

PARKS CANADA
RAISED PATHWAY
PENOUILLE PENINSULA
FORILLON NATIONAL PARK
TECHNICAL SPECIFICATION
PROJECT No. 121-25049-00

FOR TENDER

DO NOT USE THESE DOCUMENTS FOR CONSTRUCTION PURPOSE.

GENIVAR Inc.
5355 des Gradins Blvd
Quebec, Quebec
G2J 1C8
Tel: 418 623-2254
Fax: 418 622-1137

Éric Therrien, ingénieur

Quebec, August 16, 2013

SECTION	SUBJECT	NUMBER OF PAGES
DIVISION 01	GENERAL REQUIREMENTS	
01 11 01	Work Related General Information	3
01 14 00	Work Restrictions	1
01 29 00	Payment Procedures.....	2
	Appendix – Bid form.....	1
01 29 83	Payment Procedures for Testing Laboratory Services	2
01 33 00	Submittal Procedures.....	5
01 35 29.06	Health and Safety Requirements	7
01 35 43	Environmental Procedures.....	6
01 45 00	Quality Control	3
01 51 00	Temporary Utilities	2
01 52 00	Construction Facilities	4
01 56 00	Temporary Barriers and Enclosures	2
01 61 00	Common Product Requirements.....	3
01 74 11	Cleaning	2
01 74 21	Construction/Demolition Waste Management and Disposal	2
01 77 00	Closeout Procedures.....	2
DIVISION 06	WOOD, AND PLASTICS	
06 10 00	Rough Carpentry.....	4
06 15 00	Wood Decking.....	3
DIVISION 31	EXCAVATION	
31 23 33.01	Excavation, Trenching and Backfilling	5
31 62 00	Screw-in Piling	3
APPENDIX		
APPENDIX A	Geotechnical investigation report (LVM)	

PART 1 - GENERAL

<u>1.1 RELATED SECTION</u>	.1	Section 01 56 00 – Temporary Barriers and Enclosures
<u>1.2 WORK COVERED BY CONTRACT DOCUMENTS</u>	.1	Work of this contract includes the construction of a footbridge on the Penouille Peninsula, in Forillon National Park.
	.2	Work mainly comprises, without limitation, the clearing, excavation and grading of the site toward the construction of a footbridge to required levels and dimensions. Limit intervention to minimum given the ad hoc nature of this type of work.
	.3	The construction of a footbridge in treated wood on screw piles.
<u>1.3 CONTRACTOR USE OF PREMISES</u>	.1	Limit use of premises for Work and for access. Contractor to determine a work method to limit, wherever possible, traffic along the edges of the marsh.
	.2	Co-ordinate use of premises under direction of the Departmental Representative.
	.3	Only the area within site limits indicated on the plan is available to the Contractor. Should the Contractor wish to use areas adjacent to the site, he shall make arrangements with the owners and pay any costs. Provide copy of any such agreement to the Departmental Representative.
	.4	The existing access road may be used to access the work site. Access to the planned footbridge (i.e., job-site roads) shall be strategically located in order to reduce to a minimum any disruption of the site and the environment. Materials required to perform the work shall be transported using the appropriate equipment.
	.5	Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Departmental Representative.
	.6	At completion of operations condition of existing work: equal to or better than that which existed before new work started.
<u>1.4 SUBSOIL CONDITIONS</u>	.1	Refer to the geotechnical investigation report and the environmental report appended to this specification.

- 1.5 RANGING OUT OF THE PREMISES
- .1 Assume full responsibility for staking out the work and perform the task to full extent as to location, lines and levels indicated.
 - .2 Before work inception, the Contractor shall ascertain all measurements on location and notify Departmental Representative of any error or discrepancy.
- 1.6 METRIC UNITS
- .1 Units of the International Metric System (S.I.) are exclusively used in the plans and specifications of this project.
- 1.7 DOCUMENTS REQUIRED
- .1 Maintain at job site for one record copy of the following documents:
 - .1 Contract drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Reviewed shop drawings.
 - .5 List of unreviewed shop drawings.
 - .6 Change orders.
 - .7 Other changes to contract.
 - .8 Field test records.
 - .9 Copy of approved construction schedule.
 - .10 Health and safety plan and related safety-related documents.
 - .11 Other documents indicated.
- 1.8 PROJECT DOCUMENTS AND SAMPLES
- .1 Maintain at job site for Departmental Representative's perusal one record copy or set of:
 - .1 Contract drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change orders and other amendments to contract.
 - .5 Reviewed shop drawings, product data, and samples.
 - .6 Field test records.
 - .7 Inspection certificates.
 - .8 Certificates issued by the suppliers of the materials.
 - .2 Store record documents and samples in field office apart from documents used for construction. Provide files & racks as well as secure storage.
 - .3 Label record documents and file in accordance with section number listings in List of Contents of this Project Manual. Label each document "Project Record" in neat, large, printed letters.
 - .4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.

- .5 Keep record documents and samples available for inspection by Departmental Representative
- 1.9 RECORDING ACTUAL SITE CONDITIONS
- .1 Record information on set of opaque drawings provided by Departmental Representative.
- .2 Provide felt tip marking pens, and use different colours for each significant system.
- .3 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.
- .4 Contract drawings and shop drawings: mark each item to record actual construction, including:
- .1 Measured horizontal and vertical locations of subsoil elements relative to permanent above ground features.
 - .2 Field changes of structural dimension and detail.
 - .3 Changes made following change orders.
 - .4 Details not on original Contract Drawings.
 - .5 References to shop drawings and related modifications.
- .5 Specifications: mark each item to record actual structures, including:
- .1 Name of manufacturer, brand name and catalogue number of each product actually installed.
 - .2 Modifications made to reflect all Addenda and change orders.
- .6 Other documents: retain and file suppliers' certificates, inspection certifications, and records of field tests.

PART 2 - PRODUCTS

- 2.1 NOT USED .1 Not used.

PART 3 - EXECUTION

- 3.1 NOT USED .1 Not used.

End of section

PART 1 - GENERAL

<u>1.1 ACCESS AND EGRESS</u>	.1	Design, construct and ensure the maintenance of temporary "access to" and "egress from" work areas, including stairs, runways, ramps or ladders (scaffolding), in accordance with municipal, provincial or other regulations.
<u>1.2 USE OF SITE AND FACILITIES</u>	.1	Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.
	.2	Maintain existing services to building and provide for personnel and vehicle access.
	.3	Where security is reduced by work provide temporary means to maintain security.
<u>1.3 SPECIAL REQUIREMENTS</u>	.1	Work must be carried out from Monday to Friday.
	.2	Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.
	.3	Keep within limits of work and avenues of ingress and egress.
<u>1.4 BUILDING SMOKING ENVIRONMENT</u>	.1	Comply with smoking restrictions. Smoking is not permitted.
<u>1.5 NATIONAL PARKS ACT</u>	.1	Carry out work in accordance with the National Parks Act when carried out within the limits of a National Park.

PART 2 - PRODUCTS

<u>2.1 NOT USED</u>	.1	Not used.
---------------------	----	-----------

PART 3 - EXECUTION

<u>3.1 NOT USED</u>	.1	Not used.
---------------------	----	-----------

End of section

PART 1 - GENERAL1.1 METHOD OF MEASUREMENT

- .1 Unless otherwise specified, the supply of materials, labour, tools, equipment, protection, transportation, administrative expenses, profits, financing, etc., necessary to carry out the work of this contract are included in each of the items described below.
- .2 The Contractor shall provide the breakdown of the cost of Stipulated Price (lump sum) items no later than ten (10) days after notification of contract award.
- .3 Work measured as Stipulated Price (lump sum) items are as follows:
 - .1 Site organisation: this item includes all elements of division 01 of the specification manual. It also includes work indicated on the drawings and in the specifications and whose payment is not provided for in another measurement item.
 - .2 Deforestation and site preparation: this item includes the felling of trees which do not generally exceed 300 mm in diameter, the removal of bushes in the work area, and their disposal. Tree felling must be made as closely to the ground as possible and it does not include grubbing. Provide for a surface area of 2 500 m² unevenly distributed over the work zone.
 - .3 Excavation and grading: this item includes the excavation and grading of localised areas as required for construction of the footbridge to levels and dimensions indicated on the drawings. Disposal of excess soil is included in this item. Provide for a volume of 25 m³ unevenly distributed over the work zone.
- .4 The unit price measurement method applies to the following items on the bid form:
 - .1 Rotation driven piles: this item is paid per unit incorporated in the Work and includes all costs for the supply and installation of the piles and related accessories, all within the tolerances and elevations indicated and accepted by the Departmental Representative.
 - .2 Wooden superstructure - Footbridge: this item is paid per linear metre of footbridge incorporated in the Work and accepted by the Departmental Representative.

- .3 Wooden superstructure - Interpretation display: this item is paid per unit incorporated in the Work and accepted by the Departmental Representative.
- .4 Approach to footbridge: this item is paid per unit incorporated in the Work and accepted by the Departmental Representative.

PART 2- PRODUCTS

2.1 NOT USED .1 Not used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not used.

End of section



**PARKS CANADA
RAISED PATHWAY
PENOUILLE PENINSULA
FORILLON NATIONAL PARK
PROJECT No. 121-25049-00**

BID FORM

<u>Item</u>	<u>Designation</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit price</u>	<u>Total price</u>
1	Site organisation		Total	_____ \$	_____ \$
2	Deforestation and site preparation		Total	_____ \$	_____ \$
3	Excavation and grading		Total	_____ \$	_____ \$
4	Rotation driven piles	332	unit	_____ \$	_____ \$
5	Wooden superstructure - Footbridge	555	l.m	_____ \$	_____ \$
6	Wooden superstructure - Interpretation display	1	unit	_____ \$	_____ \$
7	Approach to footbridge	2	unit	_____ \$	_____ \$
				TOTAL	_____ \$

Company name

Date

Tenderer's signature

PART 1 - GENERAL

- 1.1 RELATED REQUIREMENTS
- .1 Particular requirements for inspection and testing to be carried out by testing laboratory designated by Departmental Representative are specified under different sections as follows.
- 1.2 APPOINTMENT AND PAYMENT
- .1 Departmental Representative will appoint and pay for services of testing laboratory except for the following:
- .1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
 - .2 Inspection and testing performed exclusively for Contractor's convenience.
 - .3 Mill tests and certificates of compliance.
 - .4 Tests specified to be carried out by Contractor under supervision of Departmental Representative.
 - .5 Additional tests indicated below.
- .2 Where tests or inspections by designated testing laboratory reveal Work not in accordance with contract requirements, pay costs for additional tests or inspections as required by Departmental Representative to verify acceptability of corrected work.
- 1.3 CONTRACTOR'S RESPONSIBILITIES
- .1 Provide labour, equipment and facilities to:
- .1 Provide access to Work for inspection and testing.
 - .2 Facilitate inspections and tests.
 - .3 Make good Work disturbed by inspections and tests.
 - .4 Provide storage on site for laboratory's exclusive use to store equipment and cure or process test samples.
- .2 Notify Departmental Representative 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 Departmental Representative.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not used.

End of section

PART 1 - GENERAL1.1 ADMINISTRATIVE

- .1 Submit to Departmental Representative required submittals for approval. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of contract time and no claim for extension by reason of such default will be allowed.
- .2 Do not proceed with Work affected by submittals until review of all elements submitted is complete.
- .3 Present shop drawings, product data, product and structure samples in SI Metric units.
- .4 Where items or information is not produced in SI Metric units converted values are acceptable.
- .5 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and contract documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
- .6 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of contract documents stating reasons for deviations.
- .7 Verify field measurements and affected adjacent Work are co-ordinated.
- .8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
- .9 Contractor's responsibility for deviations in submission from requirements of contract documents is not relieved by Departmental Representative review.
- .10 Keep one reviewed copy of each submission on site.

1.2 SHOP DRAWINGS AND
PRODUCT DATA

- .1 The term "shop drawings" means drawings, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.

- .2 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Québec, Canada.
- .3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .4 Allow five (5) days for Departmental Representative's review of each submission.
- .5 Adjustments made on shop drawings by Departmental Representative are not intended to change contract price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
- .6 Make changes in shop drawings as Departmental Representative may require, consistent with contract documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.
- .7 Accompany submissions with two (2) copies of a transmittal letter 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.
 - .5 Other pertinent data.
- .8 Submissions to include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
 - .4 Contractor's stamp, signed by Contractor's authorised Representative certifying approval of submissions and that all necessary field measurements have been completed in compliance with contract documents;
 - .5 Details of appropriate portions of Work as applicable:
 - .1 Materials and fabrication.
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Performance characteristics.

- .5 Reference standards.
- .6 Relationship to adjacent Work.
- .9 After Departmental Representative's review, distribute copies of shop drawing and product data.
- .10 Submit one (1) electronic copy of shop drawings prescribed in specification sections and as Departmental Representative may reasonably request.
- .11 Submit one (1) electronic copy of product data sheets or brochures for requirements requested in specification sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
- .12 Submit one (1) electronic copy of test reports for requirements requested in specification sections and as requested by Departmental Representative.
 - .1 Report signed by authorized official of testing laboratory to certify that material, product or system identical to material, product or system to be provided has been tested in accordance with specified requirements.
 - .2 Testing must have been performed within the year before date of contract award for project
- .13 Submit one (1) electronic copy of all certificates requested in specification sections and as requested by Departmental Representative.
 - .1 Documents printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product to attest that product, system or material meets specification requirements.
 - .2 Certificates must be dated after award of project contract, complete with project name.
- .14 Submit one (1) electronic copy of manufacturer's instructions for requirements in specification sections and as requested by Departmental Representative.
 - .1 Pre-printed material describing installation of product, system or material, including special notices and material safety data sheets concerning impedances, hazards and safety precautions.
- .15 Submit one (1) electronic copy of manufacturer's field reports for requirements in specification sections and as requested by Departmental Representative.
 - .1 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance of products, materials, equipment or systems with manufacturer's standards or instructions.

- .16 Submit one (1) electronic copy of Operation and Maintenance Data for requirements in specification sections and as requested by Departmental Representative.
- .17 Delete information not applicable to project.
- .18 Supplement standard information to provide details applicable to project.
- .19 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, submissions will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, annotated copies will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

1.3 SAMPLES

- .1 Submit two (2) samples for review as requested in specification sections. Label samples with origin and intended use.
- .2 Deliver samples prepaid to Departmental Representative's business address.
- .3 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of contract documents.
- .4 Where colour, pattern or texture is criterion, submit full range of samples.
- .5 Adjustments made on samples by Departmental Representative are not intended to change contract price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
- .6 Make changes in samples which Departmental Representative may require, consistent with contract documents.
- .7 Reviewed and accepted samples will become standard of Workmanship and material against which installed Work will be verified.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

End of section

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 This section governs the management of work site activities required to ensure that the health and safety of the public and work site personnel, including environmental protection, are at all times given precedence over project cost or schedule considerations.

1.2 REFERENCES

- .1 Canada Labour Code, Part II, Canada Occupational Safety and Health Regulations.
- .2 Canadian Standards Association (CSA).
- .3 Workplace Hazardous Materials Information System (WHMIS)/ Health Canada.
 - .1 Material Safety Data Sheets (MSDS).
- .4 Act Respecting Occupational Health and Safety, R.S.Q. Chapter S-2.1.
- .5 Safety Code for the Construction Industry, S-2.1, r.6 2001.
- .6 Canada Shipping Act, and Navigable Waters Protection Act.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 (Submittal Procedures).
- .2 Submit to Departmental Representative, to ASP Construction (Association paritaire en santé et sécurité du secteur de la Construction) and to CSST the site-specific safety program as outlined in article 1.7, at least thirty (30) days prior to start of work. Contractor to review his program during the course of the project if any change occurs in Work as planned. The Departmental Representative may, after receiving the program or at any time during the project, ask the Contractor to update or modify the program in order to better reflect the reality of the construction site. Contractor to make the required changes before work begins.
- .3 Submit once per week to Departmental Representative the site inspection sheet, duly completed.
- .4 Submit to Departmental Representative within twenty four (24) hours one (1) copy of any inspection report, correction notice or recommendation issued by federal or provincial inspectors.

- .5 Submit to Departmental Representative within twenty four (24) hours an investigation report for any accident involving injury and any incident exposing a potential hazard.
- .6 Submit to Departmental Representative all material safety data sheets for controlled products to be used at the site no less than three (3) days before they are to be used on the worksite.
- .7 The Departmental Representative will examine the health and safety plan prepared by the Contractor specifically for the worksite and provide the Contractor with observations within ten (10) days of the receipt of the document. If needed, the Contractor shall revise his health and safety plan and resubmit no later than five (5) days after receipt of Departmental Representative observations.
- .8 Departmental Representative'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.
- .9 Submit to Departmental Representative copies of the training certificates required toward the application of the safety program, including:
 - .1 General construction site safety and health courses.
 - .2 Safety officer certificate.
 - .3 First aid in the workplace and cardiopulmonary resuscitation.
 - .4 Work likely to release dust.
 - .5 Lockout procedure.
 - .6 Wearing and fitting of individual protective gear.
 - .7 Safe driving of lift trucks.
 - .8 Elevating scaffold walks.
 - .9 Work near water bodies with drowning hazard.
 - .10 Work involving third parties.
 - .11 Any other training called for by regulation or the safety program.
- .10 Medical examinations: Where legislation, regulations, directions, specifications or a safety program require medical examinations, the Contractor shall:
 - .1 Prior to mobilization, submit to Departmental Representative certificates of medical examination for all supervisory staff and employees concerned with the first paragraph of this article.
 - .2 Thereafter, submit without delay certificates of medical examination for any newcomers to the worksite and concerned with the first paragraph of this article.
- .11 Emergency plan: The emergency plan, as defined in article 1.7.3, shall be submitted to Departmental Representative along with the site-specific safety program.

- .12 Notice of site opening: Notice of site opening shall be submitted to CSST (Commission de la santé et de la sécurité du travail) with copy to the Departmental Representative before work begins. Copy of such notice shall be posted in full view at the site. At demobilization, a notice of site closing shall be submitted to CSST, with copy to Departmental Representative.
- .13 Work permits: the Contractor shall obtain all the municipal, provincial and federal permits that are required in the Contract. A copy of the permit application forms and permits actually delivered shall be submitted without delay to the Departmental Representative.
- .14 Engineering plans and certificates of compliance: The Contractor shall provide CSST and Departmental Representative with a copy of all plans and certificates of compliance signed and sealed by an engineer as required in the Construction Safety Code (S-2.1, r. 6) or by any other legislation or regulation or by any other clause in the specifications or in this contract. A copy of these documents must be on hand at the site at all times.
- .15 Certificate of compliance delivered by CSST: The certificate of compliance is a document delivered by CSST to certify that the Contractor is in good standing with CSST, i.e., that he has paid out all the benefits concerning any given contract. This document must be provided to the Departmental Representative at work completion.

1.4 SAFETY ASSESSMENT

- .1 The Contractor must identify all hazards inherent to each task carried out at the site.
- .2 The Contractor shall plan and organize the work so as to foster hazard abatement at the source, or mutual protection so that reliance on individual protective gear can be kept to a minimum. Where individual protection against falls is required, workers shall use a safety harness to CAN/CSA- Z-259.10-M90 requirements. Safety belts shall not be used as protection against falls.
- .3 Equipment, tools and protective gear which cannot be installed, fitted or used without compromising the health or safety of workers or the public shall be deemed inadequate for the work at hand.

- .4 All mechanical equipment shall be inspected before delivery to the site. Before using any mechanical equipment, submit to Departmental Representative a certificate of compliance signed by a qualified mechanic. Whenever the Departmental Representative suspects a defect or risk, the Departmental Representative may order the immediate shut-down of equipment and require a new inspection by a specialist of his own choosing.

1.5 MEETINGS

- .1 A Contractor's representative who has decisional ability must attend all meetings at which site safety and health issues are to be discussed.
- .2 The Contractor shall set up a safety committee, and convene meetings in accordance with the Construction Safety Code.

1.6 REGULATORY REQUIREMENTS

- .1 Comply with all legislation, regulations and standards applicable to the Work.
- .2 Comply with specified standards and regulations to ensure safe operations at worksite areas contaminated with hazardous or toxic substances.
- .3 Regardless of the publication date of standards indicated in the construction safety code, always use the version that is applicable.

1.7 HEALTH AND SAFETY CO-ORDINATOR

- .1 Acknowledge and assume all the charges and obligations which customarily devolve upon a Departmental Representative under the terms of the Act Respecting Occupational Health and Safety (R.S.Q., chapter S-2.1) and the Construction Safety Code (S-2.1, r.6).
- .2 Develop a site-specific safety program based on hazard identification and apply it from the start of project until close-out (demobilization) is completed. The safety program must take into account all the information appearing in article 1.6. It must be submitted to all parties concerned, in accordance with the provisions set forth in article 1.3. At minimum, the site-specific safety program shall include:
 - .1 Company safety and health policy.
 - .2 A description of the work, total costs, schedule and projected workforce curve.
 - .3 Flow chart of safety and health responsibility.
 - .4 The physical and material layout of the site.
 - .5 First-aid and first-line treatment standards.
 - .6 Identification of site-specific hazards.

- .7 Risks identified to the tasks being carried out, including preventive measures and procedures for applying the latter.
 - .8 Training requirements.
 - .9 Procedures in case of accident/injury.
 - .10 Written commitment to comply with the prevention program, signed by all parties.
 - .11 A site inspection schedule based on the preventive measures.
- .3 The Contractor shall draw up an effective emergency plan based on the characteristics and constraints of the site and its surroundings. Submit the emergency plan to all parties concerned, as required in article 1.3. The emergency plan shall include:
- .1 Evacuation procedure.
 - .2 Identification of respondents (police, firefighters, ambulance services, etc.).
 - .3 Identification of persons in charge at the site.
 - .4 Identification of first-aid attendants.
 - .5 Training required for those responsible for applying the plan.
 - .6 Any other information needed, in the light of the site characteristics.
- .4 Before work is undertaken, seek, obtain and convey to Departmental Representative a Letter of Compliance issued by Transport Canada for the approval of all water crafts (transport, rescue, inspection or other).
- .5 Establish emergency procedures in writing and in which the following information is stated; ensure that all workers concerned by such procedures have undergone the necessary training and information for the purpose of applying the procedures.
- .1 A complete description of the procedures, including the responsibilities of the persons who are given access to the work area.
 - .2 The location of emergency equipment.

1.8 RESPONSIBILITY

- .1 No matter the size of the construction site or the number of workers on the site, designate a competent person to supervise and take responsibility for health and safety. Take all necessary measures to ensure the health and safety of persons and property at or in the immediate vicinity of the site and likely to be affected by the work.
- .2 Take all necessary measures to ensure application of and compliance with the safety and health requirements of the contract documents, federal and provincial regulations, applicable standards as well as the site-specific safety program, and comply without delay with any order or

correction notice issued by CSST (Commission de la santé et de la sécurité du travail).

- .3 Take all necessary measures to keep the site clean and tidy throughout the course of the work.

1.9 POSTING OF DOCUMENTS

- .1 Make all necessary arrangements to ensure effective communication of safety and health information at the site. As they arrive on site, all workers must be informed of the site specific safety program and of their rights and obligations. The Contractor must insist on workers' right to refuse to perform work which they feel may threaten their own health, safety or physical integrity or that of other persons at the site. The Contractor shall keep and update a written record of all information transmitted and the signature of all workers who received the information.
- .2 The following information and documents must be posted in a location readily accessible to all workers:
 - .1 Notice of site opening.
 - .2 Identification of coordinating manager.
 - .3 Company OHS policy.
 - .4 Site-specific safety program.
 - .5 Emergency plan.
 - .6 Material safety data sheets (MSDS) for all hazardous material used at the site.
 - .7 Minutes of site committee meetings.
 - .8 Names of site committee representatives.
 - .9 Names of first-aid attendants.
 - .10 Action reports and correction notices issued by CSST.

1.10 UNFORESEEN HAZARDS

- .1 Whenever a source of danger, not defined in the specifications or unidentifiable during the preliminary site inspection, arises as a result of the work or in the course of activities, the Contractor shall interrupt work immediately and take appropriate temporary measures to protect the workers and the public and notify the Departmental Representative, both verbally and in writing. The Contractor shall then modify or update the site specific safety program in order to resume work in safe conditions.

1.11 WORKPLACE INSPECTION AND CORRECTION OF HAZARDOUS SITUATIONS

- .1 Proceed to workplace inspection and fill the site inspection checklist at least once a week.

- .2 Immediately take all necessary measures to correct any lapses from legislative or regulatory requirements and any hazards identified by a government inspector, by the Departmental Representative, by the construction safety and health coordinator or during routine inspections.
- .3 Submit to Departmental Representative written confirmation of all measures taken to correct lapses and hazardous situations.
- .4 Work interruption: Give the safety officer or, where there is no safety officer, the person assigned to safety and health responsibilities, full authority to order interruption/resuming of work when deemed necessary or desirable in the interest of safety and health. This person should always act so that the safety and health of the public and site workers and environmental protection take precedence over cost and scheduling considerations.
- .5 Without limiting the scope of articles 1.8 and 1.9, the Departmental Representative may order cessation of work if, in Departmental Representative's view, there exist hazards or threats to the safety or health of site workers or the public, or to the environment. Departmental Representative may stop work if non-compliance of health and safety regulations is not corrected.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not used.

End of section

PART 1 - GENERAL

1.1 DEFINITIONS

- .1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humans; or degrade environment aesthetically, culturally and/or historically.
- .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction. Prevention of pollution and damages to environment covers the protection of soils, water, air, biological and cultural resources; it also covers management of visual design, noise, solid, chemical, gaseous and liquid waste, radiant energy, radioactive material and other pollutant.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 (Submittal Procedures).
- .2 Before commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review and approval by Departmental Representative. Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction which must abide by National Parks Act and related regulations.
- .3 Address topics at level of detail commensurate with environmental issue and required construction tasks.
- .4 Include in Environmental Protection Plan:
 - .1 Name of persons responsible for ensuring adherence to Environmental Protection Plan.
 - .2 Name and qualifications of persons responsible for training site personnel.
 - .3 Descriptions of environmental protection personnel training program.
 - .4 Erosion and sediment control plan identifying type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.

- .5 Drawings indicating locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.
- .6 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use. Plan to include measures for marking limits of use areas and methods for protection of features to be preserved within authorized work areas.
- .7 Spill Control Plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
- .8 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
- .9 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash are contained on project site.
- .10 Contaminant Prevention Plan identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.
- .11 Waste Water Management Plan identifying methods and procedures for management or discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines.
- .12 Plan and procedures for identifying and protecting historical, archaeological and cultural resources, as well as biological resources and wetlands.

1.3 FIRES

- .1 Fires and burning of rubbish on site are not permitted.

1.4 WASTE DISPOSAL

- .1 Unless explicitly authorised by Departmental Representative, do not bury rubbish and waste materials on the work site.
- .2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.

1.5 DRAINAGE

- .1 Develop and submit Erosion and Sediment Control Plan identifying type and location of erosion and sediment controls provided. Plan to include monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations
- .2 Storm Water Pollution Prevention Plan may be substituted to erosion and sediment control plan.
- .3 Provide temporary drainage and pumping required to keep excavations and site free from water.
- .4 Ensure pumped water into waterways, sewer or drainage systems is free of suspended materials.
- .5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.6 SITE CLEARING AND PLANT PROTECTION

- .1 Protect trees and plants on site and adjacent properties. Pay close attention to "rare plants" indicated on plans and identified on site by the Departmental Representative.
- .2 Protect trees and shrubs adjacent to construction work, storage areas and trucking lanes with burlap. Encase trees and shrubs with protective wood framework from grade level to height of 2 m minimum.
- .3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones of protected trees.
- .4 Minimize stripping of topsoil and vegetation.
- .5 Restrict tree removal to areas designated by Departmental Representative.
- .6 Cut trees or shrubs outside the birds nesting season, i.e., before May 15 or after August 15.
- .7 Cut trees manually or with a tracked logger. All equipment used during work must be on track or use high buoyancy tires.
- .8 Where specified by Departmental Representative, promote low branches for stumps support. Cut stumps as close to the ground as possible without disrupting the soil.

- .9 Limit tree cutting to the footbridge layout (footprint: bridge width + 1 meter (0.5 m each side) and to access roads (or haul roads).
- .10 Promote the use of access roads (or haul roads) over sparsely treed areas.
- .11 Clear from site cut wood (trunks) and branches to a designated and authorized site.
- .12 Limit traffic of logging equipment to existing road, to the course of cleared of trees and to access roads (or haul roads) between the road and the planned layout agreed to with Departmental Representative.
- .13 Submit for approval by Departmental Representative a workplan to limit equipment traffic.
- .14 Avoid heavy equipment traffic in wet areas such as the salt marsh.

1.7 WORK ADJACENT TO WATERWAYS

- .1 Traffic of equipment and storage of equipment or materials is not allowed in the littoral area delineated by the high-water mark shown on plans, under any circumstances.
- .2 Do not use construction equipment in waterways unless approved by Departmental Representative.
- .3 Do not borrow materials from waterbody or stream beds.
- .4 Waterways to be kept free of excavated fill, waste material and debris.
- .5 Design and construct culverts or temporary crossings to minimize erosion of waterways.
- .6 Do not skid logs or construction materials across waterways.
- .7 Avoid indicated spawning beds when constructing culverts and temporary crossings of waterways.

1.8 POLLUTION CONTROL

- .1 Maintain temporary erosion and pollution control features installed under this Contract.
- .2 Control emissions from equipment and plant in accordance with local authorities' requirements.
- .3 Provide temporary enclosures to prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area.

- .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

1.9 HISTORICAL / ARCHAEOLOGICAL CONTROL

- .1 Provide historical, archaeological and cultural resources, biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands known to be on project site; and that identifies procedures to be followed should historical, archaeological and cultural resources, biological resources and wetlands not previously known to be on site or in area are discovered during construction.
- .2 Plan to indicate methods designed to ensure protection of known or discovered resources and identify lines of communication between Contractor personnel and Departmental Representative.
- .3 Stop work and inform Departmental Representative if potential archeological vestiges are found during work.

1.10 NON-COMPLIANCE NOTICE

- .1 Departmental Representative will notify Contractor in writing of each observed non-compliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.
- .2 After receipt of such non-compliance notice, inform Departmental Representative of proposed corrective action and take such action upon approval by Departmental Representative.
- .3 Departmental Representative will issue a cease work order until satisfactory corrective action has been taken.
- .4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

PART 2 -PRODUCTS

2.1 NOT USED

- .1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

End of section

PART 1 - GENERAL1.1 INSPECTION

- .1 Allow Departmental Representative access to Work. If part of Work is carried out at locations other than Place of Work, allow access to such Work throughout construction.
- .2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.
- .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4 Departmental Representative will order part of Work to be examined if Work is suspected to be non compliant with Contract Documents. If, upon examination such work is declared non compliant with Contract Documents, Contractor shall correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Departmental Representative shall pay cost of examination and overhauling.

1.2 INDEPENDENT TESTING AND INSPECTION AGENCIES

- .1 Independent Inspection and Testing Agencies will be appointed by Departmental Representative. Cost of such services will be borne by Departmental Representative.
- .2 Employment of inspection and testing agencies does not relax Contractor of his responsibility to perform Work in accordance with Contract Documents.
- .3 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Departmental Representative. Pay costs for retesting and reinspection.

1.3 ACCESS TO WORK

- .1 Allow inspection and testing agencies access to Work, and off site manufacturing and fabrication plants.
- .2 Co-operate to provide reasonable facilities for such access.

1.4 PROCEDURE

- .1 Notify appropriate agency and Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made.

- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store test samples.
- 1.5 REJECTED WORK
- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Departmental Representative.
- 1.6 REPORTS
- .1 Submit (4) copies of inspection and test reports to Departmental Representative.
- .2 Provide copies to subcontractor of work being inspected or tested.
- 1.7 TESTS AND MIX DESIGNS
- .1 Furnish test results.
- .2 Cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work are subject to Departmental Representative approval and may be authorized as recoverable.
- 1.8 MILL TESTS
- .1 Submit mill test certificates as requested or required of specification Sections.
- PART 2 - PRODUCTS
- 2.1 NOT USED
- .1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

End of section

PART 1 - GENERAL1.1 ACTION AND
INFORMATIONAL
SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 (Submittal Procedures).

1.2 INSTALLATION AND
REMOVAL

- .1 Provide temporary utilities controls in order to execute work expeditiously.
- .2 Remove from site all such work after use.

1.3 TEMPORARY POWER
AND LIGHT

- .1 Provide and pay for temporary power during construction for temporary lighting and operating of power tools and of field offices.
- .2 Arrange for connection with appropriate utility company. Pay costs for installation, maintenance and removal.

1.4 TEMPORARY
COMMUNICATION FACILITIES

- .1 Provide and pay for temporary telephone, fax, data, hook up to main networks, lines and equipment necessary for own use and use of Departmental Representative and work site supervisor.

1.5 FIRE PROTECTION

- .1 Provide and maintain fire protection equipment during performance of Work required by insurance companies having jurisdiction and governing codes, regulations and bylaws.
- .2 Burning rubbish and construction waste materials is not permitted on site.

PART 2 -PRODUCTS2.1 NOT USED

- .1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

End of section

PART 1 - GENERAL

1.1 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 (Submittal Procedures).

1.2 INSTALLATION AND REMOVAL

- .1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.
- .2 Identify areas which have to be gravelled to prevent tracking of mud.
- .3 Indicate use of supplemental or other staging area.
- .4 Provide, install or develop required construction facilities in order to execute work expeditiously.
- .5 Dismantle and remove from site all such work after use

1.3 SCAFFOLDING

- .1 Scaffolding in accordance with CAN/CSA-S269.2.
- .2 Provide and maintain scaffolding, ramps, ladders, swing staging, platforms and temporary stairs required to perform Work.

1.4 HOISTING

- .1 Provide, operate and maintain hoists, cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for their use of hoists.
- .2 Hoists and cranes to be operated by qualified operators

1.5 SITE STORAGE/LOADING

- .1 Confine work and operations within limits indicated in Contract Documents. Do not unreasonably encumber premises with equipment and products.
- .2 Do not load or permit to load any part of Work with weight or force that will endanger Work.

1.6 CONSTRUCTION PARKING

- .1 Parking will be permitted on site provided it does not disrupt performance of Work.
- .2 Provide and maintain adequate access to project site.

1.7 SECURITY

- .1 Provide and pay for responsible security personnel to guard site and contents of site after working hours and during holidays.

1.8 OFFICES

- .1 Provide office heated to 22 degrees C, lighted 750 lux and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table.
- .2 Provide marked and fully stocked first-aid case in a readily available location.
- .3 Where necessary, subcontractors to provide their own offices. Direct location of these offices.
- .4 Departmental Representative's Site office.
 - .1 Provide temporary office for Departmental Representative.
 - .2 Inside dimensions minimum 3.6 m long x 3 m wide x 2.4 m high, with floor 0.3 m above grade, complete with two (2) 50% opening windows and one lockable door.
 - .3 Insulate office and provide heating system to maintain 22 degrees C inside temperature at -20 degrees C outside temperature.
 - .4 Finish inside walls and ceiling with plywood, hardboard or wallboard and paint in selected colours. Finish floor with 19 mm thick plywood.
 - .5 Install electrical lighting system to provide minimum 750 lux using surface mounted, shielded, commercial fixtures with 10% upward light component.
 - .6 Provide private washroom facilities adjacent to office complete with flush or chemical type toilet, lavatory and mirror and maintain supply of paper towels and toilet tissue.
 - .7 Furnish office with 1 m x 2 m table, 2 chairs, 3-drawer filing cabinet, one plan rack, and one coat rack and shelf.
 - .8 Maintain in clean condition.

1.9 EQUIPMENT, TOOL AND MATERIALS STORAGE

- .1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .2 Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities

1.10 SANITARY FACILITIES

- .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
- .2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.11 PROTECTION AND MAINTENANCE OF TRAFFIC

- .1 Provide access and temporary relocated roads as necessary to maintain traffic. Never use or disrupt the high part of the beach and the plant-covered strip (between the beach and the existing access road).
- .2 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Departmental Representative.
- .3 Where needed, provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placement of lighting around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs.
- .4 Protect travelling public from damage to person and property.
- .5 Contractor's traffic on roads selected for hauling material and equipment to and from site shall interfere as little as possible with public traffic.
- .6 Verify adequacy of existing roads and allowable load limit on these roads. Contractor shall be responsible for repair of damage to roads caused by construction operations.
- .7 Construct access and haul roads as necessary.
- .8 Build haul roads with appropriate slope and width; avoid sharp bends, blind curves, and any dangerous intersections.
- .9 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.

- .10 Dust abatement: adequate to ensure safe operation at all times.
- .11 Location, slope, width and layout of access roads and haul roads are subject to approval by Departmental Representative.
- .12 Provide snow removal during construction period.
- .13 Remove, upon completion of work, haul roads designated by Departmental Representative.

1.12 CLEAN-UP

- .1 Remove construction debris, waste materials, packaging material from work site daily.
- .2 Clean dirt or mud tracked onto paved or surfaced roadways
- .3 Store materials resulting from demolition activities that are salvageable.
- .4 Do not store in site installations any new and salvaged equipment and materials.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not used.

End of section

PART 1 - GENERAL

1.1 INSTALLATION AND REMOVAL

- .1 Provide, install or develop temporary access and protection controls in order to execute Work expeditiously
- .2 Dismantle and remove from site all such work after use.

1.2 HOARDING

- .1 Erect 1,2 m high temporary fence of new snow fence attached with wire to iron T posts set at 2,4 m center-to-center.
- .2 Provide barriers around trees and plants designated to remain and protect from damage by equipment and construction procedures.

1.3 GUARD RAILS AND BARRICADES

- .1 Provide secure, rigid guard rails and barricades around deep excavations.
- .2 Provide and install such elements as required by governing authorities.

1.4 ACCESS TO SITE

- .1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.

1.5 PUBLIC TRAFFIC FLOW

- .1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect the public.

1.6 FIRE & EMERGENCY ROUTES

- .1 Maintain access to property for emergency response vehicles and ensure adequate height clearances.

1.7 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

- .1 Protect surrounding private and public property from damage during performance of Work.
- .2 Where applicable, be responsible for damage incurred.

1.8 PROTECTION OF
BUILDING FINISHES

- .1 Provide protection for finished and partially finished building finishes and equipment throughout performance of Work.
- .2 Provide necessary screens, covers, and hoardings.
- .3 Be responsible for damage incurred due to lack of or improper protection.

PART 2 -PRODUCTS

2.1 NOT USED

- .1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not used.

End of section

PART 1 - GENERAL1.1 REFERENCE
STANDARDS

- .1 If there is question as to whether products or systems are in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to assess conformance.
- .2 Cost for such testing will be borne by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.

1.2 QUALITY

- .1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .3 Should disputes arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.
- .4 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout Work.

1.3 STORAGE,
HANDLING AND
PROTECTION

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling, and in accordance with manufacturer's instructions where applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store lumber and sheet materials on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .5 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.

- .6 Touch-up damaged factory finished surfaces to Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.
- 1.4 TRANSPORTATION .1 Pay costs of transportation of products required in performance of Work.
- 1.5 MANUFACTURER'S INSTRUCTIONS .1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels and packaging or enclosures provided with products. Obtain written instructions directly from manufacturers.
- .2 Notify Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Departmental Representative may establish appropriate course of action.
- .3 Improper installation or erection of products, due to failure in complying with manufacturers' requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.
- 1.6 QUALITY OF WORK .1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative if required Work is such as to make it impractical to produce required results.
- .2 Do not employ anyone unskilled in their required duties. Departmental Representative reserves right to require dismissal from site of workers deemed incompetent or careless.
- .3 Decisions as to skills of workers or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative whose decision is final.
- 1.7 REMEDIAL WORK .1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Co-ordinate adjacent affected Work as required.
- .2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.8 FASTENINGS – <u>GENERAL</u>	.1	Except where fastenings in stainless steel or other material are prescribed for use outdoors in the relevant Section of the specifications, use corrosion-proof hot-dip galvanized steel fastenings and anchors.
------------------------------------	----	--

PART 2 — PRODUCTS

<u>2.1 NOT USED</u>	.1	Not used.
---------------------	----	-----------

PART 3 — EXECUTION

<u>3.1 NOT USED</u>	.1	Not used.
---------------------	----	-----------

End of section

PART 1 - GENERAL

1.1 PROJECT CLEANLINESS

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Owner or other contractors.
- .2 Remove waste materials from site daily at regular scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.
- .3 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .4 Provide on-site containers for collection of waste materials and debris.

1.2 FINAL CLEANING

- .1 Refer to article CG 3.14 of the General Conditions set forth in CCDC 2.
- .2 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .3 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
- .4 Prior to final inspection remove surplus products, tools, construction machinery and equipment.
- .5 Remove waste products and debris including that caused by Owner or other contractors
- .6 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.
- .7 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .8 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
- .9 Broom clean and wash footbridge and exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .10 Remove dirt and other disfiguration from exterior surfaces.
- .11 Sweep and wash clean paved areas.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

End of section

PART 1 - GENERAL1.1 WASTE
MANAGEMENT GOALS

- .1 Prior to start of Work conduct meeting with Departmental Representative to review and discuss Waste Management Plan and Goals.
- .2 Accomplish maximum control of solid construction waste.
- .3 Preserve environment and prevent pollution and environment damage.

1.2 DEFINITIONS

- .1 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.
- .2 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.
- .3 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 or for storage for use on future projects.
 - .2 Returning reusable items including pallets or unused products to vendors.
- .4 Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects (industrial, commercial and institutional) for purpose of reuse or recycling.
- .5 Separate Condition: refers to waste sorted into individual types.
- .6 Source Separation: acts of keeping different types of waste materials separate beginning from first time they became waste.

1.3 PRECAUTIONS

- .1 Prevent contamination of waste materials to be reused or recycled as required for acceptance at designated facilities.
 - .1 Separate waste materials at source.
 - .2 Provide a bill of lading for separated waste materials.

1.4 DISPOSAL OF NON-CONTAMINATED MATERIALS

- .1 Do not bury rubbish or waste materials.
- .2 Do not dispose of waste, volatile materials, mineral spirits and hydrocarbons into waterways, storm, or sanitary sewers.
- .3 Recover waste materials as Work progresses.
- .4 Prepare project summary to verify destination and quantities on a material-by-material basis of waste removed from site.
- .5 Non-contaminated dry materials that are not reused/backfilled or recycled shall be disposed of at one or several sites authorised by MDDEP (Ministère du Développement durable, de l'Environnement et des Parcs). Comply with the requirements of the Environment Quality Act (L.R.Q. c.Q-2). Upon request, MDDEP may provide information on the disposal sites that are in operation and accept waste materials by type.
- .6 Provide Departmental Representative with copy of authorisations and permits obtained from owners or operators of dry material disposal sites before such wastes are allowed to leave the site.

PART 2 - PRODUCTS2.1 NOT USED

- .1 Not used.

PART 3 - EXECUTION3.1 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.

End of section

PART 1 - GENERAL

- 1.1 RELATED REQUIREMENTS .1 Section 01 74 11 – Cleaning.
- 1.2 INSPECTION AND STATEMENT OF SUBSTANTIAL ACHIEVEMENT
- .1 Contractor's Inspection: Contractor and subcontractors to conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
- .1 Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
- .2 Request Departmental Representative's inspection of Work.
- .2 Departmental Representative's Inspection: Departmental Representative and Contractor to inspect Work and identify defects and deficiencies. Contractor to correct Work as directed.
- .3 Completion Tasks: submit written certificates in that tasks have been performed as follows:
- .1 Work: completed and inspected for compliance with Contract Documents.
- .2 Defects: corrected and deficiencies completed.
- .3 Work is complete and ready for final inspection.
- .4 Personnel designated by Departmental Representative has undergone the necessary training regarding the operation of equipment and systems.
- .4 Final Inspection: When completion tasks are done, request final inspection of Work jointly by the Owner, the Departmental Representative and the Contractor.. When Work is deemed incomplete according to Owner and Departmental Representative, complete outstanding items and request re-inspection.
- 1.3 FINAL CLEANING .1 Clean in accordance with Section 01 74 11 (Cleaning).
- .2 Remove waste and surplus materials, rubbish and construction facilities from the site in accordance with Section 01 74 21 (Construction/Demolition Waste Management and Disposal).

PART 2 - PRODUCTS

- 2.1 NOT USED .1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

End of section

PART 1 - GENERAL1.1 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA B111-1974, Wire Nails, Spikes and Staples.
 - .2 CSA O121-FM1978, Douglas Fir Plywood.
 - .3 CAN/CSA O141-F91 Softwood Lumber.
- .2 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber 2000.

1.2 QUALITY ASSURANCE

- .1 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .2 Identification of plywood, OSB and wood-based composite panel construction sheathing: by grade mark in accordance with applicable CSA standards and ANSI.
- .3 Departmental Representative may require that moisture content be verified upon arrival at the work site by designated laboratory.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling in accordance with Section 01 74 21 (Construction/Demolition Waste Management and Disposal), and with the Waste Reduction Workplan, where economically justifiable.
- .2 Separate wood waste for recycling in accordance with the Waste Management Plan and place in designated areas classified as follows: treated, painted, and contaminated wood.
- .3 Do not burn waste on site.

1.4 CERTIFICATES

- .1 Submit required certificates in accordance with Section 01 33 00.
- .2 Submit wood quality certificates to Departmental Representative.
- .3 Each piece to bear stamp indicating species, grade, and moisture content.
- .4 Provide certificates, attestations, test procedures, and results of each bundle of treated wood delivered on site.

- | | | |
|---|----|--|
| <u>1.5 SHOP DRAWINGS</u> | .1 | Submit shop drawings, product descriptions, and samples in accordance with Section 01 33 00. |
| | .2 | Submit shop drawings to Departmental Representative's approval. |
| <u>1.6 SHIPPING, HANDLING AND STORAGE</u> | .1 | Ship, handle and store materials on site in such way as to obviate damage to materials. |
| | .2 | Handle and store lumber, pieces of wood to avoid permanent deformations. |

PARTIE 2 - PRODUCTS

- | | | |
|---|----|---|
| <u>2.1 FRAMING AND LUMBER MATERIALS</u> | .1 | Pressure-treated wood |
| | .1 | Unless specified otherwise, all structures constructed in pressure-treated pine with alkaline copper quaternary (ACQ) preservative to obtain minimum net retention of 6,4 kg/m ³ of wood by vacuum impregnation process in a closed cylinder to latest edition of CSA 080-M89 standard. |
| | .2 | Incise with micro slits before treatment. Ensure that the preservative forms a consistent and deep envelope. |
| | .2 | Preservation product: the preservative used in wood grooves and cuts shall be a penetrating water-repellent solution to help protect wood against decay and rot in compliance with the relevant CSA 080 series standards. Product to contain 2% zinc naphthenate. This solution is not intended to replace pressure impregnation of the wood. |
| | .3 | Lumber: unless otherwise specified, use softwood dressed 4 sides, with maximum 19% moisture content and in accordance with following standards and rules: |
| | .1 | CAN/CSA-O141. |
| | .2 | NLGA Standard Grading Rules for Canadian Lumber. |
| | .4 | Framing and decking: in accordance with National Building Code of Canada requirements: |
| | .1 | Decking lumber and steps: red pine, grade n° 1. |
| | .2 | Framing lumber and cheek walls strings: SPF grade n° 1. |

	.5	Furring, shims, nailing strips, and wood grounds: .1 Boards: standard or "superior" grade; .2 Dimension lumber: light framing (balloon frame) class, "standard" or superior grade.
<u>2.2 ACCESSORIES</u>	.1	Nails, spikes and staples: to CSA B111, hot-dip galvanized.
	.2	Lag bolts: to CSA-B34-1972, hot-dip galvanized.
	.3	Bolts: 16 mm diameter unless indicated otherwise, in stainless steel or galvanized complete with nuts and washers.
	.4	Proprietary fastening systems: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, recommended for purpose by manufacturer.
	.5	Joist hangers: steel sheet 6 mm thick minimum, ZF001 galvanized coating.
	.6	Nail washers: at least 25 mm diameter and 0,4 mm thick flat galvanized plate, designed to prevent cupping. Distorted disks (convex or concave) are not acceptable.
<u>2.4 FINISHES – FASTENING SYSTEMS</u>	.1	Galvanized steel: to CAN/CSA-G164, use galvanized fasteners for outdoor structures and pressure-treated lumber.
	.2	Stainless steel: A316 grade.
<u>PARTIE 3 - EXECUTION</u>		
<u>3.1 PREPARATION</u>	.1	Store lumber and by-products.
<u>3.2 INSTALLATION</u>	.1	Perform work to CAN3-086. Comply with requirements of NBC 1995, Part 9, and to following prescriptions.
	.2	Install members true to line, levels and elevations, square and plumb.
	.3	Construct continuous elements using sections of longest practical length.

- .4 Select exposed decking elements for appearance. Install lumber materials so that grade-marks and other defacing marks are concealed or are removed by sanding where materials are left exposed.

3.3 ERECTION

- .1 Assemble, anchor, fasten, attach and brace members to provide required strength and rigidity.
- .2 Countersink where bolt or lag screw heads will interfere.
- .3 Discard lumber damaged on the top surface.

3.4 PRE-DRILLED HOLES

- .1 Bore holes shall the same diameter and depth as the unthreaded section of the shank.
- .2 Holes shall be continued to a depth equal to the length of the threaded section of the lag screw to a diameter no larger than two thirds (2/3) the shank diameter.
- .3 Lag screws shall be screwed and not driven into place. Do not use hammer, sledgehammer or any other percussion device.

End of section

PART 1 - GENERAL1.1 REFERENCES

- .1 American Wood Preservers' Association (AWPA)
 - .1 AWWA A2-98, Standard Methods for Analysis of Water-borne Preservatives and Fire Retardant Formulations.
 - .2 AWA A3-00, Standard Methods for Determining Penetration of Preservatives and Fire Retardants.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA B111-1974, Wire Nails, Spikes and Staples.
 - .2 CAN/CSA 080 Series-08, Wood Preservation.
 - .3 CSA 080.20-97, Preservative Treatment of All Timber Products by Pressure Processes.
 - .4 CSA 086-01, Engineering Design in Wood.
- .3 Environmental Choice Program (ECP):
 - .1 PCE-76-98, Surface Coatings.
- .4 National Lumber Grades Authority.
 - .1 NLGA, Standard Grading Rules for Canadian Lumber, 2000.

1.2 QUALITY ASSURANCE

- .1 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board (CLSAB).
- .2 Provide test certificates, attestations, procedures and results for each batch of treated wood delivered to work site.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate treated wood waste materials for reuse and recycling.
- .2 Dispose of waste wood at nearest recycling facility approved by Departmental Representative.
- .3 Where possible, divert reusable materials to nearest construction materials recovery facility.
- .4 Dispose of unused wood preservation products at a special waste collection facility.
- .5 Provide Departmental Representative with copy of authorisations and permits delivered by the owners or managers of dry materials disposal sites before dry materials are authorised to leave the work site.
- .6 Provide Departmental Representative with coupons attesting delivery at authorised disposal sites.

1.4 SAMPLES

- .1 Submit for approval two (2) samples of wood decking prepared (incision and treatment) and shipped as indicated.

PART 2 - PRODUCTS2.1 MATERIALS

- .1 Pressure-treated wood.
- .1 Unless otherwise indicated, all structures constructed in pressure-treated pine with alkaline copper quaternary (ACQ) preservative to obtain minimum net retention of 6,4 kg/m³ of wood by vacuum impregnation process in a closed cylinder to latest edition of CSA 080-M89 standard.
 - .2 Incise with micro slits before treatment. Ensure that the preservative forms a consistent and deep envelope.
 - .3 Red pine: Grade No 1 with sound knots to CSA 0141-1970 and NLGA.
- .2 Preservation product: the preservative used in wood grooves and cuts shall be a penetrating water-repellent solution to help protect wood against decay and rot in compliance with the relevant CSA 080 series standard. Product to contain 2% zinc naphthenate. This solution is not intended to replace pressure impregnation of the wood.
- .3 Hardware: all ties, bolts, lag bolts, anchors and other hardware items to be in stainless steel or hot-dip galvanized steel approved by Departmental Representative.
- .4 Galvanization: all hot-dip galvanized material to comply with CSA G164 M92 and ASTM A-123 and display a zinc coating of 600 g/m².

PART 3 - EXECUTION3.1 CONSTRUCTION

- .1 Perform wood deck work to CSA O86 except where specified otherwise.
- .2 Install decking to CSA O86.
- .3 Place decking to pattern indicated on approved shop drawings and design details. Unless otherwise indicated use screws, lag bolts, bolts or other resistant ties so that they cannot become loose or unfastened. Use bolts and lag bolts that ensure the stability of Work. Install Work to detail drawings and as approved by Departmental Representative. Proceed to construction according to details shown on plan details. Countersink bolt heads flush with top of decking.

- .4 Chamfer decking elements as indicated on the plans.
- .5 Provide minimum of one bearing support for each plank except for cantilevers which shall extend over two supports. Install sloping deck with tongues up.
- .6 Stagger end joints in adjacent planks minimum of 0.5 m and separate joints in same area by at least 2 intervening courses. Avoid joints in first fifth of end spans and minimize joints in middle third of all spans.
- .7 Apply preservation product to end cuts where treated wood is specified.

3.2 FIELD QUALITY CONTROL

- .1 Testing moisture content of delivered material will be by testing laboratory designated by Departmental Representative.

3.3 SURFACE FINISH

- .1 Eliminate tool marks, scratches and traces of abrasion.
- .2 Dedicate particular care to finish details that convey high aesthetic quality to the Work.
- .3 Trim and mill or bevel and sand all sharp edges.

3.4 CLEANING

- .1 Keep site clean at all times. Dispose of construction waste as directed by Departmental Representative and in this specification.

End of section

PART 1 - GENERAL

1.1 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM C 117-04, Standard Test Method for Material Finer than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C 136-05, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .3 ASTM D 422-63/2002, Standard Test Method for Particle-Size Analysis of Soils.
 - .4 ASTM D 698-00ae1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³) (600 kN-m/m³).
 - .5 ASTM D 1557-02e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³) (2,700 kN-m/m³).
 - .6 ASTM D 4318-05, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB)
 - .1 AN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.
- .3 U.S. Environmental Protection Agency (EPA)/Office of Water
 - .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.2 DEFINITIONS

- .1 Excavation classes: two (2) classes of excavation will be recognized; common excavation and rock excavation.
 - .1 Rock excavation: solid material in excess of 1.00 m³ and which cannot be removed by means of heavy mechanical excavating equipment with 0.95 to 1.15 m³ bucket. Frozen material not 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 Topsoil:
 - .1 Material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.

- .2 Any material reasonably free from subsoil, clay lumps, brush, objectionable weeds, and other litter, and free from cobbles, stumps, roots, and other objectionable material larger than 25 mm in any dimension.
- .4 Waste material: excavated material unsuitable for use in Work or surplus to requirements.
- .5 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.
- .6 Recycled fill material: material, considered inert, obtained from alternate sources and engineered to meet requirements of fill areas.
- .7 Unsuitable materials:
 - .1 Weak, chemically unstable, and compressible materials.
 - .2 Frost susceptible materials: 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-8.2.

1.3 SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 (Submittal Procedures).
- .2 Quality Control:
 - .1 Submit condition survey of existing conditions as described in EXISTING CONDITIONS article of this Section.
 - .2 Submit for review by Departmental Representative proposed dewatering and heave prevention methods as described in PART 3 of this Section.
 - .3 Submit to Departmental Representative written notice when bottom of excavation is reached.
 - .4 Submit to Departmental Representative testing and inspection results and reports as described in PART 3 of this Section.
- .3 Preconstruction Submittals:
 - .1 Submit construction equipment list for major equipment to be used in this section prior to start of Work of this Section.
 - .2 Submit records of underground utility locates, indicating: location plan of existing utilities as found in field, clearance record from utility authority, location plan of relocated and abandoned services, as required.
 - .3 Submit technical data sheets of backfill materials used in the Work.

1.4 QUALITY ASSURANCE

- .1 Do not use soil material until written report of soil test results are reviewed and approved by Departmental Representative.

1.5 EXISTING CONDITIONS

- .1 Buried services:
 - .1 Before commencing work verify and establish location of buried services on and adjacent to site.
 - .2 Arrange with appropriate authority for relocation of buried services likely to interfere with execution of work: pay costs of relocating services.
 - .3 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
 - .4 Prior to beginning excavation Work, notify Departmental Representative of location and state of use of buried utilities and structures. Authorities having jurisdiction to clearly mark such locations to prevent disturbance during Work.
 - .5 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered as indicated.
 - .6 Record location of maintained, re-routed and abandoned underground lines.
 - .7 Confirm locations of recent excavations adjacent to area of excavation.
- .2 Existing buildings and surface features:
 - .1 Conduct, with Departmental Representative, condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, rail tracks, pavement, survey bench marks and monuments which may be affected by Work.
 - .2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair as directed by Departmental Representative.
 - .3 Where required for excavation, cut roots or branches as directed by Consultant.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Backfill materials: MG-20, MG-112 et CG-14 to NQ 2560-114.
 - .1 Crushed, pit run or screened stone, gravel or sand.
 - .2 Gradations to be within limits specified when tested to ASTM C 136 and ASTM C 117. Sieve sizes to CAN/CGSB-8.2.

- .2 Class B backfill materials: material from excavation or other sources, approved by Departmental Representative for use intended, unfrozen and free from rocks larger than 75 mm in any dimension, cinders, ashes, sods, refuse or other deleterious materials.
- .3 Geotextiles: to Section 31 32 19.01 - Geotextiles.

PART 3 - EXECUTION

3.1 SITE PREPARATION

- .1 Remove obstructions, ice and snow from surfaces to be excavated within limits indicated.

3.2 PREPARATION/ PROTECTION

- .1 Protect existing features in accordance with Section 01 56 00 (Temporary Barriers and Enclosures) and applicable municipal regulations.
- .2 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 Protect buried services that are required to remain undisturbed.

3.3 STOCKPILING

- .1 Stockpile fill materials in areas designated by Departmental Representative.
- .2 Stockpile granular materials in manner to prevent segregation.
- .3 Protect fill materials from contamination.
- .4 Implement sufficient erosion and sediment control measures to prevent sediment release off construction boundaries and into water bodies.

3.4 GRADING AND EXCAVATION

- .1 Perform grading and excavation as needed for construction of proposed footbridge to grades and dimensions as indicated.
- .2 Do not disturb soil within branch spread of trees or shrubs that are to remain. If excavating through roots, excavate by hand and cut roots with sharp axe or saw.
- .3 Dispose of surplus and unsuitable excavated material off site.

- .4 Do not obstruct flow of surface drainage or natural watercourses.
- .5 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
- .6 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.
 - .2 Clean out rock seams and fill with concrete mortar or grout to approval of Departmental Representative.

3.5 FILL TYPES AND COMPACTION

- .1 Use types of fill as indicated or specified below. Compaction densities are percentages of maximum densities obtained from ASTM D 698.
 - .1 Approach to footbridge: Place type MG-20 backfill material in uniform layers not exceeding 150 mm compacted thickness. Compact to 95%.

3.6 BACKFILLING

- .1 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
- .2 Do not use backfill material which is frozen or contains ice, snow or debris.
- .3 Place backfill material in uniform layers not exceeding 150 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.

3.7 RESTORATION

- .1 Upon completion of Work, remove waste materials and debris, trim slopes, and correct defects as directed by Departmental Representative.
- .2 Replace topsoil as indicated or as directed by Departmental Representative.
- .3 Reinstate pavements [and sidewalks] disturbed by excavation to thickness, structure and elevation which existed before excavation.
- .4 Clean and reinstate areas affected by Work as directed by Departmental Representative.
- .5 Protect newly graded areas from traffic and erosion and maintain free of trash or debris.

End of section

PART 1 - GENERAL

1.1 SCOPE

- .1 The supplier of piles shall be acquainted with the site conditions before the closing of the call for tenders and ascertain that the use and installation of his product are appropriate for the Work at hand.
- .2 The work of this section consists in the supply of piles and related accessories, and installing screw piles using all the construction equipment required to perform the piling work. The expertise and supervision required to place the piles into the ground as well as the loading tests are integral to this specification.
- .3 The expression "pile" is meant to include the tip module and any attachments or extensions. The base plate is also included in the related accessories.

1.2 MATERIALS

- .1 Each pile used in this project shall withstand factored loads as follows: 70 kN compressive (bearing) and 15 kN shear (lateral).
- .2 Before work is undertaken, the Contractor shall provide Departmental Representative with manufacturer's shop drawings signed and sealed by an engineer member of OIQ (Ordre des ingénieurs du Québec). Piles mechanically driven or vibrated will not be accepted.
- .3 The tubular section shall have a 6,4 mm minimum wall thickness, and thickness of helical blades to be no less than 13 mm. All elements to be hot-dip galvanized to the requirements of CSA G164-M. Prepare surfaces in compliance with SSPC-SP6 requirements.
- .4 Piles and related accessories supplied by the manufacturer shall be in new steel and comply with CSA W59-M design standards for the welding of the parts, with that of ASTM A325 for steel nuts, bolts and washers, and with CSA-G40.21-M for the steel of the shaft and helical blades of the piles.

1.3 EQUIPMENT

- .1 Drive piles using a calibrated rotary motor applying minimum 16 000 N-m tightening torque value.

- .2 The contractor responsible for installation shall provide a calibration report for each rotary motor used to install the screw piles. Calibration to be performed by a recognised firm under supervision of an engineer member of OIQ in the last twelve months. The calibration report shall include a chart indicating clearly the “hydraulic pressure—tightening torque” ratio signed by an engineer member of OIQ.
- .3 The installation unit shall weigh at least 10 000 lb. net and be fitted with a hydraulic pressure gauge indicator at all times accessible to the work site supervisor.

1.4 SITE PROTECTION AND PREPARATION WORK

- .1 Contractor is responsible for making work site accessible and safe, for obtaining the required permits, and for locating and protecting buried or overhead services against any damage caused by the operator during screw piling operations.
- .2 Contractor to perform the location of each screw pile and provide for their final required elevation.

1.5 INSTALLATION

- .1 During screw piling, minimum pressure shall be applied to the head and in the axis of the pile.
- .2 During installation, perform continuous monitoring of pile verticality relative to the angle of the installation.
- .3 Increase in tightening torque values to be gradual over the last metre. The operator shall ascertain that piles are installed in the required layer of soil and that the latter is homogeneous.
- .4 The upper helix of the pile to be at least 1,8 m below ground level (or as indicated in the National Building Code according to region).
- .5 Apply an upward pressure should a screw pile need to be partially or completely unscrewed. However, when a screw pile must be installed at the same location, the operator shall ensure that the tip module is ultimately lodged in undisturbed material.

1.6 SUPERVISION

- .1 The piling contractor shall keep a record of the installation of each pile and indicate the following information:
 - .1 Type of equipment used.
 - .2 Pile number and model.

- .3 Depth of installation.
- .4 Final tightening torque reached.

- .2 Should soil conditions differ from indications in the geotechnical investigation report, the Contractor shall immediately notify the Departmental Representative and await instructions before resuming work.

1.7 PILE REPAIR AND/OR REPLACEMENT

- .1 Departmental Representative has the right to refuse any pile that does not comply with permissible tolerances, including any pile damaged during installation.
- .2 Any non-compliant screw pile shall be removed from ground for re-installation or replacement with a pile that will comply with specifications.

End of section

APPENDIX A

Geotechnical investigation report (LVM)

Parcs Canada

Construction d'une passerelle sur pieux vissés à la presqu'île de Penouille (Québec)

Genivar/D : 121-25049-00

Rapport d'étude géotechnique

Date : Janvier 2013

N/Réf. : 073-P-0000500-0-49-148-GE-R-0100-00

Parcs Canada**Construction d'une passerelle à pieux vissés à la
presqu'île de Penouille (Québec)**

Rapport d'étude géotechnique

Préparé par :

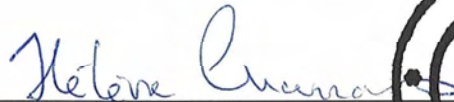


Rachel Poliquin, ing.jr

Membre OIQ #5007389

Chargée de projet

Vérifié par :




Hélène Charrois, géo. M.Sc.

Membre OGQ #358

Chargée de discipline



Approuvé par :



Noël Huard, ing.

Membre OIQ # 42077

Directeur de service / Rimouski



TABLE DES MATIÈRES

1	INTRODUCTION.....	1
2	DESCRIPTION DU PROJET ET DU SITE	2
2.1	Description du projet	2
2.2	Description du site.....	2
3	MÉTHODE DE RECONNAISSANCE	3
3.1	Travaux sur le terrain	3
3.1.1	<i>Forages</i>	3
3.1.2	<i>Arpentage</i>	3
3.1.3	<i>Supervision</i>	4
3.2	Travaux de laboratoire	4
4	NATURE ET PROPRIÉTÉS DES MATÉRIAUX.....	5
5	EAU SOUTERRAINE.....	7
6	RECOMMANDATIONS.....	8
6.1	Profondeur du gel.....	8
6.2	Excavations	8
6.3	Drainage temporaire	8
6.4	Fondations	9
6.5	Catégorie d'emplacement en fonction de la réponse sismique	9
6.6	Accélération spectrale.....	9
6.7	Potentiel de liquéfaction des sols.....	10
6.8	Suivi de construction	10

Tableaux

Tableau 3.2 :	Analyses de laboratoire	4
Tableau 4.0 :	Résumé des conditions stratigraphiques.....	6
Tableau 5.0 :	Niveau de l'eau souterraine.....	7
Tableau 6.6 :	Accélération spectrale et accélération maximale du sol.....	10

Annexes

Annexe 1	Portée de l'étude
Annexe 2	Notes explicatives sur les rapports de sondage et rapports de forages
Annexe 3	Essais de laboratoire
Annexe 4	Reportage photographique
Annexe 5	Plans de situation et de localisation

Propriété et confidentialité

« Ce document d'ingénierie est l'œuvre de LVM et est protégé par la loi. Ce rapport est destiné exclusivement aux fins qui y sont mentionnées. Toute reproduction ou adaptation, partielle ou totale, est strictement prohibée sans avoir préalablement obtenu l'autorisation écrite de LVM et de son Client.

Les sous-traitants de LVM qui auraient réalisé des travaux au chantier ou en laboratoire sont dûment qualifiés selon la procédure relative à l'approvisionnement de notre manuel qualité. Pour toute information complémentaire ou de plus amples renseignements, veuillez communiquer avec votre chargé de projet. »

REGISTRE DES RÉVISIONS ET ÉMISSIONS		
No de révision	Date	Description de la modification et/ou de l'émission
00	2013-01-18	Rapport final

DISTRIBUTION	
2 exemplaires	PARCS CANADA
	Madame Marie-P. Rousseau, ing.

1 INTRODUCTION

Parcs Canada a retenu les services de LVM, consultants en géotechnique et ingénierie des matériaux, pour effectuer une étude géotechnique relativement à la construction d'une passerelle à pieux vissés à la presqu'île de Penouille (Québec). Les travaux ont été menés en accord avec les termes de référence de notre proposition de services professionnels du 26 novembre 2012 (N/Réf : 12-0440-073) et qui a été acceptée par madame Lucie Maillé le 29 novembre 2012 sous le numéro de contrat 45322521.

Cette étude a pour but de déterminer la nature et quelques propriétés des matériaux à l'emplacement des fondations projetées, d'évaluer les conditions d'eau souterraine à ces endroits et de formuler des recommandations d'ordre géotechnique nécessaires à la conception des fondations en pieux vissés.

Ce rapport contient une description du projet et du site, des explications sur la méthode de reconnaissance utilisée sur le terrain et en laboratoire, une description de la nature et des propriétés des matériaux rencontrés, des informations relativement aux conditions d'eau souterraine et des recommandations d'ordre géotechnique applicables.

La portée du rapport est précisée à l'annexe 1. Celle-ci s'avère importante pour une bonne compréhension des informations contenues dans le rapport et doit être considérée comme faisant partie intégrante de celui-ci. L'annexe du rapport contient également les rapports de forages, les résultats d'essais en laboratoire, un reportage photographique ainsi que des plans de situation et de localisation.

2 DESCRIPTION DU PROJET ET DU SITE

2.1 DESCRIPTION DU PROJET

Parcs Canada projette de construire une passerelle sur la presqu'île de Penouille. La passerelle sera construite le long du chemin existant, sur une longueur approximative de 600 mètres. Des pieux vissés sont prévus être utilisés à titre de fondations de la passerelle.

Il est à noter qu'au moment de rédiger ce rapport, les contraintes induites aux sols de fondation de même que la géométrie des pieux et le niveau du terrain fini étaient inconnus. Pour les fins de la rédaction du présent document, nous avons considéré que le niveau du terrain fini correspondrait au niveau moyen du terrain actuel à l'endroit du tracé. Lorsque les paramètres mentionnés dans ce paragraphe seront déterminés, nous devrons en être avisés afin de réévaluer, s'il y a lieu, nos recommandations.

2.2 DESCRIPTION DU SITE

Le site à l'étude est localisé dans le Parc national de Forillon, secteur de Penouille, sur le territoire de la Ville de Gaspé. Une route asphaltée permettant la circulation de piétons et de bicyclettes est actuellement présente. La figure de situation placée en annexe présente la localisation du site.

D'une manière générale, le site présente une topographie légèrement irrégulière, à une élévation approximative de 2 mètres au-dessus du niveau de la mer.

3 MÉTHODE DE RECONNAISSANCE

La détermination de la nature et des propriétés des matériaux a été réalisée à partir de travaux sur le terrain et en laboratoire.

3.1 TRAVAUX SUR LE TERRAIN

Les travaux sur le terrain ont été effectués les 3, 4 et 21 décembre 2012. Ils ont consisté en la localisation et la réalisation de cinq (5) forages aménagés en puits d'observation. Leur emplacement est montré sur le plan de localisation placé à l'annexe 5.

3.1.1 Forages

Les forages, identifiés TF-01-12 à TF-05-12, ont été réalisés à l'emplacement des repères implantés par Genivar. Les forages ont tous atteint une profondeur de 6,10 mètres sous la surface du terrain actuel. Les forages ont été effectués au moyen d'une foreuse à tarière évidée.

Sol

Des échantillons remaniés de sol ont été prélevés avec des cuillères fendues normalisées de 51 millimètres de diamètre intérieur et de 600 millimètres de longueur, enfoncée par battage à l'aide d'un marteau de 63,5 kilogrammes tombant en chute libre d'une hauteur de 76 centimètres permettant ainsi de déterminer la stratigraphie et l'indice « N » de l'essai de pénétration standard, conformément à la norme NQ 2501-140.

Tube d'observation

Un tube d'observation en polyéthylène d'environ 20 millimètres de diamètre et perforé dans sa partie inférieure a été laissé dans chacun des trous de forages pour permettre des mesures du niveau de l'eau souterraine ultérieurement aux travaux de forage.

3.1.2 Arpentage

La localisation des forages a été effectuée par le personnel de LVM aux emplacements piquetés par le personnel de Genivar, le long du tracé projeté de la passerelle. Toutes les élévations mentionnées dans ce rapport se réfèrent aux données d'élévation indiquées sur un plan de localisation fourni par Genivar.

3.1.3 Supervision

Les travaux sur le terrain ont été réalisés sous la supervision d'une professionnelle en sciences de la terre. Cette dernière a effectué la localisation des forages, dirigé les opérations, identifié les échantillons récupérés, mesuré le niveau de l'eau souterraine et rédigé les rapports de sondage sur le terrain.

3.2 TRAVAUX DE LABORATOIRE

Les échantillons récupérés dans les forages ont été acheminés à notre laboratoire où ils ont fait l'objet d'un examen visuel de la part d'une géotechnicienne. Par la suite, les analyses suivantes ont été réalisées sur des échantillons jugés représentatifs de façon à préciser la nature des matériaux. Les résultats des analyses de laboratoire sont présentés à l'annexe 3. Tous les essais ont été effectués conformément à la norme applicable.

Tableau 3.2 : Analyses de laboratoire

ANALYSE	NOMBRE	NORME
Analyse granulométrique par tamisage	2	LC 21-040

Les échantillons non analysés seront conservés pendant une période de trois (3) mois à compter de la date de parution de ce rapport. Ils seront par la suite détruits à moins de recevoir des directives spéciales à cet égard de la part d'un représentant autorisé du client.

4 NATURE ET PROPRIÉTÉS DES MATÉRIAUX

On devra se référer aux rapports de forages placés à l'annexe 2 pour une description détaillée des matériaux rencontrés alors que le tableau 4.0 présente un résumé des conditions stratigraphiques. Le terme « profondeur » utilisé ici fait toujours référence à la surface du terrain à l'emplacement des sondages au moment de nos travaux. De plus, la compacité des matériaux a été déterminée à partir des valeurs d'indice « N » mesurées lors de l'exécution des forages.

Tableau 4.0 : Résumé des conditions stratigraphiques

FORAGES	TF-01-12	TF-02-12	TF-03-12	TF-04-12	TF-05-12	COMPACTÉ
ÉLÉVATION (m)	1,37	2,27	1,97	0,74	2,02-	
DESCRIPTION DES MATÉRIAUX	PROFONDEUR (m)					
Terre végétale	0,00 – 0,08	0,00 – 0,10	0,00 – 0,05	0,00 – 0,08	0,00 – 0,05	-
Sable, traces de silt et de gravier	0,08 – 2,28	0,10 – 2,28	0,05 – 1,52	0,08 – 0,76	0,05 – 2,28	Lâche à très lâche
Sable, un peu de gravier, traces de silt	-	-	-	0,76 – 2,28	-	Lâche à compacte
Sable, trace à un peu de silt, traces de gravier	2,28 – 6,10	2,28 – 6,10	1,52 – 6,10	2,28 – 6,10	2,28 – 6,10	Lâche à compacte

5 EAU SOUTERRAINE

Le niveau de l'eau souterraine a été mesuré dans les tubes d'observation ultérieurement aux travaux de forage. Les résultats représentent toutefois une condition à court terme compte tenu de la durée des observations sur le terrain. Le niveau de l'eau souterraine peut varier selon les précipitations, les saisons, les marées et les modifications à l'environnement. Les résultats sont indiqués au tableau suivant :

Tableau 5.0 : Niveau de l'eau souterraine

FORAGES	ÉLÉVATION DE LA SURFACE (m)	DATE	EAU SOUTERRAINE	
			PROFONDEUR (m)	ÉLÉVATION (m)
TF-01-12	1,37	21 décembre 2012	1,16	0,21
TF-02-12	2,27	21 décembre 2012	2,25	0,02
TF-03-12	1,97	21 décembre 2012	1,80	0,17
TF-04-12	0,74	21 décembre 2012	0,50	0,24
TF-05-12	2,02	21 décembre 2012	2,02	0,00

6 RECOMMANDATIONS

Les recommandations présentées dans les paragraphes suivants sont basées sur les résultats des travaux sur le terrain de même que sur les informations transmises par monsieur Dominique Maheu, ing., de Genivar.

6.1 PROFONDEUR DU GEL

Selon la base de données d'Environnement Canada, l'indice de gel moyen est d'environ 1 110 °C-jour dans la région de Gaspé. La profondeur anticipée pour la pénétration du gel dans les sols est donc évaluée à 1,8 mètre dans cette région. Par conséquent, le niveau de l'assise de toutes les fondations conventionnelles reportées sur des dépôts meubles et exposées à l'action du gel doit être recouvert de sol sur une épaisseur minimale de 1,8 mètre afin de les protéger contre les effets néfastes du gel.

Si toutefois, les fondations des structures doivent être implantées à une profondeur moindre, elles doivent être protégées contre les effets du gel par des isolants thermiques.

6.2 EXCAVATIONS

Le couvert de terre végétale rencontré à l'emplacement des fondations projetées devra être enlevé et entreposé en dehors des aires de travail.

6.3 DRAINAGE TEMPORAIRE

Sur la base des observations de l'eau souterraine prises en date de nos travaux, des niveaux d'eau souterraine ont été rencontrés, au long du tracé étudié, à des profondeurs variant entre 0,50 et 2,25 mètres sous la surface. Conséquemment, des infiltrations d'eau doivent être prévues si des excavations sont prévues à ces profondeurs. Cette eau de même que celles pouvant survenir suite à des précipitations devront être évacuées selon une méthode adaptée au projet et aux conditions particulières des matériaux en place de façon à ce que le fond de l'excavation soit maintenu stable et à sec sur une épaisseur suffisante pour permettre la construction. De plus, on devra profiler le fond d'excavation de façon à éviter la formation de cuvettes où l'eau ne pourra pas être drainée et favoriser l'écoulement d'eau vers un système de drainage.

6.4 FONDATIONS

Les sols granulaires en place présentent les paramètres géotechniques définis aux paragraphes suivants.

Pour des sables contenant des traces à un peu de gravier et/ou de silt, de compacité lâche, tel que rencontrés, de façon générale, sur les premiers 3 à 4 mètres dans les sondages :

- ▶ Poids volumique total (γ) : 19 kN/m³ ;
- ▶ Poids volumique déjaugé (γ') : 11 kN/m³ ;
- ▶ Angle de frottement interne (ϕ) : 30° ;
- ▶ Coefficient de poussée au repos K_0 : 0,50 ;
- ▶ Coefficient de poussée active K_a : 0,33 ;
- ▶ Coefficient de butée K_p : 3.

Pour les sols de compacité moyenne, rencontrés plus en profondeur dans les sondages :

- ▶ Poids volumique total (γ) : 19 kN/m³ ;
- ▶ Poids volumique déjaugé (γ') : 11 kN/m³ ;
- ▶ Angle de frottement interne (ϕ) : 32° ;
- ▶ Coefficient de poussée au repos K_0 : 0,47 ;
- ▶ Coefficient de poussée active K_a : 0,31 ;
- ▶ Coefficient de butée K_p : 3,25.

6.5 CATÉGORIE D'EMPLACEMENT EN FONCTION DE LA RÉPONSE SISMIQUE

La catégorie d'emplacement en fonction de la réponse sismique, tel que défini par le « Code National du Bâtiment – Canada, 2005 », a été déterminée à partir de la nature des sols rencontrés dans les forages. La catégorie d'emplacement à utiliser est « D ». Les tableaux donnant les valeurs des coefficients d'accélération F_a et de vitesse F_v sont disponibles à la section 4.1.8.4 du « Code National du Bâtiment – Canada, 2005 ». Cette catégorie pourrait être confirmée ou augmentée à la hausse si un forage de 30 mètres ou jusqu'au roc était réalisé.

6.6 ACCÉLÉRATION SPECTRALE

Les valeurs d'accélération spectrale pour différentes périodes ainsi que la valeur de l'accélération maximale du sol (AMS) pour différentes villes et municipalités sont rendues disponible par Ressources naturelles Canada. Dans le secteur de la ville de Gaspé, les données d'accélération spectrale et d'accélération maximale du sol pour une probabilité de dépassement de 2 % sur 50 ans sont indiquées au tableau 6.6.

Tableau 6.6 : Accélération spectrale et accélération maximale du sol

LOCALISATION DU SECTEUR À L'ÉTUDE	DONNÉES SISMIQUES				
	Sa (0,2)	Sa (0,5)	Sa (1,0)	Sa (2,0)	AMS (g)
Gaspé	0,188	0,165	0,080	0,031	0,060

6.7 POTENTIEL DE LIQUÉFACTION DES SOLS

Le potentiel de liquéfaction des sols a été vérifié selon la procédure décrite au chapitre 6 du « Manuel canadien des fondations », 2006, et sur la base des profils stratigraphiques situés au droit des forages.

Pour les fins du calcul du potentiel de liquéfaction des sols, nous avons utilisé une valeur d'accélération maximale du sol (AMS) avec une probabilité de dépassement de 2 % en 50 ans égale à 0,060 obtenue à partir des données de référence de Ressources naturelles Canada et une magnitude de séisme de 7 sur l'échelle de Richter.

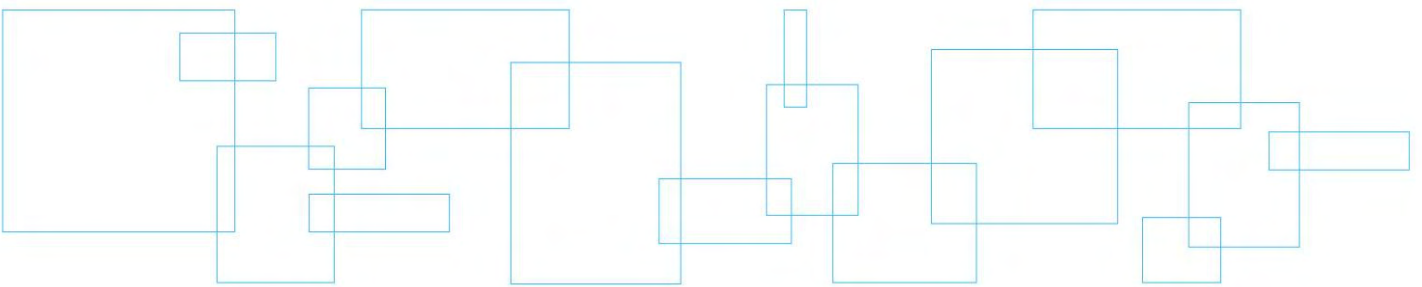
Les facteurs de sécurité calculés sont supérieurs à 1, indiquant ainsi que les couches de mort-terrain sont non vulnérables pour le scénario sismique considéré.

6.8 SUIVI DE CONSTRUCTION

Nous recommandons qu'un programme de contrôle qualitatif soit établi. Celui-ci sera supervisé par un ingénieur géotechnicien familier avec le projet et sera réalisé de façon à ce que les recommandations émises dans ce rapport soient respectées et que la qualité des travaux complétés soit adéquate.

Nous espérons que les informations contenues dans ce rapport sont complètes et suffisamment explicites. Nous vous invitons à nous contacter si, après lecture, des questions persistaient.

Annexe 1 Portée de l'étude



PORTÉE DE L'ÉTUDE GÉOTECHNIQUE

1.0 *Caractéristiques des sols et du roc*

Les caractéristiques des sols et du roc décrites dans ce rapport proviennent de forages et/ou de sondages effectués à une période donnée et correspondent à la nature du terrain aux seuls endroits où ces mêmes forages et sondages ont été effectués. Ces caractéristiques peuvent varier de façon importante entre les points de forage et de sondage.

Les formations de sol et de roc présentent une variabilité naturelle. Les limites entre les différentes formations présentées sur les rapports doivent donc être considérées comme des transitions entre les formations plutôt que comme des frontières fixes. La précision de ces limites dépend du type et du nombre de sondages, de la méthode de sondage, de la fréquence et de la méthode d'échantillonnage.

Les descriptions des échantillons prélevés ont été faites selon les méthodes d'identification et de classification reconnues et utilisées en géotechnique. Elles peuvent impliquer le recours au jugement et à l'interprétation du personnel ayant réalisé l'examen des matériaux. Celles-ci peuvent être présumées justes et correctes suivant la pratique courante dans le domaine de la géotechnique. Finalement, si des essais ont été effectués, les résultats de ces essais ne sont valides que pour l'échantillon décrit dans le présent rapport.

Les propriétés des sols et du roc peuvent être modifiées de façon importante à la suite d'activités de construction, telles que l'excavation, le dynamitage, le battage de pieux ou le drainage, effectuées sur le site ou sur un site adjacent. Elles peuvent également être modifiées indirectement par l'exposition des sols ou du roc au gel ou aux intempéries.

2.0 *Eau souterraine*

Les conditions d'eau souterraine présentées dans ce rapport s'appliquent uniquement au site étudié. La précision et la représentation de ces conditions doivent être interprétées en fonction du type d'instrumentation mis en place et de la période, de la durée et du nombre d'observations effectuées. Ces conditions peuvent varier selon les précipitations, les saisons et éventuellement les marées. Elles peuvent également varier à la suite d'activités de construction ou de modifications d'éléments physiques sur le site ou dans le voisinage. La problématique de l'ocre ferreuse et ses effets n'est pas couverte par le présent rapport.

3.0 *Utilisation du rapport*

Les commentaires et recommandations donnés dans ce rapport s'adressent principalement à l'équipe de conception du projet. Pour déterminer toutes les conditions souterraines pouvant affecter les coûts et les techniques de construction, le choix des équipements ainsi que la planification des opérations, le nombre de forages ou de sondages nécessaire pourrait être supérieur au nombre de forages ou sondages effectué pour les besoins de la conception. Les entrepreneurs présentant une soumission ou effectuant les travaux doivent effectuer leur propre interprétation des résultats des forages et des sondages et au besoin leur propre investigation pour déterminer comment les conditions en place peuvent influencer leurs travaux ou leur méthode de travail.

Toute modification de la conception, de la position et de l'élévation des ouvrages devra être communiquée rapidement à LVM de façon à ce que la validité des recommandations présentées puisse être vérifiée. Des travaux complémentaires de terrain ou de laboratoire pourraient éventuellement s'avérer nécessaires.

Le rapport ne doit pas être reproduit, sinon entier, sans l'autorisation de LVM.

4.0 *Suivi du projet*

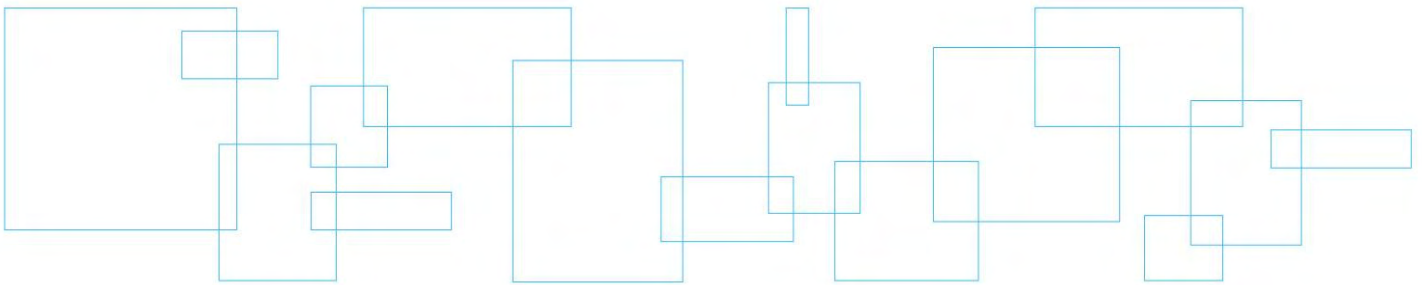
L'interprétation des résultats de chantier et de laboratoire et les recommandations présentées dans ce rapport s'appliquent uniquement au site étudié et aux informations disponibles sur le projet au moment de la rédaction du rapport.

Les informations disponibles sur les conditions de terrain et sur l'eau souterraine augmentent au fur et à mesure de l'avancement des travaux de construction. Les conditions de terrain ayant été interprétées et corrélées entre les points de forage et de sondage, LVM devrait avoir la possibilité de vérifier ces conditions de terrain par des visites de chantier effectuées au fur et à mesure de l'avancement des travaux, afin de confirmer les informations obtenues des forages et sondages. S'il nous est impossible de faire de telles vérifications, LVM n'assurera aucune responsabilité concernant l'interprétation géotechnique que des tiers feront des recommandations de ce rapport, particulièrement si la conception est modifiée ou que des conditions de terrain différentes à celles décrites dans ce rapport sont rencontrées. L'identification de tels changements requiert de l'expérience et doit être effectuée par un ingénieur géotechnicien expérimenté.

5.0 *Environnement*

Les informations contenues dans ce rapport ne couvrent pas les aspects environnementaux des conditions de terrain, ces aspects ne faisant pas partie du mandat d'étude.

Annexe 2 **Notes explicatives sur les rapports de sondage et rapports de forages**












Les rapports de sondage qui font suite à cette note synthétisent les données de chantier et de laboratoire sur les propriétés géotechniques des sols, de la roche et de l'eau souterraine recueillies à chaque sondage. Cette note a pour but d'expliquer les différents symboles et abréviations utilisés dans les rapports de sondage.

STRATIGRAPHIE

Élévation/Profondeur : Dans cette colonne sont inscrites les élévations des contacts géologiques rattachées au niveau de référence mentionné à l'en-tête du rapport de sondage et établies à partir de la surface du terrain mesuré au moment de la réalisation du sondage. Les profondeurs sont également indiquées.

Description des sols et du roc : Chaque formation géologique est décrite selon la terminologie d'usage présentée ci-dessous.

SYMBOLES

TERRE VÉGÉTALE 	SABLE 	CAILLOUX 
REMBLAI 	SILT 	BLOC 
GRAVIER 	ARGILE 	ROC 

NIVEAU D'EAU

Dans cette colonne est indiquée l'élévation du niveau de l'eau souterraine mesurée à la date indiquée. Un schéma présentant le type et la profondeur d'installation est aussi présenté dans cette colonne.

ÉCHANTILLONS

Type et numéro : Chaque échantillon est étiqueté conformément au numéro de cette colonne et la notation donnée réfère au type d'échantillon décrit à l'en-tête du rapport de sondage.

Sous-échantillon : Lorsqu'un échantillon inclut un changement de matière stratigraphique, il est parfois requis de le séparer et de créer des sous-échantillons. Cette colonne permet l'identification de ces derniers et permet l'association des mesures in situ et en laboratoire à ces sous-échantillons.

État : La position, la longueur et l'état de chaque échantillon sont montrés dans cette colonne. Le symbole illustre l'état de l'échantillon suivant la légende donnée à l'en-tête du rapport de sondage.

Calibre : Dans cette colonne est indiqué le calibre de l'échantillonneur.

N et Nb coups/150 mm : L'indice de pénétration standard « N » donné dans cette section est montré dans la colonne correspondante. Cet indice est obtenu de l'essai de pénétration standard et correspond au nombre de coups d'un marteau de 63,5 kilogrammes tombant en chute libre de 0,76 mètre nécessaire pour enfoncer les 300 derniers millimètres du carottier fendu normalisé (ASTM D-1586). Le résultat du nombre de coups obtenu par 150 mm est indiqué dans la colonne Nb coups/150 mm. Pour un carottier de 610 mm de longueur, l'indice N est obtenu en additionnant le nombre de coups nécessaire pour enfoncer les 2^e et 3^e courses de 150 mm d'enfoncement.

RQD : L'indice de qualité de la roche (RQD) est défini comme étant le rapport de la longueur totale de tous les fragments de carottes de 100 millimètres ou plus à la longueur totale de la course. L'indice RQD est présenté en pourcentage.

ESSAIS

Résultats : Dans cette section, les résultats d'essais effectués sur le chantier et au laboratoire sont indiqués à la profondeur correspondante. La définition des symboles rattachés à chaque essai est présentée à l'en-tête du rapport de sondage. Les résultats des essais qui n'apparaissent pas sur le rapport sont présentés en note à la fin du rapport de sondage. Par contre, une abréviation indiquant le type d'analyse réalisée est présentée vis-à-vis l'échantillon analysé.

Graphique : Ce graphique montre la résistance au cisaillement non drainé des sols cohérents mesurée en chantier ou en laboratoire (NQ 2501-200). Il est également utilisé pour les essais de pénétration dynamique (NQ 2501-145). De plus, ce graphique sert à la représentation des résultats de la teneur en eau et des limites d'Atterberg.

Classification

Argile
Silt et argile (non différenciés)
Sable
Gravier
Caillou
Bloc

Dimension des particules

Plus petite que 0,002 mm
plus petite que 0,08 mm
de 0,08 à 5 mm
de 5 à 80 mm
de 80 à 300 mm
plus grande que 300 mm

Terminologie descriptive

« Traces »
« Un peu »
Adjectif (ex. : sableux, silteux)
« Et » (ex. : sable et gravier)

Proportions

1 à 10 %
10 à 20 %
20 à 35 %
35 à 50 %

Compacité des sols granulaires

Très lâche
Lâche
Moyenne ou compacte
Dense
Très dense

Indice « N » de l'essai de pénétration standard, ASTM D-1586 (coups par 300 mm de pénétration)

0 à 4
4 à 10
10 à 30
30 à 50
plus de 50

Consistance des sols cohérents

Très molle
Molle
Moyenne ou ferme
Raide
Très raide
Dure

Résistance au cisaillement non drainé (kPa)

Moins de 12
12 à 25
25 à 50
50 à 100
100 à 200
plus de 200

Plasticité des sols cohérents

Faible
Moyenne
Élevée

Limite de liquidité

Inférieure à 30 %
entre 30 et 50 %
supérieure à 50 %

Sensibilité des sols cohérents

Faible
Moyenne
Forte
Très forte
Argile sensible

S_t=(Cu/Cur)

S_t < 2
2 à 4
4 à 8
8 à 16
S_t > 16

Classification du roc

Très mauvaise qualité
Mauvaise qualité
Qualité moyenne
Bonne qualité
Excellente qualité

RQD (%)

< 25
25 à 50
50 à 75
75 à 90
90 à 100

	Client : <h2 style="text-align: center;">Parcs Canada</h2>	<h1 style="margin: 0;">RAPPORT DE FORAGE</h1> Dossier n°: P-0000500-0-49-148 Sondage n°: TF-01-12 Date: 2012-12-03																			
Projet: Construction d'une passerelle à pieux vissés Endroit: Presqu'île de Penouille, Gaspé, Qc		Coordonnées (m): Nord (Y) Est (X) Géodésique Élévation 1.37 (Z) Prof. du roc: m Prof. de fin: 6.10 m																			
État des échantillons Intact Remanié Perdu Carotte		Examens organoleptiques sur les sols: Aspect visuel: Inexistant(I); Disséminé(D); Imbibé(IM) Odeur: Inexistante(I); Légère(L); Moyenne(M); Persistante(P)																			
Type d'échantillon CF Carottier fendu TM Tube à paroi mince PS Tube à piston fixe CR Tube carottier TA À la tarière MA À la main TU Tube transparent PW Carottier LVM SG Sol gelé		Abréviations L Limites de consistance M.O. Matière organique (%) W _L Limite de liquidité (%) K Perméabilité (cm/s) W _P Limite de plasticité (%) PV Poids volumique (kN/m³) I _p Indice de plasticité (%) A Absorption (l/min. m) I _L Indice de liquidité U Compression uniaxiale (MPa) W Teneur en eau (%) RQD Indice de qualité du roc (%) AG Analyse granulométrique AC Analyse chimique S Sédimentométrie P _L Pression limite, essai pressiométrique (kPa) R Refus à l'enfoncement E _M Module pressiométrique (MPa) VBS Valeur au Bleu du sol E _r Module de réaction du roc (MPa) PDT Poids des tiges SP _o Potentiel de ségrégation (mm²/H °C)																			
		Niveau d'eau N Pénétration standard (Nb coups/300mm) N _C Pénétration dyn. (Nb coups/300mm) ● σ' _p Pression de préconsolidation (kPa) TAS Taux d'agressivité des sols Résistance au cisaillement C _U Intact (kPa) Chantier Laboratoire C _{UR} Remanié (kPa) Chantier Laboratoire																			
		STRATIGRAPHIE	ÉCHANTILLONS	ESSAIS																	
PROFONDEUR - pi	PROFONDEUR - m	ÉLÉVATION - m	PROF. - m	DESCRIPTION DES SOLS ET DU ROC	SYMBOLES	NIVEAU D'EAU (m) / DATE	TYPE ET NUMÉRO	SOUS-ÉCH.	ÉTAT	CALIBRE	RÉCUPÉRATION %	Nb coups/150mm	"N" ou RQD	Examens organo.	Odeur	Visuel	RÉSULTATS	TENEUR EN EAU ET LIMITES (%)	W _p W WL	RÉSISTANCE AU CISAILLEMENT (kPa) OU PÉNÉTRATION DYNAMIQUE	20 40 60 80 100 120
		1.37	0.00	Terre végétale.			CF-1	A	X	B	50	1-1 1-2	2								
		1.29	0.08	Sable, traces de silt et de gravier, brun rougeâtre, humide, de compacité très lâche.			CF-2	B	X	B	70	3-2 3-3	5								
		0.61	0.76	De compacité lâche.			CF-3		X	B	70	1-3 2-2	5								
		-0.15	1.52	Saturé.			CF-4		X	B	70	2-2 2-3	4								
		-0.91	2.28	Sable, un peu de silt, traces de gravier, brun rougeâtre, saturé, de compacité lâche.			CF-5		X	B	93	2-2 2-4	4								
		-3.20	4.57	De compacité moyenne.			CF-6		X	B	93	2-5 4-6	9								
		-4.73	6.10	Fin du forage à une profondeur de 6,10m. N.P.: 1,16 mètre, le 21 décembre 2012. Niveau stabilisé.			CF-7		X	B	93	2-4 10-19	14								
							CF-8		X	B	93	5-5 6-8	11								
Remarques:																					
Type de forage: Tarière évidée												Équipement de forage: CME 55									
Préparé par: M. Huard						Vérifié par: R. Poliquin, ing. jr.						2013-01-17				Page: 1 de 1					

	Client :	Parcs Canada			RAPPORT DE FORAGE		
			Dossier n°: P-0000500-0-49-148	Sondage n°: TF-02-12		Date: 2012-12-03	
Projet: Construction d'une passerelle à pieux vissés				Coordonnées (m): Nord (Y)		Est (X)	
Endroit: Presqu'île de Penouille, Gaspé, Qc				Géodésique		Élévation 2.27 (Z)	
				Prof. du roc: m		Prof. de fin: 6.10 m	

État des échantillons			Examens organoleptiques sur les sols:				
				Aspect visuel: Inexistant(I); Disséminé(D); Imbibé(IM)			
				Odeur: Inexistante(I); Légère(L); Moyenne(M); Persistante(P)			

Type d'échantillon		Abréviations		Niveau d'eau	
CF	Carottier fendu	L	Limites de consistance	M.O.	Matière organique (%)
TM	Tube à paroi mince	W _L	Limite de liquidité (%)	K	Perméabilité (cm/s)
PS	Tube à piston fixe	W _p	Limite de plasticité (%)	PV	Poids volumique (kN/m ³)
CR	Tube carottier	I _p	Indice de plasticité (%)	A	Absorption (l/min. m)
TA	À la tarière	I _L	Indice de liquidité	U	Compression uniaxiale (MPa)
MA	À la main	W	Teneur en eau (%)	RQD	Indice de qualité du roc (%)
TU	Tube transparent	AG	Analyse granulométrique	AC	Analyse chimique
PW	Carottier LVM	S	Sédimentométrie	P _L	Pression limite, essai pressiométrique (kPa)
SG	Sol gelé	R	Refus à l'enfoncement	E _m	Module pressiométrique (MPa)
		VBS	Valeur au Bleu du sol	E _r	Module de réaction du roc (MPa)
		PDT	Poids des tiges	SP _o	Potentiel de ségrégation (mm ² /H °C)
				N	Pénétration standard (Nb coups/300mm)
				N _c	Pénétration dyn. (Nb coups/300mm)
				σ' _p	Pression de préconsolidation (kPa)
				TAS	Taux d'agressivité des sols
				Résistance au cisaillement	
				C _u	Intact (kPa)
				C _{ur}	Remanié (kPa)

PROFONDEUR - pi	PROFONDEUR - m	ÉLEVATION - m	PROF. - m	STRATIGRAPHIE			ÉCHANTILLONS							ESSAIS				
				DESCRIPTION DES SOLS ET DU ROC	SYMBOLES	NIVEAU D'EAU (m) / DATE	TYPE ET NUMÉRO	SOUS-ÉCH.	ÉTAT	CALIBRE	RÉCUPÉRATION %	Nb coups/150mm	"N" ou RQD	Examens organo.		RÉSULTATS	TENEUR EN EAU ET LIMITES (%)	
														Odeur	Visuel		W _p	W
		2.27																
1		0.00		Terre végétale.														
2		2.17		Sable, traces de silt et de gravier, brun orangé, sec, de compacité lâche.														
3		0.10																
4		1.51		Brun rougeâtre, humide.														
5		0.76																
6		-0.01		Sable, un peu de silt, traces de gravier, brun rougeâtre, humide, de compacité lâche.														
7		2.28																
8		-1.54		De compacité moyenne.														
9		3.81																
10		-3.83		Fin du forage à une profondeur de 6,10m.														
11		6.10		N.P.: 2,25 mètres, le 21 décembre 2012. Niveau stabilisé.														
12																		
13																		
14																		
15																		
16																		
17																		
18																		
19																		
20																		
21																		
22																		
23																		
24																		
25																		
26																		
27																		
28																		
29																		

Remarques:

Type de forage: **Tarière évidée** Équipement de forage: **CME 55**

Préparé par: **M. Huard** Vérifié par: **R. Poliquin, ing. jr.** 2013-01-17 Page: 1 de 1

	Client : Parcs Canada	RAPPORT DE FORAGE Dossier n°: P-0000500-0-49-148 Sondage n°: TF-03-12 Date: 2012-12-04		
Projet: Construction d'une passerelle à pieux vissés Endroit: Presqu'île de Penouille, Gaspé, Qc		Coordonnées (m): Nord (Y) Est (X) Géodésique Élévation 1.97 (Z) Prof. du roc: m Prof. de fin: 6.10 m		
État des échantillons Intact Remanié Perdu Carotte		Examens organoleptiques sur les sols: Aspect visuel: Inexistant(I); Disséminé(D); Imbibé(IM) Odeur: Inexistante(I); Légère(L); Moyenne(M); Persistante(P)		
Type d'échantillon CF Carottier fendu TM Tube à paroi mince PS Tube à piston fixe CR Tube carottier TA À la tarière MA À la main TU Tube transparent PW Carottier LVM SG Sol gelé		Abréviations L Limites de consistance M.O. Matière organique (%) W _L Limite de liquidité (%) K Perméabilité (cm/s) W _P Limite de plasticité (%) PV Poids volumique (kN/m³) I _p Indice de plasticité (%) A Absorption (l/min. m) I _L Indice de liquidité U Compression uniaxiale (MPa) W Teneur en eau (%) RQD Indice de qualité du roc (%) AG Analyse granulométrique AC Analyse chimique S Sédimentométrie P _L Pression limite, essai pressiométrique (kPa) R Refus à l'enfoncement E _M Module pressiométrique (MPa) VBS Valeur au Bleu du sol E _r Module de réaction du roc (MPa) PDT Poids des tiges SP _o Potentiel de ségrégation (mm²/H °C)		
		Niveau d'eau N Pénétration standard (Nb coups/300mm) N _C Pénétration dyn. (Nb coups/300mm) ● σ' _p Pression de préconsolidation (kPa) TAS Taux d'agressivité des sols Résistance au cisaillement C _U Intact (kPa) Chantier C _{UR} Remanié (kPa) Laboratoire		
PROFONDEUR - pi PROFONDEUR - m ÉLEVATION - m PROF. - m	STRATIGRAPHIE	ÉCHANTILLONS	ESSAIS	
	DESCRIPTION DES SOLS ET DU ROC	TYPE ET NUMÉRO SOUS-ÉCH. ÉTAT CALIBRE RÉCUPÉRATION % Nb coups/150mm "N" ou RQD Examens organo. Odeur Visuel	RÉSULTATS TENEUR EN EAU ET LIMITES (%) W _p W W _L 20 40 60 80 100 120 RÉSISTANCE AU CISAILLEMENT (kPa) OU PÉNÉTRATION DYNAMIQUE 20 40 60 80 100 120	
1.97 0.00 1.92 0.05 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29	Terre végétale. 0.45 1.52 Brun rougeâtre, sec à humide, de compacité moyenne. -0.31 2.28 Humide, de compacité lâche. -1.08 3.05 De compacité moyenne. -4.13 6.10 Fin du forage à une profondeur de 6,10m. N.P.: 1,80 mètre, le 21 décembre 2012. Niveau stabilisé.	SYMBOLES NIVEAU D'EAU / DATE el. 0.17 m 2012-12-21	CF-1 A B B 80 2-1 / 2-1 3 CF-2 B 70 2-3 / 4-5 7 CF-3 B 80 3-5 / 8-9 13 CF-4 B 70 6-4 / 4-7 8 CF-5 B 90 4-5 / 10-9 15 CF-6 B 90 15-8 / 16-19 24 CF-7 B 90 3-3 / 7-11 10 CF-8 B 90 15-11 / 8-10 19	
Remarques:				
Type de forage: Tarière évidée		Équipement de forage: CME 55		
Préparé par: M. Huard		Vérifié par: R. Poliquin, ing. jr.		
		2013-01-17 Page: 1 de 1		



Client :

Parcs Canada

RAPPORT DE FORAGE

Dossier n°: P-0000500-0-49-148

Sondage n°: TF-04-12

Date: 2012-12-04

Projet: **Construction d'une passerelle à pieux vissés**Endroit: **Presqu'île de Penouille, Gaspé, Qc**

Coordonnées (m): Nord (Y)

Est (X)

Géodésique Élévation **0.74 (Z)**

Prof. du roc: m Prof. de fin: 6.10 m

État des échantillons

Intact Remanié Perdu Carotte

Examens organoleptiques sur les sols:
 Aspect visuel: Inexistant(I); Disséminé(D); Imbibé(IM)
 Odeur: Inexistante(I); Légère(L); Moyenne(M); Persistante(P)
Type d'échantillon
CF Carottier fendu
TM Tube à paroi mince
PS Tube à piston fixe
CR Tube carottier
TA À la tarière
MA À la main
TU Tube transparent
PW Carottier LVM
SG Sol gelé
Abréviations
L Limites de consistance
W_L Limite de liquidité (%)
W_P Limite de plasticité (%)
I_p Indice de plasticité (%)
I_L Indice de liquidité
W Teneur en eau (%)
AG Analyse granulométrique
S Sédimentométrie
R Refus à l'enfoncement
VBS Valeur au Bleu du sol
PDT Poids des tiges
M.O. Matière organique (%)
K Perméabilité (cm/s)
PV Poids volumique (kN/m³)
A Absorption (l/min. m)
U Compression uniaxiale (MPa)
RQD Indice de qualité du roc (%)
AC Analyse chimique
P_L Pression limite, essai pressiométrique (kPa)
E_m Module pressiométrique (MPa)
E_r Module de réaction du roc (MPa)
SP₀ Potentiel de ségrégation (mm²/H °C)

N Niveau d'eau
N Pénétration standard (Nb coups/300mm)
N_C Pénétration dyn. (Nb coups/300mm) ●
σ'_p Pression de préconsolidation (kPa)
TAS Taux d'agressivité des sols
Résistance au cisaillement
C_U Intact (kPa) ▲
C_{UR} Remanié (kPa) △

 Chambré
 Laboratoire

PROFONDEUR - pi	PROFONDEUR - m	ÉLÉVATION - m	PROF. - m	STRATIGRAPHIE		ÉCHANTILLONS							ESSAIS								
				DESCRIPTION DES SOLS ET DU ROC	SYMBOLES	NIVEAU D'EAU / DATE	TYPE ET NUMÉRO	SOUS-ÉCH.	ÉTAT	CALIBRE	RÉCUPÉRATION %	Nb coups/150mm	"N" ou RQD	Examens organo.	RÉSULTATS	TENEUR EN EAU ET LIMITES (%)					
													Odeur	Visuel	W _p	W	W _L				
		0.74														20	40	60	80	100	120
		0.00			Terre végétale.																
		0.66			Sable, traces de silt et de gravier, brun rougeâtre, sec à humide, de compacité lâche.																
		0.08																			
		-0.02			Sable, un peu de gravier, traces de silt, brun, humide, de compacité lâche.																
		0.76																			
		-0.78			De compacité moyenne.																
		1.52																			
		-1.54			Sable, traces de gravier et de silt, brun, humide, de compacité moyenne.																
		2.28																			
		-2.31			Sable, traces à un peu de gravier, traces de silt, brun, humide, de compacité moyenne.																
		3.05																			
		-5.36			Fin du forage à une profondeur de 6,10m. N.P.: 0,50 mètre, le 21 décembre 2012. Niveau stabilisé.																
		6.10																			

Remarques:

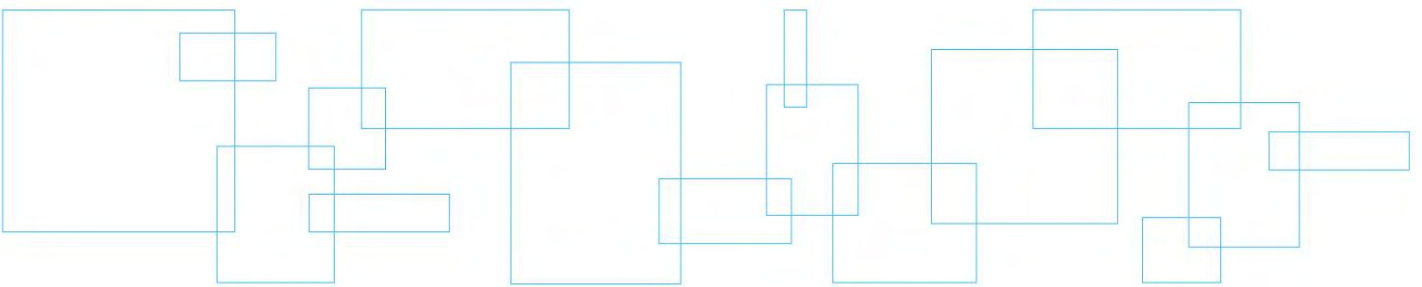
Type de forage: **Tarière évidée**Équipement de forage: **CME 55**Préparé par: **M. Huard**Vérifié par: **R. Poliquin, ing. jr.**

2013-01-17

Page: 1 de 1

	Client : Parcs Canada	RAPPORT DE FORAGE Dossier n°: P-0000500-0-49-148 Sondage n°: TF-05-12 Date: 2012-12-04																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
Projet: Construction d'une passerelle à pieux vissés Endroit: Presqu'île de Penouille, Gaspé, Qc		Coordonnées (m): Nord (Y) Est (X) Géodésique Élévation 2.02 (Z) Prof. du roc: m Prof. de fin: 6.10 m																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
État des échantillons Intact <input type="checkbox"/> Remanié <input type="checkbox"/> Perdu <input type="checkbox"/> Carotte <input type="checkbox"/>		Examens organoleptiques sur les sols: Aspect visuel: Inexistant(I); Disséminé(D); Imbibé(IM) Odeur: Inexistante(I); Légère(L); Moyenne(M); Persistante(P)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
Type d'échantillon CF Carottier fendu TM Tube à paroi mince PS Tube à piston fixe CR Tube carottier TA À la tarière MA À la main TU Tube transparent PW Carottier LVM SG Sol gelé	Abréviations L Limites de consistance W _L Limite de liquidité (%) W _p Limite de plasticité (%) I _p Indice de plasticité (%) I _L Indice de liquidité W Teneur en eau (%) AG Analyse granulométrique S Sédimentométrie R Refus à l'enfoncement VBS Valeur au Bleu du sol PDT Poids des tiges M.O. Matière organique (%) K Perméabilité (cm/s) PV Poids volumique (kN/m³) A Absorption (l/min. m) U Compression uniaxiale (MPa) RQD Indice de qualité du roc (%) AC Analyse chimique P _L Pression limite, essai pressiométrique (kPa) E _M Module pressiométrique (MPa) E _r Module de réaction du roc (MPa) SP _o Potentiel de ségrégation (mm²/H °C)	Niveau d'eau N Pénétration standard (Nb coups/300mm) N _C Pénétration dyn. (Nb coups/300mm) σ' _p Pression de préconsolidation (kPa) TAS Taux d'agressivité des sols Résistance au cisaillement C _U Intact (kPa) C _{UR} Remanié (kPa)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="3" style="width: 5%;">PROFONDEUR - pi</th> <th rowspan="3" style="width: 5%;">PROFONDEUR - m</th> <th rowspan="3" style="width: 5%;">ÉLÉVATION - m</th> <th rowspan="3" style="width: 5%;">PROF. - m</th> <th colspan="3" style="text-align: center;">STRATIGRAPHIE</th> <th colspan="5" style="text-align: center;">ÉCHANTILLONS</th> <th colspan="2" style="text-align: center;">ESSAIS</th> </tr> <tr> <th rowspan="2" style="width: 15%;">DESCRIPTION DES SOLS ET DU ROC</th> <th rowspan="2" style="width: 5%;">SYMBOLES</th> <th rowspan="2" style="width: 5%;">NIVEAU D'EAU (m) / DATE</th> <th rowspan="2" style="width: 5%;">TYPE ET NUMÉRO</th> <th rowspan="2" style="width: 5%;">SOUS-ÉCH.</th> <th rowspan="2" style="width: 5%;">ÉTAT</th> <th rowspan="2" style="width: 5%;">CALIBRE</th> <th rowspan="2" style="width: 5%;">RÉCUPÉRATION %</th> <th rowspan="2" style="width: 5%;">Nb coups/150mm</th> <th rowspan="2" style="width: 5%;">"N" ou RQD</th> <th colspan="2" style="text-align: center;">RÉSULTATS</th> </tr> <tr> <th colspan="2" style="text-align: center;">TENEUR EN EAU ET LIMITES (%)</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td>2.02</td> <td></td> <td style="text-align: center;">Terre végétale.</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>1</td> <td></td> <td>0.00</td> <td>1.97</td> <td style="text-align: center;">Sable, traces de silt et de gravier, brun orangé, sec, de compacité très lâche à lâche.</td> <td style="text-align: center;">A B</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td></td> <td>0.05</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>3</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>4</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>5</td> <td></td> <td>0.50</td> <td>1.52</td> <td style="text-align: center;">Brun rougeâtre, sec à humide, de compacité lâche.</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>6</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>7</td> <td></td> <td>-0.26</td> <td>2.28</td> <td style="text-align: center;">Sable, traces de gravier et de silt, brun rougeâtre, humide, de compacité moyenne.</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>8</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>9</td> <td></td> <td>-1.03</td> <td>3.05</td> <td style="text-align: center;">Sable, un peu de silt, traces de gravier, brun, saturé, de compacité lâche à moyenne.</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>10</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>11</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>12</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>13</td> <td></td> <td>-2.54</td> <td>4.56</td> <td style="text-align: center;">Sable, traces de silt et de gravier, brun rougeâtre, saturé, de compacité moyenne.</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>14</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>15</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>16</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>17</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>18</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>19</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>20</td> <td></td> <td>-4.08</td> <td>6.10</td> <td style="text-align: center;">Fin du forage à une profondeur de 6,10m. N.P.: 2,72 mètres, le 21 décembre 2012. Niveau stabilisé.</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>21</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>22</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>23</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>24</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>25</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>26</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>27</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>28</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>29</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>			PROFONDEUR - pi	PROFONDEUR - m	ÉLÉVATION - m	PROF. - m	STRATIGRAPHIE			ÉCHANTILLONS					ESSAIS		DESCRIPTION DES SOLS ET DU ROC	SYMBOLES	NIVEAU D'EAU (m) / DATE	TYPE ET NUMÉRO	SOUS-ÉCH.	ÉTAT	CALIBRE	RÉCUPÉRATION %	Nb coups/150mm	"N" ou RQD	RÉSULTATS		TENEUR EN EAU ET LIMITES (%)				2.02		Terre végétale.															1		0.00	1.97	Sable, traces de silt et de gravier, brun orangé, sec, de compacité très lâche à lâche.	A B														2		0.05																	3																			4																			5		0.50	1.52	Brun rougeâtre, sec à humide, de compacité lâche.															6																			7		-0.26	2.28	Sable, traces de gravier et de silt, brun rougeâtre, humide, de compacité moyenne.															8																			9		-1.03	3.05	Sable, un peu de silt, traces de gravier, brun, saturé, de compacité lâche à moyenne.															10																			11																			12																			13		-2.54	4.56	Sable, traces de silt et de gravier, brun rougeâtre, saturé, de compacité moyenne.															14																			15																			16																			17																			18																			19																			20		-4.08	6.10	Fin du forage à une profondeur de 6,10m. N.P.: 2,72 mètres, le 21 décembre 2012. Niveau stabilisé.															21																			22																			23																			24																			25																			26																			27																			28																			29																		
PROFONDEUR - pi	PROFONDEUR - m	ÉLÉVATION - m					PROF. - m	STRATIGRAPHIE			ÉCHANTILLONS					ESSAIS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
								DESCRIPTION DES SOLS ET DU ROC	SYMBOLES	NIVEAU D'EAU (m) / DATE	TYPE ET NUMÉRO	SOUS-ÉCH.	ÉTAT	CALIBRE	RÉCUPÉRATION %	Nb coups/150mm	"N" ou RQD	RÉSULTATS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
			TENEUR EN EAU ET LIMITES (%)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
		2.02		Terre végétale.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
1		0.00	1.97	Sable, traces de silt et de gravier, brun orangé, sec, de compacité très lâche à lâche.	A B																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
2		0.05																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
3																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
4																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
5		0.50	1.52	Brun rougeâtre, sec à humide, de compacité lâche.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
6																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
7		-0.26	2.28	Sable, traces de gravier et de silt, brun rougeâtre, humide, de compacité moyenne.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
8																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
9		-1.03	3.05	Sable, un peu de silt, traces de gravier, brun, saturé, de compacité lâche à moyenne.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
10																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
11																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
12																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
13		-2.54	4.56	Sable, traces de silt et de gravier, brun rougeâtre, saturé, de compacité moyenne.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
14																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
15																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
16																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
17																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
18																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
19																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
20		-4.08	6.10	Fin du forage à une profondeur de 6,10m. N.P.: 2,72 mètres, le 21 décembre 2012. Niveau stabilisé.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
21																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
22																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
23																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
24																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
25																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
26																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
27																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
28																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
29																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
Remarques:																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
Type de forage: Tarière évidée Équipement de forage: CME 55																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
Préparé par: M. Huard	Vérifié par: R. Poliquin, ing. jr.	2013-01-17 Page: 1 de 1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						

Annexe 3 Essais de laboratoire



Client :
Projet : Projets en prestation de services
Endroit :

Dossier : P-0000500-0-49-148
Réf. client :
Rapport n° : 1 **Rév. 0**
Page 1 de 1

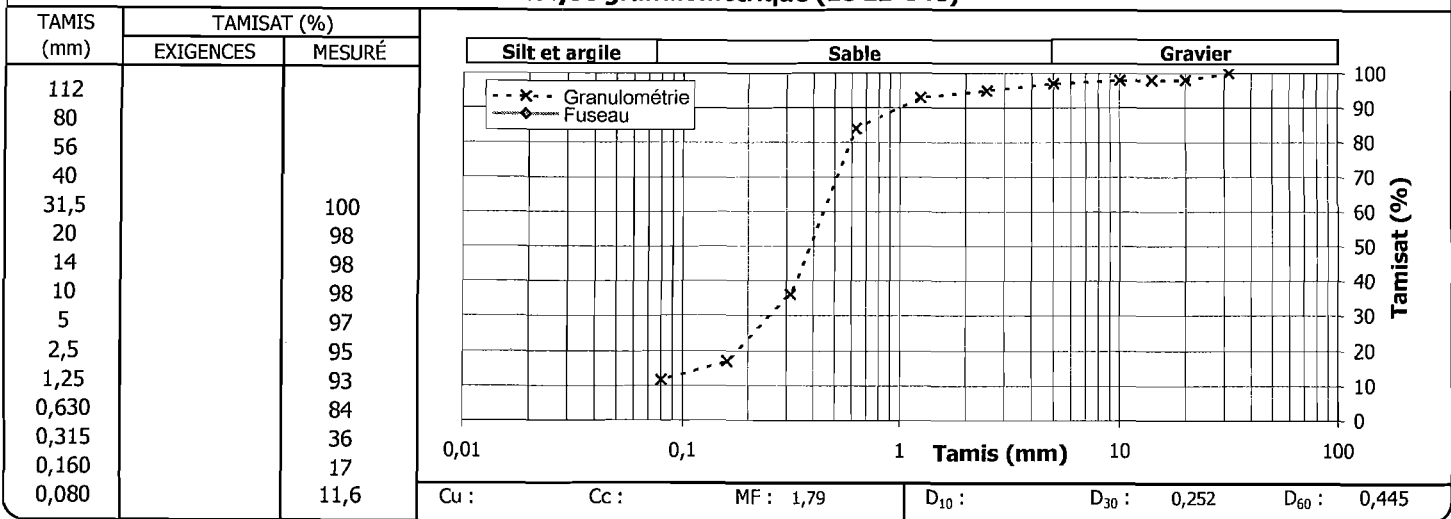
Échantillonnage

N° d'échantillon : 1
N° d'échantillon client :
Type de matériau :
Source première; ville : Matériaux en place
Endroit échantillonné : Presqu'île de Penouille; TF-01-12, CF-4; 2.28 @ 3.00

Spécification n° 1

Référence : Divers
Usage :
Calibre :
Classe :
Prélevé le : 2012-12-03
Par : Myriam Huard
Reçu le : 2012-12-06

Analyse granulométrique (LC 21-040)



Masse vol. sèche maximale
kg/m³

Humidité optimale
%

Retenu 5 mm
%

Proportions selon analyse granulométrique (%)

Cailloux : 0,0 Sable : 85,4
Gravier : 3,0 Silt et argile : 11,6

Autres essais

Exigé

Mesuré

Remarques

UN ASTERISQUE ACCOMPAGNE TOUT RESULTAT NON CONFORME

Préparé par :

Mario Allard, chef laboratoire

Date :

2012-12-13

Approuvé par :

R.P., ing. jr

Date :

2012-12-13

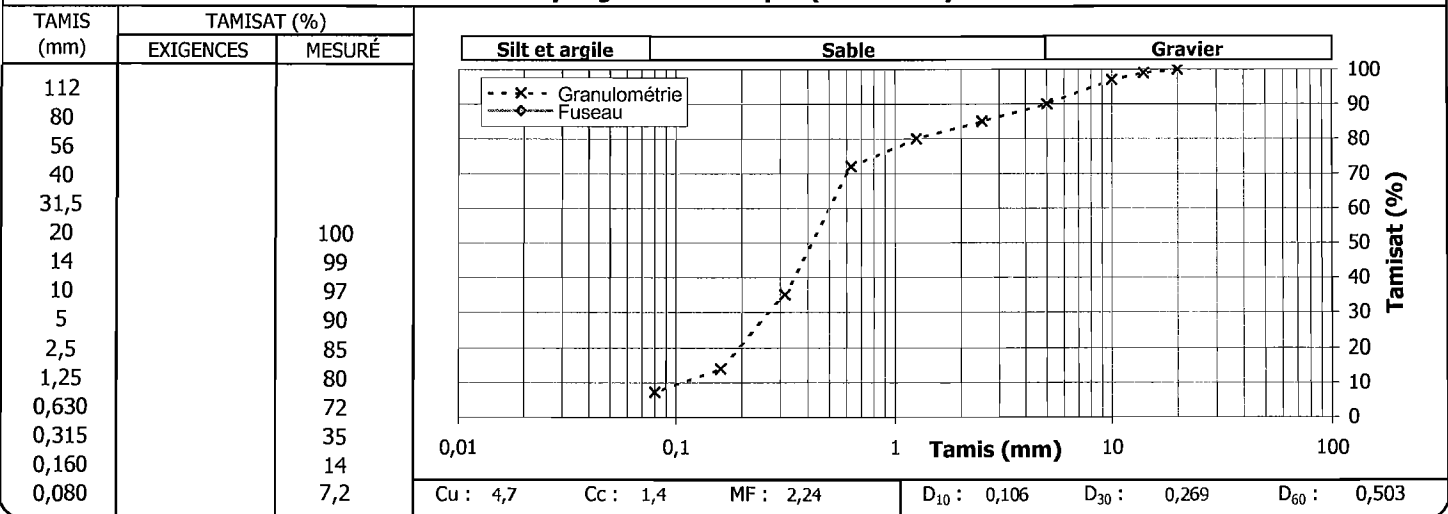
Client :	Dossier : P-0000500-0-49-148
Projet : Projets en prestation de services	Réf. client :
Endroit :	Rapport n° : 2 Rév. 0
	Page 1 de 1

Échantillonnage	
N° d'échantillon	: 2
N° d'échantillon client	:
Type de matériau	:
Source première; ville	: Matériaux en place
Endroit échantillonné	: Presqu'île de Penouille; TF-04-12, CF-3; 1.52 @ 2.28

Spécification n° 1	
Référence	: Divers
Usage	:
Calibre	:
Classe	:

Prélevé le	: 2012-12-03
Par	: Myriam Huard
Reçu le	: 2012-12-06

Analyse granulométrique (LC 21-040)



Masse vol. sèche maximale kg/m ³	Humidité optimale %	Retenu 5 mm %
--	------------------------	------------------

Proportions selon analyse granulométrique (%)	
Cailloux :	0,0
Sable :	82,6
Gravier :	10,2
Silt et argile :	7,2

Autres essais	Exigé	Mesuré

Remarques

UN ASTERISQUE ACCOMPAGNE TOUT RESULTAT NON CONFORME

Préparé par : Mario Allard, chef laboratoire	Date : 2012-12-13
--	-----------------------------

Approuvé par : R. P., ing. jr	Date : 2012-12-13
---	-----------------------------

Annexe 4 Reportage photographique

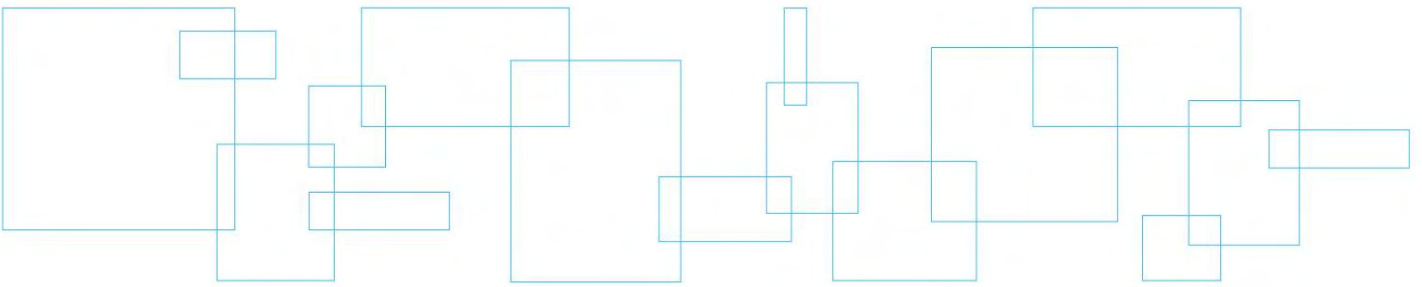




Photo 1 : Réalisation du forage TF-01-12 (3 décembre 2012).



Photo 2 : Emplacement du sondage TF-02-12.



Photo 3 : Emplacement du sondage TF-03-12 (4 décembre 2012).

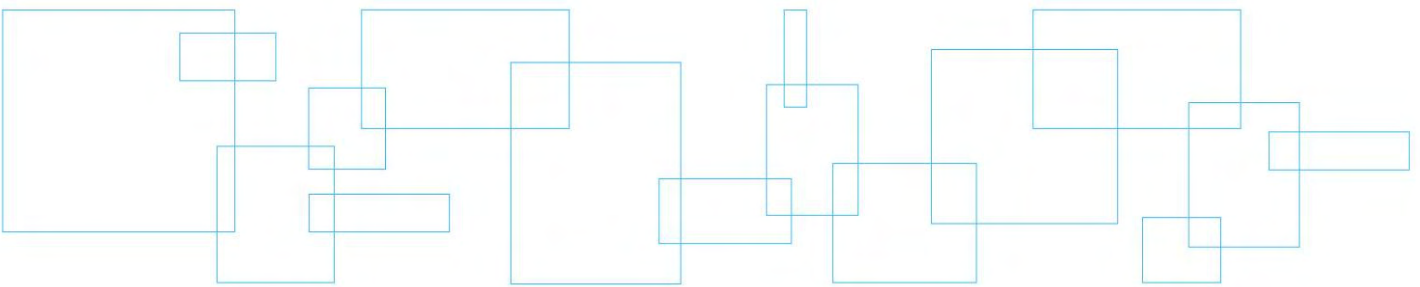


Photo 4 : Installation au forage TF-04-12.

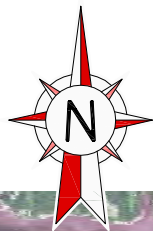


Photo 5 : Tube d'observation installé dans le forage TF-05-12.

Annexe 5 Plans de situation et de localisation



10 cm
5
4
3
2
1
0



Source: Google Maps.

Ce document doit être utilisé conjointement avec les recommandations formulées dans le rapport d'étude géotechnique

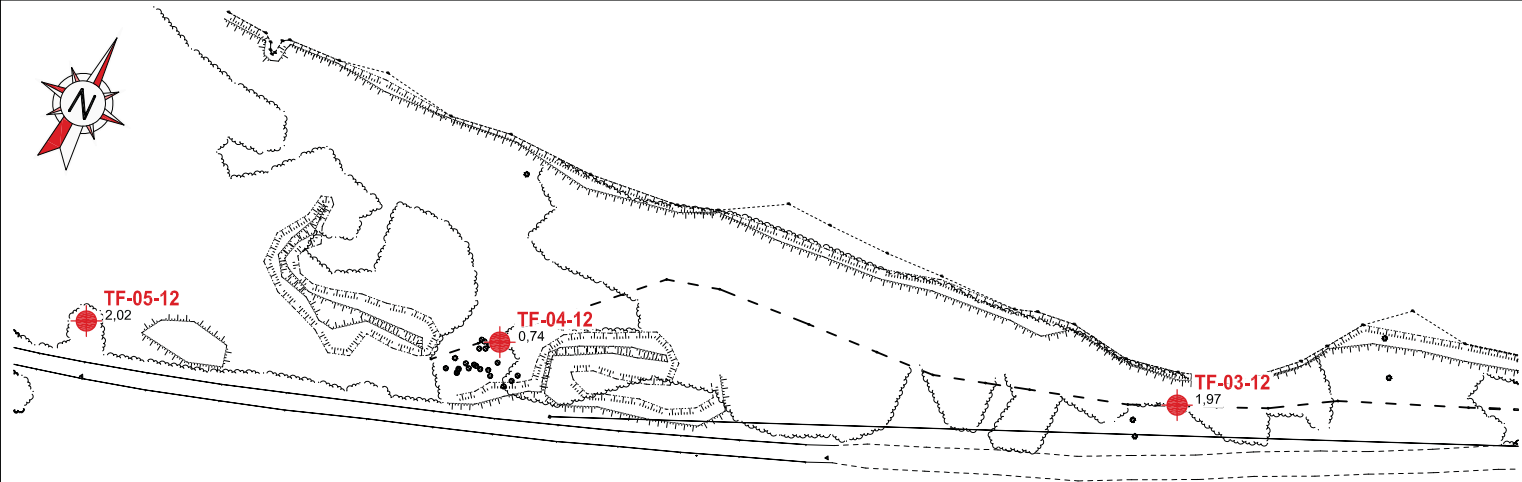
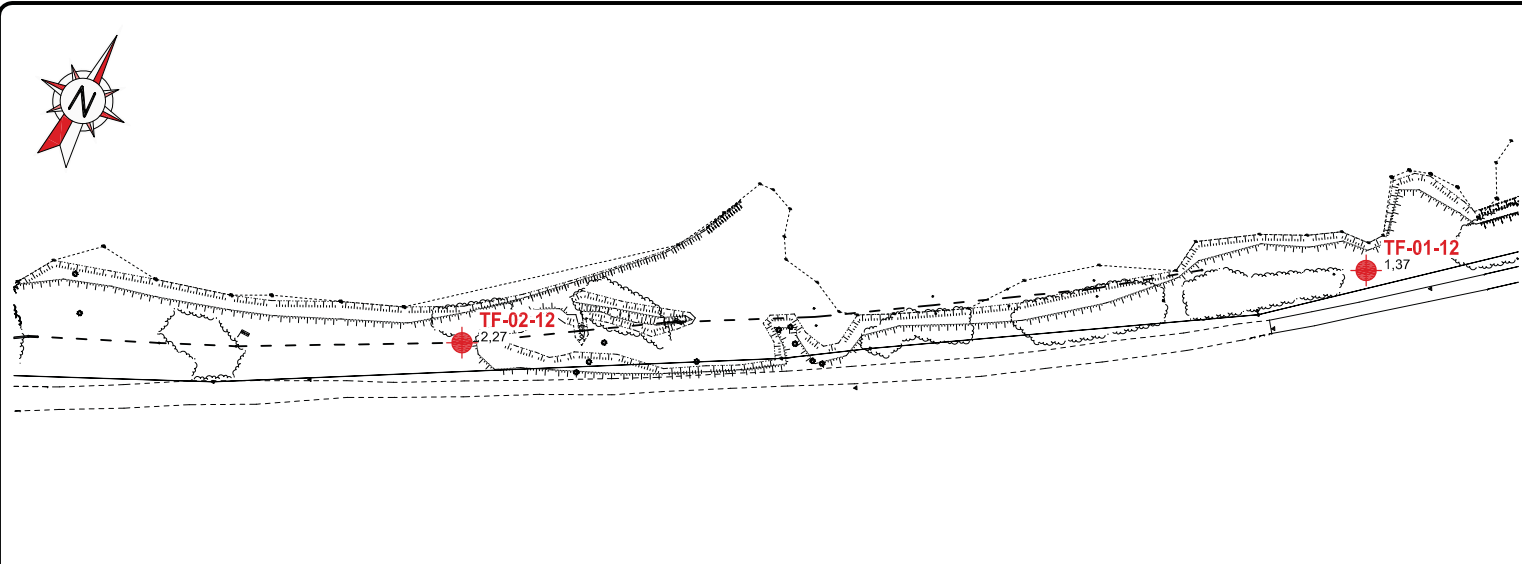
CE DOCUMENT D'INGÉNIERIE EST LA PROPRIÉTÉ DE LVM ET EST PROTÉGÉ PAR LA LOI. IL EST DESTINÉ EXCLUSIVEMENT AUX FINS QUI Y SONT MENTIONNÉES. TOUTE REPRODUCTION OU ADAPTATION, PARTIELLE OU TOTALE, EN EST STRICTEMENT PROHIBÉE SANS AVOIR PRÉALABLEMENT OBTENU L'AUTORISATION ÉCRITE DE LVM.

G:\073P-0000500_PRESTATIONS_JNGHIZ5_CAD\0TP_0-49-148_PARCS CANADA PENOUILLE\073-P-0000500-0-49-148-GE-D-001-00.DWG

Client	PARCS CANADA
Projet	CONSTRUCTION D'UNE PASSERELLE À PIEUX VISSÉS <small>PRESQU'ÎLE DE PENOUILLE, GASPÉ, QC</small>
Titre	PLAN DE SITUATION

LVM		LVM inc. <small>331, rue Rivard Rimouski (Québec) G5L 7J6 Téléphone : 418.723.1144 Télécopieur : 418.722.4691</small>
Préparé J.-N. G. Horth, ing. jr	Discipline Géotechnique	Chargé de projet N. Huard, ing.
Dessiné M.P. Côté	Échelle 1 : 40 000	Révision date :
Vérifié N. Huard, ing.	Date 2012-12-14	
Serv. resp. 073	Projet P-0000500	Otp 049148
	Disc. GE	Type D
	N° Dessin 0001	Rév. 00

10 cm
5
4
3
2
1
0



LÉGENDE :
TF-NN-AA
 00,00 FORAGE-NUMÉRO-ANNÉE
 ÉLEVATION (m)

NOTE:
 1. CE PLAN NOUS A ÉTÉ FOURNI PAR GENVAR INC. ET SERT UNIQUEMENT À LA LOCALISATION DES SONDAGES.

Ce document doit être utilisé conjointement avec les recommandations formulées dans le rapport d'étude géotechnique

CE DOCUMENT D'INGÉNIERIE EST LA PROPRIÉTÉ DE LVM ET EST PROTÉGÉ PAR LA LOI IL EST DESTINÉ EXCLUSIVEMENT AUX FINS QUI Y SONT MENTIONNÉES. TOUTE REPRODUCTION OU ADAPTATION, PARTIELLE OU TOTALE, EN EST STRICTEMENT PROHIBÉE SANS AVOIR PRÉALABLEMENT OBTENU L'AUTORISATION ÉCRITE DE LVM.

REV.	A - M - J DATE	DESCRIPTION	Préparé Par	Vérifié Par
ÉMISSIONS / RÉVISIONS				

TOUTES LES DIMENSIONS DEVRONT ÊTRE PRISÉS ET VÉRIFIÉS AVANT DE COMMENCER LES TRAVAUX

Secours

Client

PARCS CANADA

Références du client

Projet

CONSTRUCTION D'UNE PASSERELLE À PIEUX VISSÉS

PRESQU'ÎLE DE PENOUILLE, GASPÉ, QC

Titre

**Étude géotechnique
Localisation des sondages**

LVM

LVM inc.
331, rue Rivard
Rimouski (Québec) G5L 7J6
Téléphone : 418.722.1144
Télécopieur : 418.722.4691

Préparé **R. Poliquin, ing. jr**
 Dessiné **M.P. Côté**
 Vérifié **N. Huard, Ing.**

Discipline **Géotechnique**
 Échelle **1 : 1000**
 Date **2013-01-07**

Chargé de projet
N. Huard, ing.

No. de séquence
01 de 01

Serv. resp	Projet	Op	Disc.	Type	N° Dessin	Rév.
073	P-0000500	049	148	GE	D	0002 00

G:\073\0000500_PRESTATIONS_ANALYSE_GAUCHES_PARCS_CANADA_PENOUILLE\073-P-0000500-049-148-GE-D-0001-00.DWG