Where larger sized devices or other types of "flush" outlet or junction boxes may be required, use suitably sized 100mm x 100mm (4x4") deep or 118 mm (4-11/16") square boxes complete with appropriate sized extension tile rings. The use of plaster rings in lieu of tile type extension rings is not acceptable.

.7 Provide junction boxes 150mm x 150mm (6"x6") used in branch circuit wiring complete with bonding terminal strips.

.8 Exterior units to be CSA Type 4X, 316 stainless steel.

2.3 CABINETS

.1 Type E: sheet steel, hinged screw- to-lock, door and return flange overlapping sides, handle, and catch, for surface mounting.

.2 Exterior units to be CSA Type 4X, 316 stainless steel.

2.4 UNDERGROUND PULL PITS

.1 Pre-cast concrete construction to Section 33 05 13 – Precast Structures.

.2 Minimum size for straight and 90 degree pulls for conduits and wire sizes/quantities as per CEC.

.3 Provide complete with riser rings and manhole covers sized as required to execute pulling of wires.

.4 Provide pulling irons as required.

.5 Engineered for the following loads:

.1 CL-625 truck to CSA S6.
.2 UDL: 30 kN/m2.
.3 Static point load: 87.5 kN.

.6 Provide stamped engineered drawing for pull pits as part of shop drawing submission. Engineering stamp to be from an engineer licensed to practice in the province of New Brunswick.

PART 3 - EXECUTION

3.1 SPLITTER INSTALLATION

.1 Install splitters and mount plumb, true and square to the building lines.

.2 Extend splitters full length of equipment arrangement except where indicated otherwise.

3.2 JUNCTION, PULL BOXES AND CABINETS INSTALLATION

.1 Install pull boxes in inconspicuous but accessible locations.

.2 Mount cabinets with top not higher than 2m above finished floor.

.3 Only main junction and pull boxes are indicated. Install pull boxes so as not to exceed 30m of conduit run between pull boxes.

.4 Where located above accessible ceiling systems, locate enclosures within 750mm (30") of ceiling.

.5 Suspend enclosures on 9mm plated steel threaded rod or rods secured to enclosure with one flat washer and one nut on both sides of box.

.6 Provide number of threaded rod supports as follows:

.1 Boxes up to 120mm square: one (1) rod.
.2 Boxes from 120mm to 200mm square: two (2) rods.
.3 Boxes with dimensions above 200mm: four (4) rods.

.7 Concealed junction or outlet boxes feeding a maximum of two fixture drops shall not be sized smaller than 100mm².

.8 Bond pull boxes and cabinets to ground utilizing a bonding conductor.

3.3 IDENTIFICATION

.1 Provide equipment identification in accordance with Section 26 05 00.

.2 Identify the location of conceded boxes installed above drywall ceilings or behind walls on the room side of access opening frames with properly colour coded identification disks.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 CSA C22.1-24, Canadian Electrical Code, Part 1.

PART 2 - PRODUCTS

2.1 OUTLET AND CONDUIT BOXES GENERAL

.1 Size boxes in accordance with CSA C22.1:24.

.2 Gang boxes where wiring devices are grouped.

.3 Blank cover plates for boxes without wiring devices.

2.2 EXTERIOR OUTLET BOXES

.1 Weatherproof, non-metalic, impact resistant material, water tight box and cover plate.

.2 Stainless steel, corrosion resistant hardware.

.3 Neoprene gasket cover plate with spring-loaded lift cover.

2.3 FITTINGS - GENERAL

.1 Bushing and connectors with nylon insulated throats.

.2 Knock-out fillers to prevent entry of debris.

.3 Conduit outlet bodies for conduit up to 35mm and pull boxes for larger conduits.

.4 Double locknuts and insulated bushings on sheet metal boxes.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Support boxes independently of connecting conduits.

.2 Fill boxes with paper, sponges or foam or similar approved material to prevent entry of debris during construction. Remove upon completion of work.

.3 For flush installations mount outlets flush with finished wall using plaster rings to permit wall finish to come within 6mm of opening.

.4 Provide correct size of openings in boxes for conduit, mineral insulated and armoured cable connections. Reducing washers are not allowed.

.5 Install flush mounted boxes in all finished areas unless otherwise indicated.

.6 Install surface mounted boxes in service rooms and above ceilings unless otherwise indicated.

.7 Install flush mounted boxes in outside of exterior walls unless otherwise indicated.

.8 Install type FS or FD boxes for all outlets (regardless of system type involved) to be surfaced mounted less than 2.4m AFF.

3.2 INSTALL CONCEALED BOXES IN ACCESSIBLE LOCATIONS.

.1 Flush installed 100mm or 120mm square box being used as a pull box or junction box shall have installed a single or double gauge tile ring and blank cover installed on the box.

.2 Do not use sectional type boxes with rigid galvanized steel conduit, rigid PVC conduit or EMT.

.3 In metal drywall partitions, install a short piece of metal stud (same width as wall) on non-supported side of box and secure to box.

END OF SECTION

PART 1 - GENERAL

1.1 LOCATION OF CONDUIT

.1 Drawings do not indicate all conduit runs. Those indicated are in diagrammatic form only.

1.2 REFERENCES

.1 CSA C22.2 No. 211.2-06(R2021), Rigid PVC (Unplasticized) Conduit.

1.3 TRADE SIZE

.1 The following are Metric trade sizes and Imperial trade size equivalent based on CEC Metric Units:

Metric (mm)	Imperial (inch)
12	3/8
16	1/2
21	3/4
27	1
35	1-1/4
41	1-1/2
53	2
63	2-1/2
78	3
91	3-1/2
103	4
129	5
155	6

1.4 RELATED WORK

.1 Section 26 05 29: Fastenings and Supports

PART 2 - PRODUCTS

2.1 CONDUITS

.1 Rigid PVC conduit, fittings; couplings and connectors: to CSA C22.2 No. 211.2.

2.2 CONDUIT FASTENINGS

.1 One hole steel straps to secure surface conduits smaller than 41mm. Two hole steel straps for conduits 41mm and larger.

.2 Beam clamps to secure conduits to exposed steel work.

.3 Channel type supports for two or more conduits at 1.5m oc.

.4 9mm diameter threaded rods to support suspended channels.

2.3 CONDUIT FITTINGS

.1 Fittings: manufactured for use with conduit specified. Coating: same as conduit.

.2 Use conduit fittings (LB, LL, LR) for 90 degree bends. "Ells", or corner pulling "Elbows" are prohibited.

.3 Use waterproof type connectors on all conduit runs connecting equipment.

.4 Plastic screw on bushings for conduit ends.

2.4 GENERAL FITTINGS

.1 Bushing and connectors with nylon insulated throats.

.2 Knock-out fillers to prevent entry of debris.

.3 Conduit outlet bodies for conduit up to 35mm and pull boxes for larger conduits.

.4 Double locknuts and insulated bushings on sheet metal boxes.

2.5 EXPANSIOIN FITTINGS RIGID CONDUIT

.1 Weatherproof expansion fittings with internal bonding assembly suitable for 200mm linear UIT.

.2 Watertight expansion fittings with integral bonding jumper suitable for linear expansion and 19mm deflection in all directions.

.3 Weatherproof expansion fittings for linear expansion at entry to panel.

2.6 FISH CORD

.1 Polypropylene: minimum 3mm diameter.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Use rigid PVC conduit underground: minimum size 21mm dia.

.2 Install fish cord in empty conduits.

.3 Where conduits become blocked, remove and replace blocked section. Do not use liquids to clean out conduits.

.4 Dry conduits out before installing wire.

.5 Non-connected PVC or steel raceways protruding up through open bottoms of free-standing equipment require PVC bell ends and steel type "ground bushings" installed on ends of respective types of conduits. Extend conduits a minimum of 50mm (2") above housekeeping pad or concrete trough.

3.2 SURFACE CONDUITS

.1 Run parallel or perpendicular to structure lines.

.2 Group conduits wherever possible on suspended or surface channels.

.3 Do not pass conduits through structural members except as indicated.

3.3 CONDUITS UNDERGROUND

.1 Slope conduits to provide drainage.

.2 Waterproof joints (PVC accepted) with heavy coat of bituminous paint.

.3 Underground and underslab conduits are only permitted to be installed where specifically indicated.

.4 PVC conduits of all sizes prior to turning-up through floor slabs, unless specifically indicated otherwise, are to have transition to rigid steel threaded conduit take place as previously indicated.

.5 Underground conduits to be fibre-reinforced concrete encased, unless specifically indicated otherwise.

.6 Pull properly sized mandrel through conduits to remove debris prior to pulling wires/cables.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK

.1 Electrical General Requirements: Section 26 05 00.

PART 2 - PRODUCTS

2.1 CABLE PROTECTION

.1 Protection materials and methods as indicated on drawings.

PART 3 - EXECUTION

3.1 CABLE INSTALLATION IN DUCTS

.1 Install cables as indicated in ducts.

.2 Do not pull spliced cables inside ducts.

.3 Install multiple cables in duct simultaneously.

.4 Use CSA approved lubricants of type compatible with cable jacket to reduce pulling tension.

.5 To facilitate matching of colour coded multi-conductor control cables reel off in same direction during installation.

.6 Before pulling cable into ducts and until cable ends are properly terminated, seal ends of lead covered cables with wiping solder, seal ends of non- leaded cables with moisture seal tape.

.7 After installation of cables, seal duct ends with duct sealing compound.

3.2 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 00 - Electrical General Requirements.

.2 Perform tests using qualified personnel. Provide necessary instruments and equipment.

.3 Check phase rotation and identify each phase conductor of each feeder.

.4 Check each feeder for continuity, short circuits and grounds. Confirm resistance to ground of circuits is not less than 50 megohms.

.5 Pre-acceptance tests.

.1 After installing cable but before terminating, perform insulation resistance test with 1000 V megger on each phase conductor.

.2 Check insulation resistance after each termination to ensure that cable system is ready for acceptance testing.

.6 Provide Consultant with list of test results showing location at which each test was made, circuit tested and result of each test.

.7 Remove and replace entire length of cable if cable fails to meet any of test criteria.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Submittal Procedures: Section 26 05 00

.2 Electrical General Requirements: Section 01 33 00

1.2 PRODUCT DATA

.1 Submit product data in accordance with Section 01 33 00.

PART 2 - PRODUCTS

2.1 CONTACTORS

.1 Contactors: to EEMAC Standards.

.2 Mechanically held controlled by 120V output from remote location and rated for type of load controlled.

.3 Complete with two (2) normally open and two (2) normally closed auxiliary contacts unless indicated otherwise.

.4 Number of poles as indicated.

.5 Mount in CSA Type 1 Enclosure.

.6 Include following options in cover:

.1 Hand-off-auto selector switch.

2.2 EQUIPMENT IDENTIFICATION

.1 Provide equipment identification in accordance with Section 26 05 00.

.2 Nameplate indicating name of load controlled.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Install contactors where indicated, plumb, true and square to building lines.

.2 Make connections of power and control as indicated.

3.2 TESTING

.1 Perform tests in accordance with Section 26 05 00.

.2 Test the contactor by intentionally energizing the coil. Verify loads are operating satisfactorily.

.3 Verify proper operation of time clock and contactor.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 26 27 26 - Wiring Devices

.2 Section 26 50 00 - Lighting Equipment

1.2 WORK SCOPE

.1 The work of this contract involves the supply and installation of a electronic timer to control outdoor lighting.

1.3 PRODUCT DATA

.1 Submit product data in accordance with Section 01 33 00.

PART 2 - PRODUCTS

2.1 ELECTRONIC TIMER SWITCH

.1 Electronic Timer Control - 24-Hour/365 Day 2-Circuit Electronic Control, 240 VAC, 2-SPST/DPST with metal enclosure.

.2 100-hour supercapacitor that eliminates the need for batteries.

.3 Configurable outputs allow the control of various voltages and applications.

.4 LED light fixtures compatible.

.5 Temperature range: -40 degrees Celsius to 40 degrees C.

.6 Mounting: as indicated on the drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Install electronic time in NEMA 4X enclosure.

.2 Configuration as per the manufacturer installation requirements.

.3 Configure lights to turn ON at sunset and OFF at dawn.

.4 Instruct maintenance staff on operation and configuration of the equipment.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 IEEE C62.41.1-2002, Guide on the Surge Environment in Low-Voltage AC Power Currents.

.2 IEEE C62.45-2002, Recommended Practice on Surge Testing for Equipment Connects to Low-Voltage (1000V or less) AC Power Circuits.

.3 UL 1283-2017, Electromagnetic Interference Filters.

1.2 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 01 33 00.

.2 Drawings to include electrical detail of panel, branch breaker type, breaker quantity, ampacity, short circuit rating, bus materials and enclosure dimension.

1.3 OPERATION AND MAINTENANCE DATA

.1 Provide operation and maintenance data for loadcentres for incorporation into manual specified in Section 01 78 00.

.2 Include panel schedules.

PART 2 - PRODUCTS

2.1 LOADCENTRES

.1 Use product of a single manufacturer throughout the Work.

.2 Sequence phase bussing with odd numbered breakers on left and even on right, with each breaker identified by permanent number identification as to circuit number and phase.

.3 Mains, number of circuits, and number and size of branch circuit breakers as indicated.

.4 Two (2) keys for each load centre and key load centre alike.

.5 Tin-plated copper bus. Neutral to be 100% rated of mains.

.6 Mains: suitable for bolt-on breakers.

.7 Trim with concealed front bolts and hinges.

.8 Trim and enclose as indicated on drawings.

.9 Minimum of one terminal screw on factory installed neutral bar for each circuit breaker position.

.10 Main breaker or main lugs as indicated on drawings.

.11 Suitable for use as service entrance equipment as indicated.

2.2 BREAKERS

.1 Breakers: to Section 26 28 21 - Moulded Case Circuit Breakers.

.2 Breakers with thermal and magnetic tripping in loadcentres except as indicated otherwise.

2.3 EQUIPMENT IDENTIFICATION

.1 Provide equipment identification in accordance with Section 26 05 00 - Electrical General Requirements.

2.4 NAMEPLATE FOR EACH LOADCENTRE SIZE 4 ENGRAVED AS INDICATED.

.1 Complete circuit directory with typewritten legend showing location and load of each circuit.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Locate loadcentre in NEMA 4X fiberglass enclosure as indicated and mount securely, plumb, true and square, to adjoining surfaces.

.2 Mount loadcentre to height specified in Section 26 05 00 - Electrical General Requirements or as indicated.

.3 Connect loads to circuits.

.4 Connect neutral conductors to common neutral bus with respective neutral identified.

.5 Where more than one bonding terminal strip is present in one panel, hardwire both together using same size bonding conductor as the one that accompanies the panel feeder conductors.

END OF SECTION

PART 1 - GENERAL

1.1 SHOP DRAWINGS

.1 Submit shop drawings for each device and cover plate type as per specification Section 01 33 00.

1.2 OPERATIONAL AND MAINTENANCE DATA

.1 Provide operation and maintenance data for wiring devices for incorporation into manual specified in Section 01 78 00.

PART 2 - PRODUCTS

2.1 RECEPTACLES

.1 5-20R duplex receptacle, marine rated.

.1 20A, 125V straight blade, marine grade receptacles, U ground, with following features:

.1 Reinforced thermoplastic construction.

.2 Suitable for No. 10 AWG for back and side wiring.

.3 Back and side wiring contacts.

.4 Triple wipe corrosion-resistant contacts and riveted grounding contacts.

.2 Other receptacles with ampacity and voltage as indicated.

.3 Use the devices of a single manufacturer throughout the Work.

2.2 COVER PLATES

.1 Cover plates for wiring devices.

.2 Stainless steel cover plates with natural finish on flush mounted outlet boxes.

.3 Galvanized pressed steel surface covers on surface mounted outlet boxes.

.4 Heavy duty weatherproof while in use cover plates for devices designated as weatherproof.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Switches:

.1 Install single throw switches with handle in "UP" position when switch closed.
.2 Mount toggle switches at height specified in Section 26 05 00 - Electrical General Requirements or as indicated.

.2 Receptacles:

.1 Mount receptacles at height specified in Section 26 05 00 - Electrical General Requirements or as indicated.
.2 Mount receptacles with "U" ground up for vertically mounted and neutral slot at top for horizontally mounted receptacle.
.3 Install "Pigtail" type leads on conductors in all device or outlet boxes where feeding through to other receptacles. "Daisy-chain" or looping through of conductors from one device to another is not acceptable. Provide separate pigtail conductor leads for final termination to each receptacle for phase, neutral and bond conductors.
.4 Test all receptacles for polarity.

.3 Cover plates:

.1 Protect cover plate finish with paper or plastic film until painting and other work is finished.
.2 Install suitable common cover plates where wiring devices are grouped.
.3 Do not use cover plates meant for flush outlet boxes on surface- mounted boxes.

.4 Device leveler and retainer is an approved accessory for securing devices to flush installed device boxes.

END OF SECTION

PART 1 - GENERAL

1.1 PRODUCT DATA

.1 Submit product data in accordance with Section 01 33 00.

1.2 OPERATION AND MAINTENANCE DATA

.1 Provide operation and maintenance data for circuit breakers for incorporation into Manual specified in Section 01 78 00.

PART 2 - PRODUCTS

2.1 BREAKERS GENERAL

.1 Bolt-on moulded case circuit breaker: quick-make, quick-break type, for manual and automatic operation with temperature compensation for 40 C ambient.

.2 Multiple breakers to have single handle.

.3 Circuit breakers to have interrupting capacity as indicated on the Drawings.

2.2 MAGNETIC BREAKERS

.1 Moulded case circuit breaker to operate automatically by means of magnetic tripping devices to provide instantaneous tripping for short circuit protection.

2.3 OPTIONAL FEATURES

.1 Include:

.1 On-off locking device for 10% of branch breakers and all breakers supplying exit signs and fire alarm devices.

2.4 GROUND FAULT CIRCUIT INTERRUPTER CIRCUIT BREAKERS

.1 Moulded case thermal magnetic circuit breaker with Class A ground fault protection.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Install circuit breakers as required, factory install breakers in all panelboards.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 AASHTO LRFDLTS-1-2022, Structural Supports for Highway Signs, Luminaires and Traffic Signals.

.2 CSA S6-19 (R2024), Canadian Highway Bridge Design Code.

1.2 SUBMITTALS

.1 Submit product data in accordance with Section 01 33 00.

PART 2 - PRODUCTS

2.1 ALUMINUM POLES

.1 Aluminum poles: designed per CSA S6 and for underground wiring and:

.1 Mounting on concrete foundation.
.2 Style: round, tapered.
.3 Suitable for single or double luminaires as indicated on the drawings.
.4 Gasketed access handhole 450 mm above pole base for wiring connections, with welded-on reinforcing frame and bolted-on cover.
.5 Anchor bolts: as per manufacturer’s recommendation with shims, nuts and covers.
.6 Finish: polyester powder coat, colour to match luminaire.
.7 Grounding lug.
.8 Rated for sustained wind loads in the installed area as well as 1.5 EPA rating of luminaires mounted on the pole.
.9 Vibration dampeners.
.10 Height: 4500mm.
.11 5-20R GFCI marine grade receptacle
.12 Refer to the drawings for pole specification in lighting fixture schedule

2.2 LUMINAIRE MOUNTING BRACKETS

.1 Refer to the drawings for luminaire specification.

.2 For single fixture poles, provide arm mount.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Install poles true and plumb, complete with brackets in accordance with manufacturer's instructions.

.2 Perform tests in accordance with Section 26 05 00.

.3 Provide anchor bolts, base cover plate and footing for the lighting standards.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 31 61 13 - Pile Foundations General

.2 Section 31 62 26 – Steel Pipe Piles

1.2 REFERENCES

.1 ASTM F3125/F3125M-25, Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength.

.2 CSA S16-24, Design of Steel Structures.

.3 CSA W47.1-25, Certification of Companies for Fusion Welding of Steel.

.4 CSA W59-24, Welded Steel Construction.

1.3 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 01 33 00. Shop drawings to be stamped by a Professional Engineer registered to practice in the Province of New Brunswick.

.2 Indicate the following items:

.1 Material.
.2 Anchorage, field control and alignment methods.
.3 Design parameters.
.4 Tolerance for driving pile.
.5 Removable members.
.6 Alternatives.

1.4 DESIGN CRITERIA

.1 Design templates to safely withstand following loads:

.1 All gravity loads to which template will be subjected.
.2 Lateral loads to firmly hold pile in position when driving.

1.5 PROTECTION

.1 Protect templates from damage. Repair damage to templates, formwork, or concrete arising from operations to satisfaction of the Consultant at no additional cost to the Contract.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Steel sections and plates: to CSA G40.20 and CSA G40.21, Type 350W.

.2 Welding Materials: to CSA W59.

.3 Bolts, nuts and washers: to ASTM F3125, Grade A325.

PART 3 - EXECUTION

3.1 FABRICATION

.1 Fabricate structural steel for templates in accordance with CSA S16 and reviewed shop drawings.

.2 Do welding in accordance with CSA W59.

.3 Welding companies must be qualified under provisions of CSA W47.1.

3.2 POSITIONING

.1 Position and hold template in location to receive piles with an accuracy which will bring piles to within tolerances specified.

.2 Before driving batter piles set templates to within 10mm of elevations indicated on shop drawings.

3.3 PLACING BATTER PILES

.1 Remove members in templates as necessary to place batter piles. Replace members prior to placing other batter piles or driving of batter piles. Indicate members to be removed for this operation on shop drawings. Mark them as "Removable".

3.4 REMOVAL OF TEMPLATES

.1 Avoid any damage to piling when removing templates.

.2 When instructed by the Consultant, remove templates from project site.

END OF SECTION

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

.1 This Section includes but is not limited to the following:

.1 Demolition of the exiting approach wharf structure including the removal and off-site disposal of timber, concrete, and ballast material.
.2 Removal of timber bracing on existing intermediate trestle structure as indicated on contract drawings.
.3 Removal of electrical components as indicated on contract drawings.
.4 Removal of old force main, water service piping and miscallaneous timber materials associated with the relocation of the existing building.
.5 Refer to Section 01 74 21 for waste management guidelines.

1.2 RELATED WORK

.1 Refer to other specification sections for related information.

.2 Refer to Section 01 33 00 for Shop Drawing/Submission requirements.

.3 Refer to Section 01 35 44 for environmental protection procedures that must be employed for the duration of demolition activities.

1.3 SUBMISSIONS

.1 Methodology:

.1 When requested provide methodology for carrying out the work.

.2 Provide submission in accordance with Section 01 33 00.

.3 Provide a demolition plan for review and approval by the Consultant showing the methodology of demolition operations. Plan must show at a minimum how environmental protection measures will be employed, waste management plan including the destination of waste materials, site specific health and safety plan, lockout procedures when doing electrical demolition operations, temporary lighting and power plan, and any other demolition activity requiring clarification from the Consultant’s review.

1.4 PROTECTION

.1 Prevent movement, settlement, or damage of adjacent structures. Provided bracing and shoring as required. In event of damage, immediately replace such items or make repairs with the approval of Consultant and at no additional cost to the Contract.

.2 Prevent debris from going adrift and becoming a menace to navigation.

.3 All damage to existing structures, roadways, and electrical systems not specified for removal to be repaired at the Contractor's cost to the satisfaction of the Consultant.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 PREPARATION

.1 Inspect site and verify with the Consultant items designated for removal and items to be salvaged.

.2 Locate and protect utility lines. Preserve operating condition active utilities traversing site.

.3 Provide temporary power and lighting as shown on the plan or as required by the Consultant.

3.2 REMOVAL

.1 Remove items indicated.

.2 Remove timber wheel guard, composite timber and concrete deck, timber pile caps and posts of the existing wharf and dispose of offsite.

.3 Remove existing timber sheathing, ladder and fendering as required to complete work.

.4 Handle, stockpile and protect material destined for removal off Site in accordance with Section 01 35 44.

.5 Do not disturb adjacent structures designated to remain in place.

.6 At end of each day's work, leave work in safe condition so no part is in danger of toppling or falling.

3.3 DISPOSAL OF MATERIAL

.1 Disposal of materials not designated for salvage or re-use in work, will be the Contractor's responsibility, and must be disposed of off-site.

.2 Transport and dispose of material in an environmentally acceptable manner to the satisfaction of the Consultant, and in accordance with any local, Municipal, Provincial and Federal restrictions and regulations.

3.4 RESTORATION

.1 Upon completion of work, remove debris, trim surfaces and leave work site clean.

.2 Reinstate areas and existing works outside areas of demolition to conditions that existed prior to commencement of work. Match condition of adjacent, undisturbed areas.

END OF SECTION

PART 1 - GENERAL

1.1 GENERAL

.1 Provide and maintain silt boom, oil boom and sediment control devices where required or as directed, prior to and during construction. Coordinate locations with the Consultant. Do not remove control features until authorized by the Consultant.

.2 Do erosion control in accordance with approved Environmental Protection Plan.

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 SILT CURTAIN

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

2.3 OIL BOOM

.1 UV resistant, vinyl coated polyester or nylon, ballasted minimum 300mm submerged.

PART 3 - EXECUTION

3.1 SEDIMENT CONTROL FENCE

.1 Attach fence with roofing nails and roofing tins. Provide wood strapping along top of fence.

.2 Excavate 150mm x 150mm trench along length of fence. Lay fabric bottom in trench and backfill with selected excavated material.

3.2 OIL BOOM INSTALLATION

.1 Install oil boom in segments as the Work progresses while maintaining complete containment. Do not impede the marine traffic on Site.

3.3 SILT CURTAIN INSTALLATION

.1 Install silt curtain in segments as the Work progresses while maintaining complete containment. Do not impede the marine traffic on Site.

.2 Anchor the silt curtain to the seafloor.

.3 Minimum depth of silt curtain to be 5m.

3.4 MAINTENANCE OF SILT AND SEDIMENT CONTROL FEATURES

.1 Maintain siltation control features throughout the construction period. Repair damage to original condition.

.2 Remove accumulated sediment from behind silt fence.

.3 Maintain siltation control features throughout the construction period. Repair damage to original condition.

3.5 REMOVAL OF SILT AND SEDIMENT CONTROL FEATURES

.1 Remove sediment control features at upon Completion of the Work.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK

.1 Section 31 32 19.16 – Geotextile.

.2 Section 32 11 23 – Granular Surface.

.3 Section 35 31 24 – Rock Revement and Breakwaters.

1.2 REFERENCE STANDARDS

.1 ASTM C117-23, Standard Test Method for Material Finer than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.

.2 ASTM C136/C136M-19 Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

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

.4 ASTM D4318-17e1, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

.5 CSA Group (CSA)

.1 CAN/CSA-A3000-23, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
.2 CSA-A23.1:24/A23.2:24, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

.6 NB Department of Transportation and Infrastructure Standard Specificantions (Latest Edition).

1.3 DEFINITIONS

.1 Excavation classes: two (2) classes of excavation will be recognized, common excavation and rock excavation.

.1 Rock: material which requires drilling, blasting, ripping or breaking up with power operated tools for it's removal, and boulders exceeding one (1) cubic metre in volume. Frozen material will not be classified as rock.
.2 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation.

.2 Unclassified excavation: excavation of deposits of whatever character encountered in Work.

.3 Waste material: excavated material unsuitable for use in Work or surplus to requirements.

.4 Borrow material: material obtained from locations outside area to be graded and required for construction of fill areas or for other portions of Work.

.5 Recycled fill material: material, considered inert, obtained from alternate sources and engineered to meet requirements of fill areas.

.6 Unsuitable materials:

.1 Weak, chemically unstable, and compressible materials.
.2 Frost susceptible materials:

.1 Fine grained soils with plasticity index less than 10 when tested to ASTM D 4318, and gradation within limits specified when tested to ASTM D 422 and ASTM C 136: Sieve sizes to CAN/CGSB-8.1.

Sieve Designation	% Passing
2.00mm	100
0.10mm	45-100
0.02mm	10-80
0.005mm	0-45

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Make submittals in accordance with Section 01 33 00 - Submissions/Shop Drawing.

.2 Quality Control:

.1 Submit condition survey of existing conditions as described in EXISTING CONDITIONS article of this Section.
.2 Submit for review by Consultant proposed dewatering methods as described in PART 3 of this Section.
.3 Submit to the Consultant written notice at least seven (7) days prior to excavation work, to ensure cross sections are taken.
.4 Submit to the Consultant written notice when bottom of excavation is reached.

.3 Preconstruction Submittals:

.1 Submit construction equipment list for major equipment to be used in this section prior to start of Work.
.2 Submit records of underground utility locates, indicating: location plan of existing utilities as found in field, clearance record from utility authority.

1.5 QUALITY ASSURANCE

.1 Submit design and supporting data at least two (2) weeks prior to beginning work.

.2 Design and supporting data submitted to bear stamp and signature of qualified professional engineer registered or licensed in the Province of New Brunswick, Canada.

.3 Keep design and supporting data on site.

.4 Do not use soil material until written report of soil test results are reviewed by Consultant.

.5 Health and Safety Requirements:

.1 Do construction occupational health and safety in accordance with Section 01 35 29 - Health and Safety Requirements.

1.6 EXISTING CONDITIONS

.1 Examine the geotechnical report titled: ” Geotechnical Investigation Report, Market Wharf Approach Trestle Replacement”, dated March 24, 2022 by Conquest Engineering. Any interpretations or extrapolations of its contents is at the sole discretion of the Contractor and the Consultant assumes no liability for its content.

.2 Buried services:

.1 Before commencing work verify location of buried services on and adjacent to site.
.2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work.
.3 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
.4 If a previously unknown buried utility is identified, notify the Consultant.
.5 Confirm locations of buried utilities by careful test excavations.
.6 Maintain and protect from damage, fuel, electric, monitoring wells, telephone and other utilities and structures encountered as indicated.
.7 Where utility lines or structures exist in area of excavation, obtain direction of Consultant before removing. Unless where noted on the drawings for removal, costs for such Work to be paid by Contractor.
.8 Record location of maintained, re-routed, and abandoned underground lines.
.9 Confirm locations of recent excavations adjacent to area of excavation.

.3 Existing conditions and surface features:

.1 Conduct, with Consultant, a condition survey of all existing buildings, service poles, wires, survey bench marks and monuments features which may be affected by Work at the project site and along the haul route.
.2 Protect existing buildings, culverts and surface features from damage while Work is in progress. In event of damage, immediately make repair as directed by Consultant.
.3 Disposal options to be reviewed with and approved by the Consultant.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Clear stone bedding: crushed and screened, hard, durable stone, free from clay and organic matter, and graded a follows

Sieve Size	% Passing
28 mm	95-100
14 mm	25-60
5 mm	01-10

.1 Aggregate base and subbase materials: to Section 32 11 23 – Granular Surface.

.2 Geotextiles: to Section 31 32 19.16 – Geotextile.

PART 3 - EXECUTION

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

.1 Remove all debris within Site limits prior to commencing earthworks.

.2 Provide temporary erosion and sedimentation control measures in accordance with Section 31 15 53 - Erosion and sediment Control. During excavation operations prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways according to the approved sediment and erosion control plan specific to the site.

.3 Inspect, repair, and maintain erosion and sedimentation control measures during construction until project completion or as directed by Consultant.

.4 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 SITE PREPARATION

.1 Remove obstructions, ice, and snow from surfaces to be excavated with limits indicated.

.2 Proof roll subgrade in areas of upland infilling locations in presence of the Consultant prior to commencing fill placement.

3.3 PREPARATION/PROTECTION

.1 Protect existing features in accordance with applicable local regulations.

.2 Keep excavations clean, free of standing water, snow, ice, and loose soil.

.3 Where soil is subject to significant volume change due to change in moisture content, cover and protect to the Consultant's approval.

.4 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.

3.4 STOCKPILING

.1 Stockpile fill materials in designated on Site areas. Other areas to be used for stock piling proposed by the Contractor must be approved by the Consultant.

.1 Stockpile granular materials in manner to prevent segregation.

.2 Protect fill materials from contamination.

.3 Implement sufficient erosion and sediment control measures to prevent sediment release off construction boundaries and into water bodies.

.4 Excavated on-site material to remain on-site.

3.5 COFFERDAMS, SHORING,BRACING AND UNDERPINNING

.1 Maintain sides and slopes of excavations in safe condition by appripriate methods and in accordance with Section 01 35 29 - Health and Safety:

.1 Where conditions are unstable, report to the Consultant so they can verify and advise method.
.2 During backfill operation.

.2 Unless otherwise indicated or directed by Consultant, remove sheeting and shoring from excavations.

.3 Do not remove bracing until backfilling has reached respective levels of such bracing.

.4 Upon completion of substructure construction:

.1 Remove cofferdams, shoring and bracing.

3.6 DEWATERING AND HEAVE PROTECTION

.1 Keep excavations free of water while Work is in progress.

.2 Provide for Consultant's review details of proposed dewatering or heave prevention methods.

.3 Avoid excavation below groundwater table if quick condition or heave is likely to occur.

.1 Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.

.4 Protect open excavations against flooding and damage due to surface run-off.

.5 Dispose of water in accordance with Section 01 35 44 - Environmental Protection Procedures for Marine Work to approved runoff areas and in manner not detrimental to public and private property, or portion of Work completed or under construction.

.6 Provide and maintain temporary drainage ditches and other diversions outside of excavation limits.

3.7 EXCAVATION

.1 Advise Consultant at least seven (7) days in advance of excavation operations for initial cross sections to be taken.

.2 Excavate to lines, grades, elevations, and dimensions as indicated on the drawings. The Contractor is responsible for maintaining their own survey control and layout. Survey monuments are noted on the drawings.

.3 Remove concrete, asphalt, steel, timber, and other obstructions encountered during excavation in accordance with Section 31 11 00 - Sitework Demolitions and Removals.

.4 Excavation must not interfere with bearing capacity of adjacent foundations.

.5 For trench excavation, unless otherwise authorized by the Consultant in writing, do not excavate more than 30 m of trench in advance of installation operations and do not leave open more than 15 m at end of day's operation.

.6 Keep excavated and stockpiled materials safe distance away from edge of trench as directed by Consultant.

.7 Restrict vehicle operations directly adjacent to open trenches.

.8 Do not obstruct flow of surface drainage or natural watercourses.

.9 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft, or organic matter.

.10 Notify Consultant when bottom of excavation is reached.

.11 Obtain Consultant approval of completed excavation.

.1 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by Consultant.

.12 Dispose of surplus and unsuitable excavated material in approved location off-site.

.13 Correct unauthorized over-excavation as follows:

.1 Fill as directed by the Consultant and compacted to the Consultant's satisfaction.

.14 Hand trim, make firm and remove loose material and debris from excavations.

.1 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil.

3.8 PROOF ROLLING

.1 Obtain written approval from Consultant to use non-standard proof rolling equipment.

.2 Proof roll at level as indicated.

.1 If non-standard proof rolling equipment is approved, the Consultant will determine level of proof rolling.

.3 Make sufficient passes with proof roller to subject every point on surface to three (3) separate passes of loaded tire.

.4 Where proof rolling reveals areas of defective subgrade:

.1 Remove underlying material to depth and extent as directed by Consultant.
.2 Backfill and compact in accordance with this section.
.3 Replace material and compact.

.5 Where proof rolling reveals areas of defective material, remove and replace in accordance with this section at no extra cost.

3.9 MATERIAL TYPES AND COMPACTION

.1 Use types of material fill as indicated on the Project Drawings with materials specified. Compaction densities are percentages of maxium densities obtained from ASTM D698 and ASTM D1557.

.2 Compact infill areas in max. 450mm lifts and rolled with a minimum of six (6) passes with a 15-tonne or larger drum vibratory roller, in the presence of the Consultant. A rolling pattern will be developed by the Consultant for each material type.

.3 Compaction equipment to be capable of obtaining required material densities.

.4 Efficiency of equipment not specified to be proved at least as efficient as specified equipment at no extra cost and written approval must be received from Consultant before use.

.5 Shape and roll alternately to obtain smooth, even and uniformly compacted sub-base and base.

.6 Apply water as necessary during compaction to obtain specified density.

.7 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Consultant.

.8 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.10 BACKFILLING

.1 Do not proceed with backfilling operations until completion of following:

.1 Consultant has inspected and approved installations.
.2 Consultant has inspected and approved of construction below finish grade.
.3 Removal of concrete formwork.
.4 Removal of shoring and bracing; backfilling of voids with satisfactory soil material.

.2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.

.3 Do not use backfill material which is frozen or contains ice, snow or debris.

.4 Place backfill material in uniform layers not exceeding 150 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.

.5 Backfilling around installations:

.1 Place bedding and surround material as specified elsewhere.
.2 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.
.3 Place layers simultaneously on both sides of installed Work to equalize loading. Difference not to exceed 600mm.
.4 Permit concrete to cure for minimum 14 days or until it has sufficient strength to withstand earth and compaction pressure and approval obtained from the Consultant.
.5 If approved by the Consultant, erect bracing or shoring to counteract unbalance, and leave in place until removal is approved by Consultant.

3.11 RESTORATION

.1 Upon completion of Work, remove waste materials and debris, and correct defects as directed by Consultant.

.2 Reinstate existing roadways disturbed by excavation to thickness, structure and elevation which existed before excavation.

.3 Clean and reinstate areas affected by Work as directed by Consultant.

.4 Protect newly graded areas from traffic and erosion and maintain free of trash or debris.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED

.1 This section specifies the requirements for supplying, transporting and placing geotextile fabric as shown on the drawings.

1.2 RELATED WORK

.1 Section 31 23 33.01- Excavating, Trenching and Backfilling.

1.3 REFERENCES

.1 American Society for Testing and Materials International, (ASTM)

.1 ASTM D 4491-22, Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
.2 ASTM D 4595-17, Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.
.3 ASTM D 4716-22, Test Method for Determining the (In-Plane) Flow Rate Per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head.
.4 ASTM D 4751-21a, Standard Test Method for Determining Apparent Opening Size of a Geotextile.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-4.2 0-2001. 11.2-M89(April 1997), Textile Test Methods - Bursting Strength - Ball Burst Test (Extension of September 1989).
.2 CAN/CGSB-148.1, Methods of Testing Geotextiles and Complete Geomembranes.

.1 No.2-M85, Methods of Testing Geosynthetics - Mass per Unit Area.

.2 No.3-M85, Methods of Testing Geosynthetics - Thickness of Geotextiles.

.3 No.6.1-93, Methods of Testing Geotextiles and Geomembranes - Bursting Strength of Geotextiles Under No Compressive Load.

.4 No.7.3-92, Methods of Testing Geotextiles and Geomembranes - Grab Tensile Test for Geotextiles.

.5 No. 10-94, Methods of Testing Geosynthetics - Geotextiles - Filtration Opening Size.

.3 Canadian Standards Association (CSA International)

.1 CSA G40.20-13/G40.21-13 (R2023), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
.2 CAN/CSA-G164-M92 (R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.

.4 Ontario Provincial Standard Specifications (OPSS)

.1 OPSS 1860-March 1998, Material Specification for Geotextiles.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit samples in accordance with Section 01 01 30.

.2 Submit to Consultant following samples at least 4 weeks prior to beginning Work.

.1 Minimum length of 2 m of roll width of geotextile.
.2 Minimum of 1 m seam with at least 300 mm of geotextile on both sides of seam.

.3 Submit to Consultant copies of mill test data and certificate at least 4 weeks prior to start of Work, and in accordance with Section 01 01 30.

1.5 DELIVERY, STORAGE AND HANDLING

.1 During delivery and storage, protect geotextiles from direct sunlight, ultraviolet rays, excessive heat, mud, dirt, dust, debris and rodents.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Remove from site and dispose of all packaging materials at appropriate recycling or disposal facilities.

.2 Fold up metal banding, flatten and place in designated area for recycling or disposal.

PART 2 - PRODUCTS

2.1 MATERIAL

.1 Geotextile: woven synthetic fibre fabric, supplied in rolls.

.2 Physical properties: Terrafix 1200R approved equivalent.

.3 Securing pins and washers: to CSA G40.21-98, Grade 300W, hot-dipped galvanized with minimum zinc coating of 600 g/mý to CAN/CSA-G164-M92 (R1998).

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Place geotextile material by unrolling onto graded surface in locations indicated and retain in position orientation and manner with manufacturer's written recommendations.

.2 Place geotextile material smooth and free of tension stress, folds, wrinkles and creases.

.3 Overlap each successive strip of geotextile over previously laid strip as per manufacturer's specifications.

.4 Join successive strips of geotextiles per manufacturer's specifications.

.5 Pin successive strips of geotextile with securing pins as per manufacturer's specifications.

.6 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material layers.

.7 After installation, cover with overlying layer within 4 hours of placement.

.8 Replace damaged or deteriorated geotextile to approval of Consultant or as per manufacturer's specifications.

.9 Place and compact soil layers in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

3.2 CLEANING

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

3.3 PROTECTION

.1 Vehicular traffic not permitted directly on geotextile.

.2 At least 300mm of fill material shall be kept between equipment and fabric.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK

.1 Section 31 09 18 - Pile Driving Templates

.2 Section 31 62 19 – Wood Piles

.3 Section 31 62 26 - Steel Pipe Piles

.4 Section 31 63 19 – Rock Sockets for Piles

1.2 SUBMISSIONS

.1 Methodology: provide methodology statement including type of pile driving equipment to carry out the Work.

.2 Provide submissions in accordance with Section 01 33 00.

1.3 REFERENCES

.1 CSA W48:23, Filler Metals and Allied Materials for Metal Arc Welding.

1.4 EXISTING SUB-SURFACE

.1 Refer to Geotechnical Investigation report, Market Wharf Approach Trestle Replacement, Conditions, dated March 24, 2022.

.2 Notify the Consultant immediately if sub-surface conditions at site differ from those indicated.

.3 Design is based on subsurface information inferred from the surrounding site records. Pile installation details are based on this information. Have installation procedures reviewed by the Consultant's geotechnical engineer to confirm conformance with design assumptions. Coordinate all work to facilitate the Consultant's observations and review.

1.5 PROTECTION

.1 Protect public and construction personnel, adjacent structures, and work of other sections from hazards due to pile driving operations or any other operations.

1.6 SCHEDULING OF WORK

.1 Submit schedule of planned sequence of pile driving to the Consultant for review, not less than two (2) weeks prior to commencement of pile driving for structure.

1.7 DELIVERY, STORAGE

.1 Protect piles from damage due to excessive bending stresses, impact, abrasion or other damages during storage and handling.

.2 Replace damaged piles to the satisfaction of the Consultant.

1.8 INSPECTION OF WORK

.1 Coordinate pile installation procedures with the Consultant minimum two (2) weeks prior to the pile installation. The method of advancing the pile to bedrock, seating, and subsequent refusal criteria will be reviewed and must be approved prior to starting work.

.2 The Consultant will inspect the work during advancement of the piles to competent bedrock and coordinate with the Contractor to determine a suitable depth to terminate the pile.

.3 The pipe pile tip elevation and seating in competent bedrock and refusal must be approved by the Consultant prior cut-off.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 For material requirements refer to Section 31 62 26 - Steel Pipe Piles and Section 31 62 19 – Wood Piles.

.2 Provide equipment of sufficient capacity to handle full length piles without cutting and splicing.

.3 Splicing of piles will not be permitted unless specifically agreed to by the Consultant. When permitted, provide details for Consultant’s review. Design details of splice to bear dated signature stamp of a Professional Engineer registered or licensed in the Province of New Brunswick.

.4 Welding materials: to CSA W48.

PART 3 - EXECUTION

3.1 EQUIPMENT REQUIREMENTS

.1 Equipment information: prior to commencement of pile installation operation, submit to the Consultant for review, details of equipment for installation of piles. For impact hammers give manufacturer's name, type, rated energy per blow at normal working rate, mass of striking parts of hammer and mass of driving cap.

.2 Pile driving System:

.1 Timber Piles: drive wood fender piles with a hammer rated to deliver approximately 750 Joules per cm of pile tip diameter (750 x pile tip diameter in cm). The refusal criteria is four (4) blows for the last 25mm of pile penetration, or when pile tip elevation is achieved.

.2 When required penetration is not obtained by use of a pile driving system complying with minimum requirements, either provide a more powerful pile driving system or take other measures, acceptable to the Consultant. Drop

hammers are permitted. Replace all piles damaged due to over driving at no additional cost to the Contract.

.3 Leads:

.1 Construct pile driver leads to provide free movement of hammer. Hold leads in position at top and bottom, with guys, stiff braces, or other means reviewed by the Consultant, to ensure support to pile while being driven.
.2 Length: except for piles driven through water, provide length of leads so that use of a follower is unnecessary.
.3 Swing leads: firmly guy top and bottom to hold pile in position during driving operation. Have method reviewed by the Consultant.

.4 Followers: when permitted, provide followers of such size, shape, length, and mass to permit driving pile in desired location to required depth and resistance. Provide followers with socket or hood carefully fitted to top of pile to minimize loss of energy and prevent damage to pile.

3.2 PREPARATION

.1 Verify conditions at pile locations and confirm they are adequate to support pile driving operations. Make provision for access and support of piling equipment during performance of work.

.2 Provide notice of readiness to the Consultant when the Work is ready for PDA tests to take place. Provide this notice at least 72 hours prior to testing taking place on Site. Provide assistance as required and access to the Work so the Consultant's geotechnical engineer can conduct PDA testing.

3.3 FIELD QUALITY CONTROL

.1 Measurement:

.1 Maintain accurate records of driving for each pile, including:

.1 Type and make of hammer, stroke, or related energy.

.2 Other driving equipment including water jet, driving cap, cushion.

.3 Pile size and length, location of pile in pile group, location or designation of pile group.

.4 Sequence of driving piles in group.

.5 Final tip and cut-off elevations.

.6 Other pertinent information such as interruption of continuous driving, pile damage.

.7 Record elevation taken on adjacent piles before and after driving of each pile.

.2 Provide the Consultant with an electronic copy of records in PDF file format.

3.4 DRIVING

.1 Use driving caps to protect piles. Reinforce pile heads if necessary. Piles with damaged heads, as determined by Consultant, will be rejected.

.2 Use steel drive shoes to protect pile toes during driving to the approval of the Consultant.

.3 Hold piles securely and accurately in position while driving.

.4 Deliver hammer blows in direct axis of pile.

.5 Do not drive piles within a radius of 8 meter of concrete which has been in place less than three (3) days.

.6 Re-drive piles lifted during driving of adjacent piles.

.7 Use of water jet:

.1 Use water jets only with written permission of the Consultant.
.2 When water jets are permitted number of jets and volume and pressure of water must be sufficient to freely erode material immediately adjacent to pile. Plant must be capable of delivering water pressure of at least 690kPa as measured at two 20 mm nozzles.
.3 Restriction: stop jetting at a minimum of 1 meter above tip elevation of piles previously driven within 2 meter of jet, except where piles are to be carried to rock surface. Drive piles down beyond depth of jetting until required resistance is obtained. If there is evidence that jetting has disturbed load-bearing capacities of previously installed piles, restore bearing capacity of those piles by re-driving. Re-drive where necessary after jetting operations in area have been completed.

.8 Cut off piles neatly and either squarely or at an angle at elevations indicated. Provide sufficient length above cut-off elevation so that the part damaged during driving is cut off.

.9 Remove cut-off lengths from site on completion of work.

.10 Installation of each pile will be subject to acceptance by the Consultant. Consultant will be sole judge of acceptability of each pile with respect to final driving resistance and depth of penetration. Consultant to accept final driving of all piles prior to removal of pile driving rig from site.

.11 Advance rock socketed piles to sound bedrock and seated using the minimum amount of energy required to achieve seating and minimum penetration into bedrock and as required to support rock socket installation while maintaining the pile shape without damaging. Contractor is solely responsible for any damage and associated effects on rock socket installation and must remedy any such damage to Consultant’s approval at no additional cost to the Contract.

3.5 DRILLING

.1 Reinforce pile heads if necessary. Piles with damaged heads, as determined by Consultant, will be rejected.

.2 Hold piles securely and accurately in position while drilling.

.3 Cut off piles neatly and squarely at elevations indicated. Provide sufficient length above cut-off elevation so that the part damaged during installation is cut off.

.4 Remove cut-off lengths from site on completion of work.

.5 Installation of each pile will be subject to acceptance by the Departmental Representative. Consultant will be sole judge of acceptability of each pile. Consultant to accept final installation of all piles prior to removal of pile drilling rig from site.

.6 Advance piles to achieve minimum penetration into bedrock indicated while maintaining the pile shape without damaging. Contractor is solely responsible for any damage, and must remedy any such damage to Consultant's approval at no additional cost to project.

3.6 TOLERANCES

.1 Pile heads to be within 75mm of locations as indicated.

.2 Piles not to be more than 1% of length out of vertical or specified batter alignment.

3.7 OBSTRUCTIONS

.1 Remove all obstructions from the surface prior to installing piles and install piles to the specified depth and/or pile resistance.

.2 Where an obstruction is encountered that causes sudden and unexpected change in penetration resistance or deviation from specified tolerances, advise the Consultant and submit for their review the Contractor's proposed method(s) for achieving specified penetrations and tolerances. Incorporate review comments in the proposed method(s) and proceed with the Work.

.3 Consideration will be made for additional compensation for non-native material and or situations that are encountered under the surface, over and above what could be reasonably anticipated from soils information available and causes delays/additional costs in piling. Each case will be reviewed and approved by the Consultant by means of the RFI process.

3.8 DAMAGED OR DEFECTIVE PILES

.1 Remove rejected pile and replace with a new and if necessary, a longer pile.

3.9 PENETRATION

.1 Protect adjacent structures, services, and work of other sections from hazards due to pile driving operations.

.2 Arrange sequencing of pile driving operations and methods such that no damage occurs to adjacent existing structures. If damaged, remedy damaged items to restore to original or better condition at no additional cost to the Contract.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK

.1 Section 31 09 18 – Pile Driving Templates

.2 Section 31 61 13 – Pile Foundations General

1.2 REFERENCE STANDARDS

.1 ASTM A307-21, Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60,000 psi Tensile Strength.

.2 CSA G40.20-13/G40.21-13(R2023), General Requirements for Rolled or Welded Structural Quality Steel / Structural Quality Steel.

.3 CAN/CSA 080 Series-15(R2020), Wood Preservation.

.4 CSA O56-10(R2020), Round Wood Piles.

.5 CSA G164-18(R2023), Hot Dip Galvanizing of Irregularly Shaped Articles.

.6 CSA W59-24, Welded Steel Construction.

.7 NLGA Standard Grading Rules for Canadian Lumber.

1.3 SUBMISSIONS

.1 At least 14 days prior to finalizing timber order, submit a schedule of pile lengths for review.

.2 Submit methodology for field treatment.

.3 Provide submissions in accordance with Section 01 33 00.

1.4 PROTECTION

.1 Avoid dropping, bruising, or breaking of wood fibres.

.2 Avoid breaking surfaces of treated piles.

.3 Do not damage surfaces of treated piles below cut-off elevation by boring holes or driving nails or spikes into them to support temporary material or staging. Support staging in rope slings carried over tops of piles or by attaching to pile clamps of approved design.

.4 Treat cuts, breaks or abrasions on surfaces of treated piles, bolt holes and field cuts in accordance with CAN/CSA-080, using approved product or material.

1.5 INSPECTION

.1 Have all timber piles inspected and accepted by Consultant prior to being incorporated in the work.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Round Wood Piles: Douglas fir, red pine, or southern yellow pine, with minimum butt size of 350 mm and tip diameter in accordance with Table A-1 of CSA O56. Order lengths in accordance with Project Drawings. Consultant shall be sole judge as to quality and dimension of piles and that they are in accordance with CSA O56.

.2 Timber Treatment:

.1 Preservative treatment to CAN/CSA-080 Series for Marine (salt water) applications. Where assay retentions are not indicated, they are to be taken as 1.5 times the indicated gauge retention. Creosote preservative will not be permitted.

.2 Make arrangements for timber testing by:

.1 Plant Inspection: Provide treatment plant identification, date of treatment, list of various pieces in the charge, charge number, plant assay testing results, concentration and type of preservative used, duration of treatment, gauge retention, species of wood; and make arrangements with the treatment plant to locate bundles, move bundles, break open bundles and carry out other measures to facilitate the inspection.

.2 Field Inspection: Providing same information as above and facilitating the inspection in the field.

.3 Filling in and submitting a pre-printed form, agreed to by the Consultant, containing the above information.

.3 The Consultant may test in the plant or in the field or may choose to not test some charges at either the plant or the field.

.4 Field treatment: same as pile preservative.

.3 Miscellaneous Hardware: Hardware must meet the following specifications:

.1 Machine bolts, drift bolts, nuts, round plate washers: to ASTM A307

.2 Spikes: galvanized for exterior work.

.3 Pile shoes: fabricated from steel plate minimum 6 mm thickness. Steel plate to CSA G40.21, Grade 300W. Welding to CSA W59. No galvanizing required.

.4 Hot dip galvanize bolts, nuts, washers and spikes to CSA G164 with minimum zinc coating of 705 g/m².

.5 All hardware to be hot-dipped galvanized unless otherwise shown on plans or specified.

2.2 WOOD PRESERVATION

.1 Treat wood piles with wood preservative treatment as specified.

PART 3 - EXECUTION

3.1 HANDLING TIMBER

.1 Protect timber during handling, shipping, offloading and field handling, by use of suitable equipment and procedures. Use rope or fabric strap slings on site for moving bundles or individual timbers, rather than metal grabs, chains or cables.

3.2 HANDLING TREATED TIMBER

.1 Handle treated material to avoid damage causing alteration in original treatment.

.2 Treat in field, spike holes, boreholes, plugged holes, cuts and any damage to treated material, using approved product or material, regardless of plant treatment type.

.3 Provide methodology pertaining application of field treatment. Apply to dry surfaces, wherever possible.

.4 Treat boreholes, using a pressurized container with an extension rod, to produce a fine spray in the holes with one application. Alternately a cylindrical brush may be used.

.5 Treat field cuts and any abrasions with minimum of two liberal applications, using either spray or brush.

.6 Environmental Concern: allow for no spillage or excess application of field preservative. Provide personnel with sufficient training and protective gear to properly and safely handle the treated materials and to apply field treatment, so as to prevent undue hazard to themselves, others, or the environment.

.7 Contain all debris and leachates (films on water surface) within the area of the work by using containment facilities such as floating booms or screens.

3.3 PREPARATION

.1 Protect pile heads during driving and hold in position by using a combination cushion-driving head and pilot. Closely fit driving heads to top of pile, and extend down sides of pile for at least 75 mm. Where necessary protect pile heads by means of heavy steel straps of wrought iron rings.

3.4 INSTALLATION

.1 Install piles in accordance with Section 31 61 13 - Pile Foundations General.

.2 Cut off fender piles giving a bevel of 4H:1V.

END OF SECTION

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

.1 This Section includes but is not the limited to the following:

.1 Inspection of all timber piles of the intermediate trestle and verify the existing conditions as described in the contract drawing. Contractor to repair and protect the damaged timber piles with fibre reinforced polymer (FRP) composite systems as per the contract drawings. Inspection shall verify all member locations and document all cracks and the existing conditions of the structural members.

.2 Furnishing all materials, tools, equipment, transportation, necessary storage, access, labor and supervision required for the proper installation of the FRP composite system as per instructions from manufacture.

.3 Coordination with other trades as necessary to complete the work per the contract drawings.

1.2 RELATED WORK

.1 Section 06 05 73-USER-Dimension Timber

1.3 REFERENCE STANDARDS

.1 ASTM A307-21, Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60,000 psi Tensile Strength.

.2 NLGA Standard Grading Rules for Canadian Lumber.

.3 ASTM D790-17, Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials

.4 ASTM D638-14, Standard Test Method for Tensile Properties of Plastics

.5 ASTM D2583-13a, Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor (Withdrawn 2022)

.6 ASTM D570-22, Standard Test Method for Water Absorption of Plastics

.7 ASTM C579 – Standard Test Methods for Compressive Strength of chemical Resistance Mortars, Grouts, Monolithic Surfacing, and Polymer concrete.

.8 ASTM C1107/C1107M-20 Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)

.9 CRD-C621 Corps of Engineers Specification for Non-Shrink Grout

.10 ASTM C190 – Standard Test Method for Tensile Strength of Hydraulic Cement Mortars

.11 ASTM C882/C882M-20 Standard Test Method for Bond Strength of Epoxy-Resin Systems Used With Concrete By Slant Shear

.12 ASTM C109/C109M-20 Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or 50-mm Cube Specimens)

1.4 SUBMISSIONS

.1 Shop drawings of proposed FRP system. The system shall be compliant with testing requirements per ASTM standard listed in section 1.3. The shop drawings include but not limited to the details below:

.1 Fiberglass jacket wall thickness and dimensions.
.2 Locations of standoff spacers.
.3 Location of grout injection ports (if used).
.4 Horizontal and vertical joint and seam details.
.5 Epoxy grout curing requirements.
.6 Sealing of the annular space between jacket and timber pile, as well as any cracks in timber pile.

.2 Manufacturer's technical data sheet indicating physical, mechanical and chemical characteristics of all materials used in the FRP system.

.3 Installation procedures, maintenance instructions, and general recommendations regarding each material to be used. Installation procedures include but not limited to information below:

.1 Date and time.
.2 Bent and pile location/number as defined in Contract Drawings.
.3 Identification of FRP pile jacket manufacturer representative(s) to be present during site visit of FRP pile jacket installation.
.4 Details on plans to isolate the watercourse, including timing and procedures for the installation.
.5 Identification of FRP pile jacket manufacturer representative(s) to be available for site consultation during FRP pile jacket installation as part of the work.
.6 Complete details of all equipment to be used to clean the timber piles and install the FRP jacket system.
.7 Temperature control plan for ensuring the jackets and grout are installed at temperatures that are in compliance with the manufacturer's requirements.

.4 Manufacturer's Safety Data Sheets (SDS) for all materials to be used.

.5 Provide submissions in accordance with Section 01 33 00.

1.5 INSPECTION

.1 Have all timber piles in the scope inspected and verified by Consultant prior to being incorporated in the work.

1.6 QUALITY ASSURANCE

.1 Manufacturer / Supplier Qualifications:

.1 The Manufacturer / Supplier must support a training program which provides instruction to applicators in the proper installation of the specified FRP system.

.2 Applicator Qualifications:

.1 Applicator must have written approval from the Manufacturer / Supplier to install the specified FRP system.
.2 At least one field representative who has completed the training program provided by the Manufacturer / Supplier for the specified FRP system must be present on site at all times during installation of the FRP system.
.3 The Consultant may suspend the work if the Contractor substitutes an unapproved fiber reinforced composite system or unapproved personnel during construction.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Fiberglass Pile Jacket (FRP Wrap):

.1 The pile jacket shall consist of a fiberglass mat woven in a polyester resin matrix. Wall thickness of jacket shall be 3 mm to 5 mm nominal.
.2 Jacket closures shall be tongue and groove.
.3 The pile jacket shall have a diameter to cover the pile and allow for sealing the top and bottom of the jacket against the pile.
.4 The fiberglass jacket shall meet all the following typical performance criteria:

.1 Flexural Strength, 172 MPa

.2 Flexural Modulus, 5,516 MPa

.3 Ultimate Tensile Strength,110 MPa

.4 Tensile Modulus, 10,342.1 MPa

.5 Elongation, 1.6%

.6 Barcol Hardness, 40-50

.7 Water Absorption, < 1%

.8 Standard Color Translucent

.9 Wall Thicknesses (nominal and minimum) 3 mm to 5 mm

.10 UV Resistance, Carbon Arc Weathering,

.2 Epoxy Grout/ Motar:

.1 The epoxy grout shall be compliant with testing requirements of ASTM C1107 and the Corps of Engineers CRD- C721.

.2 Nonshrink epoxy grout shall be a 100% solids, rapid strength gain, flowable, water displacing, non-metallic, non segregating, cementitious grout formulated with polymers, with anti-washout admixture for underwater, above water, or tidal zone grouting applications.

.3 The epoxy grout shall meet all the following typical performance criteria:

.1 Compressive strength – ASTM C-109

.2 Standard 7-day cure > 7,500 psi (51.7 MPa)

.3 Post cured > 15,000 psi (103.0 MPa)

.4 Tensile strength – ASTM C190 > 600 psi (4 MPa)

.5 Flexural strength – ASTM C190 > 1,410 psi (9.7 MPa)

.6 Bond strength – ASTM C882 > 2,500 psi (17.2 MPa)

.3 Supplementary Materials: Contractor is responsible for providing all other required materials to complete installation of the FRP systems according to the manufacturer's instructions, including but not limited to: Tongue and groove adhesive, self-tapping screws, suitable pumping ports and jacket standoffs.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

.1 Contractor to follow manufactures' instruction to complete the installation of the FRP jacket systems as per contract drawings.

.2 Contractor shall receive support training from the Manufacturer/ Supplier on installation of the specified FRP system. Written approval from the Manufacturer / Supplier to install the specified FRP system shall be obtained prior to installation.

3.2 HANDLING AND STORAGE OF MATERIALS

.1 Handle treated material to avoid damage causing alteration in original treatment.

.2 Treat in field, spike holes, boreholes, plugged holes, cuts and any damage to treated material, using approved product or material, regardless of plant treatment type.

.3 Provide methodology pertaining application of field treatment. Apply to dry surfaces, wherever possible.

.4 Treat boreholes, using a pressurized container with an extension rod, to produce a fine spray in the holes with one application. Alternately a cylindrical brush may be used.

.5 Treat field cuts and any abrasions with minimum of two liberal applications, using either spray or brush.

.6 Environmental Concern: allow for no spillage or excess application of field preservative. Provide personnel with sufficient training and protective gear to properly and safely handle the treated materials and to apply field treatment, so as to prevent undue hazard to themselves, others, or the environment.

.7 Contain all debris and leachates (films on water surface) within the area of the work by using containment facilities such as floating booms or screens.

3.3 SURFACE PREPARATIOIN

.1 Protect pile heads during driving and hold in position by using a combination cushion-driving head and pilot. Closely fit driving heads to top of pile, and extend down sides of pile for at least 75 mm. Where necessary protect pile heads by means of heavy steel straps of wrought iron rings.

3.4 INSTALLATION

.1 Install piles in accordance with Section 31 61 13 - Pile Foundations General.

.2 Cut off fender piles giving a bevel of 4H:1V.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK

.1 Section 31 09 18 – Pile Driving Templates

.2 Section 31 61 13 – Pile Foundations General

.3 Section 31 63 19 – Rock Sockets for Piles

1.2 REFERENCES

.1 ASTM A252/A252M-19, Standard Specification for Welded and Seamless Steel Pipe Piles.

.2 ASTM A53/A53M-24, Standard Specification for Pipe, Steel, Black and Hot-Dip, Zinc-Coated, Welded and Seamless.

.3 CSA G40.20-13/CSA G40.21-13(R2023), General Requirements for Rolled or Welded Structural Quality Steel / Structural Quality Steel.

.4 CSA W47.1-25, Certification of Companies for Fusion Welding of Steel.

.5 CSA W59-24, Welded Steel Construction.

.6 CSA-Z245.1:22, Steel Pipe.

1.3 TRANSPORTATION AND DELIVERY

.1 Upon arrival at the site promptly inspect pipe piles and give written report to the Consultant on condition of all piles received. Mark pipe piles in accordance with Clause 2.1.2.3 of this section.

1.4 QUALITY ASSURANCE

.1 Inspection and testing of steel piling material may be carried out by a testing laboratory designated by the Consultant at any time during course of work. When undertaken by Consultant, inspection and testing of pipe pile materials will in accordance with ASTM A252.

.2 Materials inspected or tested by the Consultant which fail to meet contract requirements will be rejected.

.3 Materials failing to meet contract requirements may be rejected at any time in course of work.

.4 Where tests or inspections by designated testing laboratory reveal that the pipe pile material fails to meet the specified requirements, cover all costs associated with this inspection and/or testing. Pay costs for any additional tests or inspections as the Consultant may require to verify acceptability of corrected work.

1.5 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 01 33 00 - Submissions/Shop Drawing.

.2 Submit the following items to the Consultant for review not less than two (2) weeks prior to commencement of work:

.1 Mill test certificates.
.2 Steel driving shoe details.
.3 Pile splice details. Pile splice details are to be stamped by a Professional Engineer licensed in the Province of New Brunswick.
.4 Pile Wraps.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Steel pipe: longitudinal butt seam, spiral butt seam or electric resistance welded (ERW), plain cut ends to ASTM A252, Grade 3 (Modified) or CSA G40.20/G40.21, Grade 350W. Welds must be full penetration.

.2 Pipe material to have following minimum properties:

.1 Yield strength: 345 MPa.
.2 Tensile strength: 455 MPa.
.3 Each length of pile to be marked by the supplier either by stencilling or other means to show manufacturer's name, heat number, kind of pipe, size, weight, length, wall thickness, specification designation and grade. Pipe pile material not marked in this way will be rejected.

.3 Pipe chemical composition: to ASTM A572, Grade 50 or CSA G40.20/G40.21, Grade 350W.

.4 Pipe allowable tolerances:

.1 Deviation from specified weight, diameter, and wall thickness to conform to ASTM A252 or CSA G40.20/G40.21.
.2 Deviation from straightness to not exceed 0.20% of total length of pile.
.3 Pipe to be checked for deviations before leaving supplier.

.5 Mill Test Certificates:

.1 Where mill test certificates originate from a mill outside Canada or the United States of America, at no additional expense to the Contract, have the information on the mill test certificates verified by testing by an ASTM or CSA certified Canadian laboratory. Provide reports to the Consultant.
.2 Where mill test certificates originate from a mill outside Canada or the United States of America, at no additional expense to the Contract, have welds 100 percent inspected by an independent third party inspection firm according to CSA W59, Clause 11, with the exception that the outside weld will be 100%

visually inspected and the inside weld will be visually inspected as far into the end of the pile as is physically possible. Provide reports to the Consultant.

.1 Unless spiral or longitudinal welds are certified as conforming to the requirements of ASTM A53, CSA Z245.1 to the satisfaction of the Consultant, at no additional expense to the Contract, have welds 100 percent inspected by an independent third party inspection firm according to CSA W59, Clause 11, with the exception that the outside weld will be 100% visually inspected and the inside weld will be visually inspected as far into the end of the pile as is physically possible. Provide reports to the Consultant.

.6 Welding electrodes: to CSA W48 series.

.7 Pile Wraps: Reinforced fabric, UV stabilized pile wraps with corrosion inhibitors and stainless steel hardware. Acceptable Products:

.1 For Pipe Piles:

.1 Retrowrap STD (Standard) as manufactured by corrosion control international.

.2 HD 4 Ply Wrap as manufactured by Carmel Corrosion Systems Inc.

.2 For H-Piles:

.1 Retrowrap H as manufactured by Corrosion Control International.

.2 Wrap as manufactured by Carmel Corrosion Systems.

PART 3 - EXECUTION

3.1 FABRICATION

.1 Fabricate full length piles to eliminate splicing during installation wherever possible. Splicing during installation shall not be done without written permission of the Consultant.

.2 If permitted, only one splice per pile will be considered. All welds to be full penetration butt welds with backing plate, to the Consultant’s approval.

.3 Submit details of planned use of pile material stock to Cosultant for approval prior to start of fabrication. Re-use cut-off lengths as directed by the Consultant.

.4 Allowable tolerance on axial alignment to be 0.25% as measured by a 3m straight edge.

.5 Allowable deviation from straightness over total length of fabricated pile to not exceed 0.20% of total length.

.6 Install pile shoes in accordance with the manufacturer's details, as required and as reviewed on shop drawings.

.7 Repair defective welds only on authority of Consultant. Welds which show evidence of having been repaired without authorization may be rejected. Make repairs in accordance with CSA W59.

.8 All pipe pile splices, if permitted, to be full penetration butt welds.

3.2 INSTALLATION

.1 Install piling in accordance with Section 31 61 13 - Pile Foundations General

.2 Drill steel bearing piles to specified embedment into bedrock

.3 Drill steel batter piles to specified embedment into bedrock and facilitate rock socket installation.

.4 If approved by Consultant, splice piles in place by welding. To prevent distortion, tack opposite points first and then weld opposite sections, weld against a backup ring. Hold member in alignment during splicing operation. Make splice by complete penetration groove welds only and to details of reviewed shop drawings stamped by a Professional Engineer registered to practice in the Province of New Brunswick.

.5 Submit full details of method and sequence of installation of piling to the Consultant for review prior to start of pile installation work. Details must include templates, bracing, handling, setting, and driving sequence.

.6 Following completion of pile cap construction, wrap all steel piles with corrosion protection system from the underside of concrete to the elevations as indicated on the drawings. Install wraps in strict accordance with manufacturer's written instructions.

3.3 OBSTRUCTIONS

.1 If obstruction is encountered during driving, advise the Consultant immediately and submit proposed remedial measures for review. Incorporate review comments into proposed work, but do not complete associated work until authorized by Consultant in writing.

3.4 WELDING

.1 Weld in accordance with CSA W59.

.2 Welding certification of companies to be in accordance with CSA W47.1.

3.5 CUTTING

.1 When flame cutting tops of piles, and flame cutting holes approved by the Consultant, use the following procedure:

.1 When air temperature is above 0 degrees Celsius, no pre-heat is necessary.

.2 When air temperature is below zero degrees C, pre-heat until steel 25mm on each side of line of cut has reached a temperature of 35 degrees Celsius. Temperature indicating crayon marks may be used to measure temperature.

.3 Use a torch guiding device to ensure smooth round holes and straight edges.

.4 Make cut smooth and free from notches throughout thickness. If grinding is employed to remove notch or crack, finished radius to be minimum 5mm.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 03 20 00 – Concrete Reinforcement

.2 Section 03 30 00 - Concrete

.3 Section 31 61 13 - Pile Foundations General

.4 Section 31 62 26 - Steel Pipe Piles

1.2 REFERENCES

.1 American Society for Testing and Materials International (ASTM).

.1 ASTM A252/A252M-19, Standard Specification for Welded and Seamless Steel Pipe Piles.

.2 Canadian Standards Association (CSA International).

.1 CSA W47.1-25, Certification of Companies for Fusion Welding of Steel.
.2 CSA W59-24, Welded Steel Construction.

1.3 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submissions/Shop Drawing.

.2 Product data: submit manufacturer's printed product literature, specifications, and datasheets.

.3 Quality assurance submittals:

.1 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
.2 Instructions: submit manufacturer's installation instructions.
.3 Submit for review by the Consultant electronic copy of pile driving records as described in PART 3 - FIELD QUALITY CONTROL.
.4 Submit to the Consultant for approval a list of equipment for installation before commencing work. Provide sufficient details to evaluate performance of equipment. Include details of equipment for excavating, drilling, cleaning out of piles and rock sockets, installation of reinforcing and concreting of rock sockets.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21.

.2 Divert unused metal materials from landfill to metal recycling facility as approved by Consultant.

.3 Divert unused concrete materials from landfill to local facility as approved by Consultant.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Concrete: in accordance with Section 03 30 00 - Concrete.

.2 Reinforcing: in accordance with Section 03 20 00 – Concrete Reinforcement, as indicated, additional material such as spacers, spiders and guides to install and hold reinforcing in location during concreting as required and reviewed by the Consultant.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 PREPARATION/PILE CLEAN-OUT

.1 After pile is installed as indicated, remove overburden inside pile down to tip of pile.

.2 Clean out material adhering to inside surface of pile by high pressure water jets and airlifts.

.3 Protect open piles from intrusion of foreign materials.

3.3 INSTALLATION OF SOCKETS

.1 Secure equipment in position during drilling.

.2 Drill sockets into sound bedrock as indicated.

.3 Consultant to determine elevation of top of sound rock and depth of socket required.

.4 Drill socket to minimum depth as indicated.

.5 After drilling is completed, clean out socket.

.6 Clean the base and walls of the socket so that not more than 25 mm thickness of loose rock cuttings and mud or pulverized rock remains on the socket bottom.

.7 Excessive overbreak in the walls of the rock socket will not be permitted as this would adversely affect the seal between the casing tip and the socket walls.

.8 After socket has been cleaned out and inspected, allow to stand for 24 h and inspect again for intrusion of material.

.9 Drive pile, as required to seal socket and repeat drilling, cleaning out and inspection process.

3.4 REINFORCING INSTALLATION

.1 Install fabricated reinforcing in drilled socket and in pile.

.2 Locate relative to pile tip as indicated.

.3 Use locating devices for centering reinforcing in pile and rock socket.

3.5 WELDING

.1 Weld in accordance with CSA W59.

.2 Welding certification of companies in accordance with CSA W47.1.

3.6 CONCRETING

.1 Place concrete in accordance with Section 03 30 00 - Concrete.

.2 Place concrete in drilled socket and up to elevation as indicated, as soon as possible after installation of reinforcing.

.3 Use concrete mix that has been demonstrated to produce required strength at temperature prevailing in socket and pile in specified time.

.1 Concrete mix and concreting pressure to approval of Consultant.

.4 Hold pile securely in position so that it does not move during concreting and until concrete has attained specified strength.

.5 Place concrete in one continuous operation to fill socket up to specified level.

3.7 FIELD QUALITY CONTROL

.1 Site Tests and Inspection:

.1 Provide method and equipment for inspection of each pile to ensure that pile and socket are properly cleaned out.
.2 Co-operate with and assist Consultant to inspect each pile and socket.

3.8 CLEANING

.1 Proceed in accordance with Section 01 74 00 – Cleaning.

.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK

.1 Section 31 23 33.01 - Excavating, Trenching and Backfilling.

1.2 REFERENCES

.1 ASTM C 117-23, Standard Test Method for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.

.2 ASTM C 131/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 C 136-19, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.4 ASTM D 698-12(2021), Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft³ (600kN-m/m³)).

.5 ASTM D 1557-12(R2021), Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft³ (2,700kN-m/m³)).

.6 ASTM D 1883-21, Standard Test Method for California Bearing Ratio of Laboratory Compacted Soils.

.7 ASTM D 4318-17e1, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.

.8 NB Department of Transportation and Infrastructure Standard Specifications (Latest Edition).

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Granular Surface: Material to meet NB Department of Transportation and Infrastructure Standard Specifications and Contract Specifications for Highway Construction Section 203 and the following requirements:

.1 31.5 Minus Aggregate Base material: processed by crushing quarried rock and shall consist of hard, durable, angular particles, free from clay lumps, cementation, organic material, frozen material and other deleterious materials and to the gradation as follows.

ASTM Sieve Size	% Passing by Mass
31.5 mm	100
25.0 mm	83-100
19.0 mm	70-90

12.5 mm	55-78
9.5 mm	45-72
4.75 mm	30-57
2.36 mm	20-46
1.18 mm	14-34
0.300 mm	5-19
0.075 mm	0-6

.2 75mm Minus Granular Subbase Crushed Rock: material: Processed by crushing quarried rock and shall consist of hard, durable, angular particles, free from clay lumps, cementation, organic material, frozen material and other deleterious material and to the gradation as follows:

ASTM Sieve Size	% Passing by Mass
90.0 mm	100
75.0 mm	95-100
63.0 mm	86-100
50.0 mm	75-95
37.5 mm	61-87
19.0 mm	38-70
9.5 mm	28-56
4.75 mm	19-46
2.36 mm	13-37
1.18 mm	9-30
0.300 mm	4-16
0.075 mm	0-7

PART 3 - EXECUTION

3.1 INSPECTION OF UNDERLYING FILL

.1 Do not place granular surface until finished sub-grade surface is inspected and approved by Consultant.

3.2 PLACING

.1 Before and after placing granular surface, provide a table of cross section elevations at 15 metre intervals showing the design and as constructed elevations, demonstrating that the surfaces are not uniformly high or low and within grading tolerance.

.2 Place material only on a clean unfrozen surface, properly shaped and compacted and free from snow and ice.

.3 Place using methods which do not lead to segregation or degradation of aggregates.

.4 Place material to full width in uniform layers not exceeding 100mm compacted thickness.

.5 Shape each layer to a smooth contour and compact to specified density before succeeding layer is placed.

3.3 COMPACTING

.1 Compact to density not less than 98% maximum dry density in accordance with ASTM D698.

.2 Shape and roll alternately to obtain a smooth, even and uniformly compacted base.

.3 Apply water as necessary during compacting to obtain specified density. If material is excessively moist, aerate by scarifying with suitable equipment until moisture content is corrected.

.4 In areas not accessible to rolling equipment, compact to specified density with approved mechanical tampers.

3.4 FINISH TOLERANCES

.1 Finished surface shall be within plus or minus 10 mm of established grade but not uniformly high or low.

.2 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.5 MAINTENANCE

.1 Maintain finished surface in a condition conforming to this section until acceptance.

END OF SECTION

ASPHALT PAVING

PART 1 - GENERAL

1.1 WORK INCLUDED

.1 This Section specifies requirements for supplying, transporting, placing and rolling asphalt pavement material including full roadway width tack coat, padding, saw cutting or keyways on all adjacent surfaces or as indicated on the Drawings or as directed by the Consultant.

.2 Any handwork in placing asphalt paving will be considered incidental to the Work.

1.2 REFERENCES

.1 New Brunswick Department of Transportation and Infrastructure (NBDTI), Standard Specifications for Highway Construction, Latest Edition.

1.3 SAMPLES

.1 At least 2 weeks prior to commencing work, inform Consultant of source of aggregates and asphalt cement and provide access for sampling.

.2 Preliminary approval of any sample of any material shall not constitute a final approval of material or its source of supply.

.3 All materials to be incorporated in the work shall be continuously and regularly sampled and tested in the field and in the laboratory and shall comply with the requirements of the material specification.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Tack coat and asphalt cement shall be as per NBDTI Standard Specifications, Item No. 259 and Item No. 261.

.2 Asphaltic material: hot mixed, hot laid combination of mineral aggregates, uniformly coated and mixed with an asphaltic binder in a suitable mixing plant. Asphaltic materials and aggregates shall meet the requirements of NBDTI Standard Specifications, Item No. 261.

.3 Composition of mixture: to grading and asphalt requirements in NBDTI Standard Specification. Base course asphalt pavement shall be Mix Type B, thickness 50 mm. Seal course asphalt pavement shall be Mix Type D, thickness 40 mm, or as specified on the Drawings.

PART 3 - EXECUTION

3.1 INSPECTION OF EXISTING GRANULAR BASE

.1 Before paving, reshape existing granular base roadbed as required to bring it to subgrade elevations as directed by the Consultant. Removing or shaping of existing driveway aprons to match new road profiles is incidental to the Work.

3.2 EQUIPMENT

.1 Pressure distributor:

.1 Distributor to be designed, maintained, equipped and operated that asphalt concrete pavement at even temperature may be applied in a uniform manner on width up to 4.5 metres at readily determined and controlled rates.
.2 Equipped with easily read, accurate and sensitive device which registers temperature of liquid in reservoir.

3.3 ASPHALT PAVING

.1 Prior to laying mix, clean surface of loose and foreign material.

.2 Apply full roadway width tack coat to asphalt surface when placing seal asphalt on existing asphalt or new asphalt that has been placed over 24 hours earlier or the previous calendar day.

.3 Place asphalt pavement to thicknesses, grades and lines indicated unless otherwise directed by Consultant. Carry out interface with existing asphalt as per NBDTI Standard Specifications. Keyways, tack coat and saw cutting straight edges is considered incidental to the Work.

.4 Placing conditions:

.1 Place asphalt pavement only when air temperature is above 5°C for base course and 10°C for surface course.
.2 When temperature of surface on which material is to be placed falls below 10°C, provide extra rollers as necessary to obtain required compaction before cooling.
.3 Do not place asphalt pavement when pools of standing water exist on surface to be paved, during rain, or when surface is damp.

.5 Place, roll, and compact asphalt pavement to NBDTI Standard Specifications.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED

.1 This Section specifies requirements for constructing precast concrete manholes and structures. Work includes supplying, transporting and installing of precast concrete bases and sections, metal castings, testing and adjusting existing structures.

1.2 RELATE WORK

.1 Section 31 23 33.01 - Excavating, Trenching and Backfilling.

.2 Section 33 41 00 - Storm Utility Drainage Piping.

1.3 REFERENCES

.1 ASTM C478M-22, Specification for Precast Reinforced Concrete Manhole Sections.

.2 ASTM D 698-12(2021), Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbs/ftü (600 kN-m/mü)).

.3 CAN/CSA-A8-98, Masonry Cement.

.4 CAN/CSA-A23.2-19, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

.5 CAN/CSA-G164-M92 (R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.

.6 CSA G40.20/G40.21-13 (R2023) General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

1.4 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 01 33 00.

.2 Submit manufacturer's test data and certification that materials meet requirements of this section. Include manufacturer's drawings, information, size of components, dimensions and details where pertinent.

1.5 HANDLING AND STORAGE

.1 Prevent damage to materials during storage and handling.

.2 Store gaskets in cool location out of direct sunlight, and away from petroleum products.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Precast sections: to ASTM C 478M-97, as indicated. Top sections flat slab top type with opening offset for vertical ladder installation. Precast concrete bases to be approved by Consultant.

.2 Joints: to be made watertight using rubber O-rings.

.3 Mortar:

.1 Cement: to CAN/CSA-A8-93.

.4 Adjusting rings: precast concrete, to ASTM C 478-02a.

.5 Frames and covers: to dimensions as indicated and following requirements:

.1 Metal gratings and covers to bear evenly on frames. A frame with grating or cover to constitute one unit. Assemble and mark unit components before shipment.
.2 Bearing surfaces to be ground to eliminate surface imperfections.
.3 Manhole frames and covers:; heavy duty municipal type for road service. Cover cast without perforations and complete with two 25 mm square lifting holes.

.6 Ladders: steel to CSA G40.21-98, hot-dipped galvanized to CAN/CSA-G164-M92 (R1998).

.1 Acceptable product: Industrial Marine Products Type L2.

.7 Granular bedding material: as specified in Section 31 23 33.01.

.8 Pipe material: as indicated on the Drawings.

PART 3 - EXECUTION

3.1 PREPARATION

.1 Carefully inspect products for defects and remove defective products from site.

3.2 EXCAVATION AND BACKFILL

.1 Excavate and backfill in accordance with Section 31 23 33.01 and as indicated.

.2 Obtain approval of Consultant before installing manholes or structures.

3.3 INSTALLATION

.1 Construct units in accordance with details indicated, plumb and true to alignment and grade.

.2 Position metal inserts in accordance with dimensions and details as indicated.

.3 Complete units as pipe laying progresses.

.4 Dewater excavation as directed by Consultant and remove soft and foreign material before placing concrete base.

.5 Set precast concrete base on 300 mm minimum of granular bedding materials compacted to 95% Standard Proctor Density. Top of base to be level.

.6 Set first ring section on precast base and make joint watertight with O-ring gaskets. Grout joints inside and out with non-shrink grout.

.7 Plug lifting holes with non-shrink grout.

.8 Place stub outlets at elevations and in position indicated. Provide type of gasket connection as indicated.

.9 Install benching where shown on the Drawings using concrete suitable for exposure classification C-2 as specified in CAN/CSA-A23.1-00.

.10 Compact backfill to 95% Standard Proctor density to ASTM D 698-00a.

.11 Install frames and covers on top section to elevation shown on Drawings or as directed.

.12 Adjust existing structures to the elevations indicated on the Drawings.

.13 Install ladders where indicated.

.14 Clean units of debris and foreign materials. Remove fins and sharp projections. Prevent debris from entering system.

3.4 TESTING

.1 Inspect manholes and structures with Consultant for inflow, infiltration or leakage.

.2 Provide labour, equipment and materials required to perform inspection.

.3 Backfill prior to inspection

.4 Locate and repair defects if inspection reveals deficiencies.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED

.1 This section specifies the requirement for supplying and installing various diameter water main and water services. Work includes supply and installation of pipe, fittings, restraints and cathodic protection, bedding materials, backfill, granular materials, compaction and testing of pipe as shown on the drawings.

1.2 RELATED WORK

.1 Section 31 23 33.01- Excavating, Trenching and Backfilling.

1.3 REFERENCES

.1 American Society for Testing and Materials (ASTM):

.2 ASTM B88M-20, Standard Specification for Seamless Copper Water Tube (Metric).

.3 Canadian Standards Associations (CSA):

.1 B137:23 Series Package Thermoplastic Pressure Piping Compendium.

1.4 MATERIAL CERTIFICATION

.1 Submit manufacturer's test data and certification that pipe materials meet requirements of this section at least 2 weeks prior to commencing work. Include manufacturer's drawings, information and shop drawings where pertinent.

1.5 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 01 33 00.

1.6 SCHEDULING OF WORK

.1 Schedule work to minimize interruptions to existing service.

.2 Submit schedule of expected interruptions to Consultant for approval and adhere to interruption schedule as approved by Consultant.

.3 Notify Consultant minimum of 24 hours in advance of any interruption in service.

.4 Notify Consultant of any planned or accidental interruption of water supply to hydrants.

PART 2 - PRODUCTS

2.1 PIPE, JOINTS AND FITTINGS

.1 Polyvinyl chloride pressure pipe: to ANSI/AWWA C900AWWA C900, pressure class 150, DR18 cast iron outside diameter. Pipe to be shipped and delivered to the site with factory installed end caps on both ends.

.2 Fittings: mechanical joint cast iron and ductile iron fittings: to AWWA C110/A21.10 ANSI/AWWA C110/A21.10.

.3 Molecularly Oriented Polyvinyl Chloride (PVCO) pressure pipe: to the latest CSA B137 Series-17 and AWWA C909. PVCO shall be produced with cast iron pipe outside diameter. PVCO pipe shall meet minimum wall thickness requirements for AWWA C909 Pressure Class 235 PSI (PC235). Acceptable product Bionax as manufactured by IPEX or approved equal. Pipe to be shipped and delivered to site with factory installed end caps.

.4 Temporary water service: high impact polyvinyl chloride (PVC) reusable, spline connected, piping system. The pipe, valves, fittings and couplings shall be listed in NSF Standard 61, and in accordance with ASTM D1784. The piping system valves and couplings shall be a restrained system.

.1 Acceptable product: Aquamine Series 2900 or approved equal.

2.2 SERVICE LATERALS AND FITTINGS

.1 Water service lateral tubing: shall be a minimum of 19mm and shall be one of the following:

.1 Type "K" seamless copper to ASTM B88M ASTM B88.
.2 Municipex (PEXa) tubing to CSA B137.5 or approved equal.

.2 Brass corporation fittings (corporation stop, curb stop, tee and valve): shall be compression joint type, full port manufactured by Mueller or Cambridge Brass.

.3 Service saddles: for PVC pipe shall be Concorde Daigle D-71, Smith-Blair TaperSeal or Romac with wide flat stainless steel bands and components. Service saddles must be used for all service connections.

.4 Service lateral curb stop box: shall be 1.8 m to 2.1 m adjustable valve box with 1.2 m stainless steel internal rod and stainless steel cotter pin. Acceptable product: Mueller A-726 or approved equal. The top shall have a pentagon shaped brass nut and the cap marked with Water. Acceptable product: Mueller A-800.

2.3 VALVES AND VALVE BOXES

.1 Gate valves: standard buried type to AWWA C500 or C509 up to 300 mm, minimum working pressure rating1380kPa.

.1 Body: cast iron with mechanical joint ends for all buried gate valves.
.2 Mechanism: bronze mounted solid wedge, with resilient rubber seat and machined seating surface, epoxy coated, stainless steel nuts and bolts for bonnet and packing gland, non-rising spindle and O-ring seal.
.3 Direction to close: clockwise.
.4 Operating nut: 2 inches square.
.5 Internal and external epoxy coating, minimum 6 mil thick.
.6 All valves and hydrant boots shall be completely wrapped in 8 mil poly according to AWWA C105.

.2 Cast iron valve boxes: three piece sliding type adjustable over a minimum of 450 mm. Base to be large round type with minimum diameter of 300 mm complete with centering disc; size of box to be 130 mm. Top of box to be marked "WATER".

.1 Acceptable products: Bibby, Mueller.

2.4 FIRE HYDRANTS

.1 Hydrant: dry barrel type to AWWA C502 and as follows:

.1 Depth of bury: as indicated on the Drawings.
.2 Barrel: two piece with safety break-away flange and stem.
.3 Inlet connection: mechanical joint, 150 mm diameter.
.4 Nozzles: two 65 mm male threaded hose outlets, one 135 mm male threaded pumper connection to Town municipal standards.
.5 Direction to close: clockwise.
.6 Plug drain holes internally.
.7 Acceptable product: McAvity M67.

2.5 CATHODIC PROTECTION

.1 Anodes: cathodic protection will be provided to buried valves, fittings and fire hydrants using sacrificial anodes.

.1 All mechanical fittings shall require one 5.4kg zinc anode.
.2 All valves, fire hydrants, corporation stops, curb stops and other moving appurtenances shall require one 10.9 kg zinc anode.

2.6 JOINT RESTRAINTS

.1 Joint Restraints for PVC and PVCO pipe: shall be ductile iron, incorporated with a series of mechanical wedge type serrations on the inside diameter of the restraint to provide positive restraint on the pipe.

.1 Provide mechanical restraining glands on water main at tees, bends, hydrants, main line gate valves and dead ends.
.2 Acceptable products: PVC pipe shall be Megalug as manufactured by EBAA Iron Sales Inc. or approved equal. PVCO pipe shall be Sigma PV-Lok Series, Star PVC Grip Series 3500 (PVC Ring Lock) or approved equal.

2.7 PIPE BEDDING AND SURROUND MATERIAL

.1 Clear stone bedding material as described in Section 31 23 33.01 - Excavating, Trenching and Backfilling.

PART 3 - EXECUTION

3.1 PREPARATION

.1 Clean pipes, fittings, valves, hydrants, and appurtenances of accumulated debris and water before installation. Carefully inspect materials for defects to approval of Consultant. Remove defective materials from site as directed by Consultant.

3.2 TRENCHING

.1 Do trenching work in accordance with Section 31 23 33.01 - Excavating Trenching and Backfilling.

.2 Trench depth to provide cover over pipe of not less than 1800 mm from finished grade or as indicated.

.3 Trench alignment and depth require Consultant's approval prior to placing bedding material and pipe.

3.3 GRANULAR BEDDING

.1 Place granular bedding material in uniform layers not exceeding 150 mm compacted thickness to depth of 150 mm below bottom of pipe to depth as indicated.

.2 Do not place material in frozen condition.

.3 Shape bed true to grade to provide continuous uniform bearing surface for pipe.

.4 Shape transverse depressions in bedding as required to suit joints.

.5 Fill authorized or unauthorized excavation below design elevation of bottom of specified bedding in accordance with Section 31 23 33.01 - Excavating Trenching and Backfilling with compacted bedding material.

3.4 PIPE INSTALLATION

.1 Handle pipe by methods recommended by pipe manufacturer. Do not use chains or cables passed through pipe bore so that weight of pipe bears on pipe ends.

.2 Lay pipes on prepared bed, true to line and grade. Ensure barrel of each pipe is in contact with shaped bed throughout its full length. Take up and replace defective pipe.

.3 Do not exceed permissible deflection at joints as recommended by pipe manufacturer.

.4 Keep jointing materials and installed pipe free of dirt and water and other foreign materials. Whenever work is stopped, install a removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials.

.5 Position and join pipes with equipment and methods approved by Consultant.

.6 Cut pipes in an approved manner as recommended by pipe manufacturer, without damaging pipe or its coating and to leave smooth end at right angles to axis of pipe.

.7 Align pipes carefully before jointing.

.8 Install gaskets to manufacturer's recommendations. Support pipes with hand slings or crane as required to minimize lateral pressure on gasket and maintain concentricity until gasket is properly positioned.

.9 Avoid displacing gasket or contaminating with dirt or other foreign material. Gaskets so disturbed or contaminated shall be removed, cleaned, lubricated and replaced before jointing is attempted again.

.10 Complete each joint before laying next length of pipe.

.11 Minimize deflection after joint has been made.

.12 Apply sufficient pressure in making joints to ensure that joint is completed to manufacturer's recommendations.

.13 Ensure completed joints are restrained by compacting bedding material alongside and over installed pipes or as otherwise approved by Consultant.

.14 When stoppage of work occurs, install watertight plug and block pipes in an approved manner to prevent creep during down time.

.15 Recheck plastic pipe joints assembled above ground after placing in trench to ensure that no movement of joint has taken place.

.16 Do not lay pipe on frozen bedding.

3.5 VALVE INSTALLATION

.1 Install valves to manufacturer's recommendations at locations as indicated.

3.6 HYDROSTATIC AND LEAKAGE TESTING

.1 Test all pipework for watertightness. All tests to be made in the presence of the Consultant. Notify Consultant twenty-four (24) hours in advance of testing.

.2 Test pipework using potable water. Provide potable water as required.

.3 The allowable leakage shall not be exceeded between adjacent valves.

.4 Conduct tests on sections of pipeline as directed by Consultant.

.5 Provide all labour, equipment and materials required to perform hydrostatic and leakage tests. All equipment used to be approved by the Consultant before use.

.6 Before testing ensure that all restrained plugs are blanked off with watertight plugs or caps and all bends are adequately restrained.

.7 Discharge test water through newly laid pipeline if a suitable outfall exists, or otherwise in accordance with the Contract.

3.7 TESTING PIPEWORK

.1 Test pipework after backfilling.

.2 Fill water main, for testing. Pipeline to remain filled for not less than 24 hours prior to pressure test. Ensure all air is purged before starting pressure and leakage tests.

.3 Gradually increase water pressure inside pipe until it reaches 1035 kPa at the lowest location under test. Maintain pressure test for two hours.

.4 Measured leakage of water as measured by a water meter approved by the Consultant.

L = N x D x (P^0.5)
130,000
Where
L = allowable leakage, in litres/hour
N = number of joints.
N = number of joints.
D = nominal diameter (mm)
P = test pressure (kPa)

.5 The allowable leakage shall not be exceeded between adjacent valves.

.6 Replace, at no cost to Contract, all pipes, valves, fittings and couplings which are defective. Perform test at no cost to Contract until pipeline is approved by Consultant.

3.8 TESTS TO BE REPEATED

.1 Should tests disclose leakage, locate and repair defective pipes, or joints, to approval of Consultant.

.2 Tests to be carried out, at Contractor's expense to determine success or otherwise of remedial measures applied to pipework. These tests to be repeated at Contractor's expense until results show that remedial measures have been successful.

.3 Following acceptance of field tests, should the Consultant suspect the water main, for any reason, no longer complies with requirement of the test, he may order a second test and should the length of pipeline prove defective, Contractor shall repair or make good defect at his own expense.

.4 Cost of this second test to be borne by Contractor if test proves a defect. However, if this second test shows pipe to be satisfactory, cost of second test will be borne by Authority.

.5 When testing is done during freezing weather, protect hydrants, valves, joints and fittings from freezing.

3.9 FLUSHING AND DISINFECTION

.1 Flush and disinfect all water mains and services to ANSI/AWWA C651 and as specified. Notify Consultant 4 days in advance of flushing and disinfection.

.2 Flush water mains and services with potable water with sufficient flow to produce minimum velocity in water main of 1.5 M/sec for minimum 10 minutes. Flush until foreign materials have been removed and water is clear.

.3 Slowly open and close valves and hydrants to ensure thorough flushing.

.4 If satisfactory results cannot be achieved by flushing, swab pipes by approved methods and reflush.

.5 Disinfect water main and services upon completion of flushing using chlorine solution distributed throughout entire system.

.6 Inject 1% chlorine solution through a corporation cock in the top of newly laid pipe, at point close to where main is being filled and at rate proportional to filling rate. Prepare stock chlorine with concentration of 1% free chlorine by volume as follows:

Product	Of Compound	Of Water
High test calcium		
hypochlorite		
(67-70% Cl)	1.0 kg	60
Chlorinated lime		
(32-35% Cl)	1.0 kg	30
Liquid bleach		
(5.25% Cl)	1.0 litre	3.5
(10.5% Cl)	1.0 litre	7.0

.1 Calcium hypochlorite and chlorinated lime are not to be used when water temperature is less than 5°C.

.2 The following table indicates the quantity of 1% chlorine stock solution required per 100 metre length of pipe.

	1% Chlorine
Pipe Diameter	Stock Solution
(mm)	(litres)
100	4.9
150	10.9
200	19.4
250	30.4

300	42.9
350	58.4
400	76.3
450	96.6
500	119.2
600	171.7
750	268.3

.3 Operate valves, hydrants and appurtenances while main contains chlorine solution.

.4 Take water samples at all hydrants and termination points, in suitable sequence, to test chlorine residual.

.5 When tests indicate minimum chlorine residual of 50 mg/L, leave system charged with disinfectant solution for 24 hours to ensure minimum chlorine residual of 25 mg/L throughout system.

.6 Flush disinfectant solution from line after 24 hours. Add 1.0% Hydrogen Peroxide reducing agent to the disinfectant solution at point of discharge or within a retention facility such that the solution is disposed to the environment with a total chlorine residual no greater than 0.0 mg/L. Check chlorine residual before disposal and at regular intervals during disposal to ensure compliance. This dechlorination requirement can only be excluded with the written consent of the New Brunswick Department of Environment and Local Government.

.7 Dispose of dechlorinated disinfectant solution. Where disposing to the environment, disposal of the dechlorinated solution must be at least 100 m from the nearest watercourse.

.8 Where disinfectant solution is dechlorinated at point of discharge, inject stock reducing agent at a rate proportional to discharge rate. Injection and discharge rates must be monitored continuously to ensure proper proportioning.

.9 Prepare stock reducing agent by volume with concentration of 1% Hydrogen Peroxide (H202) by mass, as follows:

Liquid Reducing Agent Hydrogen	Amount of Agent (litres)	Quantity of Water (litres)
Peroxide (35% H202 by mass)	1	34

.10

.11 The following table indicates quantity of 1% Hydrogen Peroxide required to reduce total chlorine residual of disinfectant solution contained per 100 metre length of pipe, from 50 mg/L to 0.0 mg/L.

Pipe Diameter	1% Hydrogen Peroxide

(mm)	Stock Solution
100	4.5
150	10.2
200	18.1
250	28.2
300	40.6
350	55.3
400	72.3
450	91.4
500	112.9
600	162.6
750	254.0

.12 Where total chlorine residual of disinfectant solution exceeds 50 mg/L, quantity of stock reducing agent for dechlorination can be increased in direction proportion to the quantity indicated in the above table.

.13 After disinfectant solution is flushed from water main, assist Consultant in obtaining water samples on two (2) consecutive days for bacteriological tests. Repeat disinfection procedure if bacteriological tests fail. Coliform tests must indicate 0 on two consecutive days combined with background count of less than 150.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED

.1 This Section specifies requirements for supplying, installing and video testing sanitary gravity sewers to the lines, grades and dimensions indicated on the Drawings and as specified in this Section.

.2 Work also includes the supply and installation of service lateral connections, including the main line tee, wye, long sweep bend and flexible connector or cap at the property line for a complete lateral connection.

.3 The service lateral piping will include the supply and installation of pipe from the main line tee to the connection point near the property line.

.4 Supply and installation of sanitary sewer forcemain to the lines, grades and dimensions as indicated on the Drawings, including leakage testing.

1.2 RELATED WORK

.1 Section 31 23 33.01 - Excavating, Trenching and Backfilling.

.2 33 11 16 - Water Main.

1.3 REFERENCES

.1 CAN/CSA B137:23 Series Package, Thermoplastic Pressure Piping Compendium.

.2 CAN/CSA B1800:24, Thermoplastic Plastic Nonpressure Piping Compendium.

1.4 SHOP DRAWINGS

.1 Submit shop drawings for all pipe, fittings, valves, and all other items necessary for a complete installation. Include details showing dimensions and tolerance of pipe and joint proposed.

1.5 MATERIAL CERTIFICATION

.1 Submit manufacturer's test data and certification that products and materials meet requirements of this Section

.2 Ensure certification is marked on pipe.

1.6 DELIVERY, STORAGE & HANDLING

.1 Handle and store pipe, valves, fittings, in such a manner as to avoid shock and damage and as per manufacturer's recommendations. Do not use chains or cables passed through pipe bore.

.2 Store gaskets in cool location, out of direct sunlight, and away from petroleum products.

1.7 SCHEDULING OF WORK

.1 Schedule Work to minimize interruptions to existing services and maintain existing flows during construction.

.2 Submit schedule of expected interruptions for approval and adhere to approved schedule.

.3 Notify Authority and Owner 24 hours minimum in advance of any interruption in service.

PART 2 - PRODUCTS

2.1 SEWER PIPE AND FITTINGS

.1 PVC pipe and fittings: PSM type polyvinylchloride (PVC), to CAN/CSA-B182.2, DR35 complete with bell and spigot joints with rubber gaskets. Green in colour.

2.2 FORCEMAIN PIPE

.1 Municipex (PEXa) tubing to CSA B137.5 or approved equal. Green in colour.

2.3 PIPE BEDDING MATERIAL

.1 Clear stone bedding material: as specified in Section 31 23 33.01 - Excavating, Trenching and Backfilling.

PART 3 - EXECUTION

3.1 PREPARATION

.1 Clean pipes and appurtenances of accumulated debris and water before installation. Carefully inspect materials for defects. Remove defective materials from site.

.2 Provide proper implements, tools and facilities approved by the Authority, for the safe and convenient prosecution of the work.

.3 Take every precaution to prevent foreign material from entering the pipe.

3.2 TRENCHING AND BACKFILLING

.1 Do trench excavation and backfilling work to Section 31 23 33.01 - Excavating, Trenching and Backfilling.

3.3 PIPE BEDDING

.1 Place granular bedding material to depth indicated.

.2 Shape bed true to grade to provide continuous uniform bearing surface for pipe exterior. Do not use blocks when bedding pipe.

.3 Shape transverse depressions in bedding as required to make joints.

.4 Carry bedding material horizontally across actual trench width. Mounding bedding material will not be permitted.

.5 After installation of pipe, place and compact bedding material to haunch line of pipe. Place and compact remaining bedding material to depth indicated above top of pipe before further compaction.

3.4 PIPE LAYING

.1 Carefully lower pipe into the trench. Do not drop or dump materials into the trench.

.2 Lay and join pipes and fittings as specified herein and according to manufacturer's published instructions.

.3 Commence laying at outlet and proceed in upstream direction with bell ends of pipe facing upgrade.

.4 Prevent entry of bedding material, water or other foreign matter into pipe. Use temporary water-tight bulkheads when pipe laying is not in progress.

.5 Do not lay pipe when the trench bottom is frozen, underwater or when trench conditions or weather are unsuitable.

3.5 PIPE JOINTING

.1 Install gaskets in accordance with manufacturer's published instructions. During cold weather store gaskets in heated area to assure flexibility.

.2 Align pipe carefully before joining. Do not use excessive force to join pipe sections.

.3 Support pipes as required to assure concentricity until joint is properly completed.

.4 Keep pipe joints free from mud, silt, gravel or other foreign material.

.5 Avoid displacing gasket or contaminating with dirt, petroleum products, or other foreign material. Remove, clean, reinstall and lubricate gaskets so disturbed.

.6 Where deflection at joints is permitted, deflect only after joint is completed. Do not exceed maximum joint deflection recommended by manufacturer.

.7 Cut pipe as required for fittings or closure pieces, square to centreline, and as recommended by manufacturer.

.8 Make watertight connections to manholes and structures.

.9 Complete each joint before laying next length of pipe.

3.6 PIPE CLEANING

.1 Prior to testing, flush and clean gravity sewer to remove foreign materials.

.2 Do not flush debris into receiving sewers.

3.7 TESTING

.1 Test all sanitary gravity sewers that do not have active service lateral connections. All tests to be made in the presence of the Authority.

.2 Provide all labour, equipment and materials required to perform leakage tests.

.3 Air test each section of gravity sewer. A section is the length of pipe between successive manholes or termination points.

.1 Provide plugs at each end of section, with one plug equipped for air inlet connection.
.2 Fill test section slowly until a constant pressure of 28 kPa is reached. If ground water is above section being tested, Authority may recommend increase in air pressure.
.3 Allow minimum 2 minutes for air temperature to stabilize, adding only the amount of air required to maintain pressure.
.4 After 2 minute period, shut off air supply.
.5 Decrease pressure to 24 kPa. Measure time required for pressure to reach 17 kPa. Minimum time allowed for pressure drop is as follows:

Pipe Diameter (mm)	Minimum Time Min:Sec
100 mm	1:53
150 mm	2:50
200 mm	3:47
250 mm	4:43
300 mm	5:40
375 mm	7:05
450 mm	8:30
525 mm	9:55
600 mm	11:20

.4 Test all forcemains as per Section 33 11 16 - Water Main, Testing of Pipework, at a pressure of 690 kPa.

3.8 TESTS TO BE REPEATED

.1 Should test disclose leakage is greater than permissible amount, locate and repair defective pipe, or joint, to the approval of the Authority.

.2 Test to be carried out, at no extra cost to Contract to determine success or otherwise of remedial measures applied to pipework. These tests to be repeated at no extra cost to Contract until results show that remedial measures have been successful.

.3 Following acceptance of field tests, should Authority suspect the sanitary gravity sewer, for any reason, no longer complies with requirement of the test, the Authority may order a second test and should the length of pipeline prove defective, the Contractor shall repair or make good the defect at no extra cost to Contract.

.4 Cost of second test to be at no extra cost to Contract if test proves a defect. However, if this second test shows pipe to be satisfactory, cost of second test will be borne by Owner.

.5 Repair visible leaks regardless of test results.

3.9 CLOSED CIRCUIT TELEVISION INSPECTIONS

.1 Inspection of installed sewers and outfalls by television camera will be required 30 days after installation of pipe.

.2 Equipment:

.1 Provide equipment meeting following requirements:

.1 Self-contained monitoring unit and camera with remotely controlled lighting system capable of varying the illumination.

.3 Picture quality shall produce continuous 600-line resolution picture, showing entire periphery of pipe.

.1 A meter device with readings above ground or marking on cable to clearly identify exact location of camera.

.4 Definition of fault:

.1 Any pipe joint which displays a gap or spread, offset, gasket, or signs of infiltration.
.2 Any section of pipeline which is crushed, broken or displays cracks.
.3 Any variance in grade of pipeline.
.4 Any gravel, roots, or foreign material which may impede flow.
.5 Any deformation in shape of pipe.

.5 Inspection:

.1 Perform inspection of pipe by passing TV camera through pipeline in direction of flow.

.6 Records:

.1 Maintain inspection record in log form, during television inspection.
.2 Log to include location of each fault.
.3 Photograph fault from the television screen using a 35 mm camera. All photographs to be clear and precise with distinct definition of fault.
.4 Include detailed technical description with photographs as supporting data for each fault.

.7 Reports:

.1 Provide 2 composite reports of TV inspection. Enclose report in binder on letter size paper. Include following pages and information.

.1 Title page identifying project, camera operator and dates of inspection.

.2 Index page identifying pipeline, page number or numbers where information for section is contained.

.2 Report on each pipeline to contain:

.1 Heading:

.1 Reference drawing number, if applicable.

.2 Weather on the day of inspection.

.3 Statement of soil condition in area of inspection, i.e., dry, damp, wet, frozen.

.4 Date of inspection.

.2 Key Plan showing magnetic north, horizontal distance, pipe and material and direction of flow.

.3 Inspection findings for each pipeline to include:

.1 Location of all faults.

.2 One photograph each of typical joint and flanged connection.

.4 Mount photographs on left-hand page and place corresponding description on right-hand page. Number all photographs in order. Number beside photograph to correspond with description number.

.5 Enclose all pages of report in transparent sheet protector.

.6 Provide copy of video tape to Authority.

.7 Repeat Inspection:

.1 Repair faults detected during television inspection. Repeat television inspection at no cost to the Owner.

3.10 CLEANUP

.1 Upon completion of testing of each section remove all ancillary equipment and plug holes. Do not backfill around test plugs until inspected by Authority.

END OF SECTION

PART 1 - GENERALSTARTFRAGMENT ENDFRAGMENT

1.1 WORK INCLUDED

.1 This section specifies requirements for maintaining services, supplying, transporting and installing storm sewers. Work includes supply and installation of pipe, fittings, and bedding material to the grades and dimensions indicated on the Drawings and as directed by the Consultant.

1.2 RELATED WORK

.1 Section 31 23 33.01 - Excavating, Trenching and Backfilling.

.2 Section 32 11 23.01 - Granular Surface.

.3 Section 33 05 14 - Precast Manholes and Structures.

1.3 REFERENCES

.1 ASTM C 76M-22a reinforced concrete culvert storm drain and sewer pipe (metric).

.2 CAN/CSA-B182.2-M95 Polyvinyl Chloride 1120 Pipe and Fittings.

.3 CAN/CSA-A257 Series-24 Standards for Concrete Pipe.

PART 2 - PRODUCTS

2.1 CONCRETE PIPE AND FITTINGS

.1 Pipe and fittings

.1 Reinforced Concrete Class V: to ASTM C 76M-02 or CAN/CSA-A257 Series-M92(R1998).

2.2 POLETHYENE PIPE

.1 CSA Standard B182.8, non perforated rigid dual wall pipe with smooth interior and corrugated exterior Polyethylene Pipe for roadway use. Acceptable product: Solflo Max or approved equal.

2.3 POLYVINYL CHLORIDE 1120 PIPE AND FITTINGS

.1 CAN/CSA-B182.2-M95 with a pipe Dimensional Ratio (DR) of 35.

2.4 PIPE BEDDING MATERIAL

.1 Clear stone bedding material: as specified in Section 32 11 23.01 - Excavating, Trenching and Backfilling.

PART 3 - EXECUTION

3.1 PREPARATION

.1 Clean pipes and appurtenances of accumulated debris and water before installation. Carefully inspect materials for defects. Remove defective materials from site.

.2 Provide proper implements, tools and facilities approved by the Consultant for the safe and convenient execution of the work. Take every precaution to prevent foreign material from entering the pipe.

3.2 TRENCHING AND BACKFILLING

.1 Do trenching and backfill work in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

3.3 PIPE BEDDING

.1 Place bedding to depth indicated on Drawings.

.2 Shape bed true to grade to provide continuous uniform bearing surface for pipe exterior, including spading under the pipe haunches. Do not use blocks when bedding pipe.

.3 Shape transverse depressions in bedding as required to make joints.

.4 Carry bedding material horizontally across actual trench width. Mounding bedding material will not be permitted.

.5 After pipe installation place remainder of bedding in layers over pipe to dimensions indicated.

3.4 PIPE LAYING

.1 Carefully lower pipe into the trench. Do not drop or dump materials into trench.

.2 Firmly and accurately set pipe to line and elevation on bedding material to the depth shown on the Drawings, using laser. Install pipe without reverse grade.

.3 Check profiles at the commencement of work. Confirm grade and depths. Any variation shall be made only at the order of the consultant.

.4 Start laying of the pipe at the lowest pipe and lay upgrade unless approved otherwise by the Consultant.

.5 Do not lay pipe when the trench bottom is frozen or underwater or when trench conditions or weather are unsuitable.

.6 Temporarily support all pipe during assembly in a manner to ensure pipe is not strained during jointing procedure. Do not exceed permissible deflection at joints as recommended by pipe manufacturer.

.7 Whenever it is necessary to cut pipe to fit into pipeline this work shall be done and materials provided by the Contractor at his own expense. The Contractor will not receive extra compensation for cutting of pipe or for placing cut pipe.

.8 Should inspection disclose pipe having ponding/reverse grade and/or misalignment, the Contractor shall locate and repair defective pipes, or joint to approval of Consultant without additional payment.

3.5 PIPE JOINTING

.1 Align pipes carefully before jointing.

.2 Support pipes with hand slings or crane as required to minimize lateral pressure on joints.

.3 Maintain pipe joints clean and free from foreign materials.

.4 Complete each joint before laying next length of pipe.

.5 Apply sufficient pressure in making joints to ensure that joint is completed to manufacturer's recommendations. Minimize deflection after joint has been made to avoid damage.

3.6 PIPE SURROUND

.1 Place surround material in unfrozen condition.

.2 Upon completion of pipe laying, and after Consultant has inspected pipe joints, surround and cover pipes as indicated. Leave joints and fittings exposed until field testing is completed.

.3 Hand place surround material in uniform layers not exceeding 150 mm compacted thickness as indicated.

.4 Place layers uniformly and simultaneously on each side of pipe.

.5 Compact each layer from pipe invert to underside of backfill to at least 95 % corrected maximum dry density maximum density to ASTM D 698-00a. Minimum one nuclear density test per 100m of trench for each lift of backfill.

.6 When field test results are acceptable to Consultant, place surround material at pipe joints.

3.7 BACKFILL

.1 Place backfill material in unfrozen condition.

.2 Place backfill material, above pipe surround, in uniform layers not exceeding 150 mm compacted thickness up to grades as indicated.

3.8 FLUSHING

.1 Flush sewer after installation. Do not flush debris into receiving sewers.

.2 Flushing operations to be approved and witnessed by Consultant.

.3 Flush through available outlets until foreign materials have been removed and flushed water is clear.

3.9 CLOSED CIRCUIT TELEVISION INSPECTIONS

.1 Inspection of installed sewers and outfalls by television camera will be required 30 days after installation of pipe.

.2 Equipment:

.1 Provide equipment meeting following requirements:

.1 Self-contained monitoring unit and camera with remotely controlled lighting system capable of varying the illumination.

.2 Picture quality shall produce continuous 600-line resolution picture, showing entire periphery of pipe.

.3 A meter device with readings above ground or marking on cable to clearly identify exact location of camera.

.3 Definition of fault:

.1 Any pipe joint which displays a gap or spread, offset, gasket, or signs of infiltration.
.2 Any section of pipeline which is crushed, broken or displays cracks.
.3 Any variance in grade of pipeline.
.4 Any gravel, roots, or foreign material which may impede flow.
.5 Any deformation in shape of pipe.

.4 Inspection:

.1 Perform inspection of pipe by passing TV camera through pipeline in direction of flow.

.5 Records:

.1 Maintain inspection record in log form, during television inspection.
.2 Log to include location of each fault.
.3 Photograph fault from the television screen using a 35 mm camera. All photographs to be clear and precise with distinct definition of fault.
.4 Include detailed technical description with photographs as supporting data for each fault.

.6 Reports:

.1 Provide 2 composite reports of TV inspection. Enclose report in binder on letter size paper. Include following pages and information.

.1 Title page identifying project, camera operator and dates of inspection.

.2 Index page identifying pipeline, page number or numbers where information for section is contained.

.2 Report on each pipeline to contain:

.1 Heading:

.1 Reference drawing number, if applicable.

.2 Weather on the day of inspection.

.3 Statement of soil condition in area of inspection, i.e., dry, damp, wet, frozen.

.4 Date of inspection.

.2 Key Plan showing magnetic north, horizontal distance, pipe and material and direction of flow.

.3 Inspection findings for each pipeline to include:

.1 Location of all faults.

.2 One photograph each of typical joint and flanged connection.

.4 Mount photographs on left-hand page and place corresponding description on right-hand page. Number all photographs in order. Number beside photograph to correspond with description number.

.5 Enclose all pages of report in transparent sheet protector.

.6 Provide copy of video tape to Authority.

.7 Repeat Inspection:

.1 Repair faults detected during television inspection. Repeat television inspection at no cost to the Owner.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK

.1 Section 31.23.33.01 Excavating, Trenching and Backfilling.

1.2 REFERENCES

.1 Canadian Standards Association (CSA)

.1 CAN/CSA-A3000-23, Cementitious Materials Compendium.
.2 CAN/CSA-A23.2-19, Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.
.3 CAN/CSA-G30.18-21, Carbon-Steel Bars for Concrete Reinforcement.

1.3 SHOP DRAWINGS

.1 Submit shop drawings for precast manholes in accordance with Section 01 01 30.

PART 2 - PRODUCTS

2.1 PVC DUCTS

.1 PVC ducts, type DBII, encased in concrete.

2.2 PVC DUCT FITTINGS

.1 Rigid PVC opaque solvent welded type couplings, bell end fittings, plugs, caps, adaptors as required to make complete installation.

.2 Expansion joints where ducts exit the ground.

.3 Rigid PVC 5 degree angle couplings.

2.3 PRECAST CONCRETE MANHOLES

.1 Precast concrete manholes and auxiliary sections fabricated in steel forms.

.2 Aggregates: to CAN/CSA-A23.1-00.

.3 Concrete minimum strength: 5000 psi (35 MPA) at 28 days.

.4 Air entraining: 5 - 7%.

.5 Steel reinforcement: 10 m rebar and structural fibre.

.6 Pulling inserts and bolts for racks integrally cast in concrete.

.7 Neoprene gasket seals between manhole sections: to ASTM D 1056-00.

.8 Design for earth deadload.

.9 Cast frame and cover.

.10 Grade rings as required.

.11 Conduit window.

.12 Size: as noted on the Drawings.

2.4 CABLE PULLING EQUIPMENT

.1 Pulling iron: galvanized steel rods, size and shape as indicated.

.2 Pull rope: 6 mm stranded polypropylene, tensile strength 5 kN, continuous throughout each duct run with 3 m spare rope at each end.

PART 3 - EXECUTION

3.1 INSTALLATION GENERAL

.1 Install underground duct banks and manholes including formwork.

.2 Build duct bank and manholes on undisturbed soil or on well compacted granular fill not less than 150 mm thick, compacted to 95% of maximum proctor dry density.

.3 Open trench completely between manholes to be connected before ducts are laid and ensure that no obstructions will necessitate change in grade of ducts.

.4 Install ducts at elevations and with slope as indicated and minimum slope of 1 to 400.

.5 Install base spacers at maximum intervals of 1.5 m levelled to grades indicated for bottom layer of ducts.

.6 Lay PVC ducts with configuration and reinforcing as indicated with preformed interlocking, rigid plastic intermediate spacers to maintain spacing between ducts at not less than 190 mm horizontally and vertically. Stagger joints in adjacent layers at least 150 mm and make joints watertight. Encase duct bank with 75 mm thick concrete cover.

.7 Make transpositions, offsets and changes in direction using 5 degree bend sections, do not exceed a total of 20 degree with duct offset.

.8 Use bell ends at duct terminations in manholes.

.9 Use conduit to duct adapters when connecting to conduits.

.10 Terminate duct runs with duct coupling set flush with end of concrete envelope when dead ending duct bank for future extension.

.11 Cut, ream and taper end of ducts in field in accordance with manufacturer's recommendations, so that duct ends are fully equal to factory-made ends.

.12 Allow concrete to attain 50% of its specified strength before backfilling.

.13 Use anchors, ties and trench jacks as required to secure ducts and prevent moving during placing of concrete. Tie ducts to spacers with twine or other non-metallic material. Remove weights or wood braces before concrete has set and fill voids.

.14 Clean ducts before laying. Cap ends of ducts during construction and after installation to prevent entrance of foreign materials.

.15 Immediately after placing of concrete, pull through each duct mandrel not less than 300 mm long and of diameter 6 mm less than internal diameter of duct, followed by stiff bristle brush to remove sand, earth and other foreign matter. Avoid disturbing or damaging ducts where concrete has not set completely. Pull stiff bristle brush through each duct immediately before pulling-in cables.

.16 Install four 3 m lengths of 10M reinforcing rods, one in each corner of duct bank when connecting duct to manholes or buildings. Wire rods to 10M dowels at manhole or building and support from duct spacers. Place concrete down sides of duct bank filling space under and around ducts. Rod concrete with flat bar between vertical rows filling voids.

.17 In each duct install pull rope continuous throughout each duct run with 3 m spare rope at each end.

3.2 MANHOLES

.1 Install precast manholes where indicated on the Drawings.

.2 Build up concrete manhole neck to bring cover flush with finished grade in paved areas and 50 mm above grade in unpaved areas.

.3 Install manhole frames and covers for each manhole. Set frames in concrete grout onto manhole neck.

.4 Drain floor towards sump with 1 to 48 slope minimum and install drainage fittings as indicated.

.5 Grout frames of manholes. Cement grout to consist of two parts sand and one part cement and sufficient water to form a plastic slurry.

.6 Ensure filling of voids in joint being sealed. Plaster with cement grout, walls, ceiling and neck.

3.3 INSPECTIONS

.1 Inspection of duct will be carried out by Consultant prior to placing. Placement of concrete and duct cleanout to be done when Consultant present.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 Canadian Standards Association (CSA)

.2 CSA C22.2-94. 211.2-06, Rigid PVC Conduit.

1.2 SUBMITTALS

.1 Make submittals in accordance with Section 01 01 30.

.2 Submit WHMIS MSDS - Material Safety Data Sheets acceptable to Health Canada for solvent cement. Indicate VOC content.

PART 2 - PRODUCTS

2.1 PVC DUCTS AND FITTINGS

.1 Rigid PVC duct: to CSA C22.2-94. 211.2, with moulded fittings, for direct burial.

.2 Rigid PVC bends, couplings, reducers, bell end fittings, plugs, caps, adaptors same product material as duct, to make complete installation.

.3 Rigid PVC 90° and 45° bends.

.4 Rigid PVC 5° angle couplings.

.5 Expansion joints where conduits exit ground.

2.2 SOLVENT WELD COMPOUND

.1 Solvent cement for PVC duct joints.

2.3 CABLE PULLING EQUIPMENT

.1 6mm stranded polypropylene pull rope, tensile strength 5 kN, continuous throughout each duct run with 3m spare rope at each end.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Install duct in accordance with manufacturer's instructions.

.2 Clean inside of ducts before laying.

.3 Ensure full, even support every 1.5 m throughout duct length.

.4 Slope ducts with 1 to 400 minimum slope.

.5 During construction, cap ends of ducts to prevent entrance of foreign materials.

.6 Pull through each duct mandrel not less than 300mm long and of diameter 6mm less than internal diameter of duct, followed by stiff bristle brush to remove sand, earth and other foreign matter. Pull stiff bristle brush through each duct immediately before pulling-in cables.

.7 In each duct install pull rope continuous throughout each duct run with 3m spare rope at each end.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK

.1 Section 31 23 33.01 – Excavating, Trenching and Backfilling.

1.2 REFERENCE STANDARDS

.1 ASTM C127-24, Standard Test Method for Relative Density (Specific Gravity) and Absorption of Coarse Aggregate.

.2 AASHTO T85-22, Standard Method of Test for Specific Gravity and Absorption of Coarse Aggregate.

.3 CIRIA, CUR, CETMEF. (2007). The Rock Manual – The Use of Rock in Hydraulic Engineering, 2nd Edition.

1.3 SOURCE SAMPLING AND APPROVAL

.1 Inform the Consultant of proposed source of materials and provide access for sampling at least two (2) weeks prior to commencing work, and at least one (1) week prior to shipping material to site. Forward, prepaid, a sample rock to be used to a testing consultant determined by the Consultant for approval. Sample to be between 5 and 10 kg, representative of quarry and submitted minimum two (2) weeks prior to starting work and at least one (1) week prior to shipping material to site.

.2 Armourstone to be individually selected at the source and marked for delivery to the site by the Contractor.

.3 Acceptance of material at the source does not preclude future rejection at the site if it fails to conform to the requirements specified.

.4 Miscellaneous stone materials excavated from the site may be suitable for reuse in the new structures if they meet the requirements specified herein. Reuse of excavated stone materials requires the approval of the Consultant.

1.4 EXISTING CONDITIONS AND HAUL ROAD

.1 Determine what preparatory work will be required for the following:

.1 Condition of existing structures over which material must be hauled.

.2 Preparation, maintenance and removal of temporary roadways to and on the rock revetment and breakwaters for the use of trucks, cranes, excavators, draglines, etc.

.3 Preparation, maintenance and removal of all temporary causeways and/or fills as required for trucks, loaders, excavators, cranes, draglines, etc.

.4 Contractor will be solely responsible for construction and maintenance of haul roads which will be considered incidental to the work. Remove all temporary roads at the completion of the project and restore the land to its original condition.

1.5 STONE MATERIAL QC/QA PROGRAM

.1 Quality Control (QC) Program:

.1 The contractor is responsible for, and shall establish and maintain, Quality Control for all stone production, hauling and placement under this contract to assure compliance with the specifications.

.2 The Contractor shall exercise care in loading, hauling, unloading, and placing of stone during all phases of construction to prevent cracking and splitting that would otherwise lead to rejection at the job site.

.3 The Contractor shall be responsible for:

.1 Maintaining a daily log, compiled in tabular format, presented in a clear and legible fashion indicating the following as a minimum:

.2 quantity of stone produced to date for each stone type.

.3 quantity of stone shipped to date for each stone type.

.4 Loading trucks with stone from one classification only.

.5 Maintaining separate stockpiles of stone materials by stone classification. Stone may only be shipped to the site from stockpiled materials.

.6 Visually inspecting all armourstone for blast fractures, size, and quality factors to verify that stone meets the quality requirements of this section.

.7 Conducting stone gradations and elongation tests and making appropriate production modifications on each stone classification as required to verify that they meet the gradation and geometric requirements of this section.

.8 Quality Assurance (QA) Activities:

.1 Quality Assurance activities will be performed by the Consultant. These activities are intended to provide independent observations of conformance to the requirements of this section prior to shipment of the stone to the site, and in no way relieve the Contractor of his responsibilities for Quality Control (QC) and in-place requirements.

.2 The Consultant may also perform Quality Assurance (QA) activities at the project site.

1.6 STONE GRADATION TEST REQUIREMENTS

.1 Armourstone:

.1 Two (2) Quality Assurance gradation tests will be conducted for the armourstone throughout the scheduled work, unless gradation test results or observations of stone materials indicate additional gradation tests are required.

.2 The Consultant will randomly select a representative sample of stone equal to at least 30 times the median stone weight for the stone classification being sampled. The total sample must be accurately weighed to within 1%. Each individual stone in the sample will then be measured along three mutually perpendicular axes (dimensions a, b and c) and the measurements recorded. Individual stone weights will then be initially estimated based on the measured volume (i.e., measured volume = a x b x c) multiplied by the saturated surface dry (SSD) stone density for that stone type. The individual initial estimated weights will then be "adjusted" by an adjustment factor equal to the ratio of the actual total sample weight divided by the sum of the individual initial estimated weights. The resulting "adjusted" stone weights will be used to assemble a gradation curve for the sample. Alternatively, the Contractor may elect to weigh every stone in the sample, in which case the gradation curves will be assembled using the actual measured stone weights.

.2 Filterstone:

.1 Two (2) Quality Assurance gradation tests will be conducted for the filterstone throughout the scheduled work, unless gradation test results or observations of stone materials indicate additional gradation tests are required.

.2 Undertake Quality Assurance gradation tests for filterstone in accordance with Article 1.5.1.2 above, with a minimum sample size of 3000 kg. Alternative methods may be considered, subject to approval by the Consultant.

1.7 PRODUCTION SCHEDULE

.1 All stone materials shall be produced and prepared for delivery according to the construction schedule of the Contractor.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Rock Material:

.1 Test all rock materials and have approved by the Consultant prior to installation in the work.

.2 All rock materials to be free from cracks, seams and other defects which may impair durability.

.3 Armourstone and Filterstone to meet the following requirements: Specific Gravity minimum 2.65 and absorption maximum 2.0%. Slate, sandstone,

shale and stone containing mica not acceptable for filterstone or armourstone.

.4 Corestone to meet the following requirements: Specific Gravity minimum 2.50.

.5 Actual Specific Gravity and absorption will be determined by testing selected samples of material being incorporated into the works. Materials with a specific gravity less than required minimum specified above or an absorption rate in excess of 2% will be rejected.

.2 300 mm minus Rock Fill Corestone:

Sieve Size	Percent Passing
	12" minus Rockfill
12" (300mm)	100
6" (150mm)	60-90
4" (100mm)	-
3" (75mm)	40-55
2" (50mm)	-
3/8" (9.5mm)	0-5

.1 Rockfill shall be hard, durable, sound, quarried rock, free from splits, seams, or defects likely to impair it's soundness during handling or by actions of water, and free from silt, clay, organic or other deterious materials. Rockfill shall be well-graded. The material shall have an abrasion loos of not more than 50%.

.2 Rockfill shall be suitably graded such as to minimize segregation during end dumping.

.3 Gradation shall be within the above limits for all rockfill.

.3 Armourstone:

.1 Armourstone to be angular in shape, with the ratio of maximum to minimum dimensions (aspect ratio) not exceeding 2.0.

.2 Armourstone class designation ‘500 to 1500 kg’ to conform to 1000kg median weight and:

.1 No more than 5% must be less than 400 kg.

No more than 10% must be less than 500 kg.

No less than 70% must be less than 1500 kg.

No less than 97% must be less than 2000 kg.

.3 Armourstones outside of the specified ranges may be acceptable for use at the discretion of the Consultant.

.4 Filterstone:

.1 Filterstone to be angular in shape, with the ratio of maximum to minimum dimensions (aspect ratio) not exceeding 2.0.

.2 Filterstone to conform to ‘50 to 150kg’ Class designation, 100 kg Median weight and:

.1 No more than 5% must be less than 40 kg.

.2 No more than 10% must be less than 50 kg.

.3 No less than 70% must be less than 150 kg.

.4 No less than 97% must be less than 200 kg.

.3 Armourstones outside of the specified ranges may be acceptable for use at the discretion of the Consultant.

PART 3 - EXECUTION

3.1 CORESTONE

.1 Do not place corestone until bottom area has been accepted by the Consultant.

.2 Do not place material under poor weather conditions. Place immediately prior to planned placement of filterstone.

.3 Tolerance: surface of bearing layer to be within 50mm of elevation indicated and variation in elevation over whole area of bearing layer not to exceed 75mm.

.1 Other layers to be within 100mm of lines shown.

.4 Place core material to lines, grades and dimensions indicated on the plan.

.5 Place geotextile fabric on clean harbour bottom to specified grades, and after the removal of kelp, debris, snow, ice, etc.

.6 Execute work in such a manner to protect core material from storm wave action or tidal erosion damage. Replace material lost due to storm or erosion damage at no additional cost to the Contract.

.7 Do not extend rockfill corestone material more than 10 metres beyond filterstone protection.

.8 Corestone Rock Fill material may be placed by end dumping. However, note that due to the side slopes of the breakwaters that mechanical placing of the core will be necessary to produce the slopes and shapes required.

.9 Grades, lines, dimensions, slope and quantity of core, to be reviewed and approved by the Consultant before proceeding with overlaying filter layer.

3.2 FILTERSTONE

.1 Place filter layer material to lines, grades and dimensions indicated on the plans.

.2 Place filter layer material in two (2) layers as shown on plans.

.3 Do not extend filter material for breakwaters more than 10 metres beyond armourstone protection.

.4 Place filterstone using mechanical means to the lines, grades and dimensions shown on the plans. Do not dump filter units into place. Commence placement at toe of slope and proceed up the slope towards the crest. Place filterstone so that it is stable, secure on slope and supported by units below. Control placement of filterstone so as to produce a uniform and continuous cover over the underlying layer.

.5 Replace filterstone units broken or damaged during placement. Remove damaged units from the work. Provide replacements and removals at no additional cost to the Contract.

.6 Have grades, lines, dimensions, slopes and quantity of filterstone reviewed and approved by the Consultant before proceeding with the overlying armour layer.

3.3 ARMOURSTONE

.1 Place armourstone in layers as shown on the plan to the lines, grades and dimensions shown on the plan.

.2 Place each armourstone individually using mechanical means to the lines, grades and dimensions shown on the plans. Do not dump armour units into place. Commence placement at toe of slope and proceed up the slope towards the crest elevation. Place each unit so that it is stable and secure on slope and supported by units below. Control placement of armour units so as to produce a uniform and continuous cover.

.3 Completed armourstone in place to consist of:

.1 Two (2) layers along all slopes of the breakwaters, including seaward slope, 180-degree end cones and back slopes, as shown on Project Drawings.
.2 Two (2) layers along the whole crest of the breakwaters, as shown on Project Drawings.
.3 Place armourstone in an approved manner to produce regular surface and a stable mass.

.4 Replace armourstone units broken or damaged during placement. Remove damaged units from the work. Provide replacements and removals at no additional cost to the Contract.

3.4 TOLERANCES

.1 Consider the layer thicknesses and slopes shown on the Project Drawings the target thicknesses and grades.

.2 Completed component layers to be within following tolerances of line and grades indicated:

.1 Rock Fill Corestone: plus or minus 50 mm.
.2 Filterstone ‘50 to 150kg’ above low water line (dry): +150 mm to -50 mm.
.3 Filterstone ‘50 to 150kg’ below low water line (wet): +200 mm to -100 mm.
.4 Armourstone ‘500 to 1500kg’ above low water line (dry): +300 mm to -200 mm.
.5 Armourstone ‘500 to 1500kg’ below low water line (wet): +500 mm to -400 mm.
.6 Armourstone crest elevation: Minimum elevation not to be uniformly high or low.

.3 The tolerances of two (2) consecutive finished surface profiles must be positive.

.4 Layer thickness not to be less than 80 percent of design thickness.

.5 Tolerances outside the limits prescribed above may be acceptable at the discretion of the Consultant.

3.5 CROSS SECTIONS

.1 During construction submit cross-section sheets to the Consultant showing the following:

.1 Cross-sections at stations every 10 metres along the breakwater slope.
.2 The design cross-section showing proposed core rock fill, filter, and armourstone in solid lines.
.3 Superimposed in dashed lines elevations taken at 2 metre intervals perpendicular to the centreline and at top and toe of slopes showing core, filter, and armourstone as constructed surfaces.
.4 Reference cross-sections to the plan view of the breakwaters with stations shown for reference.
.5 Submit cross-sections as work at each station is completed for each class of stone. Do not place next layer until the Consultant or his representative has reviewed and approved the as-built elevations for underlying layer.
.6 After construction is complete and before the Final Certificate of Completion will be paid, submit detailed as-built survey plan to Consultant to show that contract grades and elevations have been achieved. Provide an electronic file and two (2) sets of prints. The following minimum requirements must be met:

.1 Elevations every 10 meters along the centerline of the breakwaters and every 6 meters perpendicular to the centerline, on the end cone, and top and toe of slopes.

3.6 PROTECTION

.1 Conduct all necessary repairs to the work during construction, including reshaping of slopes and replacement of materials displaced by waves, currents, own activities or any other cause.

.2 The work site is subject to water level variations due to tidal action. Take into account anticipated weather conditions and degree of exposure of site and tidal conditions in setting requirements for protection.

.3 Schedule and carry out construction so that each phase of work is not left exposed longer than necessary.

.4 Progress of placement of rock fill core, armour and filter stone to be recorded daily by the Consultant’s inspector with Contractor's concurrence. Replacement of material lost due to storm wave action or tidal erosion damage will be based on daily journal of work progress and is considered incidental to the work.

END OF SECTION

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

.1 This section specifies requirements for the following items:

.1 Miscellaneous hardware.

1.2 RELATED SECTIONS

.1 Section 05 50 00 – Metal Fabrications

1.3 REFERENCE STANDARDS

.1 ASTM A48-22, Standard Specification for Gray Iron Castings.

.2 ASTM A307-21, Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60,000 psi Tensile Strength.

.3 ASTM A563/A563M-24, Standard Specification for Carbon and Alloy Steel Nuts (Inch and Metric).

.4 ASTM A780/A780M-20, Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.

.5 ASTM F1554-20, Standard Specification for Anchor Bolts, Steel, 36, 55, and 105 ksi Yield Strength.

.6 CSA G40.20-13/G40.21-13(R2023), General Requirements for Rolled or Welded Structural Quality Steel / Structural Quality Steel.

.7 CSA S16-24, Design of Steel Structures.

.8 CSA G164-18 (R2023), Hot Dip Galvanizing of Irregularly Shaped Articles.

.9 CSA W59-24, Welded Steel Construction.

1.4 SUBMISSIONS

.1 1 Shop Drawings:

.1 Clearly indicate the following items:

.1 General arrangements, dimensions, clearance locations and directions of assemblies as installed on structures.

.2 Locations, sizes and installation tolerances of anchor bolts, and embedded parts.

.3 Types of materials used, finishes and core thickness.

.4 All other pertinent details and accessories.

.2 Test Results:

.1 Provide test results for galvanized items.

.3 Submissions

.1 Provide submissions in accordance with Section 01 33 00.
.2 Product Data/Samples:

.1 Provide product data and manufacturers brochures for mooring cleats.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Hardware and miscellaneous items must meet the following specifications:

.1 Machine bolts, lag bolts, drift bolts, nuts, washers: to ASTM A307.
.2 Anchor rods: to ASTM F1554, GR.55; anchor rod nuts to: ASTM A563, Grade A Heavy Hex Nut.
.3 Steel plates, and miscellaneous steel: to CSA G40.20/G40.21, Grade 300W.
.4 Do not use items manufactured or fabricated from scrap steel of unknown chemical composition or physical properties.
.5 Hot dip galvanize bolts, anchor bolts, nuts, washers, steel plates, and any other miscellaneous steel to CSA G164 with minimum zinc coating of 705 g/m².

.2 Miscellaneous metal works items

.1 Miscellaneous anchors, bolts, and inserts:

.1 Where size, spacing and the like are not indicated, provide as necessary for the purpose.

.2 Galvanize all miscellaneous anchors, bolts and inserts.

.2 Miscellaneous Steel:

.1 Provide miscellaneous steel as required to the shape, size and details required.

.2 Galvanize all miscellaneous steel items.

PART 3 - EXECUTION

3.1 FABRICATION

.1 Build work square, true, straight and accurate to required size, with joints closely fitted and properly secured.

.2 Fabricate items unless otherwise noted.

.3 Where possible, fit and shop assemble work, ready for installation.

.4 Confirm through inspection that exposed welds are continuous for length.

3.2 INSTALLATION GENERAL

.1 Boreholes for drift bolts to be 1.5mm smaller in diameter than bolt and for full length of bolt. Boreholes for machine bolts to be same diameter as bolts. Boreholes for lag bolts to be same diameter as shank for unthreaded portion and 0.70 times the shank diameter for the threaded portion. Threaded portion of lag bolts will be installed using a wrench, not by driving.

.2 Contain all debris and leachates (films on water surface) within the area of the work by using containment facilities such as floating booms or screens.

3.3 ERECTION

.1 Install metalwork square, plumb, straight and true, accurately fitted, with tight joints and intersections.

.2 Make field connections with bolts to CSA S16, or weld.

.3 Touch-up bolts and scratched galvanized surfaces after completion of erection in accordance with ASTM A780/A780M.

END OF SECTION

APPENDIX A

GEOTECHNICAL REPORT

Geotechnical Investigation Report

Market Wharf Approach Trestle Replacement

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Town of Saint Andrews

Conquest Engineering
Experience commitment.
Geotechnical and Materials Engineers

Project # 222828.00 | March 24, 2022

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1 | Introduction

Conquest Engineering, a division of CBCL Limited, have conducted a geotechnical investigation for the proposed approach trestle replacement and shoreline infill at the Market Wharf in Saint Andrews, New Brunswick, at the request of the Town of Saint Andrews. The purpose of this investigation was to evaluate the subsurface conditions at the site and to provide geotechnical recommendations for construction and design.

This report presents our findings and our geotechnical recommendations for design and general site work.

2 | Site Description and Geology

The site (Market Wharf) is located at the south end of King Street. The existing wharf consists of an approach trestle, an intermediate trestle, and a pier head.

Timber cribbing is located along the existing shoreline with a rock fill slope along its eastern end. A small ramp is situated between the west side of the approach trestle and the timber cribbing. Just to the east of the approach trestle, a small building and deck extend beyond the cribbing. These structures appear to be founded on stilts or shallow timber piles.

Parking areas and several small buildings are located behind the existing cribbing.

The existing beach/harbour bottom (the area is submerged at high tide) is primarily covered with sand, gravel, and cobbles. Several inferred bedrock outcrops were observed along the beach/harbour bottom just east of the approach trestle.

Bedrock in the area is generally mapped as red pebbly sandstone, sandstone, polymictic conglomerate, and siltstone of the Perry Formation.

3 | Summarized Subsurface Conditions

On February 25, 2022, Lantech Drilling Ltd. was engaged to drill a total of four (4) boreholes along the west side of the existing wharf approach trestle. The boreholes were advanced using a track mounted CME style drill rig to depths ranging from 0.6 m to 9.3 m below existing grade. The borehole locations from the investigation are shown in the attached Drawing 1.

Representative soil samples were taken during the field work and the conditions of the boreholes were logged by a Conquest Engineering representative. The overburden was sampled at close intervals using a 50 mm OD split spoon sampler. Sampling within the boreholes was completed in general accordance with ASTM procedures with Standard Penetration Test blow counts recorded for each sample taken. Bedrock cores were sampled by continuous diamond core drilling using an HQ size core barrel.

The subsurface conditions encountered at the site are described in detail on the appended Borehole Records and summarized below in the following paragraphs and Table 1.

The subsurface condition encountered throughout the site generally consist of the following sequence:

- Overburden - SAND with gravel to silty SAND with gravel
- BEDROCK

The overburden encountered throughout the site generally consisted of a loose to compact, brown to black, SAND with gravel to silty SAND with gravel. Some cobbles and shells were encountered throughout. This layer varied in thickness from 0.6 m to 1.7 m.

Bedrock generally consisted of red SANDSTONE with an RQD (Rock Quality Designation) ranging between 17% and 88%, indicating a very severely fractured to sound rock mass. RQD was generally observed to improve with depth.

Unconfined compressive strength testing was conducted on sixteen (16) samples of selected rock core. Testing showed unconfined compressive strengths between 24.3 MPa and 106.2 MPa, which is considered weak to very strong.

Table 1: Summary of Findings

Location	Elevation (m)[1]	Coordinates (m)[2]	Depth to Bedrock (m)	Depth of Borehole (m)
BH-01	5.0	N 7341540.3 E 2456389.5	1.2	9.3
BH-02	4.0	N 7341524.9 E 2456376.1	0.6[3]	0.6
BH-03	3.7	N 7341507.6 E 2456367.0	0.6[3]	0.6
BH-04	3.2	N 7341482.8 E 2456354.4	1.7	4.7

Notes: [1]Chart Datum.
[2]Coordinate system NB Grid NAD83 CSRS.
[3]Inferred bedrock.

4 | Discussions and Recommendations

It is understood that the existing wharf approach trestle is to be replaced with a crib/caisson structure or a pile supported structure. It is also understood that the existing shoreline is to be extended.

4.1 | Crib/Caisson Structure

The following provides general considerations and recommendations for a gravity crib/caisson structure.

Removal of the overburden down to bedrock will be required. A thin rock fill mattress will be required below the crib/caisson for levelling purposes. The extent of dredging must extend beyond the perimeter of the cribs/caissons to include a 1 m bench and a 1H:1V downward splay.

The rock fill mattress should consist of a minimum 300 mm thick leveling course. The recommended mattress gradation is provided below in Table 2.

Table 2: Leveling Course Gradation

Sieve Size (mm)	Percent Passing (%)
60	100
50	70 – 90
37.5	40 – 70
25	0 – 25
19	0 - 3

End dumped rock fill is the typical method of construction for marine mattress construction. Compaction of end dumped material is due to dynamic energy due to free falling and self-weight.

The bearing resistance will depend on the properties of the rock fill, crib/caisson, mattress dimensions, and loading conditions. A factored geotechnical bearing resistance (ULS) of 1,500 kPa may be used for design, provided the following conditions are met:

- The width of the crib/caisson is between 3.5 m and 5.6 m.
- The mattress thickness does not exceed 300 mm.
- The resultant force acts within the middle third of the base of the crib/caisson.
- The surrounding grades are flat.

Assuming the rock fill mattress does not exceed 300 mm in thickness, total settlement will be less than 25 mm.

Sliding resistance will have to be reviewed as the design advances. For preliminary analysis, the ultimate friction factor at the interface of the cribs/caissons and the rock fill mattress can be taken as 0.45.

Internal fill (ballast) for the caissons may consist of a well-graded gravel or rock fill with a maximum particle size of 150 mm. Assuming an end-dumped material, the following parameters may be used for design:

- Total Unit Weight (100% Saturation) 21 kN/m^3
- Submerged Unit Weight 11 kN/m^3
- At-Rest Earth Pressure, K_o 0.4

Internal fill (ballast) for the cribs will have to be sized according to the spacing of the timbers. Assuming an end-dumped, open-graded material, the following parameters may be used for design:

- Total Unit Weight (100% Saturation) 20 kN/m^3
- Submerged Unit Weight 10 kN/m^3
- At-Rest Earth Pressure, K_o 0.4

The rock fill for the mattress should consist of hard, durable, quarried rock having a particle unconfined compressive strength of at least 85 MPa and a specific gravity not less than 2.65. Rock fill particles must be sharp, angular, and very rough. Rock fill shall also be sound, free from splits, seams, or defects likely to impair its soundness during handling or by the actions of water. It shall also be free from silt, clay, organic, or other deleterious materials. The material, when tested by the Micro-Deval test method in accordance with MTO LS-618, shall have a Micro-Deval loss not greater than 30%.

The ballast should consist of hard, durable, quarried rock having a particle unconfined compressive strength of at least 85 MPa and a specific gravity not less than 2.65. Ballast shall also be sound, free from splits, seams, or defects likely to impair its soundness during handling or by the actions of water. It shall also be free from silt, clay, organic, or other deleterious materials. The material, when tested by the Micro-Deval test method in accordance with MTO LS-618, shall have a Micro-Deval loss not greater than 30%.

A review of locally available materials should be undertaken so that both economical and practical materials can be selected.

On-site geotechnical review of the dredging operations is recommended.

4.2 | Pile Supported Structure

A deck supported on a rock-socketed pile foundation could be considered for the approach trestle. Rock sockets can be used to develop both axial compressive and tensile (or uplift) resistance through the bond developed along the socket sidewall between the concrete and the bedrock.

Rock socketed piles would consist of driven or drilled steel pipe piles installed within the overburden material and a concrete socket installed within the bedrock. Steel pipe piles should be seated approximately 1.0 m into the bedrock to provide a good surface seal.

The following factored axial resistances may be used for design:

- Factored bond resistance in axial compression 500 kPa
- Factored bond resistance in axial tension 350 kPa

The above axial resistances include a resistance factor of 0.4 for compression and 0.3 for tension. For the above-noted resistances, the length to diameter ratio of the rock sockets should not exceed 5. The minimum bond length should be the larger of either twice the diameter of the pipe pile (2D) or 2 m.

For the resistance values given above, it was assumed that rotary percussion tooling or drag bits would be used to construct the rock sockets. Under-reaming tools/methods will be needed to advance and seat in the pipe piles (casing) into bedrock. It is essential that rock sockets be thoroughly cleaned and flushed with water such that all residue from drilling muds and/or cuttings are removed. Lifts will be needed to clean out residuals/sediment from the sockets following flushing.

Concrete should be a minimum of 35 MPa and placed by tremie methods.

Rock sockets should be inspected by geotechnical personnel during construction and following socket completion a down-hole video camera should be used to observe the condition of each socket.

4.3 | Infilling

It is understood that the existing shoreline is to be extended along the east and west side of the approach trestle. Upwards of 4 m of fill is anticipated to raise the existing grades along the beach to that of the adjacent cribbing/wharf.

Assuming the existing overburden is left in-place, it is expected that post-construction settlement will be less than 25 mm. However, if permanent building foundations are proposed within the shoreline extension area, the existing overburden should be removed and reinstated with structural fill.

4.3.1 Excavation

Where permanent building foundations are proposed within the shoreline extension area, the existing overburden should be removed a reinstated with structural fill. The extent of the excavation must extend beyond the perimeter of the footings to include a 0.3 m bench and a 1H:1V downward splay.

Where temporary excavations into the overburden are required, a three horizontal to one vertical (3H:1V) slope may be necessary, assuming that water controls are in-place. However, slopes should be reviewed by geotechnical personnel during construction.

4.3.2 Dewatering of Excavations

The contractor undertaking the earthworks must be prepared to dewater excavations. Structural fill should not be placed in standing water, slough, or over softened bearing soils.

Excavations will be complicated by the tides. Installation of water controls prior to the commencement of excavations will be required.

Discharge from the dewatering activities must be carried out in strict accordance with environmental regulations. Discharge may have to be collected and/or filtered to meet environmental guidelines.

4.3.3 Structural Fill Placement and Compaction

The infill (structural fill) should consist of the following:

- Imported, quarried rock fill and gravel, or;
- Sand and gravel pit run.

Structural fill should be placed at or near the optimum moisture content (ASTM D698).

The lift thickness used during placement of structural fill must be compatible with the compaction equipment and the material type to ensure the specified density throughout. For preliminary consideration, the lift thickness should not exceed approximately 300 mm for mass filling. The maximum particle size should be no larger than ⅔ of the lift thickness.

Structural fill should be compacted to the following percentage of maximum Standard Proctor dry density:

Structural fill within building area	100%
Structural fill within 300 mm of paved area subgrade	98%
Structural fill 300 mm or more below paved area subgrade	95%

4.3.4 Slopes

Permanent structural fill slopes should be 2H:1V, or flatter. If permanent cut slopes are proposed, we should be contacted.

4.3.5 Observation and Testing

Observation and testing are recommended during site grading.

4.4 | Winter Construction

Additional effort will be required to conduct earthwork during winter conditions. Winter construction guidelines are attached in Appendix D.

Undertaking earthworks in the winter is not ideal and despite best efforts and good intentions, the quality of earthworks often is compromised.

5 | Closure

This report has been prepared for the sole benefit of the Client. All information, documentation or other material contained in, attached to, or forming part of this report reflects Conquest's opinion and best judgment based on the information available to us at the time of preparation. Any use or reliance on this report by the Client in circumstances where there has been a change in site conditions or for any purpose not expressly intended by or delineated in this report shall be the sole responsibility of the Client and Conquest accepts no liability for such use or reliance. Any use or reliance on this report by any third party, without Conquest's prior express written consent, shall be the sole responsibility of that third party. Conquest accepts no liability whatsoever for such use or reliance.

The information and conclusions contained in this report are generally consistent with professional standards for engineering and scientific professionals providing similar services at the same time, in similar locations and under similar circumstances.

A geotechnical field investigation is a limited sampling of a site. Some variation between sampling locations should be expected. The conclusions presented in this report represent the technical judgment of Conquest, based on the data obtained from the work and on Conquest's understanding of the project. The data obtained by Conquest is specific to the time the work was performed at the specific testing and/or sampling locations and can only be extrapolated to an undefined limited area surrounding these locations. The extent of the limited area depends on the soil and groundwater conditions, as well as the history of the site reflecting natural, construction and other activities. Due to the nature of the investigation and the limited data available, Conquest cannot and does not warrant that

undiscovered environmental liabilities and/or undetected subsurface conditions may not arise.

If any conditions become apparent that differ significantly from our understanding of conditions as presented in this report, we require that we be notified immediately to allow for reassessment of the conclusions provided herein. Further, if there are changes to Client's design, we require that we be notified to allow for review and possible changes to our recommendations.

We trust this is the information you require at this time. We are available to discuss the contents of this report at your convenience.

Sincerely,

Conquest Engineering, a division of CBCL Limited

Devan McKenney, P.Eng.
Geotechnical Engineer
902-789-6046
Email: DMckenney@conquest-eng.com

REGISTERED PROFESSIONAL ENGINEER
Province of New Brunswick
M8692
Devan J. McKenney
Signature
March 24/22
Date
Province du Nouveau-Brunswick
INGÉNIEUR IMMATRICULÉ

APPENDIX A

Borehole Location Plan – Drawing 1

LEGEND

- APPROXIMATE CONQUEST BOREHOLE LOCATIONS (MAR 2022)
- APPROXIMATE INFERRED BEDROCK OUTCROP (MAR 2022)

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PROJECT

BOREHOLE LOCATION PLAN

MARKET WHARF APPROACH
TRESTLE REPLACEMENT
SAINT ANDREWS, NB

JOB #:	222828.00
SCALE:	NTS
DATE:	23-MAR-2022
DRAWN BY:	DM
CHECKED BY:	KL

DOCUMENTS PREPARED BY CONQUEST ENGINEERING LTD. ARE TO BE USED ONLY FOR THE SPECIFIC PROJECT AND SPECIFIC USE FOR WHICH THEY WERE PREPARED. ANY EXTENSION OF USE TO OTHER PROJECTS, BY OWNER, OR ANY OTHER PARTY, WITHOUT THE EXPRESSED, WRITTEN AUTHORIZATION OF CONQUEST ENGINEERING LTD. IS DONE AT THE USERS OWN RISK. IF USED IN A WAY OTHER THAN WHAT WAS SPECIFICALLY INTENDED, THE OWNER WILL HOLD CONQUEST ENGINEERING LTD. HARMLESS FROM ALL CLAIMS AND LOSSES.

DRAWING: 1

REV: 0

APPENDIX B

Symbols and Terms used on Borehole and Test Pit Records

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SYMBOLS AND TERMS USED ON BOREHOLE AND TEST PIT RECORDS

SOIL DESCRIPTION

Terminology describing common soil genesis:

Topsoil	variable mixture of mineral particles and organic matter
Peat	decomposing vegetative matter having fibrous and/or amorphous structure
Till	unstratified glacial deposit which may range from clay to boulders
Fill	any materials below the surface identified as placed by humans (excluding buried services)

Terminology describing soil structure:

Desiccated	having visible signs of weathering by oxidation of clay minerals, shrinkage cracks, etc.
Fissured	having cracks, and hence a blocky structure
Varved	composed of regular alternating layers of silt and clay
Stratified	composed of alternating successions of different soil types, e.g. silt and sand
Layer	>75 mm
Seam	2 mm to 75 mm
Parting	< 2 mm
Well Graded	having wide range in grain sizes and substantial amounts of all intermediate particle sizes
Uniformly Graded	predominantly of one grain size

Terminology describing soils on the basis of grain size and plasticity is based on the ASTM D2488 – Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). The classification excludes particles larger than 76 mm (3 inches). This system provides a group symbol (e.g. SM) and group name (e.g. silty sand) for identification.

Terminology describing materials outside the USCS, (e.g. particles larger than 76 mm, visible organic matter, construction debris) is based upon the proportion of these materials present:

Trace, or occasional	Less than 10%
Some	10-20%
Frequent	Greater than 20%

The standard terminology to describe cohesionless soils includes the compactness as determined by laboratory test or by the Standard Penetration Test 'N' – value.

Relative Density	'N' Value	Compactness %
Very Loose	<4	<15
Loose	4-10	15-35
Compact	10-30	35-65
Dense	30-50	65-85
Very Dense	>50	>85

The standard terminology to describe cohesive soils includes the consistency, which is based on undrained shear strength as measured by in-situ vane tests, penetrometer tests, unconfined compression tests, or occasionally by standard penetration tests.

Consistency	Undrained Shear Strength (Su)		'N' Value
	Kips/sq.ft.	KPa	
Very Soft	< 0.25	< 12.5	< 2
Soft	0.25 – 0.5	12.5 – 25	2 – 4
Firm	0.5 – 1.0	25 – 50	4 – 8
Stiff	1.0 – 2.0	50 – 100	8 – 15
Very Stiff	2.0 – 4.0	100 – 200	15 – 30
Hard	> 4.0	> 200	> 30

ROCK DESCRIPTION

Rock Quality Designation (RQD)

The classification is based on a modified core recovery percentage in which all pieces of sound core over 100 mm long are counted as recovery. The smaller pieces are considered to be due to close shearing, jointing, faulting, or weathering in the rock mass and are not counted. RQD was originally intended to be done on N-size (45 mm) core; however, it can be used on different core sizes if the bulk of the fractures caused by drilling stresses are easily distinguishable from in situ fractures.

RQD	ROCK QUALITY
90 – 100	Excellent, intact, very sound
75 – 90	Good, massive, moderately jointed or sound
50 – 75	Fair, blocky and seamy, fractured
25 – 50	Poor, shattered and very seamy or blocky, severely fractured
0 – 25	Very poor, crushed, very severely fractured

Terminology describing rock mass:

Spacing (mm)	Bedding, Laminations, Bands	Discontinuities
2000 – 6000	*Very Thick*	*Very Wide*
600 – 2000	*Thick*	*Wide*
200 – 600	*Medium*	*Moderate*
60 – 200	*Thin*	*Close*
20 – 60	*Very Thin*	*Very Close*
< 20	*Laminated*	*Extremely Close*
< 6	*Thinly Laminated*	

Strength Classification	Uniaxial Compressive Strength (MPa)
Very Weak	1 – 5
Weak	5 – 25
Medium Strong	25 – 50
Strong	50 – 100
Very Strong	100 – 250
Extremely Strong	> 250

Terminology describing weathering:

Slight - Weathering limited to the surface of major discontinuities. Typically iron stained.
Moderate - Weathering extends throughout rock mass. Rock is not friable.
High - Weathering extends throughout rock mass. Rock is friable.

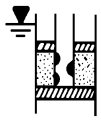
STRATA PLOT

Strata plots symbolize the soil or bedrock description. They are combinations of the following basic symbols:

Boulders Cobbles Gravel	Sand	Silt	Clay	Organics	Asphalt	Concrete	Fill	Igneous Bedrock	Metamorphic Bedrock	Sedi-mentary

WATER LEVEL MEASUREMENT

Borehole or Standpipe



Piezometer

SAMPLE TYPE AND/OR FIELD TESTS

SS	Split Spoon Sample (obtained by performing the Standard Penetration Test)	AS	Auger Sample
		BS	Bulk Sample
		WS	Wash Sample
ST	Shelby Tube or Thin Wall Tube	HQ, NQ, BQ, etc. Rock Core Samples (obtained with the use of standard size diamond drilling bits)	
PS	Piston sample		
DC	Dynamic Cone Penetration		
FSV	Field Shear Vane		

N- VALUE

Numbers in this column are the results of the SPT (Standard Penetration Test): the number of blows of a 140 pound (64kg) hammer falling 30 inches (760 mm), required to drive a 2 inch (50.8 mm) O.D. split spoon sampler one foot (305 mm) into the soil. For split spoon samples where insufficient penetration was achieved and 'N' values cannot be presented, the abbreviation SSR (Split Spoon Refusal) will appear in place of a numerical value.

OTHER TESTS

Symbols in this column indicate that the following laboratory tests have been carried out and the results are presented separately.

S	Sieve analysis	H	Hydrometer analysis
G_s	Specific gravity of soil particles	γ	Unit weight
k	Permeability	C	Consolidation
	Single packer permeability test; test interval from depth shown to bottom of borehole	CD	Consolidated drained triaxial
		CU	Consolidated undrained triaxial with pore pressure measurements
	Double packer permeability test; Test interval as indicated	UU	Unconsolidated undrained triaxial
		DS	Direct shear
	Falling head permeability test using casing	Q_u	Unconfined compression
		I_p	Point Load Index (I_p on Borehole Records equals I_p (50); the index corrected to a reference diameter of 50 mm)
	Falling head permeability test using well point or piezometer	MSV	Laboratory Miniature Shear Vane

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APPENDIX C

Borehole Records

BOREHOLE RECORD

Conquest Engineering
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Project Name: Market Wharf Approach Trestle
Project Number: 222828.00
Client: Town of Saint Andrews
Location: Saint Andrews, NB
Water Level: Tidal

BH - 01
Date Drilled: February 25, 2022
Page: 1 of 1
Datum: Chart
Water Level Date: N.A

Depth (m)	Water Level (m)	Sample Type	Sample Number	N Value or RQD %	Recovery (mm) or %	Symbols	SOIL AND/OR ROCK DESCRIPTION	Elevation (m)
								5.0
							Dense brown SAND with gravel - some cobbles shells	
		SS	1	SSR	200			3.8
		HQ	2	17%	100%		Very severely fractured to sound red SANDSTONE	
		HQ	3	58%	80%			
		HQ	4	57%	100%			
		HQ	5	50%	93%			
		HQ	6	80%	100%			
		HQ	7	88%	100%			
								-4.3
							End of Borehole at 9.3 m	

SPT N-Value (Blows/300mm) 20 40 60 80

Undrained Shear Strength (kPa) 500 1000 1500 2000

Moisture Content / Atterberg Limits Wp I---o---I WL (%) 20 40 60 80

BOREHOLE RECORD

Conquest Engineering
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A division of CBCL Limited

Project Name: Market Wharf Approach Trestle
Project Number: 222828.00
Client: Town of Saint Andrews
Location: Saint Andrews, NB
Water Level: Tidal

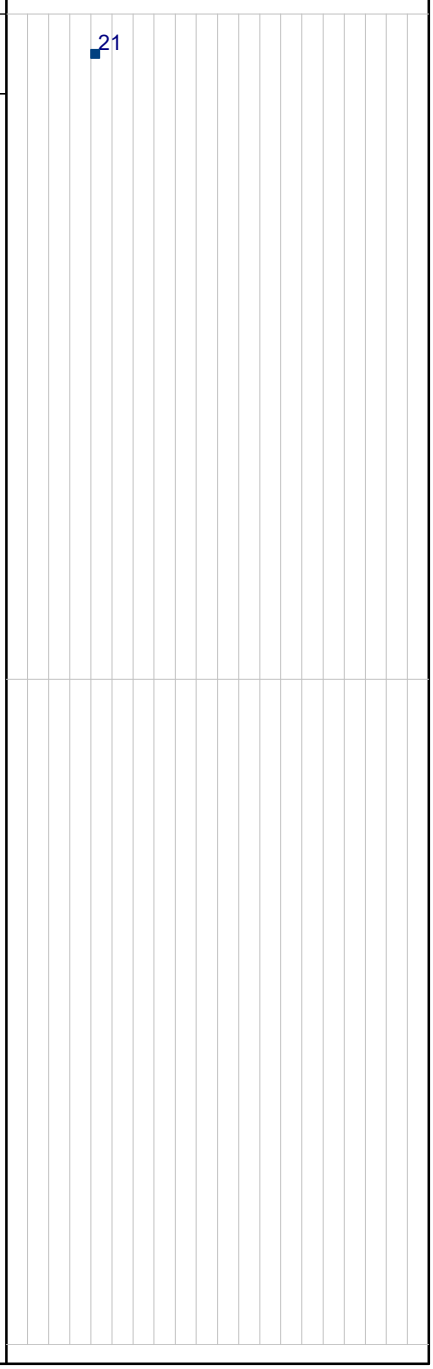
BH - 02
Date Drilled: February 25, 2022
Page: 1 of 1
Datum: Chart
Water Level Date: N.A

Depth (m)	Water Level (m)	Sample Type	Sample Number	N Value or RQD %	Recovery (mm) or %	Symbols	SOIL AND/OR ROCK DESCRIPTION	Elevation (m)
								4.0
		SS	1	21	375		Compact brown to black silty SAND with gravel - some shells	3.4
							End of Borehole at 0.6 m - SPLIT SPOON REFUSAL ON INFERRED BEDROCK	

SPT N-Value (Blows/300mm) 20 40 60 80

Undrained Shear Strength (kPa) 500 1000 1500 2000

Moisture Content / Atterberg Limits Wp I---o---I WL (%) 20 40 60 80



BOREHOLE RECORD

Conquest Engineering
Experience commitment.
A division of CBCL Limited

Project Name: Market Wharf Approach Trestle
Project Number: 222828.00
Client: Town of Saint Andrews
Location: Saint Andrews, NB
Water Level: Tidal

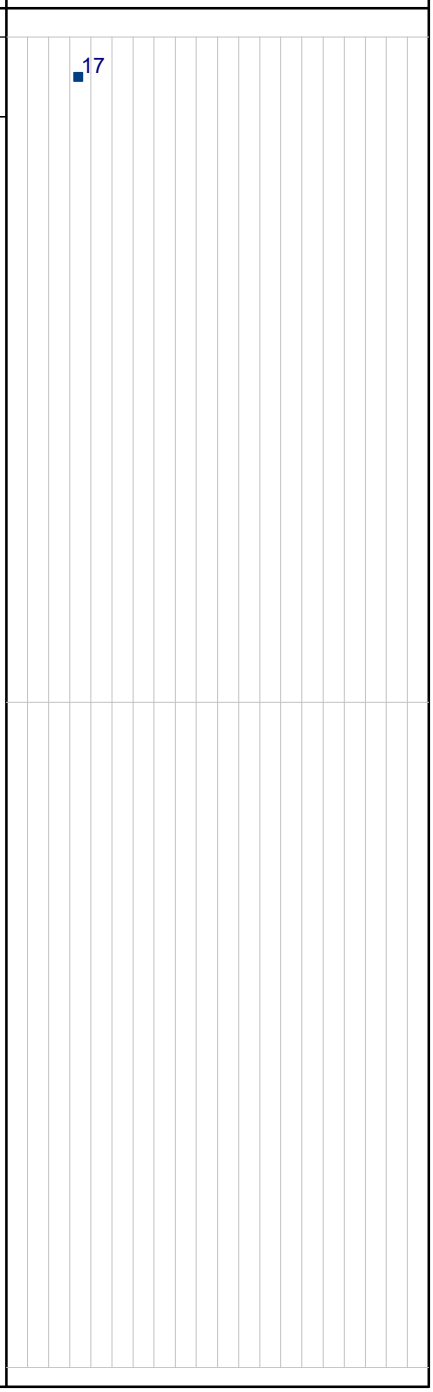
BH - 03
Date Drilled: February 25, 2022
Page: 1 of 1
Datum: Chart
Water Level Date: N.A

Depth (m)	Water Level (m)	Sample Type	Sample Number	N Value or RQD %	Recovery (mm) or %	Symbols	SOIL AND/OR ROCK DESCRIPTION	Elevation (m)
								3.7
		SS	1	17	400		Compact brown to black silty SAND with gravel - some shells	3.1
							End of Borehole at 0.6 m - SPLIT SPOON REFUSAL ON INFERRED BEDROCK	

SPT N-Value (Blows/300mm) 20 40 60 80

Undrained Shear Strength (kPa) 500 1000 1500 2000

Moisture Content / Atterberg Limits Wp I---o---I WL (%) 20 40 60 80



BOREHOLE RECORD

Conquest Engineering
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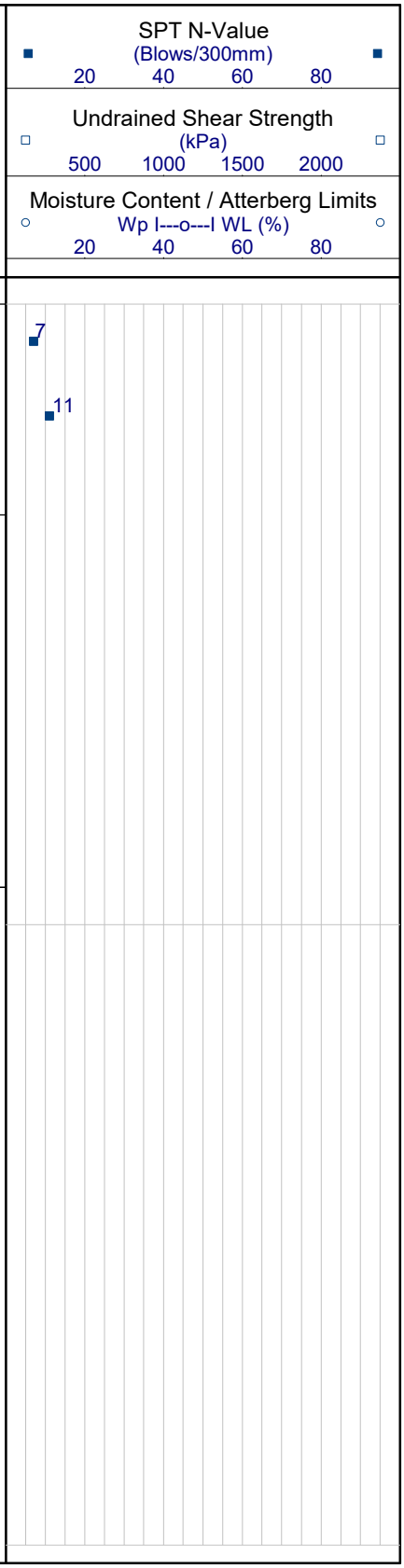
Project Name: Market Wharf Approach Trestle
Project Number: 222828.00
Client: Town of Saint Andrews
Location: Saint Andrews, NB
Water Level: Tidal

BH - 04
Date Drilled: February 25, 2022
Page: 1 of 1
Datum: Chart
Water Level Date: N.A

Depth (m)	Water Level (m)	Sample Type	Sample Number	N Value or RQD %	Recovery (mm) or %	Symbols	SOIL AND/OR ROCK DESCRIPTION	Elevation (m)
								3.2
		SS	1	7	300		Loose to compact brown to reddish brown SAND with gravel to silty SAND with gravel - some shells	
		SS	2	11	400			
		SS	3	SSR	25			1.5
		HQ	4	47%	100%		Severely fractured red SANDSTONE	
		HQ	5	40%	100%			-1.5
							End of Borehole at 4.7 m	



APPENDIX D

Geotechnical Guidelines for Winter Construction

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GEOTECHNICAL RECOMMENDATIONS WINTER CONSTRUCTION

The following are general geotechnical recommendations for earthworks for building areas in winter conditions.

General

- Earthworks conducted during freezing conditions are suspect. Special procedures and precautions must be exercised to minimize the risk of future problems.

- A site meeting should be held at project start-up to discuss the schedules of the various contractors in relation to the following geotechnical recommendations.

Excavation

- The rootmat/topsoil layer and any overlying snow will reduce the frost penetration. Conducting only the excavation work required for each day of work is recommended to minimize freezing of the soil in the foundation areas.

- Excavated material to be used as structural fill should not be stockpiled, but should be placed and compacted immediately after excavation.

Fill Placement

Based on our experience, it is generally impractical to place well-graded gravel, sand, or fine-grained soils in temperatures lower than about -5 degrees Celsius. On very cold days, loose material starts to freeze within about 15 minutes. At temperatures below -5 degrees Celsius, clear gravel or clear rockfill is recommended but subject to design considerations governing the work.

The following provides recommendations for all structural fill types.

- Structural fill placement should be conducted in small areas. Depending on the temperature, this may allow for continuous placement of fill lifts during the work day without the requirement for excavation of frozen material prior to placement of the next lift.

  - Material containing snow or ice should not be incorporated in the work. During snow events, fill placement should be stopped. When the earthwork restart, all snow and ice should be removed from the fill surface prior to subsequent fill placement. In order to remove all snow and/or ice after a snow event, some of the underlying fill may have to be removed and wasted.

- For intermediate fill lifts, frost protection (e.g.; straw, insulated tarp, etc) should be provided at the end of the work day, or alternatively, fill that freezes overnight should be removed in the morning. Also, any snow or ice should also be removed. Fill surfaces should be sloped to prevent ponding of water during milder weather.

- The final fill surface, the base of footing excavations and slab subgrade should be protected from freezing. If the final fill surface is exposed to freezing temperatures, heat will be required to thaw the soil. Test pits and temperature readings could be completed to determine if the soil is above freezing. Consideration should also be given to the installation of thermocouples in the fill during placement, as a means of reading temperatures at depth. The areas that were frozen should be proof-rolled.

- The moisture content of fill materials should be approximately 2% below optimum. Fill materials with moisture contents above the optimum should not be used.

- Loose edges of the structural fill lifts should be avoided to reduce frost penetration. Edges of fill lifts should be tapered and compacted.

- Regular checks of the temperature of the fill should be made. The soil temperature should be greater than +2°C to allow for compaction to the specified degree.

Footing Construction

- Footings should not be placed on frozen material.

- Where the footing elevation is within approved finer-grained materials, we recommend over-excavation by at least 6 inches and placement of nominal 1 inch stone or other clean gravel. This will reduce disturbance of the bearing surface.

- Following construction of footings, temporary frost protection must be provided to avoid freezing of the bearing surface and for protection of the concrete during curing.

- Consideration should be given to specifying that the footing depth for interior foundations be 1.2 m below slab subgrade for frost protection during construction; or alternatively, fill could be temporary bermed over interior footings to provide insulation.

- Foundations should be backfilled with a free-draining granular material and drainage provided to prevent adfreeze of foundations, particularly during construction.

- Cast-in-place concrete should be protected during colder weather conditions as per CSA A23.1-2009.

Geotechnical Inspection and Testing

The information herein should be reviewed by geotechnical personnel and customized to the specific geotechnical aspects and design considerations of a site. Full-time inspection and testing by experience geotechnical personnel is particularly important during earthworks in winter conditions and is strongly recommended.

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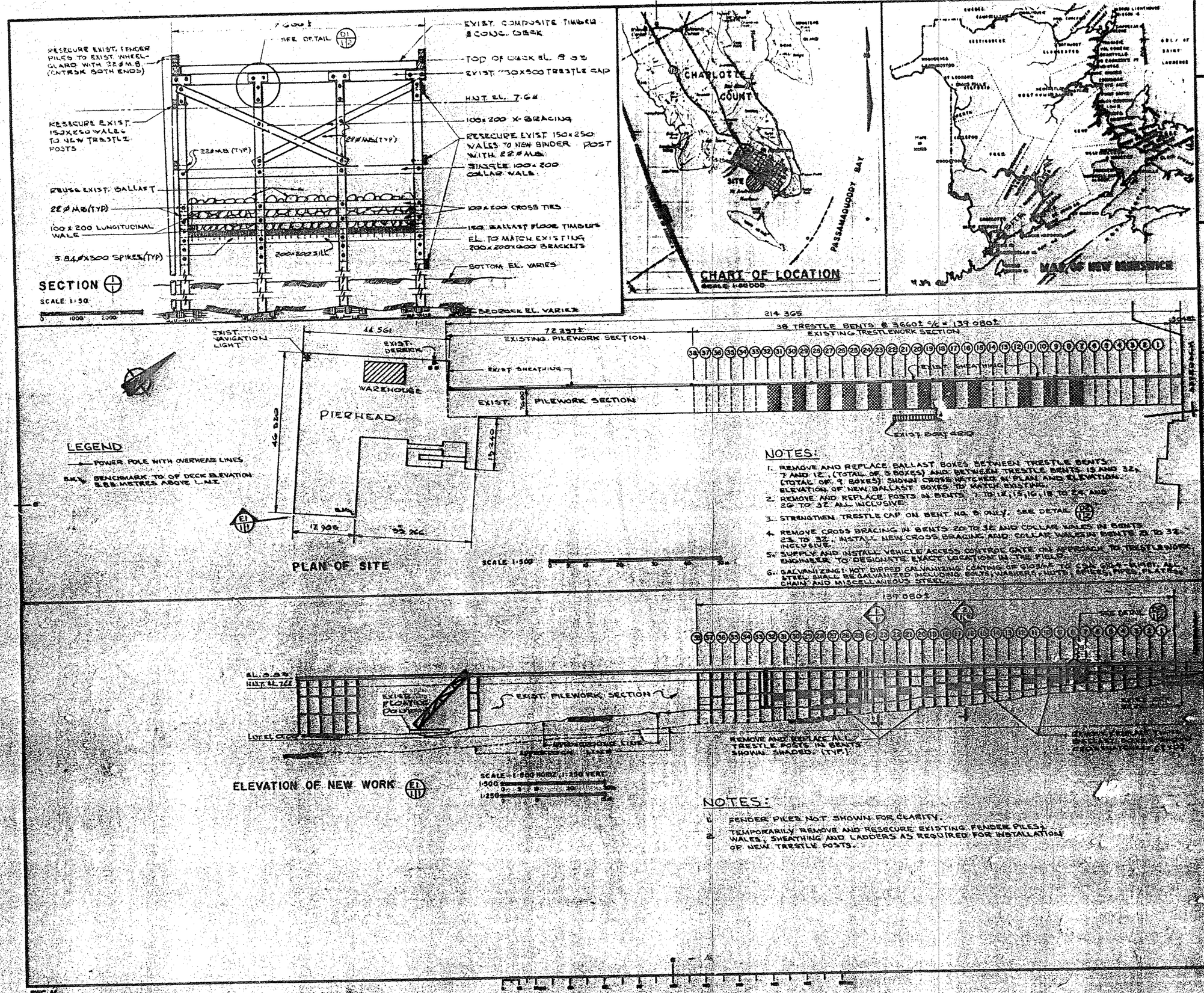
Geotechnical and Materials Engineers

Saint John | Moncton | Fredericton | Halifax

https://www.conquest-eng.com/

APPENDIX B

Original As Built (1956)



ST. ANDREWS
510/18-20
1/2
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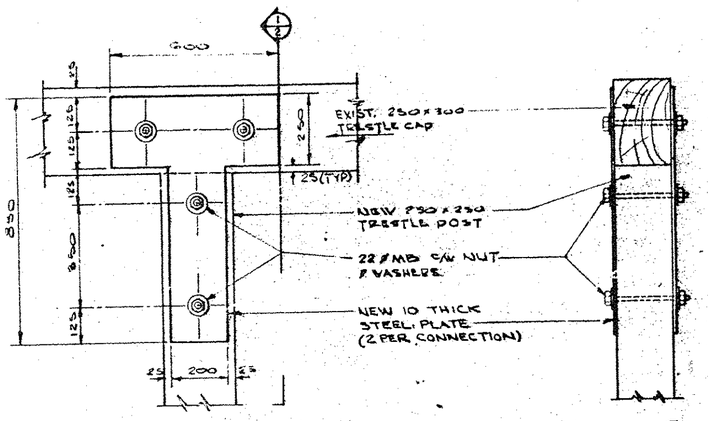
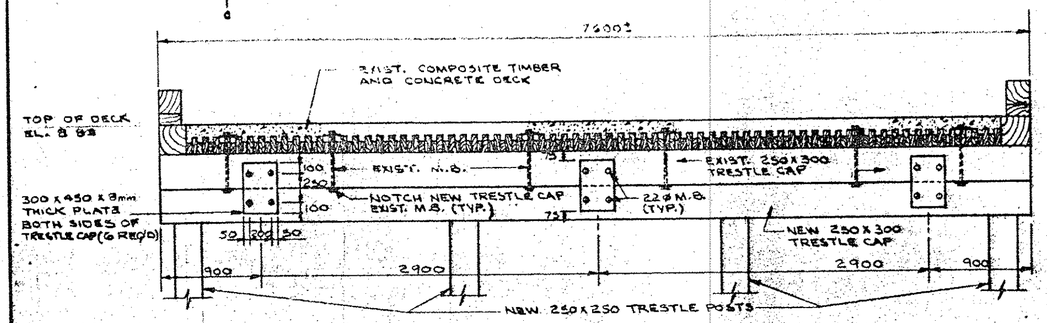
24X



TRESTLE POST CONNECTION DETAIL (D1/12)

SCALE 1:10

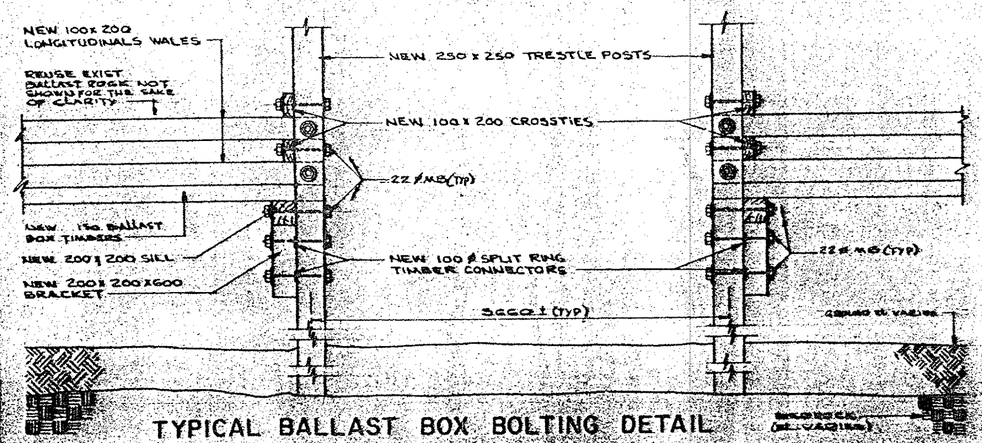


NOTES:

1. TRESTLE POST CONNECTION PLATES NOT SHOWN FOR CLARITY
2. TREAT NOTCHES WITH PRESERVATIVE TO CSA O80-M1983

TRESTLE CAP STRENGTHENING DETAIL (D2/12)

SCALE 1:25

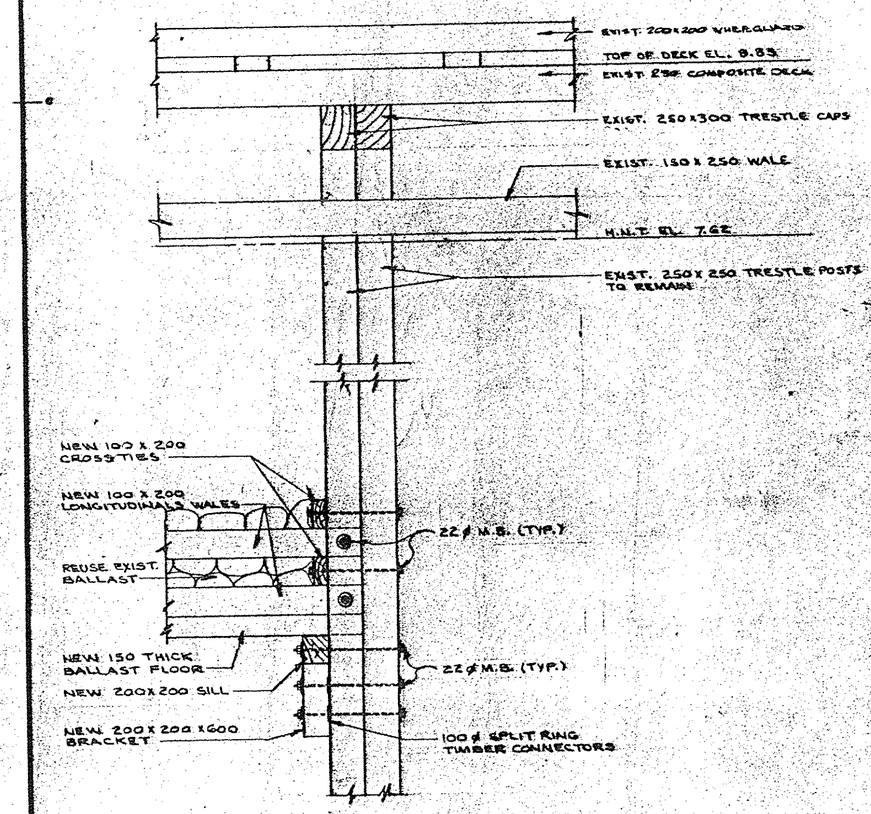


TYPICAL BALLAST BOX BOLTING DETAIL

SCALE 1:25

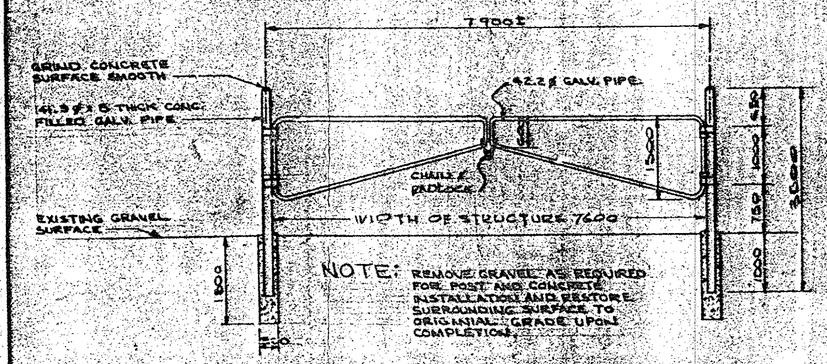
NOTES:

1. ELEVATION OF NEW BALLAST BOXES TO MATCH EXISTING.
2. EXCAVATE TO BEDROCK AS REQUIRED FOR TRESTLE POST INSTALLATION.



SECTION (2/12) TYPICAL AT BENTS No. 17 & 25

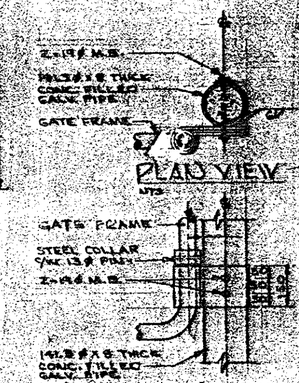
SCALE 1:20



NOTE: REMOVE GRAVEL AS REQUIRED FOR POST AND CONCRETE INSTALLATION AND RESTORE SURROUNDING SURFACE TO ORIGINAL GRADE UPON COMPLETION.

VEHICLE ACCESS CONTROL GATE

SCALE 1:50



Public Works Canada / Travaux publics Canada

AS BUILT

WHARF REPAIRS

ST. ANDREWS

Charlotte Co., N.B.

SECTIONS, DETAILS

AS BUILT

658041

2 OF 2

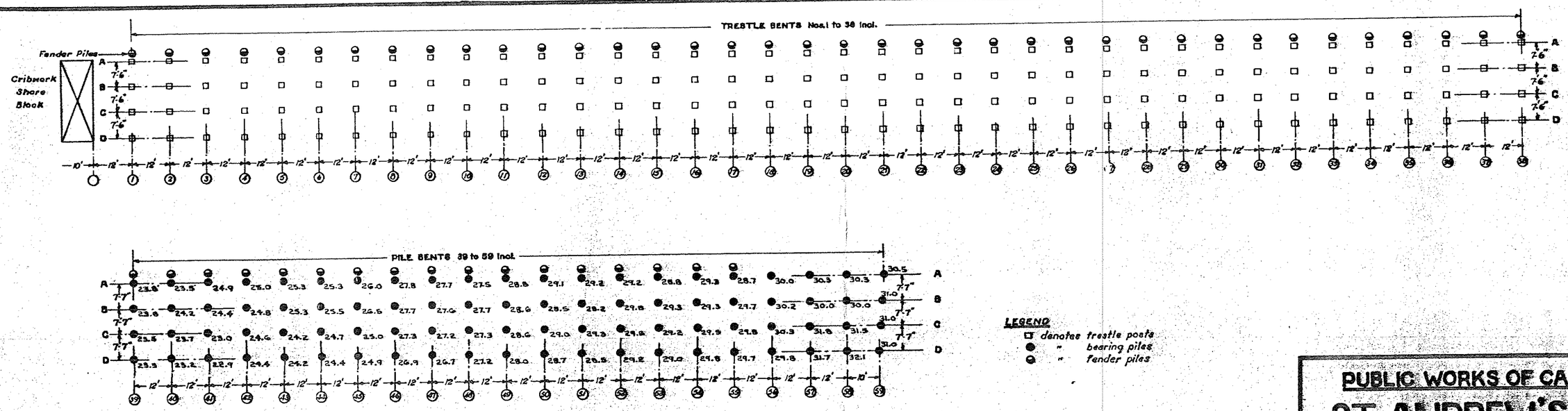
PWC A1

24X

ST ANDREWS

S10/18-20

3/2



LEGEND
- □ denotes trestle posts
- ● " bearing piles
- ◉ " fender piles

NOTE:
FIGURES BESIDE PILES INDICATE LENGTH OF PILES IN WORK MEASURED FROM UNDERSIDE OF PILE CAPS

PLAN OF TRESTLE AND PILE BENTS

SCALE:- 1in = 16Ft.

PUBLIC WORKS OF CANADA

ST. ANDREW'S, N.B.

WHARF REPAIRS

PLAN AND DETAILS
AS CONSTRUCTED - 1956

SCALES AS NOTED — SHEET 3 OF 3

SURVEYED BY ___ DRAWN BY ___ EXAMINED BY ___ OTTAWA 22-1955
DESIGNED BY ___ APPROVED ___ 1955
VERIFIED BY ___ CHIEF ENGINEER
CERTIFIED CORRECT June 13th 1955
R.P. Henderson
DISTRICT ENGINEER

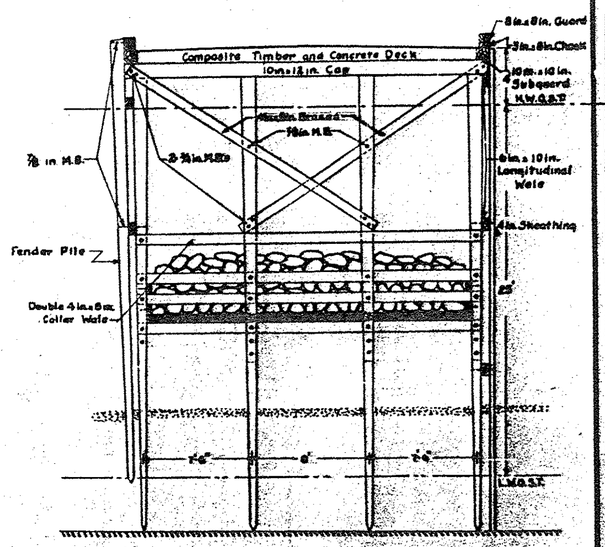
REGISTERED PROFESSIONAL ENGINEER R.P. Henderson PROVINCE OF NEW BRUNSWICK

PLAN No A-522

LOCAL PLAN No. 72A

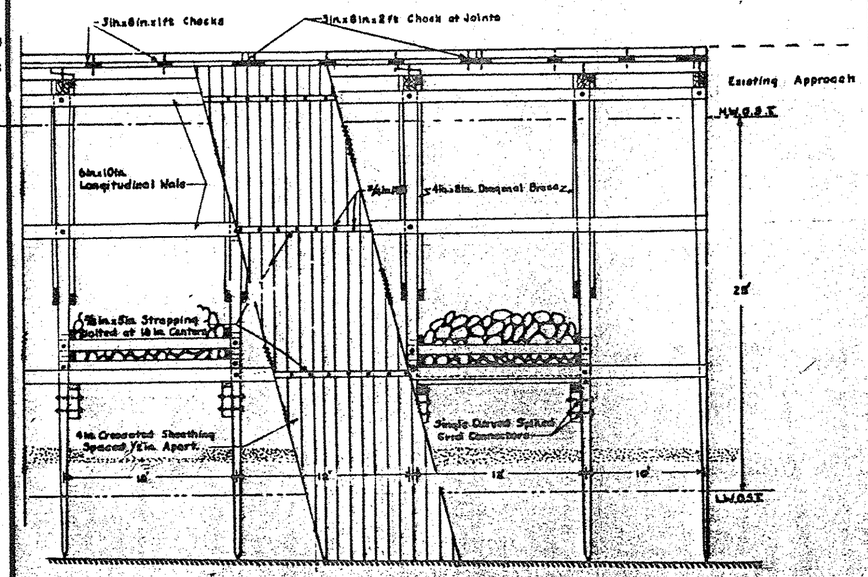
24X

RECEIVED JUN 01 2007



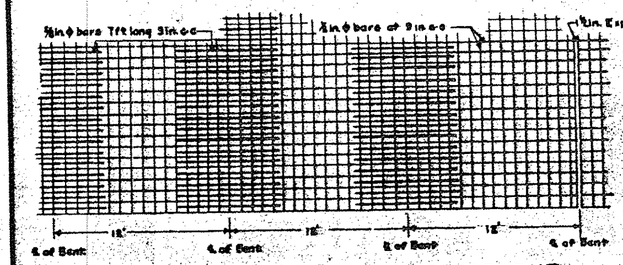
6A CROSS SECTION A-A

Scale 1in.=4ft.



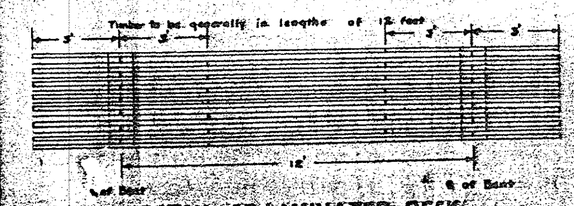
7 PART PILE ELEVATION

Scale 1in.=4ft.



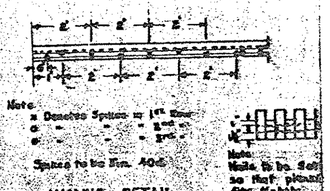
12 DETAIL OF STEEL REINFORCEMENT

Scale 1in.=4ft.

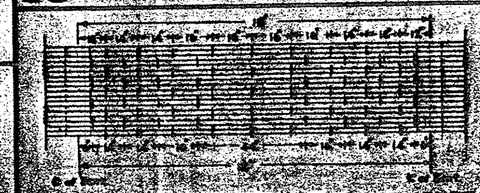


13 DETAIL OF LAMINATED DECK

Scale 1in.=2ft.

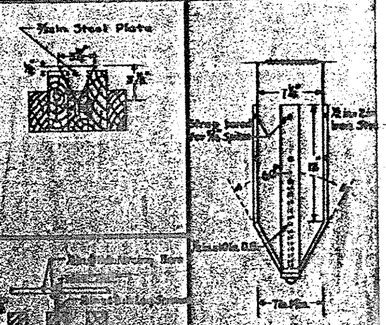


NAILING DETAIL



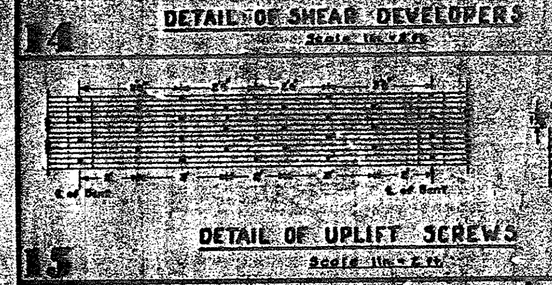
14 DETAIL OF SHEAR DEVELOPERS

Scale 1in.=4ft.



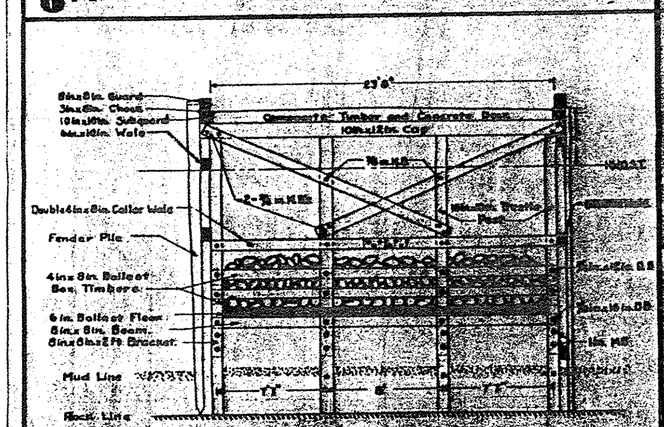
17 DETAIL OF PILE SHOE

Scale 1in.=6in.



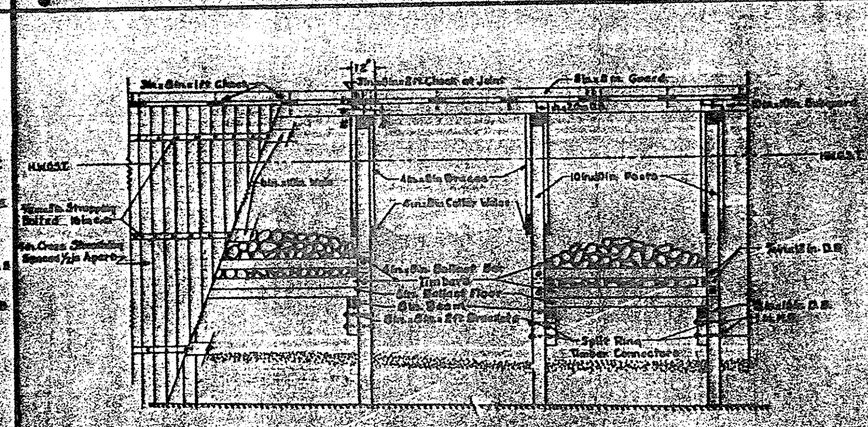
15 DETAIL OF UPLIFT SCREWS

Scale 1in.=2ft.



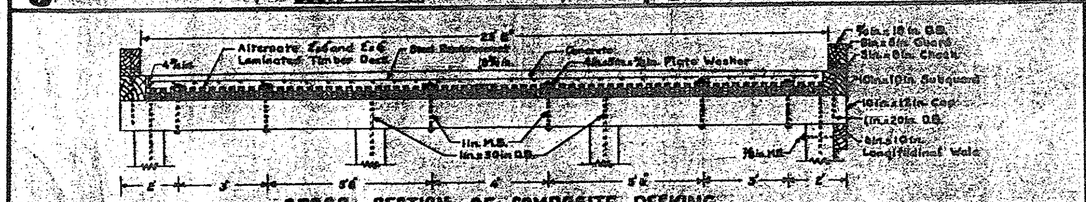
8 CROSS SECTION B-B

Scale 1in.=4ft.



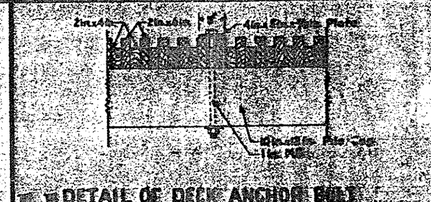
9 PART TRESTLE ELEVATION

Scale 1in.=4ft.



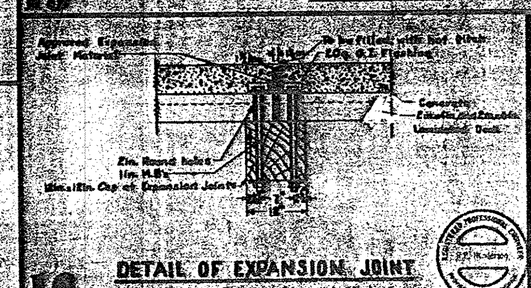
10 CROSS SECTION OF COMPOSITE DECKING

Scale 1in.=2ft.



11 DETAIL OF DECK ANCHOR BOLT

Scale 1in.=1ft.



16 DETAIL OF EXPANSION JOINT

Scale 1in.=1ft.

PUBLIC WORKS OF CANADA

ST ANDREWS

GRAVE REPAIR

Plans and Details AS CONSTRUCTED

Scales as Noted

Chief Engineer

Chief Engineer

Contract Number

Jan. 19th 1949

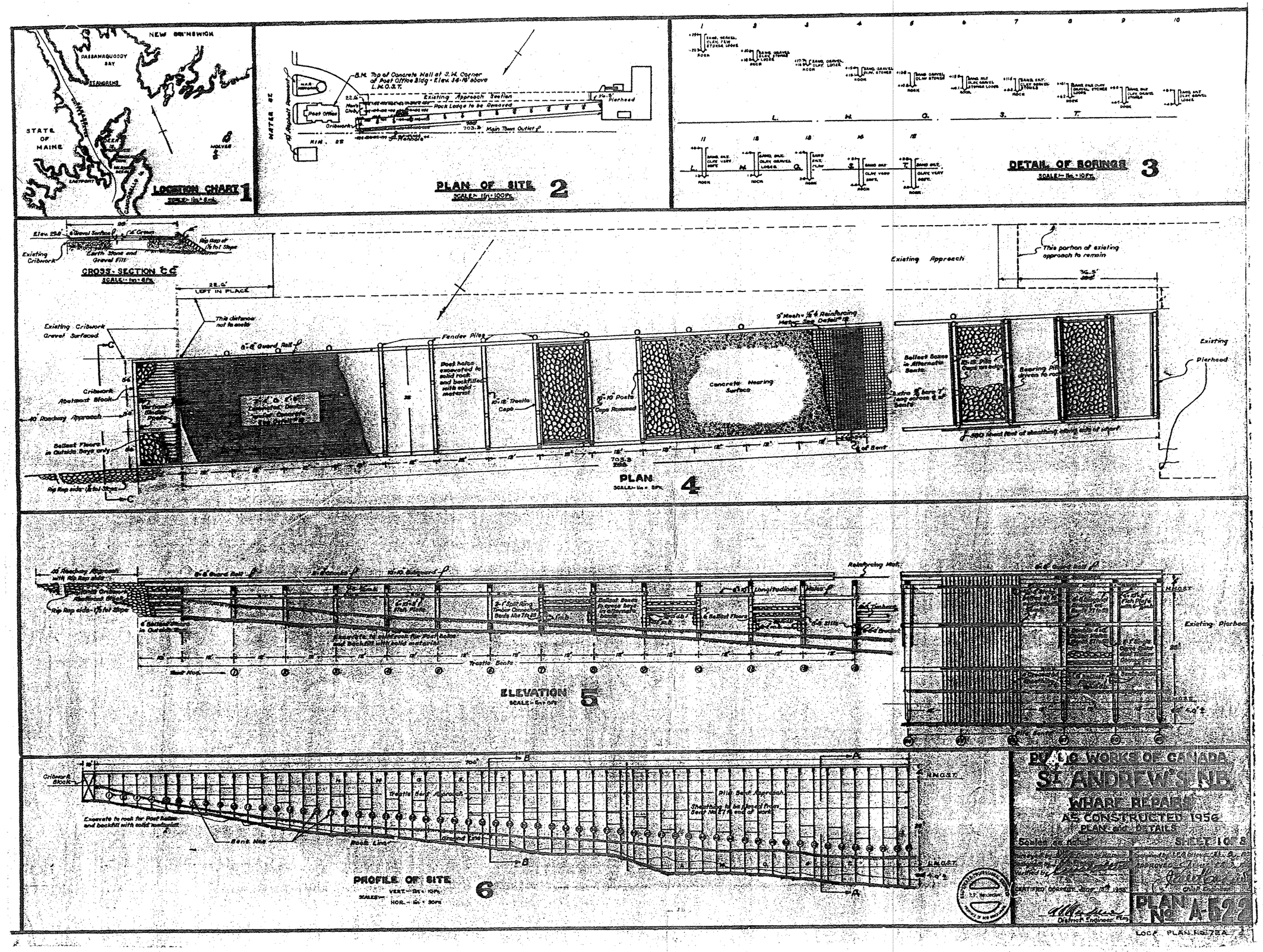
PLAN NO. 142

LOCATION No. 7-A

1" = 12"

RECEIVED JUN 01 2007

30X



ST. ANDREWS

SA/P-4

JUN 0 1 2007

1/3

0723
PLANS.

30X