



TechnoRem

AECOM

**Public Services and
Government Services Canada**

**Implementation of environmental
mitigation measures at the former
Contrecoeur landfill**

**ANNEX A
TECHNICAL SPECIFICATIONS**

REFERENCE: R.078691.200

July 2019

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**WORK DESCRIPTION AND
ADDITIONAL SPECIFIC
REQUIREMENTS AND CONDITIONS
SECTION 01**

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1.1 GENERAL INFORMATION

1.1.1 Terminology

1.1.1.1 All definitions presented in article CG1.1.2 “Terminology” of the General Clauses and Conditions of the Module GC1 “General conditions - Construction services” (R2810D, most recent version) of the PWGSC Standard Acquisition Clauses and Conditions (SACC) (available online: buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual) are applicable to this contract.

1.1.2 Additional Definitions

1.1.2.1 The following paragraphs describe additional conditions which modify or complete the definitions of the Conditions (article CG1.1.2 “Terminology”).

1.1.2.2 “Assets” means all the assets resulting from the Work, including all the equipment, devices, components or any other elements making up the Final Capping of the Site or other planned works as part of the Work.

1.1.2.3 “Relevant Authority” represents a physical individual or legal entity, including a Governmental Authority or Public Service Utility Supplier, who exercises a control or power or with jurisdiction on the execution of all or part of the Project Work or the Site because of any Law whatsoever or under terms of a major contract.

1.1.2.4 “Government Authority” designates a federal, provincial, territorial, regional, municipal or local government authority, a quasi-governmental authority, a court, a governmental or self-regulating body, a commission, an office, an administrative or other, federal, provincial, territorial, regional, municipal or local counsel or body, or subdivision, a service or a general direction, political or other, of one or another of the entities mentioned above, with jurisdiction in any way whatsoever over an aspect of the execution of the Contract relative to the Project, Site or infrastructures located on it, or on any part or aspect at all of the Work, including the Federal Government.

1.1.2.5 “Substantial Performance Notice” corresponds to the notice sent by the Contractor to the Client indicating the expected date for finishing the Construction Work, which must be at least 30 days, but not more than 90 days after the date of the Substantial Performance Notice.

1.1.2.6 “Tender Price Table” refers to the table used for presenting the prices for the financial proposal, also called costs table and presented in Appendix B of the request for bids documents.

1.1.2.7 “Certificate of Substantial Performance” designates the certificate issued by the Client when the operating and performance tests have been done, when the relevant reports have been submitted and approved, and when the installed



equipment and systems, such as built, are compliant with all requirements from the Contract relative to the construction of the System, notwithstanding Minor Defects. This text completes article GC1.1.4 « Substantial Performance » of the General Clauses and Conditions of the Module GC1 “General conditions - Construction services” (R2810D, most recent version) of the PWGSC Standard Acquisition Clauses and Conditions (SACC) available online: buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual.

- 1.1.2.8 “Certificate of Final Completion” designates the certificate issued by the Client at the end of the Construction Period, including the maintenance work required for seeding, when the Client thinks that the Minor Defects cited in the Certificate of Substantial Performance have all been corrected to the satisfaction of the Client, and that vegetation is well established in seeded areas.
- 1.1.2.9 “Worksite” indicates any location where the Construction Work that is the subject of the Contract is executed under the sole responsibility of the Contractor as principal contractor during execution of the work and also any location used for temporary facilities and for the storage of materials and equipment.
- 1.1.2.10 “Challenge” means any civil disobedience or challenge, including measures that one or more People who protest or demonstrate against the execution of all or part of the Work take or threaten to take after the date the Contract enters into force with the exception however of an event otherwise excluded by the Contract
- 1.1.2.11 “Contract” is defined in the PWGSC Standard Acquisition Clauses and Conditions (SACC) available online: buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual.
- 1.1.2.12 “Expiration Date” means the date on which the Contract ends, by reaching the Term or by termination thereof by the Client or the Contractor according to the provisions of the Contract.
- 1.1.2.13 “Effective Date” means the date the Contract enters into force.
- 1.1.2.14 “Spill” means any deposit, emission, release or discharge of contaminants in violation of the Fisheries Act (RSC 1985, c F-14), the Canadian Environmental Protection Act (CEPA 1999, c 33), the Environmental Quality Act, Article 20 (LRQ, c Q-2) or the authorizations issued under these laws.
- 1.1.2.15 “Technical Specifications” means Appendix A of request for bids documents.
- 1.1.2.16 “Quality Assurance Documents” designates the following documents: Quality Manual, Quality Plan, Collection of Recordings Relating to Quality and Verification Reports.



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- 1.1.2.17 “Construction Documents” means, depending on the context, the Construction Documents issued for construction, the Final Construction Documents, or the combination of the two.
- 1.1.2.18 “Construction Documents issued for construction” means plans, drawings and specifications prepared by the Contractor according to the final design for Construction Work purposes.
- 1.1.2.19 “Final Construction Documents” means the final plans, drawings and specifications sealed and prepared by the Contractor.
- 1.1.2.20 “Technical Documents” means drawings, plans, reports, photographs, specifications, software, surveys, calculations and other data, and collected, assembled, drawn or drafted information and documents, including computer printouts, related to the Project.
- 1.1.2.21 “Intellectual Property Rights” indicates the rights recognized by law, including any intellectual property right protected by law, such as the laws governing patents, copyrights, industrial designs, printed circuit masks and plant protection rights, or subject to protection by law, like trade secrets or confidential information.
- 1.1.2.22 “Contractor” is defined in the PWGSC Standard Acquisition Clauses and Conditions (SACC) available online: buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual.
- 1.1.2.23 “Operating Tests” means the tests on the equipment and devices serving to show that their operation meets the specifications and/or standards of the manufacturers.
- 1.1.2.24 “Force Majeure Event” means one of the following events:
- a war, civil war, armed conflict, act of terrorism, acts by foreign enemies or hostilities, a natural catastrophe (except for flooding);
 - nuclear or radioactive, and chemical or biological contamination unless this contamination is due to an act or omission of either Party or of any Person for whom either Party is responsible;
 - the discovery of fossils, remains, coins, articles of value or antiquities, and other analogous objects or of the heritage nature which, under the Law, requires suspending or abandoning Construction Work;
 - a general strike in Québec or any other labor conflict which last more than sixty (60) business days generally affecting the infrastructure construction, operation or maintenance sector or specifically affecting the Client;
 - interference caused by civil or military authorities including a blockade, embargo or quarantine;



which directly makes it such that either Party is unable to execute all or part of the obligations to which it is held under the terms of the Contract.

- 1.1.2.25 “Turnover Requirements on the Expiration Date” designates the following requirements applicable or expected on the Expiration Date:
- The Final Capping of the Site and each of its elements must be in a state which is operational, defect free and compliant with the conditions stated in the Contract.
- 1.1.2.26 “Supplier” is defined in the PWGSC Standard Acquisition Clauses and Conditions (SACC) available online: buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual.
- 1.1.2.27 “Federal Government” designates Her Majesty the Queen in Right of Canada and any ministry (or any general directorate of a ministry), including the councils, commissions, societies or other public bodies which are agencies of Her Majesty the Queen of Right in Canada, and includes, for further precision, Public Works and Government Services Canada (PWGSC) and/or Public Services and Procurement Canada (PSPC).
- 1.1.2.28 “Characterization Guide” means the Site Characterization Guide from the MELCC (most recent version in effect).
- 1.1.2.29 "Environmental Analysis Sampling Guide" means the Environmental Analysis Sampling Guides (Books 1, 3, 5 and 8, most recent versions in effect) from the Québec Center of Expertise in Environmental Analysis (CEAEQ).
- 1.1.2.30 “Intervention Guide" means the Intervention Guide – Soil Protection and Contaminated Sites Rehabilitation from the MDDELCC (most recent version in effect).
- 1.1.2.31 "Engineer" represents the firm of consulting engineers with which the Client has concluded a contract for professional services to perform in particular the preparation of drawings and Technical Specifications for the present contract and the monitoring of the work, and any representative authorized by them.
- 1.1.2.32 “Invention” means any implementation, any method, any machine, fabrication or composition of materials or any improvement thereof.
- 1.1.2.33 “Work Boundaries” means all areas, including but not limited to the Site as defined in this section, and areas outside the Site, including portions of the Rang du Ruisseau, that are used by the Contractor or a sub-contractor dealing with the execution of the Works.
- 1.1.2.34 “Environmental Quality Act” means the Environmental Quality Act (RLRQ, c Q-2).



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- 1.1.2.35 “Law” means all Permits, Licenses and Authorizations (other than consents and agreements granted by third parties who are not governmental authorities) and all federal and provincial laws and all regulations, all municipal regulations, all rules, all codes (including building and design codes), all ordinances, all judgments, all orders and all administrative interpretations with which one Party is required to comply.
- 1.1.2.36 “Occupational Health and Safety Act” means collectively Canada Labour Code (R.S.C., 1985, c. L-2) and the Act Respecting Occupational Health and Safety (RLRQ, c. S-2.1).
- 1.1.2.37 “Client” designates Public Works and Governmental Services Canada (PWGSC) or Public Services and Procurement Canada (PSPC).
- 1.1.2.38 “Principal Contractor” designates the Contractor.
- 1.1.2.39 “Quality Manual” means the manual stating the Contractor’s quality policy and describing the methods of the Quality Assurance System that the Contractor must apply.
- 1.1.2.40 “Hazardous Materials” has the meaning given to it in the Environmental Quality Act.
- 1.1.2.41 “Residual Materials” has the meaning given to it in the Environmental Quality Act.
- 1.1.2.42 “MELCC” designates the ministry of the « Environnement et de la Lutte contre les changements climatiques » of the Province of Quebec, formally known under the name of the ministry of « Développement durable, de l’Environnement, de la lutte contre les changements climatiques » (MDDELCC), of the Province of Quebec, or any ministry succeeding it.
- 1.1.2.43 “Ministry” means Public Works and Governmental Services Canada (PWGSC) or Public Services and Procurement Canada (PSPC).
- 1.1.2.44 “Applicable Standards” designates the standards, guidelines, codes, policies or documents which are typically cited and used as minimal references and standards in Québec by professionals experienced in the design, construction, or maintenance of a final site capping and for providing a minimum quality level of materials, fabrication and installation conforming to the planned Work, including all standards called for in applicable law.
- 1.1.2.45 “Party” means the Client or the Contractor.
- 1.1.2.46 “Construction Period” means the time beginning with the starting with construction work and ending on the completion date..
- 1.1.2.47 "Permit" means all permissions, consents, approvals, certificates, permits, licenses, understandings and authorizations provided for or required by law, and



also all understandings and consents by third parties necessary in order to satisfy the Technical Specifications.

- 1.1.2.48 "Person" is defined in the PWGSC Standard Acquisition Clauses and Conditions (SACC) available online: buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual.
- 1.1.2.49 "Quality Plan" means the document describing each step of execution and supervision of the Construction Work and specifying the methods for application of the Quality Assurance System.
- 1.1.2.50 "Stop Point" designates a point beyond which an activity must not continue without the presence of the Client's Representative.
- 1.1.2.51 "Monitoring Point" designates a point beyond which an activity must not continue without the Client's Representative having been advised.
- 1.1.2.52 "Project" means the construction project for implementing environmental mitigation measures on the Site that is the subject of the Contract, and comprising the culvert, Final Capping of the Site as well as the installation of site access control infrastructures such as fences.
- 1.1.2.53 "Intellectual Property" designates any industrial, scientific, technical, commercial, literary, dramatic or artistic information or knowledge or information or knowledge which touches creativity in the work environment, whether it is communicated orally or recorded in any form or on any medium, without regard to whether or not it is the subject of copyright; this comprises, without limitation, inventions, designs, methods, procedures techniques, know-how, demonstrations, models, prototypes, layouts, samples, drawings, experimental or test data, reports, drawings, plans, specifications, photographs, manuals and any other document, software and firmware.
- 1.1.2.54 "Verification Reports" means the documents, which can include forms, inspection sheets, sketches or other, which indicate whether the object of the verification is compliant or noncompliant with the Contract's requirements.
- 1.1.2.55 "Report on the Completion" means the report prepared by the Client with the help of the Client's Engineer following receiving the Notice of Substantial Performance and describing the condition of the equipment and systems depending on the requirements from the Contract concerning the Construction Work and also every aspects of the equipment and systems which are not compliant with these requirements.
- 1.1.2.56 "Final Capping of the Site" means all the work described in Section 23 of the present Technical Specifications so as to allow the capping of the surface of the Site, including grading and preparation of the surface to be covered, installation of a drainage layer, a geomembrane, a synthetic drain, a protective layer and a topsoil layer, seeding and also installation of a biogas ventilation system.



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- 1.1.2.57 “Collection of Recordings Relating to Quality” designates a register that gathers all the recordings made in connection with monitoring the Construction Work.
- 1.1.2.58 “Client’s Representative” or “Representative of the Ministry” means the person designated in the contract or in a written notice served to the Contractor as Representative of the Client or Representative of the Minister for application of this Contract, including any person authorized and designated thereby in writing.
- 1.1.2.59 “Rules of the Art” are understood to be the implementation of standards, practices, methods and procedures for reaching good commercial standards, the compliance with laws and the exercise of the level of skill, care, diligence, prudence and foresight that is usually and reasonably expected of a person who is skilled, qualified and experienced in a similar type of undertaking, under identical or similar circumstances.
- 1.1.2.60 “QA Manager” means a manager for quality assurance (QA) who oversees the preparation, establishment and maintenance of the Quality Assurance System.
- 1.1.2.61 “Services” designates all activities necessary to the preparation of an asset management plan and a preventive maintenance program, the performance of the maintenance work for the Final Capping of the Site and other works satisfying the requirements of the Contract, in particular those described in the Technical Specifications.
- 1.1.2.62 “Site” means the sector described in Article 1.3.1 of the present section and where the Work defined in this Technical Specifications will be undertaken.
- 1.1.2.63 “Soil” means the materials from the Site composed of over 50% (fifty per cent) soil.
- 1.1.2.64 “Quality Assurance System” means a quality assurance system compliant with the requirements of the ISO 9000 standards (or inspired by it) and with the requirements of the Contract.
- 1.1.2.65 “Term” means the period starting with the Effective Date and ending with March 31st 2021, except if the Contract is terminated before that date under the terms of the Contract.
- 1.1.2.66 “Work” or “Construction Work” are defined in the PWGSC Standard Acquisition Clauses and Conditions (SACC) available online (buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual).



1.1.3 Acronyms

- PCB: Polychlorinated biphenyls
- BTEX: Benzene, toluene, ethylbenzene, xylenes;
- CEAEQ: Centre d'expertise en analyse environnementale du Québec;
- CCME: Canadian Council of Ministers of the Environment;
- SACC: PWGSC Standard Acquisition Clauses and Conditions available online: buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual;
- CNESST: Commission des normes, de l'équité, de la santé et de la sécurité du travail du Québec;
- VOC: Volatile Organic Compounds
- FS: Material Safety Data Sheets;
- MAH: Monocyclic aromatic hydrocarbons;
- PAH: Polycyclic aromatic hydrocarbons;
- PH C₁₀-C₅₀ : Petroleum Hydrocarbons, C₁₀-C₅₀;
- OHSAA: Occupational Health and Safety Act (Loi sur la santé et la sécurité du travail);
- MELCC: Ministère de l'Environnement et de la Lutte aux changements climatiques;
- mg/L: Milligrams per liter (ppm);
- µg/L: Micrograms per liter (ppb);
- ppm: Parts per million (equivalent to mg/L);
- ppb: Parts per billion (equivalent to µg/L);
- WHMIS: Workplace Hazardous Materials Information System
- PSPC: Public Services and Procurement Canada (PSPC)
- PWGSC: Public Works and Government Services Canada

1.2 CONTEXT

1.2.1 Site Description

1.2.1.1 The site of the former Contrecoeur landfill is located on the Rang du Ruisseau, at Contrecoeur in the Lajemmerais Regional County Municipality (RCM), and about thirty kilometers south-east of the Island of Montreal (see technical drawings in Appendix 1.1). The site covers a total area of 165,435 m². From 1972 to 1996, industrial residual waste from the region's steel mills was imported onto the front part of the site, which is accounting for about 60% of the total area of the site, and is delineating by a permanent pond. Accumulated residual waste consist mainly of non-ferrous residues from automobile shredding ("fluff"), foundry sands, slag, demolition wood, refractory bricks, tires, and materials contaminated with petroleum hydrocarbons. In 1996, at the request of the Ministry of the Environment and Wildlife (MEF), partial environmental mitigation measures were carried out, including: the recovery of apparent metal scrap, the demolition and disposal of the loading dock, smoothening of embankment slopes, partial site capping with 9,000 m³ of clay soil obtained following drainage works, and revegetation.



- 1.2.1.1 Despite these mitigation measures, environmental investigations carried out since 2015 have shown that the residual waste present on the site is responsible for the contamination of soil, groundwater and surface water beyond applicable regulatory limits, mainly for metals. The presence of other contaminants, including PAHs, petroleum hydrocarbons (F2-F3 fractions), VOCs, PCBs and dioxins and furans, was also detected in the backfill above the residual waste as well as within the underlying natural soil down to about 1.4 m in depth. Soil located in drainage ditches on the periphery of the site also exceed the applicable criteria for certain metals. Non-hazardous and hazardous residual waste volumes are estimated respectively at 198,800 m³ and 3,330 m³, while contaminated soil represent a total volume of 17,500 m³ (excluding natural clay soils showing high concentration of certain metals (B, Cr, Ni) potentially from a natural origin). Groundwater present within the residual waste embankment is contaminated by metals, chlorides, fluorides, cyanides, sulphides, PCBs, dioxins and furans, PAHs, VOCs, HP C₁₀-C₅₀ and PHC fractions F1-F2. For monitoring wells completed in natural soil located outside of the residual waste embankment, groundwater is contaminated primarily by metals, some of which may be of natural origin and representative of high salinity groundwater associated with clayey deposits of the Champlain Sea. A significant portion of the groundwater present in the residual waste is resurging in the ditches on the periphery of the site. Exceedances of the applicable criteria were observed in the surface water within ditches for metals as well as dioxins and furans in some places. Toxicity tests conducted on surface water collected at the downstream end of the site showed no toxicity.
- 1.2.1.2 According to the characterization work carried out, the geology of the site is characterized, at the location of the residual waste stockpiling, by a sandy to clayey silt backfill layer approximately 0.4 m thick, overlying residual waste materials (mainly non-ferrous car shredding residues, but also tires, drums, ashes, bricks, etc.) up to 7.2 m thick, which are laying on natural clayey, or silty to sandy soil in the southeastern part of the site. The two (2) main hydrostratigraphic units observed on the site are the saturated portion of the residual waste (water table aquifer) and the natural silty clays on which the residual waste rests (aquitarde). Groundwater flow in the residual waste unit is radial under an average horizontal gradient ranging from 0.008 to 0.05 m/m. In the clay unit, the main component of the flow is thought to be vertical. Artesian pressure was observed in a well nest located near the northwestern end of the site.
- 1.2.1.2 From the available data, a numerical groundwater flow model was developed using the two-dimensional SEEP2D numerical code. The objectives of the modeling work were to simulate groundwater flow and to assess the impact of the implementation of containment technologies on the evolution of groundwater and surface water contamination. The model, calibrated using piezometric data collected in November 2016, estimates a flow entering the site equal to 10.5 m³/d. The results of the simulations carried out show that the waterproofing of the surface would allow a significant reduction in the volumes of water entering vertically. The average amount of infiltration water would thus decrease annually by nearly 90%, from 3,150 m³ to 360 m³.



1.2.1.3 After the identification of the environmental problem on the site, a search and evaluation of alternatives for environmental management or mitigation measures were done and resulted in the development of three potential scenarios for the elimination of the human and environmental risks associated with the migration of contaminated ground and surface water. The comparative technical evaluation of these three potential scenarios was done in order to guide preparation of the intervention strategy for the environmental management of the former Contrecoeur landfill. The following article presents the scenario selected by the Client.

1.2.2 Context of the work request

1.2.2.1 Since 2015, Public Works and Governmental Services Canada (PWGSC; the "Client") ensures the management of the site of the former Contrecoeur landfill and carried out several works in order to improve its knowledge of the environmental conditions of the site and to evaluate possible options for environmental site remediation or management. Following the review and analysis of all the conceivable potential options for site remediation, the Client selected an intervention scenario in order to ensure a comprehensive environmental management of the site. This scenario, entitled "Surface capping, toxicological and eco-toxicological risk analysis and environmental monitoring", calls for implementing environmental mitigation measures including : 1) Final Capping of the Site (or sealing of the site surface) in a way that limits water infiltration and contaminant leaching, 2) a toxicological and eco-toxicological risk analysis, and 3) the implementation of ground and surface quality monitoring program, including the study of the piezometric conditions.

1.2.2.2 The present Technical Specifications state the minimum technical requirements with which the Contractor must comply in the context of the Contract. These requirements mainly target the preparation of the Technical Documents and the Construction Work necessary for the Final Capping of the Site (i.e. sealing) and the installation of a fence.

1.2.3 Information supplied by the Client

1.2.3.1 The Parties agree that the Client does not incur any liability by the transmission to the Contractor of the information described in Article 1.2.3. The Client makes no representation as to the sufficiency, relevance or quality of the information thus transmitted.

1.2.3.2 No obligation of the Contractor provided in the Contract or required under the Law to produce a report, proceed with a sampling or determine a method of execution related to any part of the Work is reduced by the transmission to the Contractor of information described in Article 1.2.3 or any other information by the Client.

1.2.3.3 Documents attached to the present Technical Specifications:

- Appendix 1.1: Technical drawings;

- Appendix 1.2: Previous studies :
 - Executive summary of the document « *Évaluation environnementale de site – Phase III, Propriété de l’ancien dépotoir de Contrecoeur* » (TechnoRem, 2017; project number PR16-75);
 - Geotechnical study performed for the culvert design.
- Appendix 1.3: Borehole logs;
- Appendix 1.4: Summary table of the attenuation measures arising from the assessment of the environmental effects (Englobe, 2019);
- Appendix 1.5: “Topographic Map, certificate of location and staking certificate, Former Contrecoeur Landfill” (PWGSC, 2016).
- Appendix 1.6: List of existing monitoring wells to be kept.

1.2.4 Requirements, Codes and Regulations

1.2.4.1 General information

1.2.4.1.1 If the Contractor becomes aware that a portion of the drawings and Technical Specifications is not compliant with the codes and regulations that govern them, it must inform the Client of it as soon as possible. If the Contractor performs work that is not compliant with the applicable codes and regulations, it is responsible for the costs of the subsequent changes required. The standards and codes are defined inside Section 2, "Standards, Codes, Regulations and Acts", of the present Technical Specifications.

1.2.4.2 Implications and Limitations

1.2.4.2.1 The documents listed in Article 1.2.3.3 are an integral part of the tender documents.

1.2.4.2.2 It is the responsibility of the tenderer to review these documents and consider them in the preparation of its tender.

1.2.5 Geotechnical Study and Soil Survey

1.2.5.1 The technical studies made available to the Contractor by the Client or the Representative of the Client, as well as the recommendations that are formulated in these studies, in no way incur the liability of the Client or its Representative.

1.2.5.2 The information presented on the nature and depth of the soil layers can be considered accurate only in the areas of the drilling or surveys. Any interpretation about the nature of the soil between two drillings or surveys of any kind remains the responsibility of the Contractor and in no way incurs the liability of the Client or its Representative.

1.2.5.3 The Contractor must engage its own experts as it deems appropriate for determining the difficulties in construction methods and also the nature of the soil between two drillings, and assume the related costs.



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- 1.2.5.4 It is up to the Contractor to fully analyze the content of the geotechnical reports in question and to fully verify the nature of the soil in question, because no supplement will be allocated to it for omission and/or improper interpretation in this respect.
- 1.2.5.5 It is up to the expertise of the Contractor to properly evaluate the full context of the work and properly assess all the conditions for the excavation and construction to be done so as to comply with the safety standards in this chapter and meet the requirements of the corresponding drawings and specifications.
- 1.2.5.6 The Contractor shall assume full and complete responsibility for any use or interpretation that may be made of the documents attached to this Technical Specification. No claims will be received by the Client on the basis of these reports.
- 1.2.5.7 The experts engaged by the Contractor must consider the following points, without limitation:

Excavation slopes;

- Existing structures to be protected during the excavations;
- Water in the excavations and surface water;
- First class excavation (note: first class excavated material includes solid rock as well as, when it has a volume over 1 m³, blocks of rock, large pebbles and massive concrete structures);
- Need to leave safe passage for residents and emergency vehicles (e.g. ambulances, fire trucks, home medical visit, etc.).

1.2.5.8 The Contractor must use all required methods in order to avoid destabilizing the embankments and/or existing structures and maintaining safe and stable excavation walls including, without limitation, pumping, shoring and trench boxes.

1.3 SCOPE OF THE CONTRACT

1.3.1 Work Location

1.3.1.1 The former Contrecoeur landfill is located on the edge of the Rang du Ruisseau at Contrecoeur in Lajemmerais Regional County Municipality (RCM). It is located about thirty kilometers southeast of the island of Montreal and about 3 km northeast of the heart of Contrecoeur City (see drawing R_078691-S01-P001 in Appendix 1.1). The site does not have a civic address, but is located approximately 200 m northeast of the residence located at 6 191, Rang du Ruisseau and it corresponds to lot 4 812 972 of the renovated cadaster of Quebec. The site is zoned A-01-123, allowing agricultural uses.

1.3.1.2 The lot is rectangular in shape, oriented in a northwesterly and southeasterly direction, and is approximately 110 m (southwesterly/northeasterly) by 1,400 m (northwesterly/southeasterly axis), for a total area of 165,435 m². The lot includes (2) distinct parts: the front part (north-west) and the rear part (south-east). The



front part, representing about 60% of the total area, is vacant with sparse vegetation, while the rear part is occupied by dense forest. An artificial (permanent) pond with an area of approximately 2,800 m² and another seasonal pond separate the two (2) parts of the lot. The approximate geographic coordinates of the center of the property are 45°51'44"N latitude and 73°11'44"W longitude (CIMA 2016). The front part of the property represents the area covered by the Work (the "Site" below).

- 1.3.1.3 The front part of the lot, representing an area of approximately 99,300 m², was used as an illegal landfill for industrial Residual Materials between 1972 and 1996, resulting in an elevation of the Site surface in relation to the surrounding lands, which consists of agricultural fields to the northeast, southwest and northwest. Drawing R_078691-S01-P002 in Appendix 1.1 provides a detailed topographic map from a survey conducted by PWGSC's topographic services in the fall of 2015.
- 1.3.1.4 Drainage ditches border the site to the northeast, northwest and southwest. The St. Lawrence River and Laprade Creek respectively flow about 2.1 km and 180 m northwest of the property.

1.3.2 Scope of work

- 1.3.2.1 The Contractor must provide the complete and compliant implementation of the works and deliveries that are the subject of the Contract. Unless indicated otherwise, the execution of all work and transportation, the delivery on the job site of all managing staff, all labor, equipment and materials necessary for this implementation are the responsibility of the Contractor even if this work, transport and deliveries are not explicitly mentioned in the Contract.
- 1.3.2.2 The Contractor is specifically responsible for:
- Apply of labor, materials and equipment and the execution of all work necessary for the installation of a culvert et the Site entrance;
 - The supply of labor, materials and equipment and the execution of all work necessary for Final Capping of the Site, including, among other things, the following items: grading and preparation of the surface to be capped, installation of anchoring trenches within the lateral slopes, the supply and installation of a draining layer under the geomembrane, the supply and installation of the ventilation system for the biogases, the supply and installation of the geomembrane, the supply and installation of the synthetic drain above the geomembrane, the supply and installation of a protection layer above the geomembrane, the supply in installation of a topsoil layer, and the seeding of the capped surfaces;
 - The construction, maintenance and supply of materials for the access roads and work site circulation lanes necessary for conducting the Work according to the requirements of these Technical Specifications;



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- The supply and installation of the fence circling the Site;
 - The dismantling and off-site disposal of the palisade currently located along the Rang du Ruisseau;
 - The implementation of the attenuation measures presented in Appendix 1.4;
 - The fabrication and supply of the materials and equipment of all kinds, necessary for the complete and compliant implementation of the works and deliveries that are the subject of the Contract;
 - The management and general coordination of the work and the various participants in the project, including the participation to meetings and the revision of meeting minutes or other documents related to these meetings;
 - The tests and inspections;
 - Study and implementation of the execution methods;
 - Execution of works in compliance with the project schedule.
 - The performance warranty for the materials, hardware, devices, equipment and all other items supplied and installed by the Contractor.

1.3.3 Contract Duration

1.3.3.1 The Contract enters into effect on the Effective Date and ends March 31, 2021 except if the Contract is terminated before that date under the terms of the Contract.

1.3.4 Lifespan

1.3.4.1 The Contractor is obligated to perform, on each element of the Project, all maintenance, replacement and minor repair necessary for the reasonable management of the Project assets, including the culvert, the Final Capping of the Site and the fence. The Contractor is also responsible for rehabilitation of these assets at the end of the Contract.

1.3.5 Complete work

1.3.5.1 Drawings and the Technical Specifications are part of a whole in order to implement the construction as a whole. They must be read jointly and severally, one with respect to the others in order to consider all of their implications.

1.3.5.2 These implications include, in addition to the requirements set in the contractual documents, all demolition (if required), drilling, connecting and finishing work which is not specifically indicated but which is required for execution of the complete works.

1.3.6 Execution Schedule

1.3.6.1 Refer to Article GC3.1 "Progress Schedule" from the General Clauses and Conditions of the Module GC3 "Execution and Control of the Work" (R2830D, latest version) of the Standard Acquisition Clauses and Conditions (SACC) of the PWGSC (buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual).

Following the written order of the Client to proceed with the execution of the Work, the Contractor must respect the schedule of completion provided in the tender documents. The project has two phases of development work. The following table presents the main milestones to be included in the schedule produced by the Contractor. If the Contractor considers that some work from Phase 2 can be carried out during Phase 1, the Contractor must justify the proposed approach allowing such work to be carried out ahead of proposed schedule and must obtain authorization from the Client to proceed with the work.

Work	Milestones
Development work – Phase 1 - Mobilization - Worksite installations - Culvert installation - Surface preparation and profiling (grubbing and brush clearing, grading of surface)	End of work: December 15 2019
Shipping of Geomaterials on the Site - Geomembranes - Synthetic drains - Geotextiles	No later than March 15 2020
Development work – Phase 2 - Surface preparation and profiling (drainage ditches, anchor trenches, draining layer) - Biogas ventilation system - Geomembrane installation - Synthetic drain installation - Drainage and protection layer - Permanent circulation lanes - Fence - Topsoil - Seeding - Demobilization and site restauration	Work from April 1 2020 to October 30 2020

1.3.6.2 The Contractor must, at least 15 days before starting construction work, submit a new detailed schedule having a length less than or equal to that provided in the request for bids document. This detailed schedule for the work must include at a minimum the following items:

- The order of the phases of activities that it proposes to follow;
- The start and end dates for each of the Project's activities;



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- The projected progress of the activities by work team.

- 1.3.6.3 The detailed schedule must be prepared in the form of a timeline diagram showing the Contractor's planning and ordering the Project's activities. It is presented on reproducible medium and in electronic format. This diagram must be accompanied by explanatory documents giving a detailed description of the labor, materials, hardware and means and methods that the Contractor intends to use for executing Project activities and achieving the planned production rhythm.
- 1.3.6.4 With the documents associated with the detailed schedule, the Contractor must clearly specify the anticipated progress of each of the activities necessary for implementing the Project in the required intervals, by indicating the start and end dates of each of the activities together with their interdependencies. The level of details for the activities from the diagram and also the written explanations must allow the Client's Representative to evaluate the feasibility of the detailed schedule presented.
- 1.3.6.5 The detailed schedule must also include activities related to the preparation and application of the Quality Plan. The diagram from the detailed schedule must be developed according to the Critical Path Method (CPM) and its components must be computerized and presented to the Client's Representative in the most recent version available on the market of the project management software MS Project For Windows or any other equivalent software approved by the Client. However, for internal management purposes, the Contractor can use any other computer management tool for planning and tracking the execution of the Project activities.
- 1.3.6.6 The detailed schedule will next be analyzed by the Engineer and the Client and then become a fully contractual document. No work may begin before a detailed schedule is accepted and signed by the Contractor and Client.
- 1.3.6.7 The Contractor must take all necessary provisions for executing work in compliance with the detailed schedule that was signed by all the Parties.

1.4 COMMITMENTS, OBLIGATIONS AND RESPONSIBILITIES

1.4.1 Permits and Authorizations

- 1.4.1.1 The Contractor must obtain, keep in force and comply with the conditions with all the Permits required by Law for the Work.
- 1.4.1.2 The Contractor must submit a copy of any Permit to the Client's Representative immediately after having received it from the Person who issued it.

1.4.2 Patents and Intellectual Property Rights

- 1.4.2.1 For the equipment or systems installed in connection with the project and subject in whole or in part to patents or intellectual property rights for which the Contractor is the owner, the Contractor guarantees the Client the supply of



materials, hardware, replacement parts or other goods required for the proper operation of the installed equipment or systems, and does so for a period of one year following provisional acceptance, unless additional guarantees or different intervals are stipulated elsewhere in the Contract. This guarantee applies to the installed equipment or systems, whether they were designed and developed or not for the purposes of the Project.

1.4.3 Decrees Concerning the Construction

1.4.3.1 Without limitation to the scope of the Contractor's obligations, the Contractor must fully comply with any decree concerning the construction and provide for full compliance by any person who participates in the Work at its request or with its knowledge.

1.4.4 Occupational Health and Safety Act

1.4.4.1 Unless otherwise noted, the Contractor is the Principal Contractor in the meaning of the Occupational Health and Safety Act (hereafter OHSA) for the execution of the Contract and as such assumes all liabilities and obligations provided by this act and the regulations arising from it.

1.4.4.2 The Contractor must provide the Client with a copy of the notice of opening a construction worksite that it sends to the Québec Commission for Occupational Standards, Equity, Health and Safety (CNESST).

1.4.4.3 The Contractor is not authorized to start work before having received confirmation from the Client of receiving the notice.

1.4.5 Exemptions, Subsidies and Discounts

1.4.5.1 When the Client is entitled to exemptions, subsidies or discounts or can benefit from loans or cost-sharing formulas, the Contractor must upon demand provide the Client or the relevant authorities at its expense all information and data needed for these purposes.

1.4.5.2 If such a request must be made in the name of the Client by the Contractor, the Contractor must do it in the required time to the relevant authorities and agrees to submit to the Client the amount obtained in that manner.

1.4.5.3 The Contractor must reimburse the Client for any loss that it could directly or indirectly experience subsequent to the breach or negligence of the Contractor in the accomplishment of the obligations arising from this article.

1.4.6 Employees Assigned to the Work

1.4.6.1 The Contractor must employ qualified workers on the worksite (refer to tender documents for qualification requirements) who have all the necessary skills for performing the tasks safely and in compliance with the quality standards in use or specified elsewhere in the Contract.



1.4.6.2 The qualified worker will have to provide to the Client a copy of the skill cards for regulated works before starting work.

1.4.7 Exonerating Events

1.4.7.1 Refer to the PWGSC Standard Acquisition Clauses and Conditions available online (buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual).

1.4.8 Occupation and Access to Private Property

1.4.8.1 Without limiting the scope of the present article, the Contractor may not use or occupy private land without having previously obtained written authorization from the Client.

1.4.9 Water Supply

1.4.9.1 During the preparation of its proposal, the Contractor must consider that it is not authorized to continuously supply itself with water from the municipal drinking water system of the municipality of Contrecoeur for performing the activities for the present Contract. Additionally no water service is nor will be available on the Site.

1.4.9.2 Without limiting the scope of the present article, the Contractor who wishes to be supplied with water temporarily with a fire hydrant connection, must receive a formal authorization from the Client and the municipality of Contrecoeur, and must assume the costs associated to obtaining this authorization as well as the water consumption.

1.4.9.3 Any connection to a fire hydrant must be done so as to allow unrestricted access and to make its operation easier.

1.4.9.4 In the context of the present article, any authorization from the Client and/or the municipality of Contrecoeur must be in writing. It is given subject to water supply availability and the location of water system equipment.

1.4.9.5 At the expiration of the time for use of a fire hydrant, the Client does a verification to make sure that it is returned in good condition.

1.4.9.6 If a fire hydrant must be repaired following its use by the Contractor, the Contractor must defray all costs incurred for the repair.

1.4.9.7 The Client reserves the right to cancel any authorization given in conformance with the above paragraphs at any time.

1.4.10 Existing Works

1.4.10.1 The Contractor is responsible for exactly locating all existing works and existing benchmarks (ratings and elevations). No supplement can be requested if the case happens where information indicated on the drawings is not the same in reality.



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- 1.4.10.2 The Contractor must submit to the Client Representative a copy of the searches that it did with Info-Excavation or any other specialized organization.
- 1.4.10.3 When there is a contradiction between the Technical Specifications and the actual conditions on the site, the Contractor must immediately inform the Client in writing so that the Client can go ahead with a verification and issue instructions. If the Contractor continues the work in question and if that work becomes noncompliant with the potential instructions from the Engineer, the Contractor must redo that work at its expense.
- 1.4.10.4 The Contractor shall provide protective measures and maintenance activities for existing works, including the temporary culvert provided for the work and the permanent culvert previously installed;
- 1.4.10.5 The Contractor is responsible for precisely locating all the existing wells on the Site. The Contractor must take all necessary precautions for protecting all existing wells which are to be preserved. In case of breakage, any existing well to be preserved, not appearing on the list in Appendix 1.6 of existing monitoring wells to be dismantled, must be replaced or repaired to the satisfaction of the Client at the Contractor's expense.
- 1.4.11 Maintenance of Existing Services and Protection of Public Utilities**
- 1.4.11.1 The Contractor must keep all existing water, sewer, storm drain and overhead or underground cables and wires services in operation whether shown on the drawings or not.
- 1.4.11.2 The Contractor must at its expense make the required arrangements for locating these services with the public utilities (e.g. water, sewer, electricity, gas, telecommunication, etc.) and protect them. The Contractor must include the cost of all this work in the unit or flat rate prices on the Tender Price Table.
- 1.4.11.3 No delay caused by the movement of public service facilities can give rise to a claim by the Contractor. The Contractor will be held responsible for any damage to the public service facilities and for any claim resulting from the service interruption.
- 1.4.11.4 The inaccuracies which the information supplied by the Client about the public service facilities, underground or above-ground, could contain cannot give rise to claims by the Contractor.
- 1.4.11.5 The Contractor will have to examine the locations of the work and gather information from the municipalities, companies, owners or operation managers of the various services, pipes or other underground or overhead facilities as to their nature, dimension and location. Any damage or cost increase caused by the inaccuracies that could be present in the records, reports or other information supplied by the municipal authorities, public service companies or ordinary individuals cannot lead to claims by the Contractor.



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- 1.4.11.6 The Contractor must get all necessary information from the public utility bodies involved in order to know all the constraints attributable to their respective works and be aware of the requirements it must meet during the execution of their work. When these works are damaged by the Contractor, it must repair them at its expense.
- 1.4.11.7 The Contractor must consider that everywhere within the Worksite Boundaries, the public utility poles have to be protected. The Contractor must also note that some poles could require works to hold them, support them, etc. so as to provide for their stability. The Contractor must get prior approval of the method for supporting poles from their owner (e.g. Hydro-Québec, etc.). In its tender cost the Contractor must anticipate the difficulties for the progression of the work that could be associated with the presence of poles. More specifically, it must include in its trench digging cost, the support and protection of each pole where required, the temporary marking (if required), the repair required due to the removal of the pole after the beginning of work and similarly the coordination with the public utilities.
- 1.4.11.8 During the course of work done near electric lines, the Contractor will have to notify Hydro-Québec at least 15 days before the date of beginning work and comply with the Hydro-Québec directives on work done near electric facilities.
- 1.4.11.9 The operation of municipal services, like the closure of valves, the use of fire hydrants or other, will be done by the municipality of Contrecoeur or the Client or in collaboration with it after having received authorization.
- 1.4.11.10 When works must be temporarily reinforced, the Contractor must obtain the services of an engineer for calculating the reinforcement and providing the responsibility for it. A copy of the drawings and engineering notes signed and sealed by the engineer who prepared them must be submitted to the Client or its Representative. The reinforcement must be inspected by the engineer who is responsible for it.
- 1.4.11.11 The Contractor must take all necessary precautions for protecting the existing pavement and the works to be retained, especially the crash barriers. At no time whatsoever may any heavy equipment travel on the curbs. At no time may any machinery that operate on tracks travel on the pavement and existing works to be retained or on the new pavement. Any area of pavement (existing or planned) which is damaged must be replaced to the satisfaction of the Client at the expense of the Contractor.
- 1.4.11.12 The Contractor must take all necessary precautions for protecting the integrity and function of the existing drainage ditches located on the site and along its periphery at all times during the Work. Unless authorized by the Client, the drainage ditches shall be left free of obstruction before, during and after the Work. Should it become necessary to undertake snow removal operations on the site during the Work, the Contractor will avoid in particular pushing, blowing or disposing of snow in the drainage ditches.



1.4.11.13 The Contractor is responsible for any damages caused to existing works and must, at its expense, make all repairs deemed necessary by the Representative of the Ministry.

1.4.12 Protection of New Installations

1.4.12.1 The Contractor is responsible for assuring the integrity of the works made in connection with this Contract. Any damage, voluntary or involuntary, caused to the new installations, including but without restriction, the installations related to the culvert, the Final Capping of the Site and to the fence will have to be duly repaired at its expense.

1.4.13 Continuity of Operation of the Drinking Water System

1.4.13.1 It is the responsibility of the Contractor to keep all of the drinking water supply and distribution systems, including fire protection, for the municipality of Contrecoeur in operation throughout the time needed for the Work.

1.4.13.2 The Contractor must coordinate with the director of public services for the municipality of Contrecoeur and the Client and also with the Engineer for any operations that could affect the continuity of operation of the municipal drinking water system. The exact location of the water lines must be determined in the field by the Contractor, and the cost must be included in the Tender Price Table.

1.4.13.3 The Contractor must get the necessary authorizations from the affected people before cutting off drinking water services by giving at least three days advance notice to the municipality of Contrecoeur and the Client.

1.4.13.4 The valves and fire hydrants for the systems can only be operated by the municipality of Contrecoeur or in collaboration with it after having obtained authorization.

1.4.13.5 If required, the Contractor must anticipate in its tender price that it will need to make required repairs if a break occurs on the existing system.

1.4.13.6 All fees connected with the maintenance of the supply and distribution service in order to allow performance of the work must be distributed over all the prices in the Tender Price Table.

1.4.14 Maintenance of the Public Roads

1.4.14.1 Without limiting the scope of the present article, the Contractor must make sure that the wheels of vehicles that leave the worksite are clean and that mud is not transported onto the public roads. In particular, the Contractor must comply with the mitigation measures provided for this purpose and presented in Appendix 1.4. Without delay and at its expense, it must clean the roads that are dirtied with a mechanical sweeper or any other adequate maintenance equipment. The Contractor must also take all necessary precautions for the protection of public roads and must replace at his own expense any damaged portion of public roads.



1.4.14.2 At all times during the work, the Contractor is required to control the dust coming from the works that it is executing in compliance with Section 3 of the present Technical Specifications. It must demolish and build so as to raise the least dust possible and must wet down dusty materials. Upon request from the Client, it must additionally spread liquid calcium.

1.4.14.3 If the Contractor does not clean the public roads quickly and adequately, the Client will perform the required work or have it done at the cost of the Contractor.

1.4.15 Rules of the Art

1.4.15.1 As provided for in the Québec Civil Code, the Contractor must perform the obligations and responsibilities that fall on it under the Contract in conformance with the Rules of the Art.

1.4.16 Intensity of the Obligations and Responsibility of the Contractor

1.4.16.1 With respect to its responsibilities and obligations, the Contractor is held to the results.

1.4.17 Worksite Organization

1.4.17.1 The following text (Article 1.4.17) supplements Article GC3.4 "Execution of the Work" from the General Clauses and Conditions of the Module GC3 "Execution and Control of the Work" (R2830D, latest version) of the Standard Acquisition Clauses and Conditions (SACC) of the PWGSC (buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual).

1.4.17.2 The worksite organization also includes instructions about access to the worksite for workers and authorized individuals. The Contractor must periodically perform maintenance on the equipment used and inspect it.

1.4.17.3 The Contractor is responsible for inspecting its Worksite in order to respect the environment and the quality of life of the workers and abutters. The Contractor must correct the defects found by it, by the Client's Representative or by any other Relevant Authority entitled to act in the public interest.

1.4.17.4 A list of people responsible for the Worksite must be submitted at the first Worksite meeting.

1.4.17.5 The Contractor must at all times have order and discipline respected on the Worksite.

1.4.17.6 The Contractor must ensure the safety of any individual and any asset on the Worksite. For this purpose, it must keep an up-to-date register of all people, employees, subcontractors, visitors or anyone else entering and exiting the Worksite. Without limitation to the preceding and if relevant, the execution of the work must not harm the movement of people and vehicles who access the Worksite.



1.4.17.7 Without limitation to the scope of the previous paragraphs of the present article, the Contractor must only employ individuals legally qualified for performing the tasks assigned to them.

1.4.17.8 The Contractor is responsible for the full execution of the Contract. Without limitation to the preceding and unless expressly indicated otherwise in the Contract, it is in particular responsible for:

- Study and implementation of execution methods;
- Provisional installations and works;
- Monitoring and coordinating its subcontractors
- Supply of materials and equipment of any kind.

1.4.17.9 The Contractor provides the maintenance, guard and control for any building, equipment or material made available to it by the Client and must use it solely for the purposes for which it is intended. At any time, it must be able to report on its use and its condition to the Client.

1.4.18 Video Recording

1.4.18.1 Before undertaking the Work, the Contractor must assign to a specialist the care of filming on videotape or an equivalent medium approved by the Client, in the presence of the Client's Representative, the sectors where it must perform the Work, in order to record on video media, the conditions existing before the start of work (buildings, walls and dry stone walls, culverts, ditches, vegetation, private entries, condition of the roadway, condition of the land in general and at the edges of the Site, state of neighboring properties in areas where an access could be required for the Work, electric service infrastructure, sidewalks, existing wells etc.), and to do that in order to reestablish the initial conditions at the end of the work. All routes and all roads intended for the transport of borrowed material and also any item that could become the subject of a damage claim must also be filmed on videotape. This activity must be done under favorable weather conditions.

1.4.18.2 No work will be authorized before returning to the Client and the Engineer two copies on DVD of the video report. The Contractor will retain the original for its personal use. The costs to the Contractor related to producing the video report must be distributed over all the prices submitted.

1.4.19 Passage near Existing Buildings

1.4.19.1 During delivery of equipment to the worksite, the Contractor must take all necessary precautions in order not to damage existing works or works being constructed. Any damage claim is under the full responsibility of the Contractor.

1.4.20 Storage, Handling and Protection

1.4.20.1 The following text (Article 1.4.21) supplements Article GC3.10 "Material, plant and real property become property of Canada" from the General Clauses and



Conditions of the Module GC3 "Execution and control of the work" (R2830D, latest version) and Article GC4.1 "Protection of Work and Property" from the General Clauses and Conditions of the Module GC4 "Protective Measures" (R2840D, latest version) of the Standard Acquisition Clauses and Conditions (SACC) of the PWGSC (buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual).

- 1.4.20.2 If materials and equipment must be handled and stored, the Contractor must do their handling, storing and guarding as to preserve their integrity while avoiding damaging them, changing them or getting them dirty.
- 1.4.20.3 The handling and storage of materials and equipment must be done in compliance with the manufacturer's instructions.
- 1.4.20.4 If possible, during handling and storage of materials and equipment, the manufacturer's original packaging, label and seal must be left intact.
- 1.4.20.5 The materials and equipment that could be damaged by bad weather must be stored in a weatherproof protective enclosure.

1.4.21 Worksite Meetings

- 1.4.21.1 The following text (Article 1.4.21) supplements Article CG2.4 "Site Meetings" from the general Clauses and Conditions from the module CG2 "Administration of the Contract - Construction Services" (R2820D, latest version) of the Standard Acquisition Clauses and Conditions (SACC) of PWGSC (buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual).
- 1.4.21.2 The Contractor and the Client will hold meetings about progress of the work according to modalities to be defined by the Client. It will set the location, date and time for any meeting. The expected frequency of meetings is once every week, unless the Client thinks otherwise.
- 1.4.21.3 The Contractor must participate in these meetings at which the Engineer, any Person designated by them, the representatives of the Subcontractors and the Suppliers and also the Client's Representative must attend if required. The agenda for each meeting will be established by the Engineer. The Contractor is also responsible for preparing the minutes of the meetings and submitting them to the participants.
- 1.4.21.4 The observations and discrepancies on the minutes from the Client and the Contractor will be sent to the Engineer within three days following reception of the minutes. The Engineer must make the necessary modifications to the minutes prior to the next meeting.
- 1.4.21.5 Subsequently, these minutes are binding the parties.



1.4.22 Evening or Night Work

- 1.4.22.1 In addition to the specifications given in Article 1.3.6, "Execution Schedule", the Contractor must lay out at his expenses a supplemental lighting system if evening or night work is done to meet the work schedule or limit the inconvenience to various users.
- 1.4.22.2 The lighting system installed by the Contractor must not cause any hindrance and must satisfy safety requirements as well as municipal and provincial regulation. Before installation of the system, the Contractor must send the Engineer any relevant documentation for purposes of approval.

1.4.23 Weather Conditions

- 1.4.23.1 If weather and terrain conditions become sufficiently unfavorable, in the opinion of the Engineer, to reduce the quality of the performance or simply block the execution of one part of the contract, the Engineer can go ahead with stopping work and the Contractor must then delay the un-started portion of the corresponding work to a later time.

1.5 TEMPORARY INFRASTRUCTURE ON THE WORKSITE

1.5.1 General information

- 1.5.1.1 The Contractor must have the Client approve in advance the sites for laying out temporary infrastructure (e.g. worksite office, material and equipment storage areas, etc.).
- 1.5.1.2 The sites for the temporary infrastructure will have to be located so as to not harm the progress of the Work and to limit environmental impacts.
- 1.5.1.3 All expenses related to temporary worksite infrastructure are the responsibility of the Contractor, including, without limitation, daily maintenance.

1.5.2 Contractor's Worksite Office

- 1.5.2.1 The Contractor must lay out for the length of the Work a worksite office for the Client and the Engineer according to the following specifications:
- The office must have a minimum floor space of 20 m²;
 - The office must be favorably located, suitably equipped, insulated, lit, heated, air-conditioned and kept clean and in order by daily maintenance such as described in the CNESST regulation;
 - The office must be supplied with 110 V-120 V electricity with at least 75 A and comprise at least four electric outlets;



- Office doors must be provided with commercial type locks and an antitheft system must provide security for the premises, the Contractor being responsible for operation and control;
- The office must have windows opening 50 %;
- The office must comprise a telephone line with fax, high-speed Internet access and a printer for the exclusive use of the representative of the Engineer;
- The office must be furnished at a minimum with a meeting table, table for reading plans, sufficient chairs, two drawer file cabinet and drawing table. Other furniture that the Contractor thinks relevant and useful can be added to it.

1.5.2.2 The Contractor must also prepare and maintain, for its use, a worksite office meeting the same requirements and having a sufficient size to hold worksite meetings.

1.5.2.3 The worksite offices must be equipped with a fire extinguisher and a complete and marked first aid kit, stored in an easy to access area. The offices must also comply with relevant ordinances and regulations, in particular the regulatory provisions of the Safety Code for the Construction Industry (latest version).

1.5.2.4 The Contractor is responsible for all communication related expenses for the worksite offices including, without limitation, base telephone costs, rental costs, use, toll calls, repair or replacement after breakage, and loss or theft of its people's cell phones.

1.5.3 Sanitary Facilities

1.5.3.1 The Contractor must supply and maintain sanitary facilities for the workers complying with relevant ordinances and regulations, in particular the regulatory provisions of the Safety Code for the Construction Industry (latest version). If chemical toilets are used, they must be cleaned at least once per week.

1.5.3.2 The Contractor must provide all necessary equipment (e.g. trash cans, bins, etc.) for preventing any dispersal of waste into the environment during the Work.

1.5.3.3 The Contractor must provide ventilation for the temporary sanitary facilities.

1.5.3.4 The Contractor must keep the area and the sector clean.

1.5.4 Water Supply

1.5.4.1 The Contractor must supply and provide freshwater for the workers and for the execution of the Work.

1.5.4.2 The Contractor will bear the cost of supplying water and the required equipment.



1.5.4.3 No water main is nor will be, available on Site and, considering the nature and environmental context of the Site, no well can be drilled for supplying water on Site.

1.5.5 Electric Power

1.5.5.1 The Contractor must cover the costs associated with the temporary electric power supply for all Work related needs.

1.5.5.2 The Contractor must make all necessary arrangements for connecting the site network to the network of the appropriate utility company (Hydro-Québec) and cover all the installation, maintenance and disconnection costs. The Contractor must also supply all equipment required for the temporary electric supply facilities.

1.5.5.3 The temporary electric facility must be authorized by Hydro-Québec and must conform to the Canadian Electric Code (Québec) and also current regulations, laws and ordinances.

1.5.5.4 The Contractor must provide temporary lighting for the locations throughout the length of the Work and oversee the network maintenance.

1.5.6 Site Signs and Notices

1.5.6.1 The Contractor must provide safety and information signs and notices in both official languages.

1.5.6.2 The Contractor must supply a worksite sign and install it in the area designated by the Client within two weeks after Contract signing. The names of the Client, its Representative and the Contractor must be indicated on the worksite sign. The stylized lettering used will comply with the instructions from the Client.

1.5.6.3 The Contractor must send the Client written requests for approval for the installation of a sign identifying the Contractor. The general appearance of this sign must correspond with that of the worksite panel and the writing must be prepared in both official languages.

1.5.6.4 Aside from the warning and safety signs, and the Contractor's identification sign approved by the Client, no other sign and no other poster may be installed on the worksite.

1.5.6.5 The writing printed on the instruction signs and on the safety notices must be written in both official languages. The graphical symbols must comply with the CAN/CSA-Z321 standard.

1.5.6.6 Keep the approved signs and notices in good condition throughout the length of the work and remove them from the worksite once the work is complete or earlier if requested by the Client.



1.5.7 Removal of the Temporary Facilities

1.5.7.1 The Contractor must take down equipment and temporary facilities and remove them from the worksite when they are no longer required or when the Client requires it.

1.5.8 Temporary Access Roads

1.5.8.1 The Contractor must build and maintain access roads and worksite circulation lanes necessary for performing the Work in compliance with the requirements of Section 7 of the present Technical Specifications.

1.5.8.2 The location, slope, width and alignment of the access roads and worksite circulation lanes are subject to the approval of the Client and the Engineer.

1.5.8.3 During the work, the Contractor must protect the existing roads and paths and repair any damage.

1.5.9 Temporary Construction Fence

1.5.9.1 The Contractor must provide construction fences as well as rigid and safe barriers, and install them around sectors that require it in order to be able to control Site access and provide safety for the public and workers. The sectors needing installation of temporary fences must be approved by the Client.

1.5.9.2 The Contractor must supply and install these elements in compliance with the requirements of the relevant authorities.

1.5.10 Temporary Lighting

1.5.10.1 The Contractor must keep acceptable lighting levels in the work areas during the Work.

1.6 EXECUTION OF THE WORK

1.6.1 Construction Methods and Execution of the Work

1.6.1.1 Refer to Article GC3.4 "Execution of the Work" from the General Clauses and Conditions of the Module GC3 "Execution and Control of the Work" (R2830D, latest version) of the Standard Acquisition Clauses and Conditions (SACC) of the PWGSC (buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual).

1.6.2 Quality Management

1.6.2.1 Contractor Obligations



1.6.2.1.1 The Contractor must prepare, establish and maintain in effect a quality assurance system compliant with the requirements of the ISO 9000 standards or inspired by it and the requirements of the Contract.

1.6.2.2 Scope of the Quality Assurance System

1.6.2.2.1 The Quality Assurance System encompasses all of the activities of the Contractor, Subcontractor and Suppliers relating to the Work.

1.6.2.3 QA Manager

1.6.2.3.1 The Contractor must name a quality assurance manager for assuring the preparation, establishment and maintenance of the Quality Assurance System. It must also provide sufficient human resources as inspection and test staff for verifying the compliance of the Construction Work with the Contract requirements.

1.6.2.3.2 The QA Manager must have the necessary authority for effectively acting with the employees of the Contractor, Subcontractors and Suppliers in order to accomplish their assignment.

1.6.2.4 Quality Assurance System Documentation

1.6.2.4.1 The Quality Assurance System includes two main documents or series of documents: 1) the Quality Manual and Quality Plan. It also provides for the preparation of verification reports and keeping of a Collection of Quality Related Recordings. The Quality Assurance System must also identify the Stop Points and Monitoring Points. The minimum requirements concerning Quality Assurance Documentation and the application of the Quality Assurance System are described below in Articles 1.6.2.5 to 1.6.2.9.

1.6.2.5 Quality Manual

1.6.2.5.1 The Quality Manual applies to all Work, both Construction Work and Services. It states the Contractor's quality policy and describes the methods of the Quality Assurance System that the Contractor must apply.

1.6.2.5.2 The Quality Manual is the permanent reference for the implementation and maintenance of the Contractor's Quality Assurance System. The Contractor must make unnumbered and dated copy of the Quality Manual available to the Client's Representative.

1.6.2.5.3 The Contractor must submit the Quality Manual to the Client's Representative for acceptance at least 15 days before starting Construction Work.

1.6.2.6 Quality Plan



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- 1.6.2.6.1 The Quality Plan specifically describes each step for implementation and monitoring of the Construction Work. It specifies the methods for application of the Quality Assurance System. In it, it states the practices, means and sequence of quality related activities specific to each product, activity or subcontract.
- 1.6.2.6.2 The Quality Plan encompasses all of the planning for the Construction Work. The necessary periods for performing the inspections and tests must be incorporated in the detailed schedule of Project activities.
- 1.6.2.6.3 The Contractor must submit the Quality Plan to the Client's Representative for acceptance at least 15 days before starting Construction Work. The Quality Plan can be submitted to the Client's Representative by step, each representing a specific and clearly delimited phase of the Construction Work. The Contractor can only start one phase of the Construction Work on the condition that the section of the Quality Plan relating to it has been submitted to the Client's Representative and accepted by it in conformance with the present article. The express or tacit acceptance of the Client's Representative of any Quality Assurance Document or its possible revisions does not lead to any obligation or responsibility for the Client to the Contractor and in no way reduces the Contractor's liability or obligations.
- 1.6.2.7 Stop Points and Monitoring Points
- 1.6.2.7.1 During the acceptance review of the Quality Plan, the Client reserves the right to include Stop Points and Monitoring Points in it.
- 1.6.2.7.2 The Contractor must notify the Client's Representative in the specified detailed before proceeding with an activity marked by a Stop Point and must not continue beyond this point without the presence of the Client's Representative without prior written consent from the Representative.
- 1.6.2.7.3 The Contractor Must Notify the Client's Representative in the specified interval before proceeding with an activity marked by a Monitoring Point. Should the Client's Representative notify the Contractor that it cannot attend an activity marked by the Monitoring Point, the Contractor is all the same authorized to continue this activity.
- 1.6.2.7.4 If the Contractor does not comply with the instructions related to Start Point or a Monitoring Point, the Client's Representative can have any verification connected with the activity targeted by this Stop Point or by this Monitoring Point that it thinks necessary done by the Person of its choice, at the Contractor's expense.
- 1.6.2.8 Verification Reports
- 1.6.2.8.1 Verification Reports can take various forms: forms, control sheets, sketches or other. They must indicate whether the subject of the verification is compliant or



noncompliant with the Contracts requirements. The reports must be signed by the QA Manager.

1.6.2.9 Collection of Quality Related Recordings

1.6.2.9.1 Collection of quality related recordings combines all the recordings made in connection with monitoring the Construction Work.

1.6.2.10 Review of Quality Assurance System Documentation

1.6.2.10.1 At any time, the Client's Representative can conduct a review of the Quality Assurance Documents in order to determine whether the application of the Quality Assurance System by the Contractor complies with the Contract requirements.

1.6.2.10.2 The review of the Quality Assurance Documents by the Client's Representative in no way indicates that the Client's Representative has counter verified the data which are recorded and in no way releases the Contractor from its responsibility to execute the Work in conformance with the Contract.

1.6.2.11 Exams by the Client's Engineer

1.6.2.11.1 The Contractor must inform the Client's Engineer at least five days in advance of the time and any place where work is done or materials produced before being incorporated in the System, so as to allow the Client's Engineer to perform any examination necessary for the verification of the application and effectiveness of the Contractor's Quality Assurance System.

1.6.2.12 Corrective Actions

1.6.2.12.1 When the Client's Representative informs the Contractor that the application of its Quality Assurance System does not satisfy the Contract's requirements, the Contractor must take, without delay, the necessary actions for correcting the situation and avoiding its repetition.

1.6.3 Documents Required during Construction

1.6.3.1 The following text (Article 1.6.3) supplements item 6 of Article GC3.4 "Execution of the Work" from the General Clauses and Conditions of the Module GC3 "Execution and Control of the Work" (R2830D, latest version) of the Standard Acquisition Clauses and Conditions (SACC) of the PWGSC (buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual).

1.6.3.2 The Contractor will have to keep the following documents on the worksite:

- Current documents;
- Technical Specifications;
- Addenda;



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- Revised shop drawings;
 - Notices of changes to the Technical Specifications;
 - Reports from tests done in the field;
 - Copy of the approved work schedules;
 - Instruction manuals from the suppliers or manufacturers;

1.6.3.3 All these documents should be available at all times for consultation by the Client and the Client's Representative.

1.6.4 Shop Drawings

- 1.6.4.1 The Contractor remains solely, completely and at all times responsible for the shop drawings required to ensure compliance with the Technical Specifications. The Contractor must confirm that the drawings comply with all applicable codes and standards, and also with all applicable requirements of the Contract and specifications, notwithstanding the revision, change or approval of drawings by third parties or the fact that these third parties have relied on or used these drawings or by one or more parties who produce or integrate the drawings on a numerical model or on a database in connection with the production, revision, change or submission of the drawings.
- 1.6.4.2 The expression "shop drawings" extends to drawings, schematics, illustrations, tables, execution graphics, brochures and other data that the Contractor must provide to have a part of the structure seen in detail.
- 1.6.4.3 Whenever shop drawings are required, the Contractor must provide to the Engineer before the start of the Work the shop drawings in three printed and digital copies, the description of the products and the indicated samples to the Engineer; they will become the property of the Client.
- 1.6.4.4 These drawings will have to be approved by the Engineer before each step of the work.
- 1.6.4.5 The Engineer's examination is limited to checking the compliance of the shop drawings with contractual documents for recommendation to the Client. The Engineer does not assume responsibility for the accuracy of the dimensions or details nor for the quantities.
- 1.6.4.6 When the shop drawings are resubmitted, inform the Engineer in writing of the revisions that were made, other than the revisions made at the request of the Engineer.
- 1.6.4.7 The Engineer reserves a period of five business days following receiving the shop drawings for their verification.



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- 1.6.4.8 Undertaking work for which the shop drawings, samples and product descriptions have not received the aforementioned approval is prohibited.
- 1.6.4.9 Work executed before approval of the execution plans will be at the Contractor's risk and can be refused, without cost to the Client.
- 1.6.4.10 The approval of the shop drawings does not discharge the Contractor from liability for errors that they may contain. Nor can it give rise to a claim for supplement from the Contractor unless the Contractor claims this supplement at the time of submitting the drawings for approval and receives the agreement of the Client in writing.
- 1.6.4.11 The submitted drawings must be shop originals prepared by the Contractor or its subcontractors, showing the portion of the work involved, the fabrication details, the disposition, and the details of installation or assembly called for in the sections relating to it.
- 1.6.4.12 The Contractor must clearly identify all the shop drawings and the details using sheet and sketch numbers from the Contract drawings.
- 1.6.4.13 The Contractor must provide the drawings in French and certified by the manufacturer for construction.
- 1.6.4.14 The drawings for non-catalog articles or materials must be made specifically for this project.
- 1.6.4.15 The shop drawings must include the following:
- Construction details, dimensions, weight and properties of equipment or materials accompanied by additional information such as notices, illustrations and exploded views of constituent parts. Promotional leaflets or publicity brochures are not accepted;
 - Charts, curves, capacities, yields and other technical data supplied by the manufacturers or requested by the Engineer concerning the operation of the equipment;
 - Wiring drawings, single-line drawings, high-level drawings, control drawings, operating sequences and all interconnections with other systems, when required;
 - Air, water, oil, fuel etc. circulation drawings, when applicable;
 - When several options are presented, arrows must clearly indicate the model and all options presented. Without such indications, the drawings will be returned for addition of such arrows.
- 1.6.4.16 The drawings will be returned with one of the following notations: "Verified", "Change and resubmit", "Provide indicated corrections" and "Refused."



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- Drawings marked “Verified” will not be the subject of any other measure. The Contractor may order its equipment in conformance with the contractual documents.
 - The drawings marked “Refused” will have to be redone and resubmitted for verification. The drawings do not comply with the contractual documents.
 - The drawings marked “Provide indicated corrections” do not need to be resubmitted. Subject to the indicated corrections, the drawings are compliant with contractual documents.
 - The drawings marked “Change and resubmit” will have to be resubmitted, in part or in whole, according to the indications, for verification. These drawings do not comply with the contractual documents.
 - Drawings marked “Provide indicated corrections” and “Change and resubmit” will have to be resubmitted in part or in whole, according to the indications on the drawings, for verification. Subject to the indicated corrections, the drawings are compliant with contractual documents.

1.6.4.17 The drawings will be prepared on sheets with the same format as those that will have been used for the drawings attached to the Contract.

1.6.4.18 The shop drawings will have to be drawn using the same system (metric) as the Engineer’s drawings.

1.6.4.19 The shop drawings must bear the nomenclature used in the drawings and specifications and each drawing must be verified, coordinated, dated and signed before being presented to the Engineer.

1.6.4.20 Without limitation, the shop drawings may include:

- Crushed stone and sand grain size distribution;
- Manholes, catch basins, culverts;
- Lines and accessories for connections;
- Temporary signage plans during the work;
- Other items of interest.

1.6.5 Limits of the Work Area

1.6.5.1 The Contractor is required to honor the official rights of way, lot limits and also the limits on rights of passage granted for execution of the work. The execution of the work must not infringe on the neighboring properties, unless indicated otherwise by a written notice from the Client. The Contractor must perform its work with the appropriate equipment and tools so as to minimize the impacts caused to the existing structures or facilities.

1.6.5.2 In the preparation of its work method, the Contractor will take care of obtaining additional easements that could result from it, unless the Client indicates



otherwise. For that purpose, the Contractor must provide the Engineer a copy of the written agreements made.

- 1.6.5.3 Any claim and injury caused in this regard are at the expense of the Contractor, who must cover the costs for the inherent repairs
- 1.6.5.4 Whatever the method used by the Contractor for performing the work, the repair of streets and/or land outside of the easements and/or work area which were damaged during the work or caused by the Contractor for maintaining access, transporting materials, moving equipment, digging trenches, etc. is not separately payable. These costs must be anticipated and distributed in the unit or flat rate prices of the Tender Price Table.

1.6.6 Leveling and Surveying

- 1.6.6.1 The Contractor must hire a qualified engineer and an outside geodetic-surveying firm in order to establish the existing (pre-project) conditions of the site (geotechnical studies and topographic readings including placement of physical markers for the lot limits) before beginning design work.
- 1.6.6.2 Once construction of portions of the Final Capping of the Site is completed, the Contractor must do the surveying and leveling of the location of the work and provide a scale drawing in AutoCAD® version indicating the new structures and those present before starting work. An Excel file version indicating the geodetic coordinates of the new structures and the infrastructure in place, all according to the MTM system.

1.6.7 Alignments and Levels

- 1.6.7.1 The alignments and levels are indicated on the plans. The Contractor must set up a reference system for giving the required elevations and alignments to its workers.
- 1.6.7.2 The general Contractor is solely responsible for laying out the project's footprint, taking all the measurements and handling the full coordination for it.
- 1.6.7.3 The consequences of erroneous footprints are at the expense of the Contractor. The Contractor must establish the list of points before the excavation work. The land's profile can be changed at the worksite for improving drainage. During layout of the footprint, there must be coordination and it must involve all participants
- 1.6.7.4 If, during execution of the Contract, the Engineer observes a difference in the footprints or profiles of the work, as established by the Contractor, the latter will have to correct the lines and levels according to the instructions given to it by the Engineer and rebuild any portion of works which was not done as provided for in the drawings and specifications. The Contractor must follow the instructions that will be given it by the Engineer and redo the defective works without recourse to additional payment because of errors it caused in the establishment of the level lines.



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- 1.6.7.5 If, during execution of its work, the Contractor observes an anomaly in the reference points, it must immediately notify the Engineer of it in order that the Engineer can verify it.
- 1.6.7.6 The Contractor must provide the Engineer technical information about the staking on the list provided for that purpose. These completed lists must be returned to the Engineer at least five business days before execution of the work.
- 1.6.7.7 The Contractor must also provide the Engineer any help needed so that the Engineer can verify the alignments and levels.
- 1.6.7.8 All works made without alignment and level, without verification or instruction from the Engineer or even without the surveillance of the Client's Representative will not be included in the progress estimates.
- 1.6.7.9 Throughout the work, the Contractor must carefully preserve and protect the benchmarks establishing the alignment and leveling. It may not remove them without authorization from the Engineer.
- 1.6.7.10 If there is a Contractual need, the Contractor must do the following tasks:
- The full surveying for the construction of the planned elements.
 - Surveying with lines and levels required for every 15 m length of elements to be built;
 - The leveling and also providing the Engineer technical information from the staking on standardized lists;
 - At the end of the work, the survey report for the elements as built.

1.6.8 Geodetic Benchmarks and Metes

- 1.6.8.1 The Contractor must protect the geodetic benchmarks and the land metes located near the Work, especially those previously put in place by the Client (see Appendix 1.5).
- 1.6.8.2 If a geodetic benchmark must be moved, the Contractor must notify the relevant authorities. The Contractor will have to cover the cost for moving it.
- 1.6.8.3 The Contractor must at its expense retain the services of a geodetic-surveyor for replacing the benchmarks, metes and surveyor monuments that are visible or shown on the drawings and made unusable subsequent to execution of the Work. The Contractor must include the services of a geodetic-surveyor in its tender prices.

1.6.9 Monitoring of the Construction Work

- 1.6.9.1 Monitoring
- 1.6.9.1.1 The monitoring of the Construction Work must be done by the Engineer.



1.6.9.1.2 In the situation where the Contractor subcontracts a part or all of the Construction Work to a Subcontractor in compliance with the Contract, the Contractor must assure that the monitoring of the work for which the subcontractor is responsible is taken on by the a representative of the Contractor and by the Engineer.

1.6.9.1.3 For this purpose, the Client reserves the right, at any time, to review any contract concluded with the Subcontractor relating to the Construction Work and require changes in it that it thinks necessary to the execution of the obligation provided for in the preceding paragraph, at the Contractor's expense.

1.6.10 Signage for Worksite Protection

1.6.10.1 The Contractor will take all necessary precautions, and will place and maintain sign panels, barricades and lighting necessary for the protection of individuals and vehicles during execution of the Work, all to the satisfaction of the Client or any other relevant authority.

1.6.11 Worksite Traffic and Signage

1.6.11.1 During the Work, the Contractor must mandatorily indicate with appropriate signage the most direct route to follow to go around the work sites. Additionally, it must reduce the length of the Work as much as possible so as to inconvenience the area residents as little as possible. The Contractor will be required to free up for traffic any portion or part of street where work is partially or entirely completed so as to reestablish normal traffic as quickly as possible.

1.6.11.2 The Contractor must assume full responsibility for any damage, delay or accident due to a defect or insufficiency of the signage for means of passage, whether temporary or not, that it makes available to the public. This responsibility also extends to any damage that, for one or another of these reasons, could affect the structure being executed.

1.6.11.3 If required in the execution of the present Contract, the Contractor must:

- Have its signage plan accepted by the Client or its Representative and also by the municipality at least five days before the beginning of work. If a portion of the work is done on a provincial route, the Contractor will have to submit this same signage plan to the MTQ at least five days before undertaking the work;
- Warn the police, fire and ambulance services;
- Warn the school bus services and agree with them on the measures to take or the alternate routes to follow during the time of the work;
- Provide and install at its cost adequate signage in the form of barricades, posters, appropriate signals, temporary traffic lights, etc.;



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- Install no parking signs in areas where parking is usually allowed. This installation must be done at least 24 hours before beginning work;
 - Warn the authorities in charge if cars are in violation during execution of the work. At the time of towing, the Contractor must confirm that a Client Representative is a witness. The towing fees for the vehicles must be covered by the Contractor. It is left to the responsibility of the Contractor to get reimbursement from the driver at fault.

1.6.11.4 The Contractor must follow the specific instructions from Section 4, Management of worksite Traffic and Signage, in particular instructions regarding the access to the Rang du Ruisseau for the transportation of materials and equipment.

1.6.12 Minor Works

1.6.12.1 The Contractor must do all the minor works which, even if it is not specified on the drawings and/or specifications are usual and necessary to the completion of the various work in the present Contract. The costs of this finishing work is included in the unit and fixed prices provided in the tender.

1.6.13 Quality and Warranty

1.6.13.1 The following text (Article 1.6.13) supplements Article GC3.13 "Warranty and Rectification of Defects in Work" from the General Clauses and Conditions of the Module GC3 "Execution and Control of the Work" (R2830D, latest version) of the Standard Acquisition Clauses and Conditions (SACC) of the PWGSC (buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual).

1.6.13.2 The Contractor warranties to the Client the good condition, compliance and, as applicable, proper operation of all Work and all materials that it supplies for a period of one year following substantial acceptance, unless additional warranties and different intervals are stipulated elsewhere in the Contract. This warranty covers both apparent defects and latent defects and as in addition to legal warranties.

1.7 MATERIALS

1.7.1 Substitution with Equivalent Materials

1.7.1.1 The following text (Article 1.7.1) supplements Article GC3.5 "Material" from the General Clauses and Conditions of the Module GC3 "Execution and Control of the Work" (R2830D, latest version) of the Standard Acquisition Clauses and Conditions (SACC) of the PWGSC (buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual).



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- 1.7.1.2 If trademarks are specified in the request for proposals document, they must be considered as representing the quality required for the equipment, measurement devices, and control and automation instruments. All equipment, measurement devices, and control and automation instruments equivalent to those specified by a trademark must be submitted to the Engineer for approval during the period allowed for the tender preparation by means of a written request for approval. The following information must be indicated in the request:
- The reasons for the substitution request;
 - The price of the material(s) and the supplier's name;
 - The price of the material(s) of its choice and the supplier's name;
 - The amount of the credit that it is offering the Client;
 - The consequences for the overall project, if any.
- 1.7.1.3 Establishing the proof of equivalence is entirely the responsibility of the Contractor and comprises the following:
- Supply the features, technical specifications and other useful information describing the proposed material;
 - Supply any other information, maintenance condition, test or report required by the Engineer.
- 1.7.1.4 These materials, processing equipment, measurement devices, and control and automation instruments must meet the criteria for compliance with the standards established in the Contract. The Engineer approves or rejects the substitutions.
- 1.7.1.5 The Contractor is responsible for delays that could be directly or indirectly caused by these substitutions.
- 1.7.1.6 In order for the base tender to be the same for all tenderers, the Contractor must present its tender with the products and quantities specified in the request for proposals document otherwise its tender could be rejected..
- 1.7.1.7 No substitute product requiring complex studies or major changes to the drawings or specifications will be considered unless the Contractor pays all costs.
- 1.7.1.8 Regarding materials or equipment specified as an option by the Contractor in the tender form, the Contractor may not present a substitution request after opening of tenders. Any such request will be automatically rejected by the Client.
- 1.7.1.9 The Contractor must reimburse all costs incurred to the Client and its Representative because of substitution requests according to the scale from the Québec Association of Consulting Engineers. This additional work includes without limitation:



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- The analysis of more than one equivalence request for one specified product or material;
 - The revision of request for proposal documents in order to adapt them to a change or equivalence request.

1.7.2 Bedding Materials for Lines and Underground Concrete Works

1.7.2.1 The Contractor is responsible for interpreting the results of the geotechnical study and/or engaging its own experts in order to anticipate the nature and thickness of the import fill to be used, for the purpose of obtaining a stable bed, considering execution constraints, its schedule (periods of work execution), the nature of the soils on-site and the water table level, etc.

1.7.2.2 In the presence of cohesive soils (e.g. clay, silty clay, etc.) in the bottom of the trench as is possibly the situation in the present Contract, the Contractor must use appropriate equipment in order to avoid reworking the materials under the bed. As needed, the Contractor must consider that the bed thickness for the lines indicated in the detail drawings is a minimum required thickness, and is so throughout the Project.

1.7.2.3 Notwithstanding the details and specifications in the drawings and specifications concerning the bedding for lines, manholes, drainage-chambers, catch basins and culverts, the Contractor must note that the use of net 20 mm diameter crushed stone covered with a geotextile membrane as a replacement for granular materials is allowed only after having obtained the authorization of the Engineer. This limitation aims to minimize the use of this material and to ensure that the usual drying methods were at least implemented, before authorizing this option, for stabilizing the cut bottom of the excavations (stable bed).

1.7.2.4 Despite this clarification, the costs of beds of granular materials and/or net crushed stone covered with a geotextile membrane remain included in the unit and/or flat price for excavation and backfill or trenching from the Tender Price Table.

1.7.3 Standards Compliance

1.7.3.1 Whatever the origin of the materials, equipment, instruments or devices, the Contractor must certify their compliance with the standards referenced in the documents.

1.7.3.2 All the steps and tests for certification of the materials, treatment equipment, measurement devices, and control and automation instruments are entirely the responsibility of the Contractor.



1.8 HEALTH AND SAFETY REQUIREMENTS

1.8.1 Worksite Safety

1.8.1.1 Refer to Article GC3.3 "Construction Safety" from the General Clauses and Conditions of the Module GC3 "Execution and Control of the Work" (R2830D, latest version) of the Standard Acquisition Clauses and Conditions (SACC) of the PWGSC (buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual).

1.8.2 Documents and Samples to be Submitted

1.8.2.1 Submit the following items to the Client's Representative:

- Project specific health and safety plan (refer to section 1.8.9), at least 15 days before starting the Work;
- Copies of guidelines or reports issued by the health and safety inspectors from the federal and provincial governments;
- Copies of incident and accident reports;
- Complete set of safety data sheets (SDS) and other documents required by the Workplace Hazardous Materials Information System (WHMIS);
- Emergency procedures, at least 15 days before starting Work;
- A weekly copy of the site inspection tables;
- All copies of training certificates which are required for application of the prevention program, in particular:
 - Health and Safety on Construction Sites Course;
 - Safety Agent card;
 - Workplace First Aid and CPR;
 - Work in confined spaces;
 - Wearing and adjusting personal protective equipment;
 - Safe driving of forklifts;
 - Elevating work platforms;
 - And any other training required by regulation or the prevention program;
- Engineer compliance plans and statements: the Contractor must send the CNESST and the Client's Representative a copy, signed and sealed by an engineer, of all plans and statements of compliance which are required under the Safety Code for the Construction Industry (S-2.1, r. 6), another law, another regulation or any clause from the specifications or Contract. A copy of these documents must be available on-site at all times.

1.8.2.2 The Client's Representative will examine the health and safety plan and the emergency procedures specific to the Site provided by the Contractor and return



its observations to the Contractor shortly after receiving the plan, for the start of construction. The Contractor must revise the plan accordingly and resubmit it to the Client's Representative during the kickoff meeting. The Contractor will have to revise the plan as needed and present it again to the Client's Representative for review when the Representative requests it.

- 1.8.2.3 Medical Monitoring: in places where a law, regulation or safety program calls for it, submit the certification of medical monitoring of the workers working on site, before starting work. Submit an additional certification to the Client's Representative for any new employee working on the worksite.
- 1.8.2.4 The health and safety plans and the revised versions are only submitted to the Client's Representative for their information and for reference purposes only. Submission of the plan must not:
- Be interpreted as implicit approval of the plan by the Client's Representative;
 - Be interpreted as a guarantee of completeness, accuracy and compliance with law;
 - Release the Contractor from its legal obligations to provide for health and safety during the project.

1.8.3 Responsibilities

- 1.8.3.1 The Contractor must assume the responsibility of Principal Contractor for the work performed under the present procurement and name a qualified coordinator who will provide for the coordination of health and safety activities for the site in compliance with the Occupational Health and Safety Act.

1.8.4 Workplace Health and Safety Coordinator

- 1.8.4.1 The health and safety coordinator must:
- Take responsibility for all workplace health and safety training sessions, and verify that only individuals who have successfully completed the required training have access to the Site for executing the work;
 - Take responsibility for the application, compliance in fine detail, and daily monitoring of the site-specific health and safety plan;
 - Be on-site during execution of the Work.

1.8.5 Terms and Conditions

- 1.8.5.1 The Contractor must provide for the installation of safety barriers and lighting systems around the Site and inside the perimeter of the Site, as needed, in order to provide for the safety of the site for the workers and the protection of individuals moving around it on foot or in a vehicle.

1.8.5.2 The Contractor must take care that unauthorized individuals do not get access to the construction zones delimited for this purpose inside the site.

- Provide appropriate measures: barriers, fences, posters, workers for verifying traffic, fixed lighting systems, etc.
- Handle securing the worksite at night or assigning a security guard as needed in order to prevent unauthorized site access.

1.8.6 Regulatory Requirements

1.8.6.1 Comply with the applicable laws, codes, rules, standards and regulation in order to provide for the safety of the activities performed on the site.

1.8.6.2 In case of discrepancies between the provisions of the aforementioned authorities, the strictest provision will apply. In case of disagreement as to what constitutes the most rigorous provision, the Client's Representative will decide what steps to take.

1.8.7 Work Permits

1.8.7.1 Before starting Work, the Contractor must see to obtaining the specialized permits required in connection with the project.

1.8.8 Production of the Project Notices

1.8.8.1 Before starting Work, the notice of worksite opening must be sent to the Commission des normes, de l'équité, de la santé et de la sécurité du travail du Québec (CNESST). A copy of this notice must be displayed in full view on the Site. During demobilization, the closure notice must be sent to the CNESST.

1.8.8.2 The Contractor must provide the Client's Representative a copy of the project notices before issuing them.

1.8.9 Health and Safety Plan

1.8.9.1 The Contractor must perform a Site-specific risk evaluation based on the examination of the contractual documents, required work and location of the work, and doing an inventory of the health risks and known and potential dangers.

1.8.9.2 The Contractor must establish a site-specific health and safety plan for the worksite and comply with it; the plan must in particular comprise the following items:

- Main requirements:
 - The Contractor's safety policy;
 - The description of the applicable obligations in terms of compliance;
 - The work related security procedures conform with the requirements of the most recent CNESST standards;



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- Evacuation procedures in case of a serious injury, including the itinerary to the closest hospital with regards to the Site ;
 - The establishment of responsibilities in safety matters and the project organization chart in this respect;
 - The general statement of the safety rules for the project;
 - The safe work methods for the project;
 - The inspection policies and mechanisms;
 - The policies and methods for reporting and investigating in case of incident;
 - The mechanisms of the health and safety committee and the assignment of delegates;
 - The health and safety meeting;
 - The methods for communication and archiving reports on health and safety;
- List of health risks and dangers inventoried after analysis of the risk evaluation, in light of the tasks and activities to be accomplished on the worksite in connection with the work.
 - List of Hazardous Materials intended to be used on the worksite in connection with the work.
 - Technical and administrative control measures to be implemented on the worksite for assuring management of inventoried risks and dangers.
 - List of personal protective equipment (PPE) for workers.
 - List of managers and substitutes assigned to worksite health and safety.
 - Required training and proposed training plan, including orientation for new workers.
- 1.8.9.3 The Contractor must prepare the plan in collaboration with all subcontractors and must make sure to bring the work and activities of subcontractors into the evaluation of the risks and to take them into account in the plan.
- 1.8.9.4 The Contractor must as necessary revise and correct the health and safety plan and resubmit it for the approval of the Client's Representative.
- 1.8.9.5 Examination by the Client's Representative: Examination of the health and safety plan by the Client in no way relieves the Contractor from its responsibility in case of error or omission in the final version of the health and safety plan, nor of its responsibility to meet all requirements stated in the contractual and construction documents.



1.8.10 Emergency Procedures

1.8.10.1 The Contractor must describe the operational measures and the interventions in case of emergency. Provide an evacuation plan and the name and contact information for the resource people in case of emergency (name, telephone number, etc.), including the following people:

- Designated employee from the Contractor;
- Agents from relevant and designated regulatory bodies under the applicable regulation;
- Resources for local interventions;
- Client's Representative.

1.8.10.2 The Contractor must include the following provisions in the emergency procedures:

- Inform the workers and the first responder of the nature and location of the emergency;
- Safely evacuate all workers;
- Verify and confirm the safe evacuation of all workers;
- Inform the fire department or other responders in case of emergency;
- Inform the neighboring residences or work locations which could be affected if the risk extends beyond the work site;
- Inform the Client's Representative.

1.8.10.3 The Contractor must provide written rescue and evacuation procedures, as needed, in particular for the following cases:

- Working from heights;
- Working in confined space or areas where there is a risk of crushing;
- Working with Hazardous Materials;
- Working underground;
- Working on, in, under and near water.

1.8.10.4 The Contractor must provide emergency procedures in case of drilling through a gas line or high-voltage line, a drinking water or sewer pipe, fiber optic cables or any other service, underground infrastructure or buried object that could pose a risk to the workers. These procedures must comply with the requirements in effect from the most recent standards from CNESST and the affected companies.

1.8.10.5 The Contractor must revise and correct, as needed, the emergency procedures and resubmit them for the approval of the Client's Representative.



1.8.11 Hazardous Materials

1.8.11.1 Satisfy the requirements of Section 3 of the present Technical Specifications for the management of hazardous materials, in addition the requirements from WHMIS, the Transportation of Dangerous Goods Act, and the Regulation respecting hazardous materials (Chapter Q-2, r. 32) for the use, storage and provision of dangerous products, and also for the labeling and affixing of safety data sheets according to methods acceptable to the Client's Representative and conforming to the Canadian Labor Code.

1.8.11.2 If it is impossible to eliminate the use of dangerous and toxic products:

- Inform the Client's Representative of the intended products before using them. Submit the applicable safety data sheets (SDS) and documents from WHMIS;
- With the help of the Client's Representative, plan the work during the hours when the site is unoccupied;
- Provide appropriate ventilation devices.

1.8.12 Electrical Safety Requirements

1.8.12.1 The Contractor must satisfy the requirements of the authorities and take care that all electricians working on new facilities or changes to existing facilities perfectly understand the circuits, and new and existing electrical equipment and their operation.

1.8.12.2 Before undertaking the work, the Contractor must coordinate the necessary turning on and turning off of existing and new circuits with the Client's Representative.

1.8.12.3 The Contractor must follow the safety procedures in matters of electricity and take all necessary precautions to provide for the safety of all the workers working in connection with this procurement and that of other employees working on the location.

1.8.13 Electrical Lockout

1.8.13.1 The Contractor must establish, implement and apply procedures aiming to carry out electrical lockout and provide for the health and safety of workers in all cases where it is necessary to work on a circuit or an electric facility.

1.8.13.2 The Contractor must produce the written lockout procedures, enumerating the stages step by step that the workers must follow including how to fill out and produce the request and authorization form. On request, submit the procedures to the Client's Representative for examination.

1.8.13.3 The Contractor must retain the documents and the lockout tags on the worksite and draw up the list of them in a journal throughout the procurement.



On request, make these data available to the Client's Representative or any authorized safety representative for consultation.

1.8.13.4 Overloads:

The Contractor is required to take care that no portion of the Work is subject to an overload which could lead to a safety risk or permanent damage.

1.8.14 Temporary Structures

1.8.14.1 The Contractor must design and build temporary works in compliance with the standard CSA S 269.1.

1.8.15 Scaffolding

1.8.15.1 The Contractor must design, build and maintain scaffolding in order to ensure its stiffness, security and safety in compliance with the CAN/CSA-S269.2 standard and with the provincial workplace health and safety regulations.

1.8.16 Confined Spaces

1.8.16.1 The Contractor must perform work in confined spaces in compliance with provincial regulations.

1.8.16.2 In the context of the present Contract, qualified labor of the Contractor could have to work in confined spaces. With reference to the Regulation Respecting Occupational Health and Safety the Contractor is completely responsible for the civil safety of all workers working on the worksite. For this purpose, the Contractor must make available to the worksite workers all instruments necessary in order to assure the safety of workers in confined spaces. To do that, the Contractor must make the following instruments available at all times: M40 Industrial Scientific type electronic gas detector or equivalent approved by the Engineer with remote sampling probe and integrated electric pump, safety harness, winch with tripod, lifeline, winder-unwinder equipped with a CSA certified anti-fall mechanism, guard rail, fan and related accessories.

1.8.16.3 The Contractor must make these equipments available to the representative of the Engineer at the worksite and do so on the first day of the beginning of work. Additionally, the Contractor must provide, as needed, the assistance of a manager having the required training, for any necessary action in confined spaces.

1.8.16.4 The Contractor must therefore include in the various articles of the Tender Price Table all these direct and indirect costs attributable to the work performed in confined spaces and the various aforementioned equipment.

1.8.17 Fire Safety and Hot Work

1.8.17.1 The Contractor must get authorization from the Client's Representative before performing welding, cutting or other hot work needing to be done on site.



1.8.17.2 Among other things, hot work includes cutting or melting done with a torch, the use of a flame heated kettle and any other open flame device and grinding with equipment producing sparks.

1.8.18 Unexpected Risks

1.8.18.1 If an unexpected risk or dangerous situation occurs during the Work, the work must be interrupted and the Client's Representative notified verbally and in writing without delay.

1.8.19 Communication and Display of Documents

1.8.19.1 The Contractor must take all necessary provisions to provide effective communication of health and safety information on site. Upon their arrival on the worksite, all workers must be informed of the specifics of the prevention program, their obligations and their rights. The Contractor must insist on the right of workers to refuse to perform a job if they think that this job could compromise their health, safety, physical integrity of that of other individuals present on site. It must keep a register on-site and up-to-date with the information transmitted and the signature of all workers who have received that information.

1.8.19.2 The Contractor must visibly display the following documents at various strategic locations on site.

- Health and Safety Plan;
- Work Scheduling;
- Emergency procedures;
- Site layout drawing, showing the layout of the site, the location of first aid stations, the evacuation routes and the rally points, and also the emergency transport measures;
- Project notices;
- Notice indicating the location on site where employees and workers can consult a copy of the Worker's Compensation Act and workplace health and safety regulations
- Documents from the Workplace Hazardous Materials Information System (WHMIS) used at work;
- Safety Data Sheets (SDS);
- List of names of the joint health and safety committee and/or the health and safety delegate, as applicable.

1.8.19.3 The Contractor must display all the Safety Data Sheets (SDS) on-site, in one common area, so that they can be easily consulted by all workers and in locations accessible to the occupants when the work for the procurement includes construction activities taking place near residential areas.



1.8.19.4 The posted documents must be protected from weather and visible from the street or from the outside of the construction worksite shelter provided for the workers and equipment, or according to indications approved by the Client's Representative.

1.8.20 Meetings

1.8.20.1 The Contractor must participate in the safety meeting before construction and at all subsequent meetings convened by the Client's Representative.

1.8.21 Correction in Case of Noncompliance

1.8.21.1 The Contractor must immediately attack noncompliance problems in health and safety matters indicated by the Client's Representative.

1.8.21.2 The Contractor must send the Client's Representative a written report of the measures taken in order to correct the noncompliant situations found that way.

1.8.21.3 The Client's Representative can order the discontinuation of work if the required corrective actions are not made in a reasonable time or in the time given. The Principal Contractor or the Subcontractors are held responsible for all costs related to an order to discontinue work.

1.9 ENVIRONMENTAL PROTECTION

1.9.1 Protection of the Environment and Bodies of Water

1.9.1.1 The Contractor will give particular attention to the protection of the environment and bodies of water, and it must comply with the modalities and specifications indicated in the Technical Specifications Section 3, "Management of Materials and Waste, and Protection of the Environment".

1.9.1.2 There must be no release into the environment of contaminants that could threaten life, health, safety, human well-being or comfort, cause damage or otherwise harm the quality of the soil, wildlife, vegetation or goods. The Contractor will have to prevent the release of any contaminant into the atmosphere or drains, waterways, ditches and gutters, and into the soil.

1.9.2 Control of Surface Water and Infiltration water

1.9.2.1 The Contractor is responsible for, at its expense, proceeding with management of surface water and infiltration water. It must direct these waters towards a pit or any other acceptable area approved by the Engineer. Also, the Contractor must make all necessary provisions to avoid affecting the water quality of the neighboring properties. The Contractor will refer to and follow the modalities of the Technical Specifications, Section 3, "Management of Materials and Waste, and Protection of the Environment".



1.9.2.2 In the presence of sediments in surface or infiltration water which will be pumped, the Contractor will have to provide basins or any other acceptable equipment approved by the Engineer for filtering the water before its treatment if required and its discharge towards a designated and approved area.

1.9.2.3 The Contractor will have to maintain and control the groundwater level in order to:

- Perform the work in full safety according to the CNESST regulation;
- Obtain the criteria for compaction of the beds and coverings specified in the plans and Technical Specifications;
- Execute the work without having occurrences of significant water in the excavations.

1.9.2.4 The choice of techniques for drying and water level control is completely the responsibility of the Contractor.

1.9.3 Management and Disposal of Excavation Surplus

1.9.3.1 The Contractor must manage and dispose of all excavation surplus and/or spoils at its cost according to the modalities from the Technical Specifications, Section 3, "Management of Materials and Waste, and Protection of the Environment" and according to the directives from the Client's Representative.

1.9.3.2 The surplus excavation materials made up of contaminated soils must be managed in compliance with relevant federal, provincial and municipal regulation, in particular:

- Division IV.2.1 of the Environmental Quality Act (EQA, LRQ c. Q-2);
- Land Protection and Rehabilitation Regulation (RPRT) (Q-2, r. 37)
- Regulation Respecting Contaminated Soil Storage and Contaminated Soil Transfer Stations (RSCTSC) (Q-2, r. 46)
- Guide - Soil Protection and Contaminated Sites Rehabilitation Policy (GIPSRTC) of the MDDELCC (Guide)
- Soil Protection and Contaminated Sites Rehabilitation Policy (PPSRTC, Policy)
- Site Characterization Guide (Site Characterization Guide);
- Environmental Analyses Sampling Guide (Sampling Guide)

1.9.3.3 The Contractor must dispose of all dangerous and non-dangerous Residual Materials resulting from the Construction Work off-site according to the guidelines of the Client's Representative and in compliance with the law. In particular, and without limitation:

- The Environmental Quality Act (EQA; LRQ c. Q-2).



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- Regulation respecting hazardous materials (Q-2, r. 32)
 - Regulation respecting the recovery and reclamation of discarded paint containers and paints (Q-2, r. 41).
 - Regulation respecting the recovery and reclamation of used oils, oil or fluid containers and used filters (Q-2, r. 42).
 - The Regulation Respecting the Dumping and Incineration of Residual Materials (REIMR) (Q-2, r. 19) In application of REIMER:
 - The Contractor must provide sufficient containers for storage of Residual Materials on a daily basis. The Contractor must establish an adequate management program for ensuring the confinement and disposal of waste material such as metal debris, used bituminous coating and concrete debris. As much as possible, this waste material must be separated at the source and recycled.
 - The Contractor must provide a management plan for Raw and Residual Materials whose elements must comply with applicable legislation, at all times, and which, without limitation, includes:
 - a. The Project's inventory of raw materials and Residual Materials;
 - b. The principles for selection and acquisition of raw materials;
 - c. The methods for handling and storage of raw materials and Residual Materials;
 - d. The methods for reusing, recycling, reclaiming or disposing of Residual Materials;
 - e. The methods for confining and disposing of waste material such as used bituminous coating and concrete debris. As much as possible, this waste material must be separated at the source and recycled;
 - f. The activities for environmental monitoring, control and tracking;
 - g. Contingency measures;
 - h. The process for incident declaration and investigation;
 - i. The program for revision and improvement of the Raw and Residual Materials Management Plan.

1.9.3.4 All surplus excavated material needing to be disposed of off-site, including Residual Materials, Hazardous Materials, dry materials and also contaminated or uncontaminated soil must be transported out of the location where the work is done to an authorized site. This site corresponds to an area conforming to current regulation. The Contractor itself must find this area and submit it to the Engineer for approval.

1.9.3.5 The Contractor must not place, pour or allow to escape onto the soil or into a body of water any organic or inorganic material such as, but without limitation, petroleum products or their derivatives, anti-freeze or solvents. These materials



must be recovered at the source and disposed of in a manner approved by the Client.

- 1.9.3.6 The Contractor must have the Client or its Representative approve all disposal sites for waste material or contaminated soil in advance.
- 1.9.3.7 In all cases, the Contractor must provide the Engineer written proof that the materials coming from the worksite were disposed of in an authorized location and that said authorized location is in fact authorized to receive them under current regulation. A soil and materials tracking system must be implemented during Work to ensure that off-site management of soil and materials is conducted according to applicable Rules of the Art and conform to the regulations in effect. This system, which is to be approved by the Client and the Ministry Representative must be permanent, indelible, un-editable, digital, encrypted, redundant, protected, confidential, and data must be acquired in real-time and visible at all time by the Client and the Ministry Representative.

1.9.4 Cleanliness and Rehabilitation of the Sites

- 1.9.4.1 Comply with requirements of Section 3 of the present Technical Specifications.
- 1.9.4.2 Be compliant with article 8 "Safety and cleanliness" of Part II "General Administrative Clauses" of BNQ 1809-900.

1.10 DOCUMENTS PRODUCED BY THE CONTRACTOR

1.10.1 General information

- 1.10.1.1 The content of each Manual must be adjusted depending on the work, works or equipment specified in the Technical Specifications. However, the conditions of this article must be met by the Contractor as to sections, principle and format of the Manuals.

1.10.2 Number of copies

- 1.10.2.1 Any document which needs to be prepared by the Contractor under the Contract must, unless indicated otherwise, be submitted to the Client in one printed copy and one electronic copy.

1.10.3 Revision by the Client or Engineer

- 1.10.3.1 At all times, the Client or the Client's Engineer can require a change to any document which is submitted to it by the Contractor, whether or not the contract specifies that this document be submitted by the Contractor for approval, acceptance, examination, revision or observations.

1.10.4 No Renunciation

- 1.10.4.1 Notwithstanding any other provision the Contract, the fact that the Client or Client's Engineer receives, revises, approves or accepts a document that the



Contractor is required to prepare under the Contract, comments on this document or requests the Contractor to modify it in no way changes the liability of the Indemnified People nor limits or reduces in any way whatsoever the liability or obligations of the Contractor under the Contract.

1.10.5 Documents from the Project Record

1.10.5.1 The Contractor must retain a set of contractual drawings and specifications on site in order to record the actual Site conditions conforming to the execution.

1.10.5.2 The Contractor must keep the drawings and specifications conforming to the execution up-to-date, in good condition and make them available for inspection by the Client's Representative at any time during the construction.

1.10.5.3 Drawings after execution (or as built drawings):

- Indicate all the changes, substitutions and differences compared to what appears in the contractual drawings or Technical Specifications using red ink on the drawings. Submit two sets of drawings to the Client's Representative. All drawings from both sets must bear the stamp "As Built Drawings", the date and signature of the Contractor.
- At a minimum, record the following information:
 - The horizontal and vertical location of underground services and related works linked to permanent service improvements;
 - The horizontal and vertical location of various elements relative to the geodetic reference point.
 - The location of related works camouflaged in the construction linked to visible and accessible elements from the construction;
 - On-site changes of dimensions and details;
 - Location of all services and plugged or terminated municipal services;
 - The set of elevations, sections and design details sized and marked in order to systematically report the state of the finished installations.

1.10.5.4 All the details produced during the Contract by the Client's Representative for adding or changing the elements from the design drawings must also be refined and sized for reflecting the as-built state and be attached to the as-built drawings;

1.10.5.5 All change authorizations issued during the term of the Contract must be entered in the final as-built documents, indicating with precision and uniformity the change state that applies to all affected drawing details.

1.10.5.6 Keep the as built documents up to date in step with the Contract progress. The Client's Representative will regularly perform examinations and inspections the documents. The frequency the examinations will be left to the discretion of the Client's Representative.



1.10.6 Corrected Shop Drawings

1.10.6.1 Compile a complete set of corrected shop drawings and data sheets covering the Project and supply a number of sets of shop drawings conforming to the requirements of section 1.10.5.3 of the Technical Specifications.

1.10.7 Update the Electronic Drawings

1.10.7.1 Please note that in addition to having to provide "red-lined" as-built documents, the Contractor must also perform, in compliance with the Contracts requirements, the service of modifying electronic drawings that were used to produce the contractual drawings.

1.10.7.2 The AutoCAD® drawing files must be changed so as to include the same as-built information in them as was required in the preceding articles, in order to produce printed as-built drawings.

1.10.7.3 Transfer all the as-built changes to the electronic files.

1.10.7.4 The digital information must be in the same format and the same order as the contractual documents and it must be submitted on CD-ROM, USB key or any other media providing an adequate transfer.

1.10.7.5 Submit the digital files of the as-built drawings to the Client's Representative.

1.10.8 As-built Drawings

1.10.8.1 At the latest two weeks following the end of the Work, the Contractor must submit to the Client the as-built drawings of the work involved which are explicitly requested from it in the Contract or that the Client thinks necessary for management and maintenance of this work.

1.10.8.2 All documents must be submitted to the Client, as a preliminary version, in two copies. After examination and acceptance of this preliminary version by the Client, the Contractor must produce the final version that it submits to the Client in three permanent copies. The preliminary copies will not be considered as permanent copies unless they were completely modified and they are identical to the permanent version.

1.10.8.3 The as-built drawings of the work involved must be bilingual in English and French.

1.10.8.4 For the Shop Drawings

- Bind a full set of corrected shop drawings for submission to the Client;
- Bind the shop drawings so that they correspond to the Technical Specification sections to which they relate;
- When large quantities of information are provided because of the size of the Project, fold and professionally bind the drawings in a separate binder with suitable dimensions.



1.11 COMPLETION OF THE CONSTRUCTION WORK

1.11.1 Substantial Performance

1.11.1.1 Notice of Substantial Performance

1.11.1.1.1 The Contractor must refer to article GC1.1.4 “Substantial Performance” in the General Clauses and Conditions of module GC1 “ General provisions – Construction services » (R2810D, most recent version) of the PWGSC Standard Acquisition Clauses and Conditions (SACC) (available online: buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual) for the requirements specific to the Substantial Performance. The following text completes the General Clauses and Conditions of the GC1 module.

1.11.1.1.2 When the Contractor thinks that the Construction Work are nearly completed, it must send the Client a noticed indicating the expected date for finishing the Construction Work which must be at least 30 days, but not more than 90 days after the date of the Notice of Substantial Performance.

1.11.2 Substantial Performance Report

1.11.2.1 After the Client receives the Notice of Substantial Performance, the Client’s Representative with the help of the Client’s Engineer, prepares a completion report for the works from the Project. The Completion Report describes the status of the equipment and works based on the Contract requirements relating to the Construction Work and describes all aspects or elements which are not compliant with these requirements. The Completion Report is based on an inspection of the works of the Project by the Client’s Representative and Client’s Engineer. It can also be based, as the Client’s Representative wishes, on Statements from the Designer, the Collection of Quality Related Recordings, the Verification Reports, the Final Construction Documents, any other document that the Contractor is responsible for preparing during the Construction Period under the Contract, or any other information thought pertinent by the Client’s Representative or Client’s Engineer.

1.11.3 Certificate of Substantial Performance

1.11.3.1 The Client issues the Certificate of Substantial Performance when the relevant reports have been submitted and approved, and when all elements included in the Work are compliant with all requirements from the Contract relative to the Work, subject to Minor Defects and the maintenance work related to seeding. The Certificate of Substantial Performance identifies all Minor Defects.

1.11.3.2 The Contractor must correct all Minor Defects within the time indicated in the Certificate of Substantial Performance. Upon the expiration of this time, the Client can have the Minor Defects corrected by the Person of its choice at the Contractor’s expense.



1.11.4 Certificate of Completion

- 1.11.4.1 The Contractor must refer to article GC1.1.5 “Completion” in the General Clauses and Conditions of module GC1 “ General provisions – Construction services » (R2810D, most recent version) of the PWGSC Standard Acquisition Clauses and Conditions (SACC) (available online: buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual) for the requirements specific to the Completion. The following text completes the General Clauses and Conditions of the GC1 module.
- 1.11.4.2 The Client issues the Certificate of Completion at the end of the period specified in the Certificate of Substantial Performance if he thinks that the Minor Defects cited in the Certificate of Substantial Performance have all been corrected to the satisfaction of the Client, or when vegetation is established over seeded areas to the satisfaction of the Client.
- 1.11.4.3 In order to rule on the condition of the works and deliver one or the other of the Certificates of Completion, the Client considers in particular the Completion Report, and also the opinions of the Client’s Engineer on the Substantial Performance and completion, as well as any other relevant document.

1.12 MEASUREMENT FOR PAYMENT PURPOSES

1.12.1 General

- 1.12.1.1 The bid prices for the items on the Tender Price Table must include the management, coordination, design, engineering, provision, storage, installation and maintenance of equipment, materials and hardware to complete the Work set out in these Technical Specifications. They must also include all labour and fees necessary to perform the work according to the requirements of these Technical Specifications and the Engineer’s instructions, including, but not being limited to, the following:
- the design and engineering required to complete the work indicated in these Technical Specifications with the exception of the Work related to the items described in section 1.12.2 for which the design and engineering is provided with the Technical Specifications;
 - the management, coordination and supervision of Construction Work, inspections and surveys, engineering, and adjustments and corrections necessary on the Worksite to ensure that the Work is executed according to the requirements of these Technical Specifications;
 - transportation of employees to and from the Worksite;
 - all that is needed to complete Work according to drawings and Technical Specifications, whether or not specific items are mentioned or listed on the drawings and Technical Specifications;



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- all that is necessary for tests and inspections as required to meet the requirements of these Technical Specifications;
 - all fees related to the management of materials that do not meet the requirements of the Technical Specifications, including but not limited to the loading, transportation and off-site management of rejected materials in accordance with the requirements of the Technical Specifications;
 - all costs associated with the on-site management of excess residual and hazardous materials, including but not limited to segregation, sieving, stockpiling and characterization in accordance with the requirements of the Technical Specifications;
 - all costs arising from the control and management of water on the site, including runoff water, snowmelt water, infiltrated water into the ground and water resulting from the Work (dewatering during excavation, drainage water from soil piles, etc.), including pumping, diversion, temporary dams, treatment and / or disposal;
 - the surveillance and guarding of all materials and equipment sent and present on the Site;
 - design, provision, installation, maintenance and dismantling of work platforms, protective bridging, scaffolding, catwalks and other means of access (temporary or permanent) to carry out and inspect the Work;
 - the provision of all contractual and professional documents required by the Technical Specifications, including, but not being limited to, the detailed schedule and updates, statutory declarations, signed and sealed "as-built" drawings, the various procedures, the compliance certificates and certificates not specifically included in any other payment item;
 - the implementation of environmental protection and site restoration measures including all labor, machinery, materials and other costs resulting from the application of the various measures presented in the Technical Specifications related to the protection of the environment, the protection of water bodies, the placement and disposal of cofferdams, the placing and disposal of sediment barriers, the disposal of soil and scrap issued from excavation, pumping, etc.;
 - Costs related to the compliance with article 8 "Safety and cleanliness" of Part II "General Administrative Clauses" of BNQ 1809-900;
 - Costs associated with the maintenance of public roads, including the cleaning of lanes that have been soiled by the passage of vehicles from the site using mechanical sweeper or other maintenance equipment;
 - Costs associated with moving and relocating obstacles;
 - The services of all the professionals required for the performance of the Work, including, but not limited to, the personnel explicitly required by this call for tenders;



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- the application and maintenance of the Safety and Prevention Program on the Worksite according to the requirements of this Contract;
 - obtaining all required permits, licenses and authorizations as well as insurance and bonds;
 - all financing costs, including interests on the contract holdback and warranty holdback;
 - all administrative costs and profit;
 - the contractual warranty;
 - all costs associated with the safe management of work areas and traffic on the Site and nearby areas;
 - all costs associated with maintaining traffic flow and signaling, including the number of signalers required in the signaling plan or by CNESST standards, the approval by the authorities, the management of traffic during the works, the layout of the spaces to allow the maintenance of the traffic flow, the restoration of the places at the end of the works and the withdrawal of the temporary signaling. In the event that the Contractor does not complete its work within the time prescribed or authorized by the Client, the additional days required by the Contractor for the maintenance of traffic and signaling are entirely at his expense.

1.12.1.2 The costs and expenses associated with the work, tests or any other element required by the Technical Specifications not explicitly stated in the items of the Tender Price Table must be included and distributed proportionally in the prices submitted in the Tender Price Table.

1.12.1.3 The Contractor shall be responsible for all associated repair costs and expenses resulting from a breakage that he or a subcontractor under his responsibility has caused to an existing infrastructure, an infrastructure to be installed, or any material or equipment, damage to a natural feature of the site to be preserved, as well as any costs resulting from omissions, resumption of work deemed non-compliant, return to suppliers and replacement of equipment found to be non-compliant, and additional costs caused by a postponement of work or a delay following a non-compliance with the requirements of the Technical Specifications

1.12.1.4 All quantities leading to a payment must be established from land surveys carried out jointly with the Engineer or the Client Representative. The Contractor is responsible for the coordination and implementation of these surveys for measurement for payment purposes, when required, and within a reasonable time frame. The quantities calculated for payment purposes must be established in compliance with nomenclature defined in the present Technical Specifications.

1.12.1.5 The Contractor is responsible for carefully reviewing the site prior to the preparation of its bid in order to become familiar with all the conditions existing on the Site, and to take these into consideration when developing the bid costs.



1.12.1.6 In addition to the requirements specified in article 1.12.1, items on the Tender Price Table must be measured for payment purposes in compliance with requirements described in section 1.12.2 of this section of the Technical Specifications.

1.12.2 Complementary Information for Measurement for Payment Purposes of the Works

1.12.2.1 Item A.1.1.1 General Mobilization(s) and Demobilization(s), Site preparation and Organization of the Worksite

1.12.2.1.1 The general mobilization(s) and demobilization(s) (as many times required by the Work), the Site preparation and the Organization of the Worksite are paid on the basis of a lump sum.

1.12.2.1.2 The bid price for this item shall include, but not be limited to, the following:

Temporary worksite installations and site preparation;

- Implementation of health and safety, circulation management, access control and environmental protection measures;
- the leasing of any property owned by third parties needed to perform the Work;
- locating and protecting, if necessary, all public utilities and other facilities owned by third parties;
- the initial environmental characterization of soil quality on which the worksite installations are to be setup;
- The transportation and installation on the Worksite of the equipment needed to perform the Work not specifically included under any other payment item;
- All work required to winterize or protect equipment and materials required to complete the Works, as well as partially completed work, in order to avoid any damage due to the winter season and/or a prolonged period of time;
- The storage of machinery, equipment, materials, accessories and tools in an appropriate location on the Worksite, as well as guarding whenever required;
- the transportation of materials to and from the Worksite that are not specifically included in any other payment item;
- the inspection of each phase of work;
- removal and disposal, not specifically included in any other payment item, of refuse such as waste and debris off the Worksite and to a designated place in accordance with these Technical Specifications;
- the dismantling and transportation out of the Worksite of equipment not specifically included in any other payment item;



- all the other Work mentioned in these Specifications and shown on the drawings and that is not included in the items above;
- the provision of all end-of-contract documents required in the Technical Specifications, including, but not being limited to, the final statutory declarations, the “as-built” drawings and any other document required by the Client to complete the Contract and that is not specifically included in any other payment item.

1.12.2.2 Item A.1.2.1 – Surface Grading and Preparation - Grubbing and Brush Clearing

1.12.2.2.1 Grubbing and brush clearing is measured for payment purposes per square meter (m²) of land that has been subject to grubbing and clearing Work as measured on the ground and as directed by the Engineer.

1.12.2.2.2 The bid price for this item shall include, but not be limited to, the following:

- grubbing and the clearing of vegetation above the ground surface;
- chipping and spreading removed vegetative material.

1.12.2.3 Item A.1.2.2 – Surface Grading and Preparation - Surface Grading

1.12.2.3.1 Surface grading is measured for payment purposes per square meter (m²) of land that has been subject to grading Work as measured on the ground and as directed by the Engineer.

1.12.2.3.2 The bid price for this item shall include, but not be limited to, the following:

- surface grading of the units according to the profiles and levels shown on the drawings;
- moving and re-using excavated materials in backfilling areas.

1.12.2.4 Item A.1.2.3 – Surface Grading and Preparation - Provision and Placement of Sand

1.12.2.4.1 The provision and placement of sand required (in excess of reused excavated materials) for surface grading of the units and installation of the drainage layer is measured for payment purposes per cubic meter (m³) of sand supplied and placed, as measured on-site and as directed by the Engineer. For verification purposes, weight tickets and transport manifests also needs to be delivered.

1.12.2.4.2 The bid price for this item shall include, but not be limited to, the following:

- the provision, delivery and dumping of sand required in areas needing a backfill for grading work;
- the provision, delivery and layout of sand required for creating the drainage layer;
- quality controls on the nature and characteristics of the sand;



- verifying the origin, the receipt and the destination of sand on Site by means of transport manifests and weight tickets and their delivery to the Engineer.
- the protection, maintenance and repair of the sand layer throughout the duration of the works and during the period of establishment of the vegetation providing protection against erosion.

1.12.2.5 Item A.1.2.4 – Surface Grading and Preparation - Creation of Ditches

1.12.2.5.1 Creation of new drainage ditches is measured for the purposes of payment per linear meter (m) of ditch created, measured on the ground and as directed by the Engineer.

1.12.2.5.2 The bid price for this item shall include, but not be limited to, the following:

- the excavation and installation of ditches according to the slopes, levels and profiles shown in drawings;
- loading, transport and re-use of excavated materials in areas requiring a backfill for grading work.

1.12.2.6 Item A.1.2.5 - Surface Grading and Preparation - Excavation and backfill of Anchor Trenches

1.12.2.6.1 The excavation and backfill of anchor trenches is measured for payment purposes per cubic meter (m³) of excavated and backfilled trench as measured on the ground and as directed by the Engineer.

1.12.2.6.2 The bid price for this item shall include, but not be limited to, the following:

- the excavation and installation of trenches according to the slopes, levels and profiles shown in drawings;
- loading, transport and re-use of excavated materials in areas requiring a backfill for grading work;
- the provision, delivery and layout of sand required for backfilling the trenches;
- quality controls on the nature and characteristics of the sand;
- verifying the origin, the receipt and the destination of sand on Site by means of transport manifests and weight tickets and their delivery to the Engineer
- backfilling of trenches with the required sand.

1.12.2.7 Item A.1.2.6 – Surface Grading and Preparation - Provision and Placement of Type 1 Geotextile

1.12.2.7.1 Provision and placement of Type 1 geotextile is measured for payment purposes per square meter (m²) of surface covered by geotextile as measured



on the ground and as directed by the Engineer. The calculation of the surface excludes the overlap between geotextile panels.

1.12.2.7.2 The bid price for this item shall include, but not be limited to, the following:

- the provision and placement of the geotextile;
- quality controls on the nature and characteristics of the geotextile.

1.12.2.8 Item A.1.3.1 – Biogas Ventilation System - Clean Stone

1.12.2.8.1 The 14–28 mm clean stone required around the vents of the biogas ventilation system is measured for payment purposes per metric ton (m.t.) of clean stone provided and placed as established by weight tickets and transport manifests.

1.12.2.8.2 The bid price for this item shall include, but not be limited to, the following:

- the provision, delivery and placement of the clean stone required around the vents of the biogas ventilation system;
- quality controls on the nature and characteristics of the clean stone.
- verifying the origin, the receipt and the destination of clean stone on Site by means of transport manifests and weight tickets and their delivery to the Engineer.

1.12.2.9 Item A.1.3.2 – Biogas Ventilation System - Provision and Placement of Type 2 Geotextile

1.12.2.9.1 The geotextile required around the vents of the biogas ventilation system is measured for payment purposes per square meter (m²) of geotextile in place as measured on the ground and as directed by the Engineer.

1.12.2.9.2 The bid price for this item shall include, but not be limited to, the following:

- the provision and placement of the geotextile;
- quality controls on the nature and characteristics of geotextiles
- the production and transmission of the required documentation.

1.12.2.10 Item A.1.3.3 – Biogas Ventilation System - Capture Lines

1.12.2.10.1 The capture lines of the biogas ventilation System are measured for payment purpose per linear meter (m) of laid pipe as measured on the ground and as directed by the Engineer.

1.12.2.10.2 The bid price for this item shall include, but not be limited to, the following:

- the excavation and backfilling of the trenches required to permit laying the capture lines in the drainage layer;
- the provision and placement of lines in the drainage layer;



- the provision of materials and equipment required for fitting;
- quality controls on the nature and characteristics of the capture lines.

1.12.2.11 Item A.1.3.4 – Biogas Ventilation System - Vents

1.12.2.11.1 Biogas ventilation system vents are measured for payment purposes per vent unit installed as shown on the Technical Specifications and as directed by the Engineer.

1.12.2.11.2 The bid price for this item shall include, but not be limited to, the following:

- the excavation of the hole required to lay the PVC lines;
- the provision, perforation and laying of PVC lines;
- the provision and installation of accessories, back plugs, elbows and fittings.

1.12.2.12 Item A.1.4.1 – Geomembrane – Provision, handling and storage

1.12.2.12.1 The provision, handling and storage of the textured 1 mm thick HDPE geomembrane are measured for payment purposes per square meter (m²) of surface to be covered by the textured geomembrane as measured in the drawings and as directed by the Engineer. The calculation of the surface excludes the overlap between geomembrane panels.

1.12.2.12.2 The bid price for this item shall include, but not be limited to, the following:

- the provision, handling, storage and installation of geomembrane panels;
- Assembly and welding at the Worksite;
- the required tests and quality controls;
- the production and transmission of the required documentation.

1.12.2.13 Item A.1.4.2 – Geomembrane – Lay out and assembly

1.12.2.13.1 Lay out and assembly of the textured, 1 mm thick HDPE geomembrane are measured for payment purposes per square meter (m²) of surface covered by the textured geomembrane as measured in the drawings and as directed by the Engineer. The calculation of the surface excludes the overlap between panels.

1.12.2.13.2 The bid price for this item shall include, but not be limited to, the following:

- installation of geomembrane panels;
- assembly and welding at the Worksite;
- the required tests and quality controls;
- the production and transmission of the required documentation.



1.12.2.14 Item A.1.4.3 – Geomembrane - Connection to the Pipes and Infrastructure

1.12.2.14.1 Connections to the pipes and infrastructure are measured for payment purposes per unit connection as measured on the ground and as directed by the Engineer.

1.12.2.14.2 The bid price for this item shall include, but not be limited to, the following:

- the provision of materials, equipment and labor needed to make the connections to the infrastructure;
- completion of connections as indicated in the drawings and different sections of the Technical Specifications;
- the required tests and quality controls;
- the production and transmission of the required documentation.

1.12.2.15 Item A.1.5.1 – Synthetic Drain – Provision, handling and storage

1.12.2.15.1 The provision, handling and storage of the synthetic drain are measured for payment purposes per square meters (m²) of surface to be covered by the synthetic drain as measured in the drawings and as directed by the Engineer. The calculation of the surface excludes the overlaps between synthetic drain panels.

1.12.2.15.2 The bid price for this item shall include, but not be limited to, the following:

- the provision, handling and storage of synthetic drain rolls;
- the required tests and quality controls;
- the production and transmission of the required documentation.

1.12.2.16 Item A.1.5.2 – Synthetic Drain – Lay out and assembly

1.12.2.16.1 The lay out and assembly of the synthetic drain are measured for payment purposes per square meter (m²) of surface covered by the synthetic drain as measured in the drawings and as directed by the Engineer. The calculation of the surface excludes the overlaps between synthetic drain panels.

1.12.2.16.2 The bid price for this item shall include, but not be limited to, the following:

- the installation of synthetic drain panels;
- assembly at the Worksite by means of fasteners;
- the required tests and quality controls;
- the production and transmission of the required documentation.

1.12.2.17 Item A.1.6.1 – Protective and Drainage Layer - Sand

1.12.2.17.1 The sand required for installing the protective layer is measured for payment purposes per cubic meter (m³) of sand supplied and placed as measured on



the Site and as directed by the Engineer. For verification purposes only, weight tickets and transport manifests have to be supplied.

1.12.2.17.2 The bid price for this item shall include, but not be limited to, the following:

- the provision, delivery and layout of sand required for creating the protective layer;
- quality controls on the nature and characteristics of the sand;
- verifying the origin, the receipt and the destination of sand on Site by means of transport manifests and weight tickets and their delivery to the Engineer;

- the protection, maintenance and repair of the sand layer throughout the duration of the works and during the period of establishment of the vegetation providing protection against erosion.

1.12.2.18 Item A.1.6.2 – Protective and Drainage Layer - Clean Stone

1.12.2.18.1 The 14–28 mm clean stone required for the placement of the drainage layer at the base of the cell slope is measured for payment purposes per metric ton (m.t.) of clean stone provided and placed as established by weight tickets and transport manifests.

1.12.2.18.2 The bid price for this item shall include, but not be limited to, the following:

- the provision, delivery and placement of the clean stone required around the vents of the biogas ventilation system;
- quality controls on the nature and characteristics of the clean stone.
- verifying the origin, the receipt and the destination of clean stone on Site by means of transport manifests and weight tickets and their delivery to the Engineer.

1.12.2.19 Item A.1.6.3 – Protective and Drainage Layer - Type 1 Geotextile

1.12.2.19.1 Provision and placement of Type 1 geotextile is measured for payment purposes per square meter (m²) of surface covered by geotextile as measured on the ground and as directed by the Engineer. The calculation of the surface excludes the overlap between geotextile panels.

1.12.2.19.2 The bid price for this item shall include, but not be limited to, the following:

- the provision and placement of the geotextile;
- quality controls on the nature and characteristics of the geotextile.

1.12.2.20 Item A.1.7.1 - Topsoil



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- 1.12.2.20.1 Topsoil required on the surface of the final cap is measured for payment purposes per cubic meter (m³) of topsoil provided and put in place as measured on the ground and as directed by the Engineer.
- 1.12.2.20.2 The bid price for this item shall include, but not be limited to, the following:
- the provision, delivery and placing of topsoil on the surface of the final cap;
 - quality controls on the nature and characteristics of the topsoil;
 - verifying the origin and receipt of soil by means of transport manifests and weight tickets and their delivery to the Engineer;
 - the protection, maintenance and repair of the topsoil layer throughout the duration of the works and during the period of establishment of the vegetation providing protection against erosion.
- 1.12.2.21 Item A.1.8.1 – Circulation Roads - Crushed Stone
- 1.12.2.21.1 The 0–56 mm crushed stone required for the development of the circulation roads is measured for payment purposes per metric ton (m.t.) of crushed stone provided and placed as established by weight tickets and transport manifests.
- 1.12.2.21.2 The bid price for this item shall include, but not be limited to, the following:
- the provision, delivery, placement and compaction of the crushed stone required;
 - quality controls on the nature and characteristics of the crushed stone.
 - verifying the origin, the receipt and the destination of clean stone on Site by means of transport manifests and weight tickets and their delivery to the Engineer.
- 1.12.2.22 Item A.2.1 - Culvert
- 1.12.2.22.1 The supply and installation of a new culvert in accordance with the Technical Specifications and with the approval of the Engineer are paid on the basis of a lump sum.
- 1.12.2.22.2 The Contractor is responsible for estimating the required quantities of materials based on the drawings provided and the Technical Specifications.
- 1.12.2.22.3 The Contractor must respect the limits of the work indicated in the tender documents and on the plans.
- 1.12.2.22.4 The bid price for this item must include, but not be limited to:



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- The preparation and submissions of all documents required in the Technical Specifications for the construction of the culvert;
 - The supply and installation of type V geotextile membrane at various work locations;
 - The installation of cofferdams, including the removal of fish if necessary, dewatering of the isolated ditch section and the removal of the cofferdams at the end of the work;
 - The installation of a temporary land retaining structure, including but not limited to:
 - the preparation of a shoring plan signed and sealed by an engineer;
 - the provision and installation of the temporary land retaining structure along the Rang du Ruisseau for the purpose of protecting the roadway;
 - the dismantling of the temporary land retaining structure at the end of the work.
 - Excavation, including but not limited to:
 - the removal of trees identified on the drawing;
 - the excavation down to the levels and invert indicated on the drawings and in the Technical Specifications and in accordance with the provisions of the CNESST Construction Safety Code;
 - the use of a bucket with flattened or flared teeth not more than 15 mm apart;
 - management of excavated materials and scrap according to the requirements of the Technical Specifications;
 - the preparation and layout of the granular foundation;
 - compacting the infrastructure;
 - all of the above according to the dimensions, the levels and the slopes indicated on the standard detail of the drawings and the other prescriptions specified in the Technical Specification.
 - The supply of a reinforced concrete culvert including but not limited to:
 - a reinforcement plan for the culvert with reinforcement of the upper slab for granular backfill limited to a thickness of 300 mm, signed and sealed by an engineer;
 - the supply and transportation of a 5 m x 3 m rectangular culvert, 18 m in length, consisting of lower and upper half sections, 1.6 m wide;
 - cut-off walls and low walls;
 - metal fasteners between sections;



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- gaskets and waterproofing membranes covering joints between sections.
 - Installation of the culvert, including but not limited to:
 - laying and compaction of the granular support cushion, including the geotextile membrane;
 - the provision of a crane with sufficient lifting capacity for the safe placement of each culvert section;
 - the laying of the lower sections, including the assembly and installation of sealing systems between each section and the construction of the cut-off walls;
 - the laying of the upper sections, following the installation of the simulated bed, including the assembly and installation of sealing systems between each section;
 - the laying and compaction of the lateral embankment with granular material up to the limit of the infrastructure;
 - all of the above according to the dimensions, the levels and the slopes indicated on the standard detail of the drawings and the other prescriptions specified in the Technical Specification.
 - The supply of crushed stone, including but not limited to:
 - the supply and transport of MG-20 granular materials for the foundation and backfilling of the culvert and the foundation of the roadway, according to the thicknesses indicated on the drawings;
 - the supply and transport of MG-56 granular materials for the sub-foundation of the roadway, according to the thicknesses indicated on the drawings.
 - Provision of simulated bed material, including but not limited to:
 - the supply and transport of granular materials in accordance with the Technical Specifications.
 - The placement of granular material for the simulated bed, including but not limited to:
 - laying, shaping according to the profiles shown on the drawings and compaction of the granular material constituting the simulated bed;
 - the fit between the profile of the simulated bed and the natural profile of the stream at each end of the culvert.
 - Road pavement, including but not limited to:
 - the laying, shaping and compaction of the granular material constituting the pavement, including the geotextile membrane according to the thicknesses indicated on the drawings;



- the transition according to specifications when connecting with the existing foundation.
- The supply and placement of stone (rip rap), including but not limited to:
 - the supply, transport and placement of granular materials according to the size and dimensions described in the Technical Specifications;
 - the price must also include the cost of supplying and installing the type V geotextile membrane.
- Dismantling and disposing of a section of the guardrail, including but not limited to:
 - the removal and disposal of semi-rigid slides, wooden poles and end devices;
 - the supply and installation of a new end device, in accordance with the Technical Specifications at the location indicated on the drawings.

1.12.2.23 Item A.2.2 - Fencing

1.12.2.23.1 Fencing is measured for payment purposes per linear meter (m) of fencing as measured on the ground and as directed by the Engineer.

1.12.2.23.2 The bid price for this item shall include, but not be limited to, the following:

- the provision, delivery, and installation as well as warranties for the concrete, fences, locks and chains, panels and barriers required in these Technical Specifications.
- All work required for the installation of the posts of the fences and barriers, including without being limited to drilling, the excavation and backfilling;
- the provision of all end-of-contract documents required in the specifications, including, but not being limited to, final statutory declarations the “as-built” drawings and any other document required by the Client to complete the Contract and that is not specifically included in any other payment item.

1.12.2.24 Item A.2.3 - Seeding

1.12.2.24.1 Seeding is measured for payment purposes per square meter (m²) of land that has-been seeded, as measured in the field and as directed by the Engineer.

1.12.2.24.2 The bid price for this item shall include, but not be limited to, the following:

- the preparation of surfaces to be seeded according to the Technical Specifications;
- hydraulic seeding according to the requirements of this Technical Specifications;



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- Maintenance and protection work of the seeded areas according to the requirements of this Technical Specifications.
- 1.12.2.24.3 If additional costs are incurred by modifications required by the Client to the seed mixture following topsoil analysis results, the Contractor shall provide the Engineer with a written proof provided by the supplier indicating the price supplement at the source of supply. The Contractor is only compensated for the price supplement at the source of supply.
- 1.12.2.24.4 The bid price must also include any maintenance work and resumption of seeding requested by the Client under the requirements set out in the Technical Specifications.
- 1.12.2.25 Item A.2.4 - Dismantling the existing palisade
- 1.12.2.25.1 The dismantling of the existing palisade is paid on the basis of a lump sum.
- 1.12.2.25.2 The bid price for this item shall include, but not be limited to, the following:
- the dismantling of the palisade including the removal of the structures of the palisade and the excavation of the bases of the posts and the anchors of the palisade;
 - carrying out the work in accordance with the requirements of the Technical Specifications, including the requirements of section 3 and the mitigation measures presented in Appendix 1.4;
 - off-site management and disposal of excavated material and materials from the dismantling of the palisade in accordance with the requirements of the Technical Specifications;
 - the completion of the dismantling work in two phases, if required, a first phase corresponding to the culvert development work, and a second one carried out as part of or following the Final Capping of the Site works;
 - The provision of all the contractual documents required in the technical specifications for this work, including without limitation proofs for the proper disposition of the materials.





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**Public Services and
Government Services Canada**

**Implementation of environmental
mitigation measures at the former
Contrecoeur landfill**

**ANNEX A
TECHNICAL SPECIFICATIONS**

REFERENCE: R.078691.200

July 2019

**STANDARDS, CODES,
REGULATIONS, AND LAWS
SECTION 02**

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2.1 GENERAL REQUIREMENTS

2.1.1 General Information

2.1.1.1 The Work must be carried out in compliance with the requirements of the Appropriate Authorities as well as the requirements set out in these Technical Specifications.

2.1.2 Applicable Standards and Codes

2.1.2.1 In a general and non-exhaustive manner, the most recent version of the standards and codes published by the following organizations apply to this Contract:

- National Plumbing Code;
- Canada Labour Code;
- Construction Code of Québec;
- Standards of the Bureau de Normalisation du Québec (BNQ);
- American National Standards Institute (ANSI);
- Canadian Standards Association (CSA);
- American Society for Testing and Materials (ASTM);
- American Standards Association (ASA);
- Canadian Government Specification Board (CGSB);
- Underwriters Laboratory (UL);
- Underwriters Laboratory of Canada (ULC);
- American Water Works Association (AWWA);
- Occupational Safety and Health Administration (OSHA);
- Workplace Hazardous Materials Information System (WHMIS)
- International Organization for Standardization (ISO);
- Applicable local codes and regulations as well as municipal orders;
- National Fire Code (NFC);
- National Fire Protection Association (NFPA);
- Code de plomberie du Québec;
- Cahier des charges et devis généraux (CCDG);

2.1.2.2 The Contractor must also comply with the requirements of municipal guidelines regarding norms and standards for infrastructure design if applicable.

2.1.2.3 When different codes and standards are in opposition, apply the stricter requirement of the code, regulation, standard or specification to the project.



The proposed equivalent standards must be equal to or more restrictive than the standards listed above.

2.1.3 Federal laws and regulations

- 2.1.3.1 The Contractor must meet the requirements of the Contract relating to the protection of the environment, including those falling under the following laws and policies:
- 2.1.3.2 The Contractor must comply with, without necessarily limiting himself or herself to, the latest versions of the following applicable federal laws and regulations:
- Fisheries Act;
 - Transportation of Dangerous Goods Act;
 - Canadian Environmental Protection Act;
 - Canada Water Act;
 - Controlled Products Regulations;
 - Canada Occupational Health and Safety Regulations.

2.1.4 Provincial laws and regulations

- 2.1.4.1 In the absence of federal regulations, or when specified in these Technical Specifications, or for work off-site (e.g.: disposal of residual materials, contaminated soil, hazardous materials, etc.), the Contractor must comply with, without necessarily limiting himself or herself to, the latest versions of the following applicable provincial laws and regulations:
- Act respecting occupational health and safety (R.S.Q. Chapter S-2.1)
 - Environment Quality Act (EQA) (R.S.Q. c. Q-2);
 - Building Act (R.S.Q. c. B-1.1);
 - Act respecting the conservation and development of Québec's wildlife and its regulations (L.R.Q., c. C-61.1);
 - Forest Act (L.R.Q., c. F-4.1);
 - Petroleum Products Act and Regulations (L.R.Q., c. P-30 .01);
 - Protection Policy for Québec's Banks, Coastlines and Floodplains (Q-2, r. 35);
 - Regulation respecting hazardous materials (RRHM) (Q-2, r. 32);
 - Regulation respecting the landfilling and incineration of residual materials (RRLIRM) (Q-2, r. 19);
 - Regulation respecting contaminated soil storage and contaminated soil transfer stations (RRCSSCSTS) (Q-2, r. 46);
 - Land Protection and Rehabilitation Regulation (LPRR) (Q-2, r. 37);



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- Regulation respecting the quality of drinking water;
 - Regulation respecting the quality of the atmosphere;
 - Regulation respecting industrial and commercial establishments;
 - Regulation respecting pressure vessels;
 - Provincial laws relating to worker compensation and associated regulations.

2.1.5 Technical guides, guidelines and other reference documents

2.1.5.1 The Contractor must perform the work in accordance with practices that are recognized and accepted in the industry and by the Appropriate Authorities, unless specific requirements are described in these Specifications. To do so, the Contractor must comply with, without necessarily limiting himself or herself to, the latest versions of the following applicable technical guides:

- Guidance Manual for Environmental Site Characterization in Support of Environmental and Human Health Risk Assessment from The Canadian Council of Ministers of the Environment (CCME);
- Canadian Environmental Quality Guidelines from the CCME;
- Canadian Drinking Water Guidelines from Health Canada;
- Guidelines for Watercourse Crossings in Quebec (Fisheries and Oceans Canada);
- Guide d'intervention - Protection des sols et réhabilitation des terrains contaminés (GIPSRTC) from the Ministry of Sustainable Development, Environment and the Fight against Climate Change (MDDELCC);
- Site Characterization Guide (Characterization Guide) from the MDDELCC;
- Sampling Guides for Environmental Analysis (Sampling Guides) from the Centre d'expertise en analyse environnementale du Québec (CEAEQ);
- Criteria for water quality in Québec from the MDDELCC.

2.2 IMPLICATIONS AND LIMITATIONS

2.2.1.1 Documents related to the standards, codes, regulations, and laws mentioned in these Specifications are an integral part of the tender documents, as if they were reproduced here in full.

2.2.1.2 It is the bidder's responsibility to obtain these documents, read them, and take them into account when preparing the bid while also taking into account the various changes that have been made and that are described in the various sections of these Technical Specifications.





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July 2019

**MATERIALS AND WASTE
MANAGEMENT AND ENVIRONMENTAL
PROTECTION
SECTION 03**

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3.1 GENERAL

3.1.1 Scope of Work

3.1.1.1 The Contractor is responsible for the environmental protection and restoration measures described in this section.

3.1.1.2 The environmental clauses in the present specifications equally apply to any temporary work carried out within Work boundaries.

3.1.2 Regulatory Obligations

3.1.2.1 In addition to the provisions of the Cahier des charges et devis généraux (CCDG) - Infrastructures routières - Construction et réparation (the most recent version from the Ministère des Transports du Québec), the Contractor shall meet the following requirements relating to environmental protection, including those from the laws and policies presented in Section 2 of the Technical Specifications.

3.1.2.2 The Contractor is responsible for compliance with federal and provincial laws as well as all regulations regarding the quality of the work environment and environmental protection.

3.1.3 Contractor Obligations

3.1.3.1 During work, the Contractor must comply with the standards set in the Cahier des charges et devis généraux (CCDG) - Infrastructures routières - Construction et réparation, which is on Publications du Québec website (www.publicationsduquebec.gouv.qc.ca) (most recent version, ministère des Transports du Québec)

3.1.3.2 The Contractor must use methods to minimize environmental impact.

3.1.3.3 For the duration of the Contract, the Contractor must ensure that any person under its jurisdiction takes all necessary environmental protection measures. He or she shall take them into account in all work methods.

3.1.3.4 The Contractor shall ensure that the person assigned to the work has been informed of the presence of watercourses, wetlands, sensitive areas and mitigation measures planned to protect these areas, including those stated in Appendix 1.4, as well as the rules of conduct associated with them.



- 3.1.3.5 For all planned work and activities beyond the limitations of the work in this Contract and which are subject to one or more regulations under the control of a public body, it is the Contractor's responsibility to obtain certificates of approval and permits required to carry out its work from these organizations. Upon request, the Contractor shall provide the Client with a copy of these documents.
- 3.1.3.6 The Contractor and any person under its jurisdiction shall refrain from using pesticides, herbicides and insecticides unless they obtain prior consent from the Client and the appropriate authorities. In all cases, the products used must be biodegradable. The use of chlorinated hydrocarbons is prohibited.

3.2 USE AND MAINTENANCE OF HEAVY MACHINERY

3.2.1 General

- 3.2.1.1 The Contractor is responsible for making sure that service manuals are present inside every vehicle circulating on-site.
- 3.2.1.2 The Contractor is responsible for limiting the movement of heavy equipment in work areas. Heavy machinery must use the most direct route between two (2) points of travel, while respecting the mitigation measures prescribed for the environmental protection of the site and presented in Appendix 1.4.
- 3.2.1.3 The Contractor must choose the construction machinery necessary to carry out the work according to the peculiarities of the environment and its fragility.
- 3.2.1.4 The Contractor shall use equipment in good working order to avoid accidents and fuel, oil and grease leaks, and, whenever necessary, provide documentary evidence of good usable conditions of the equipment.
- 3.2.1.5 The Contractor must repair construction machinery and faulty vehicles as quickly as possible.
- 3.2.1.6 General maintenance (including washing machinery), mechanical inspection, handling contaminants and fueling vehicles shall be performed in sites intended for these purposes that are more than 30 meters from aquatic environments and under continuous supervision. This distance replaces the 15 meters stipulated in article 10.4.3.1 of the CCDG. Provide a supply of absorbent materials and well-identified airtight containers intended for storing oil residues and waste on site. If it is physically impossible to maintain this distance, an enclosure confined to an absorbent pad must be installed to allow activities that risk contaminating the environment.
- 3.2.1.7 Emission control systems shall be operative and meet the standards of air quality regulations.



- 3.2.1.8 Keep machinery away from watercourses as soon as it is no longer being used.
- 3.2.1.9 All machinery is forbidden from driving in wetlands or aquatic environments except in cases where work has been planned in these environments. In these circumstances, work must be completed in accordance with the authorizations issued under the various laws and regulations.

3.3 ON SITE EROSION CONTROL

3.3.1 General

- 3.3.1.1 The Contractor is solely responsible for choosing the water control technique it will use while work is carried out. However, this technique shall comply with the requirements of the ministère de l'Environnement et de la Lutte aux changements climatiques (MELCC) and the ministère de l'Énergie et des Ressources naturelles (MERN). It shall particularly take into account, but without limiting itself to, the standards, laws and regulations listed above and in Section 2 of these technical specifications.
- 3.3.1.2 The Contractor shall set up and maintain in good condition all necessary installations used to prevent erosion and sedimentation (e.g. membranes, fabrics, geotextiles, straw bales, sedimentation basins, filter berms, canvas over sumps, covering of moderate and steep slope surfaces with mulch, stabilization mats or erosion blankets, deviation channels for surface water run off above bare slopes, and sediment traps at the bottom of embankments and so on).
- 3.3.1.3 In accordance with article 10.4.3.5 of the CCDG and before beginning work, the Contractor shall present the Engineer with the methods it intends to use for limiting erosion on the site. If work is suspended during winter, preventive soil stabilization work shall be completed according to the requirements of plans and specifications.
- 3.3.1.4 In addition to the requirements of article 10.4.3.5 of the CCDG, the Contractor shall plan work to limit the suspension of materials likely to be eroded and transported to a nearby watercourse.
- 3.3.1.5 As work is completed, all altered areas must be permanently stabilized.
- 3.3.1.6 Any pile of materials not consolidated for a period longer than 24 hours, including access roads located along the shoreline of a watercourse (distance of 20 m), shall be protected from erosion with a geotextile membrane or a similar membrane approved by the Client in order to avoid the transportation of sediment to a watercourse or a water body.



3.4 DUST CONTROL

3.4.1 General

- 3.4.1.1 For the duration of the Work, the contractor shall use recognized control methods to avoid or limit the production of dust and smoke as well as any air pollution at the site as well as along the Rang du Ruisseau. He shall control excess dust that can be harmful to traffic and keep it at a level below the threshold established in article 12.4 of the CCDG.
- 3.4.1.2 Use a firmly attached tarp or enclosed truck during transport of any fine materials that can generate dust.
- 3.4.1.3 When conditions so require, the surface is initially treated with water free of suspended solids, applied with a pressure distributor which must not damage the surface course.
- 3.4.1.4 When required by the Client Representative, calcium chloride is used in addition to water as a dust control liquid only following the Engineer's approval. The requirements for these products must comply with the requirements of article 12.4 of the CCDG and standard NQ 2410-300.
- 3.4.1.5 No dust control liquid other than water shall be spread within 30 meters of aquatic environments.

3.5 NOISE CONTROL

3.5.1 General

- 3.5.1.1 The Contractor shall take the necessary measures to make as little noise as possible and respect noise levels specified in article 46 of the municipal regulations of Contrecoeur (rule no 726-2003 (RM-CTR-203)). In all cases, the Contractor should focus on the reduction of noise at the source. The Contractor is obligated to not authorize or allow any action or activity creating noise that is not required to fulfill their contract.
- 3.5.1.2 The machinery used for work must be equipped with effective mufflers or sound attenuators in good working condition.
- 3.5.1.3 The following provisions are applicable only in the absence of requirements that are more stringent or taking precedence as stated in the municipal regulations:



- The Contractor shall take the necessary measures to protect the peace and sleep of residents near the construction site in the evening (between 7 pm and 10 pm) and at night (between 10 pm and 7 am). The reference noise level at a given hour, as defined by the memorandum of instruction 98-01 on noise from the MELCC, must be equal to or less than 45 dBA or the level of background noise in the absence of the construction site if it is greater than 45 dBA. This limit must be respected in all places whose use is residential or equivalent (hospital, institution, school, and so on).
- For work in the evening (between 7 pm and 10 pm), when the constraints are such that the contractor cannot not perform the work within the above-mentioned noise level, the Contractor shall make a claim for an waiver with the Client. Despite the approval of the waiver, the reference noise level during a given hour shall not exceed 55 dBA. Overnight (between 10 pm and 7 am), no waiver is possible except in cases of emergency or absolute necessity.

3.5.1.4 To the extent possible, any operation of generators, or other equipment with high sound levels must stop after 7 pm. If an electric distribution network is available close to the work site, the Contractor must provide the electrical connections needed for the Hydro-Québec network.

3.5.1.5 If it is impossible to connect the equipment to the power grid and the use of equipment at high noise levels is necessary after 7 pm and 10 pm, the Contractor must warn nearby residents at least 48 hours in advance and take the necessary steps to reduce the impacts caused by the noise as much as possible.

3.5.1.6 At the request of the engineer, the Contractor shall construct a temporary structure to insulate against noise from all stationary equipment (e.g., generators).

3.6 ENVIRONMENTAL PROTECTION

3.6.1 Submittals

3.6.1.1 At least 15 days before the start of the Work and delivery of materials and equipment to the Site, the Contractor shall submit an environmental protection plan to the Client and the Engineer for review and approval.

3.6.1.2 The plan shall present a comprehensive overview of known or potential environmental issues that need to be addressed and resolved during Work.



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- 3.6.1.3 The actions included in the environmental protection plan must be presented with a level of detail that corresponds to the environmental problems, mitigation measures presented in Appendix 1.4 and the Work to be performed.
- 3.6.1.4 The environmental protection plan shall include but is not limited to the following:
- the names of the individuals ensuring adherence to the plan.
 - the name and competencies of individuals responsible for the manifests for the removal of waste and hazardous materials from the worksite.
 - the name and competencies of individuals responsible for training worksite personnel.
 - a description of the training program for the personnel assigned to environmental protection.
 - a prevention plan for erosion and sediment transport indicating the measures that will be taken, including work supervision and the production of reports in order to check compliance of measures with federal, provincial and municipal regulations and laws.
 - drawings showing the location of temporary excavations or worksite roads with embankments, watercourse crossings, materials, structures, sanitary facilities, surplus materials or soiled material storage; drawings illustrating the methods used to control runoff and to contain the materials on the worksite.
 - plans for traffic management, including measures to reduce erosion of the temporary road platforms by construction vehicle traffic, particularly in wet weather.
 - a map of the Work area showing the activities planned in each part of the work area and indicating restricted and prohibited use areas. This plan must include measures to mark the boundaries of usable areas and protection methods of features that must be preserved within authorized work areas.
 - the spill emergency plan shall include the procedures to implement in case of a spill, guidelines to follow, measures put in place to contain the spill, cleaning of seepage and contaminated surfaces, and reports to file in case of a spill of a controlled substance.
 - a disposal plan for residual materials, including the disposal methods and locations for these materials and debris from cleanup work.
 - an air pollution prevention plan outlining measures to retain dust, debris, materials and waste within the worksite.



- a contamination prevention plan indicating potentially dangerous substances that will be used on the worksite, measures planned that prevent these substances from being suspended in the air or being introduced into the ground as well as details about measures that will be taken to ensure that the storage and handling of these substances comply with federal, provincial and municipal laws and regulations; the contamination prevention plan must also indicate the proposed precautions in order to minimize environmental risks related to grading, profiling, excavating or drilling work in waste materials (dangerous or not) as well as proposed measures in cases where dangerous goods are unearthed so that handling, storage, transport and disposal of such waste materials comply with federal, provincial and municipal laws and regulations; the prevention plan must also indicate precautions to take in order to minimize environmental risks related to excavation, grading, levelling or drilling work in waste material (hazardous or not) as well as measures to be taken in the event of hazardous material discovery so that manipulation, storage, transport and disposal of such material comply with federal, provincial and municipal laws and regulations.
- an implementation plan for the mitigation measures presented in Appendix 1.4.
- a water management plan indicating the methods followed and procedures implemented for the management and evacuation of water directly resulting from construction activities, for example the water pumped from excavations;
- a designation and protection plan for wetlands and historical, archaeological, cultural and biological resources, if necessary
- a pesticide treatment plan to be implemented and updated as needed

3.6.2 Accidental Contaminant Spills

3.6.2.1 The Contractor shall provide a spill prevention and response system and identify the responsible individuals and authorities as well as the procedure to follow in case of an environmental emergency. In case of spill, the Contractor must notify Urgence-Environnement and Environment Canada. The emergency procedure and the following phone numbers must be posted in the worksite office:

URGENCE ENVIRONNEMENT

1-866-694-5454

(24 hours a day)

and

Environment Canada

1-866-283-2333

- 3.6.2.2 In addition, if the spill occurs in a watercourse or a water body that is a municipal water source, the municipality shall be contacted as soon as possible.
- 3.6.2.3 At least one spill recovery kit shall be available on site at all times. The content of the kits must be adapted to the nature of the dangerous products used on site. Recovery kits and their locations must be well identified.
- 3.6.2.4 In compliance with article 10.4.2 of the CCDG, this kit should include spill absorbent socks, absorbent rolls, sphagnum moss as well as containers and related accessories (gloves, and so on) essential for dealing with small-scale accidental spills to ensure the recovery and storage of the contaminated material, and the management of contaminated soils and materials. For this case where work takes place near an aquatic environment, the kit must include sufficient absorbent rolls to take action over the width of watercourses such as a creek or a ditch, to confine a spill within a water body or to confine the petroleum products inside the perimeter of the machinery in question. The kit must be easily accessible at all times for a quick response.
- 3.6.2.5 The Contractor must not throw, dump or spill any organic or inorganic materials or petroleum products and their derivatives (antifreeze or solvent) on the ground or in the water. These materials must be recovered at the source and removed in compliance with the laws, policies and regulations of the MELCC.
- 3.6.2.6 In accordance with article 21 of the Environment Quality Act, the Contractor must, in case of the accidental presence of a contaminant in the environment, take all possible measures to stop contamination. In addition, the spilled products must be recovered.

3.6.3 Fires

- 3.6.3.1 Fires and burning waste or other materials on the worksite are prohibited.
- 3.6.3.2 The Contractor must take the necessary measures to ensure the work supervision and fire protection according to provided guidelines.

3.6.4 Notice of Non-Compliance

- 3.6.4.1 A written notice of non-compliance will be issued to the Contractor by the Client Representative every time that a non-conformity is observed to a law; a federal, provincial or municipal regulation or a permit; or any other component of the environmental protection plan implemented by the Contractor.



- 3.6.4.2 After receiving a notice of non-compliance, the Contractor must propose as soon as possible corrective measures to the Client Representative, and they must be implemented also as soon as possible after obtaining the latter's written approval.
- 3.6.4.3 The Client Representative will issue a stop Work order the until satisfactory corrective measures are taken.
- 3.6.4.4 No deadline extension and no adjustments will be given for stopping work.

3.7 TREE PROTECTION AND REMOVAL

3.7.1 Protection of forested areas

- 3.7.1.1 Tree protection work must be completed in compliance with section 11.2.7 of the CCDG.
- 3.7.1.2 Trees or shrubs present in wooded areas identified on drawing R_078691-S03-P001 in Appendix 1.1 must not be affected by the Work.
- 3.7.1.3 Machinery must not drive within a radius of five (5) metres of protected trees and shrubs.
- 3.7.1.4 When this minimum distance cannot be maintained, fit the trees and shrubs with a protective wooden cage with a height of 2 meters from the ground. In the absence of snow, spread a non-woven geotextile membrane, and place a 200 mm thick soil cushion on top. All this must be removed at the end of work.
- 3.7.1.5 If the Contractor determines that certain protected trees or shrubs are too restrictive for accessing and carrying out work, he can move them and put back them in place once work has been completed. However, the Contractor must submit this method for approval by the Engineer at least three (3) days before the start of the works. In addition, the Contractor must guarantee the survival of trees and shrubs for a period of two (2) years after the provisional acceptance of the Work.
- 3.7.1.6 When part of the root system of a protected tree or shrub is accidentally cut, the Contractor shall have a portion of the branches pruned by a specialist approved by the Engineer, in order to maintain growth and survival of the tree or shrub.



3.7.1.7 The Contractor is responsible for any damages caused to protected trees and shrubs. When damages occur, the Contractor must replace each damaged tree or shrub with a tree or shrub of the same species and size, unless specified otherwise by the Client. In the case of a large tree (more than eight (8) meters in height), replace with a tree of the same species 150 mm in diameter and 8 meters high. In the case of a large tree (more than eight (2) meters in height), replace with a tree of the same species 65 mm in diameter and 2 meters high. The Contractor must guarantee the survival of trees and shrubs for a period of two (2) years after the provisional acceptance of the Work.

3.7.1.8 Adequately mark and protect sensitive areas located in or near the work area.

3.7.2 Tree Removal

3.7.2.1 Unless given notice by the Client, no trees may be removed on the Site. However, grubbing and clearing work must be carried out prior to Final Capping of the Site as specified in article 23.2.3.2 of Section 23. Residue from grubbing and clearing work must be managed in compliance with article 3.8 of this section unless otherwise advised by the Client or the Client Representative.

3.7.2.2 In the event of the need to cut down a tree, the Contractor must manually cut down the tree and dispose of trunks, branches and stumps in an authorized site. Unless otherwise specified, cut down trees outside the nesting period, either before the May 1st or after August 15th.

3.7.2.3 On the Engineer's recommendation, pruning or other care necessary for tree protection must be carried out by a specialist approved by the Engineer.

3.8 MANAGEMENT OF WASTE AND RESIDUAL MATERIALS

3.8.1 General

3.8.1.1 Waste and residual materials discussed in this section include without limitations dry materials, building materials (asphalt surfacing, cement concrete, wood, steel and so on) or demolition materials and all other solid waste, including residue from grubbing and clearing work. Residual materials (hazardous or non-hazardous) resulting from the reprofiling operations described in Section 23 of the Specifications must be managed in accordance with Section 3.9 of the Technical Specifications.

3.8.1.2 The Contractor becomes owner of these waste and residual materials and must dispose of them in compliance with applicable laws, standards and regulations.



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- 3.8.1.3 The Contractor must promote the 3RV principle (reuse, recovery, recycling and valorization).
- 3.8.1.4 The Contractor shall submit the work methodology and the recommended management technique for waste and residual materials generated during Work for approval by the Engineer. The Contractor must prescribe a work methodology that enables optimizing of waste and residual materials management and minimize their off-site disposal. If waste and residual materials must be temporarily stored on Site, the areas designated for this purpose by the Contractor must be approved by the Client. Off-site transport of waste and residual materials must be carried out in watertight dump trucks covered with tarps to prevent the release of dust and particles during transport while following applicable regulations and standards.
- 3.8.1.5 The management and disposal of waste and residual materials must be performed in compliance with the Regulations Respecting Solid Waste (Q-2, r. 13); Regulation Respecting the Landfilling and Incineration of Residual Materials (Q-2, r. 19); Regulation Respecting Hazardous Materials (Q-2, r. 32); Protection Policy for Lakeshores, Riverbanks, Littoral Zones and Floodplains (Q-2, r. 35); and if necessary, the Environment Quality Act (R.S.Q., c. Q - 2) as well as applicable municipal regulations.
- 3.8.1.6 The disposal of waste and residual materials must be performed at sites authorized by the MELCC and according to the nature of these materials. The Contractor must seek prior approval by the Client of all waste and residual materials disposal sites.
- 3.8.1.7 It is prohibited to dispose of used oil, water loaded with suspended or volatile materials, such as the mineral spirits or oil and paint thinners, by dumping them into streams, ditches, stormwater sewers or sanitary sewers. These materials must be discarded outside the worksite and disposed of at sites authorized by the MELCC and the Client.
- 3.8.1.8 In addition to the requirements of article 11.4.7 of the CCDG and the requirements regarding municipal regulations, the Protection Policy for Lakeshores, Riverbanks, Littoral Zones and Floodplains (Q-2, r.35) as well as the Act Respecting the Preservation of Agricultural Land and Agricultural Activities, it is forbidden to dispose of any residual materials in wetlands, such as ponds, marshes, swamps and bogs.



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- 3.8.1.9 The Contractor shall remove all hazardous materials from the Site not resulting from the work described in Section 23 in compliance with the requirements of WHMIS, the Regulation Respecting Hazardous Materials (Q-2, r. 32) of the Environment Quality Act (R.S.Q., c. Q-2), the Regulation Respecting the Recovery and Reclamation of Discarded Paint Containers and Paints (Q-2, r. 41), the Regulation Respecting the Recovery and Reclamation of Used Oils, Oil or Fluid Containers and Used Filters (Q-2, r. 42) and the Regulation Respecting the Landfilling and Incineration of Residual Materials (REIMR) (Q-2, r. 19). Hazardous materials should be disposed of in sites authorized by the MELCC.
- 3.8.1.10 Do not accumulate waste in the worksite within 30 meters of waterbodies and at least 60 meters, if they contain or may contain contaminants.
- 3.8.1.11 Volatile waste must be deposited in covered metal containers designed for this purpose and based on the nature of the waste. These wastes must be removed from the worksite at the end of the day and be disposed of in compliance with the laws, standards and regulations in effect.
- 3.8.1.12 Fires and the burning of waste at or near the worksite are prohibited at all times.
- 3.8.1.13 The Contractor must provide written evidence that waste from the worksite was disposed of in the places authorized by the Engineer. The Contractor must provide the Engineer with written proof that the hazardous materials coming from the Site have been placed in a facility authorized by the MELCC, and have been monitored by the traceability system set up by the Contractor in accordance with the requirements of these Technical Specifications.

3.9 EXCAVATED MATERIALS MANAGEMENT

3.9.1 Soil and residual waste management

- 3.9.1.1 The on-site management of soil, hazardous and residual waste resulting from the works, including but not limited to the excavation required for the culvert construction (Section 22) and the reprofiling work (Section 23), is the sole responsibility of the Contractor. It must be carried out in compliance with the laws and regulations in effect. At least fifteen (15) days before the start of the works, the Contractor must submit the methodology they intend to use for the management of excess excavated material (soil and/or residual or hazardous waste) to the Engineer for approval. This methodology should take into account the following requirements:
- 3.9.1.1.1 The Contractor must prescribe a work methodology that enables optimizing the reuse of excavated material in areas requiring backfilling if these excavated materials meet the requirements of the Technical specifications.

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- 3.9.1.1.2 Excavation and reprofiling materials not considered reusable according to the requirements of these specifications with approval from the Engineer, must be managed on-site in compliance with the Regulation respecting the burial of contaminated soils (Q-2, r. 18), the regulations of the Land Protection and Rehabilitation Regulation (LPRR) (Q-2, r. 37), the Regulation respecting hazardous materials (RHM) (Q-2, r. 32), the Regulation Respecting Contaminated Soil Storage and Contaminated Soil Transfer Stations (Q-2, r. 46), and the Intervention Guide - Soil Protection and Contaminated Sites Rehabilitation and Environmental Analyses Sampling Guides.
- 3.9.1.1.3 Excavated materials deemed non-reusable that must be disposed of off site shall be temporarily piled in a materials storage area that has been predetermined by the Contractor. The contractor shall submit a plan showing the location and dimensions of the materials storage area for approval to the Engineer before the start of Work.
- 3.9.1.1.4 Managing the excavated materials in the temporary storage area should be carried out in such a way as to allow segregation, sorting and sieving according to their nature, environmental quality and content in the residual materials. Storage conditions must be created so that contaminated excavation materials cannot be the cause of water, air or underlying soil contamination.
- 3.9.1.1.5 The Contractor shall install a geomembrane (0.75 mm thick low-density polyethylene) in the lower part of the temporary storage area. The excavated materials must be deposited in a pile (maximum thickness of 1.8 meters) and covered with said geomembrane, unless otherwise specified by the Client. The overlap of the joints must be at least 600 mm.
- 3.9.1.1.6 The Contractor must take all the necessary precautions (e.g., ditch, trenchwork, etc.) to avoid contact between runoff and the pile of excavation materials in the temporary storage site.
- 3.9.1.1.7 Sampling from piles of non-reusable excavation materials must be carried out in compliance with the most recent versions of the Environmental Analyses Sampling Guides and the Site Characterization and Policy Guide. Samples taken must be analyzed by a laboratory accredited by the MELCC, taking their content into account and in compliance with Laws.
- 3.9.1.1.8 At the request of the Client or the Client Representative, the Contractor must conduct soil sampling before excavation to determine soil quality and disposal method.



- 3.9.1.1.9 The Client Representative reserves the right to counter-check these analyses. If differences are found between the Contractor and Client Representative's analyses, the latter can request that the Contractor re-sample and re-analyse one or several piles.
- 3.9.1.1.10 The assessment of the residual materials content in the excavation materials shall be done by the Contractor's laboratory or any specialized firm approved by the Client Representative. Analysis reports must be provided to the Client Representative. The number of tests must comply with the latest versions of the Environmental Analyses Sampling Guide.
- 3.9.1.1.11 If required, the Contractor will use the sieving of materials to segregate the residual materials in order to meet regulatory requirements and the requirements of the sites authorized for the disposal of excavation materials. The use of sieving and the method used is at the discretion of the Contractor, but the Client or the Client Representative may require segregation or sieving in order to optimize the management and costs associated with disposal.

3.9.2 Hazardous Material Management

- 3.9.2.1 The definition of "hazardous materials" is that of the Regulation Respecting Hazardous Materials (Q-2, r 32) of the Environment Quality Act (R.S.Q., c. (Q - 2)).
- 3.9.2.2 The Contractor shall not leave containers and empty packaging having contained dangerous goods on site.
- 3.9.2.3 The Contractor shall not store and handle hazardous products near bodies of water and wells.
- 3.9.2.4 The Contractor must clearly identify hazardous materials and educate workers on how to use them.
- 3.9.2.5 All materials and dangerous products must be transported safely while adhering to the regulations and standards in effect. Off-site transport of hazardous materials must be carried out in trucks or containers that prevent the release of dust and particles during transportation while following applicable regulations and standards.
- 3.9.2.6 Installation and dismantling of all temporary fuel tanks must follow the Petroleum Products Regulation (P - 30.01, r.1).
- 3.9.2.7 The Contractor must place cans or containers containing hydrocarbons and other dangerous products in a bin or between berms with the ability to collect 110% of stored reserves.



3.9.2.8 The Contractor must use a steel double-wall tank truck to transport petroleum products.

3.9.2.9 Fires and the burning of hazardous products are prohibited.

3.10 WATER MANAGEMENT

3.10.1 General

3.10.1.1 At all times, Work must be completed in a way that minimizes the volume of water that needs to be managed. The Contractor must particularly avoid or minimize excavation during periods of heavy rain. They must also minimize the size of excavated areas when possible by backfilling as work progresses.

3.10.1.2 Effluents from the Work (e.g., excavation dewatering, drainage from temporary residual material stockpiles, etc.) must be temporarily stored in water tight containers and treated before their release in ditches on the periphery of the site or off-site disposal.

3.10.1.3 The Contractor must provide the necessary facilities (tanks or any other acceptable equipment approved by the engineer) to store and treat water on a continuous basis, depending on the flow rates and volumes for the work in question.

3.10.1.4 The treatment equipment must allow to meet the surface water quality criteria from the MELCC if water is discharged into in ditches on the periphery of the site.

3.10.1.5 The Contractor must demonstrate to the Client the effectiveness of its treatment prior to discharge of treated water into the environment. To do this, he must pump and treat water that needs to be managed, store it temporarily in a container that he must provide for this purpose and have the raw water analyzed by an accredited laboratory and submit the results to the Client. The demonstration of effectiveness and the selection and installation of the equipment necessary for treatment must be made in a way that minimizes the impact of water management on Work progress.

3.10.1.6 In order to monitor the continued effectiveness of temporary treatment equipment used during the Work, the Contractor must prepare and submit for approval by the Client a sampling program for the water treated by this equipment and being discharged into the environment. If water was to be disposed off-site, the Contractor must present to the Engineer documentary evidence that it was disposed to a site approved by the MELCC and that it underwent a recognized traceability program.



3.11 BACKFILL MATERIAL

3.11.1 General

- 3.11.1.1 Guidelines for backfill material are presented in Section 11 of these technical specifications.
- 3.11.1.2 Adding any backfill not resulting from Work and not from the Site must be done in accordance with what is prescribed in the Soil Protection and Contaminated Sites Rehabilitation Policy of the MELCC. Unless specific authorization of the relevant authorities is granted, the materials used for construction must be free of contamination.
- 3.11.1.3 Granular material used for the construction of structures should not come from the bed of a water body or its banks or from a source located within 75 meters of an aquatic environment (creek, river, pond, lake or sea).

3.12 WORK ON BANKS IN AQUATIC ENVIRONMENTS OR WETLANDS

3.12.1 Definitions

- 3.12.1.1 "Bank" is a strip of land bordering water bodies and watercourses and extends inward from the high water line. The width of the protected shoreline is measured horizontally.

The Bank is at least 10 meters:

- When the slope is continuous and less than 30 %, or;
- When the slope is greater than 30 % and is more than 5 meters in height.

The bank is at least 15 meters:

- When the slope is continuous and greater than 30 %, or;
- When the slope is greater than 30 % and is more than 5 meters in height.

- 3.12.1.2 The high water line is located at the natural high water line, i.e.:

- At the place that transitions from a predominance of aquatic plants to a predominance of land plants, or if there are no aquatic plants, to the place where the land plants stop in the direction of water. Plants that are considered aquatic plants are all hygrophytes, including submerged plants, plants with floating leaves, emergent plants and emergent herbaceous and woody plants characteristic of marshes and wetlands continuous with bodies of water;
- When there is a water retention structure, at hydraulic structure's maximum operating level for the part of the body of water located



upstream;

- When where there is a legally erected retaining wall, starting from the top of the structure.

When unable to determine the high water line from the previous criteria, it can be located, if the information is available, at the two(2)-year flood line, which is considered equivalent to the line based on the botanical criteria above.

3.12.1.3 Aquatic environments include regular or intermittent creeks, ponds, rivers and lakes.

3.12.1.4 Wetlands include ponds, marshes, swamps and bogs.

3.12.2 General Information for Work on Banks, in Aquatic Environments or in Wetlands

3.12.2.1 In addition to the requirements of article 10.4.3.5 of the CCDG, the Contractor must submit its work method for the work on banks, in a watercourse or wetland to the Engineer at least two (2) weeks before beginning work. The Contractor's work method will also be submitted to Fisheries and Oceans Canada for approval.

3.12.2.2 Work on the coast and the shorelines of the waterbodies defined in the Protection Policy for Lakeshores, Riverbanks, Littoral Zones and Floodplains (Q 2, r. 35) are prohibited unless they have been the subject of an authorization issued by a provincial or federal body in the framework of the present work. Similarly, any intervention in a humid environment (ponds, marshes, swamps, bogs) is subject to prior authorization.

3.12.2.3 The Contractor must make the arrangements and build installations necessary to avoid having material or materials pollute watercourses or constitute substances or materials that are harmful to life in water sources.

3.12.2.4 The Contractor shall take all necessary measures to avoid any pollution or degradation of streams, shores, coasts or floodplains.



- 3.12.2.5 The duration of work on banks, in water courses and in wetlands must always be minimized.
- 3.12.2.6 Work must follow the Guide environnemental des travaux en milieu aquatique dans les projets d'assainissement et d'infrastructures from the MELCC.



- 3.12.2.7 The Contractor must clearly identify work areas and avoid having machinery drive beyond these boundaries.
- 3.12.2.8 By taking all necessary precautions, the Contractor must avoid transporting fine particles beyond work areas directly into a watercourse or involving the exposure or the disturbance of nearby soils (within 15 meters of the watercourse). The work must meet the requirements of article 3.3 (controlling erosion on the worksite) of this section.
- 3.12.2.9 In General, for all the work done on banks and in watercourses, the Contractor must ensure that the area will be returned to a state similar to the original state and that the bed of the watercourse regains the same grain size and profile as before the intervention, unless otherwise advised by the Engineer.
- 3.12.2.10 Structures that prevent erosion and turbidity (geotextile membranes, geomembranes, sandbags and so on.) must be removed last.

3.12.3 Work on Banks

- 3.12.3.1 The Contractor shall choose a method minimizing the duration of work on banks, and interventions on banks in the natural state should be kept to a minimum. The Contractor shall take all the necessary measures to protect and conserve existing vegetation cover.
- 3.12.3.2 Work on banks must be done at periods of low water.
- 3.12.3.3 No earth moving operations or excavation work shall be carried out on banks during periods of flood or heavy rain.
- 3.12.3.4 Avoid allowing machinery to drive outside work boundaries by clearly identifying work areas on banks.
- 3.12.3.5 In addition to the requirements of section 7.11 of the CCDG, the Contractor must return banks that have been affected by work to their natural state. The return to its natural state must meet the following requirements:
- All debris and all equipment must be removed.
 - Everywhere where the banks will be affected, restore the slope of the embankment to a 1V:2H ratio or less. If it turns out to be impossible to reconstruct a 1V:2H slope, it will be necessary to stabilize the shore using riprap according to the requirements given by the engineer.
 - The grading must be done to preserve the relief as it was before work and



must allow water to flow naturally, as it did before the work.

- 3.12.3.6 Existing vegetation must be protected. All surfaces of the banks affected by work will have to be stabilized using recognized techniques of plant engineering and that take into account erosion sensitivity, instability, the slope and the height of the embankment and according to the area's native species in order to recreate conditions similar to the natural environment.

3.12.4 Work in Aquatic Environments

- 3.12.4.1 Work in water courses must be carried out in compliance with the Protection Policy for Lakeshores, Riverbanks, Littoral Zones and Floodplains (Q 2, r. 35) while taking into account the municipal regulations in effect and in compliance with the requirements of any authorization issued by a provincial or federal body in the framework of the work in question.
- 3.12.4.2 The Contractor shall submit its method for working in watercourses in writing for approval by the engineer within a period of two (2) weeks before the start of work. If required by the complexity of the project, the opinion a government authority is solicited during the work method evaluation process. In the present case, the Contractor's method for working will also be submitted to Fisheries and Oceans Canada for approval.
- 3.12.4.3 The Contractor shall notify the Engineer at least forty-eight (48) hours in advance before beginning work in an aquatic environment.
- 3.12.4.4 Unless you have permission to drive on the bed of a watercourse as provided for in the working method accepted by the Engineer, keep the machinery on land for the duration of work.
- 3.12.4.5 No machinery may drive in watercourses or within a watercourse crossing structure if it is underwater.
- 3.12.4.6 All temporary structures placed in watercourses must conform to the requirements of article 3.12.5 entitled "Temporary Work in Aquatic Environments" of this section.
- 3.12.4.7 The entry and exit points of a body of water used by equipment must be located so as to mitigate the impact on banks, soil and vegetation cover. They must be clearly identified and marked. The Contractor must avoid areas where the slope of the land forces vehicles to abruptly brake.
- 3.12.4.8 Set up the slopes of access roads located along watercourses and sensitive environments so as not to exceed 5%, unless they are adequately protected against the inflow of fine particles. The maximum slope allowed for access roads is 12%.



- 3.12.4.9 The materials that go into the construction of a descent and all work in watercourses must be clean stone or gravel containing nothing but coarse sand. No clay or no silt will be tolerated in watercourses.
- 3.12.4.10 Make arrangements and build installations to prevent the suspension of fine particles that could that could clog potential spawning areas or constitute substances or materials harmful to aquatic wildlife.
- 3.12.4.11 It is forbidden to store materials on the banks of a watercourse. Transport the excavated material temporarily from the excavation to an adequate site far enough from the watercourse so that the stockpiled material does not contaminate any body of water directly or through surface water. In addition, take all the necessary measures so that no part of excavated materials stored in this way can be carried outside the boundaries of the work area. The final disposal of excavated materials must be done in accordance with the Protection Policy for Lakeshores, Riverbanks, Littoral Zones and Floodplains (Q-2, r. 35).
- 3.12.4.12 It is forbidden to temporarily reduce the width of a watercourse by more than two-thirds. The width is measured based on the 0-2 years flood recurrence high water line or the natural high water line for the construction of a culvert, bridge, diversion channel, dike, cofferdam, caissons, pier or other structures.
- 3.12.4.13 During Work, the free flow of water must be assured without creating negative impacts from hydraulic and environmental points of view. It is forbidden to permanently reduce the width of a stream by more than 20% as measured from the natural high water line.
- 3.12.4.14 In order to protect various sensitive periods of the fish life cycle (spawning, egg incubation, migration), work in water environments must be carried out between June 1 and September 15 and outside periods of heavy rain, unless otherwise advised.
- 3.12.4.15 No concrete or wet mortar shall be deposited in aquatic environments.
- 3.12.4.16 Unless you have the appropriate authorizations, excavation materials should never be used to backfill the banks or the bed of water bodies.
- 3.12.4.17 No debris may be dumped or left in aquatic environments. All debris accidentally introduced into aquatic environments must be removed as soon as possible.
- 3.12.4.18 During work in a watercourse, a response kit must be located nearby for a quick response in case of an accidental spill (refer to section 3.6 of this section).



3.12.4.19 Structures that prevent erosion and turbidity (geotextile membranes, geomembranes, sandbags and so on.) must be removed last.

3.12.5 Temporary Work in Aquatic Environment

- 3.12.5.1 During work near aquatic environments or wetlands, the Contractor must, depending on the characteristics of the soils encountered, determine the method and type of construction of the temporary structures so as to not pollute the environment. The Contractor shall take the necessary precautions to ensure the quality and free flow of water at all times.
- 3.12.5.2 Any temporary structures shall be stabilized upstream and downstream in order to maintain the integrity of the aquatic wildlife habitat and allow its free movement at all times. The removal of material must be done downstream in an upstream direction.
- 3.12.5.3 Take steps to prevent the suspension of fine particles that could clog potential spawning areas. Thus, the use of traditional cofferdams, which are made up of very erodible fine particles (clay) is unacceptable.
- 3.12.5.4 Work on these structures, including dikes, cofferdams and detour roads, must be made in compliance with articles 15.2.1, 15.2.2 and the CCDG 15.2.5. In addition, the materials used must meet requirements about the percentage of fine particles.
- 3.12.5.5 Under article 10.4.1 of the CCDG, borrowed materials used for the construction of these structures should not come from watercourses or their banks.
- 3.12.5.6 Under article 10.4.3 of the CCDG, these structures must be protected from erosion, including through the use of geotextile membranes or riprap.
- 3.12.5.7 Under article 10.4.3.2.3 of the CCDG, water from dewatering excavations and cofferdams must be evacuated into a sedimentation basin or a vegetated area, unless specified otherwise by the Client. In vegetated areas, the drain hose must be set up more than 20 metres from a watercourse.
- 3.12.5.8 Under sections 10.4.3 and 15.2.5 of the CCDG, these structures must be built out so as to limit the risk of adding sediment to water. For this reason, they must be designed to withstand floods that may occur during the Work period. In addition, the modifications must be done from upstream to downstream in the watercourse. The removal of material must be done downstream in an upstream direction.



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- 3.12.5.9 At the end of work, these structures must be dismantled and materials must be removed from the stream and its banks so that the bed's grain size and profile returns to the states that prevailed prior to the intervention.
- 3.12.5.10 In the event that the Contractor damages the bed or banks of the watercourse, it must repair them at their own expense using riprap or planting native vegetation according to the Engineer's instructions.

3.12.6 Dewatering or temporary diversions in a watercourse

- 3.12.6.1 Prior to any temporary dewatering or diversion of a watercourse, the Contractor shall remove all fish or other aquatic fauna (eg, frog, reptile, etc.) present in the area to be dried out (by electrical fishing or other form approved by the Engineer). These must be put back into the creek downstream of the bypass.
- 3.12.6.2 Temporary diversions or dewatering must be made, if possible, when watercourses are dry or at minimum flow.
- 3.12.6.3 The diversion channel should be stabilized by riprap or by installing a geotextile or waterproof membrane. In no case may the diversion channel carry sediments from the erosion of its embankment or the watercourse bed.
- 3.12.6.4 For the temporary dewatering of a section of a watercourse, where possible, the Contractor shall consider the option of placing cofferdams upstream and downstream of the watercourse section, and a submerged pump upstream of the cofferdam located furthest upstream of the section. In this case, the Contractor must ensure that the pump installed and the return line are used to convey a flow equivalent to that prevailing in the watercourse before the cofferdams installation.
- 3.12.6.5 Before carrying out work in dewatered or diverted natural watercourses, the Contractor must ensure that no pools contain fish or other aquatic fauna (frogs, reptiles, and so on). Each pool must be sufficiently dried with a pump that has a cap preventing any organism from passing through it. During the drying of these ponds, fish and other aquatic life must be captured using a dip net. They can then be returned to the water (with the help of a bucket or other container) downstream from the work zone in a shaded, deep area in a non-diverted watercourse.
- 3.12.6.6 Areas no longer in use that were used to divert water from the watercourse shall be backfilled and returned to their original state.
- 3.12.6.7 The set up and the dismantling of the structure must meet the requirements of the article "Temporary Work in an Aquatic Environment" of this section.



3.13 SITE CLEANLINESS AND RECLAMATION

3.13.1 Site Maintenance and cleanliness

- 3.13.1.1 Keep the worksite clean and free of all accumulations of debris and waste materials, including those generated by the Client or subcontractors.
- 3.13.1.2 Remove debris and waste materials from the worksite on a daily basis in compliance with local regulations and pollution control laws, or dispose of them as directed by the Client Representative as required. Waste materials should not be burnt or buried on the worksite.
- 3.13.1.3 Make necessary arrangements with and obtain permits from the relevant authorities having jurisdiction over disposal of debris and waste.
- 3.13.1.4 Store volatile waste in covered metal containers, and remove it from premises at the end of each working day.
- 3.13.1.5 Do not throw volatile waste such as white spirit, oil or solvents in a ditch, watercourse, storm or sanitary drain.
- 3.13.1.6 Do not to accumulate waste that presents any danger.
- 3.13.1.7 Provide containers closed by means of a waterproof canvas for the collection of waste and debris on the worksite.
- 3.13.1.8 Provide and use separate and identified containers for recycling.
- 3.13.1.9 In order to limit the inconvenience to residents and motorists, the Contractor shall clean soiled surfaces on the periphery of the Site without delay. Areas used by trucks will be monitored and maintained to avoid the accumulation of soil deposits. At the end of the work, the Site and its periphery must be in a perfect state of cleanliness to the satisfaction of the Engineer. In the case of failure to meet these obligations, the Client will conduct the cleanup at the expense of the Contractor.
- 3.13.1.10 Keep access roads to the Site and roadways within the site free of ice and snow. Heap/pile snow in places approved by the Client. Snow or ice from the Site must not be pushed, heaped or piled up in ditches or watercourses.

3.13.2 Final Cleaning

- 3.13.2.1 At the substantial completion of Work, remove surplus products, tools, construction machinery and equipment not required for the completion of remaining Work.



- 3.13.2.2 Remove debris and waste and leave the premises clean and ready to be occupied.
- 3.13.2.3 Prior to final inspection, remove surplus products, tools, construction machinery and equipment.
- 3.13.2.4 Remove debris and discarded materials, including those generated by the Client or by subcontractors.
- 3.13.2.5 Remove debris and waste materials from the worksite on a daily basis in compliance with local regulations and pollution control laws, or dispose of them as directed by the Client Representative as required. Waste materials should not be burnt or buried on the worksite.
- 3.13.2.6 Remove snow and ice from access roads.
- 3.13.2.7 Restore ditches damaged by machinery.
- 3.13.2.8 Take measures to restore surfaces damaged by work to good condition, including profiling, backfilling, cleaning, grading and seeding.

3.13.3 Hydraulic Seeding

3.13.3.1 General

- 3.13.3.1.1 The Contractor shall install topsoil in compliance with sections 19.3.1 and 19.3.5 of the CCDG and article 11.3.4 of Section 11, except for the thickness of the layer of topsoil, which must have a minimum of 150 mm thickness after settling. Unless otherwise specified by the Client, the Contractor must also perform type H-1 hydraulic seeding in compliance with article 19.3 and more specifically with section 19.3.6 of the CCDG. Before seeding the site, the Contractor shall have the Engineer sign off on the areas to be seeded.
- 3.13.3.1.2 Unless otherwise specified by the Client, the grass mixture for hydroseeding is specified in article 19.3.6.1 of the CCDG. These mixtures of seeds must be prepared and bagged at the supplier's facilities in order to obtain a homogeneous mixture of seeds for each bag. Before ordering seeds, the Contractor shall give the Engineer the stored topsoil analysis report. After the analysis of the report, it is possible that the proposed seed mixture will need to be adjusted. The Contractor must then change the mixture as directed by the Engineer.



- 3.13.3.1.3 During hydraulic seeding or the correction of work deficiencies, the Contractor must not spray the seeding mixture on neighboring land, wooded areas and existing infrastructure such as concrete curbs, light poles, fences, ditches and on overhead bridges or retaining walls. If these infrastructures are affected by the work of seeding, the Contractor must clean them at his own expense and to the satisfaction of the Engineer.
- 3.13.3.1.4 Seeding shall be carried out and supervised by qualified professionals for this type of work.
- 3.13.3.2 Documents to be submitted
- 3.13.3.2.1 The Contractor shall submit the required data sheets as well as the manufacturer's instructions and documentation for seeds, mulches, tackifiers, fertilizers, liquid soil improvers, micronutrients or any other element required for carrying out the seeding work.
- 3.13.3.3 Surface Preparation
- 3.13.3.3.1 Do not perform work when conditions are unfavorable, including during excessive winds or when the ground is frozen or covered with snow, ice or standing water.
- 3.13.3.3.2 Perform the final grading of surfaces for seeding so as to eliminate bumps and hollows.
- 3.13.3.3.3 Loosen surfaces designated as needing loosening to a depth of 25 mm.
- 3.13.3.3.4 Ensure that areas to be seeded are moist to a depth of 150 mm before seeding.
- 3.13.3.3.5 Have the surfaces and topsoil thickness approved by the Client Representative before seeding.
- 3.13.3.4 Applying the seeding mixture
- 3.13.3.4.1 Ensure seeding is done under the supervision of a certified planting supervisor.
- 3.13.3.4.2 Use hydraulic seeding equipment specified in article 19.3.6.1 of the CCDG.
- 3.13.3.4.3 Spread seeding mixture evenly, giving spraying at an optimal angle to ensure seed adherence to surfaces and their germination.
- 3.13.3.4.4 To ensure uniform surface coverage, go 300 mm beyond the application areas seeded during previous passes.



- 3.13.3.4.5 Resume seeding where application of the mixture is not uniform.
- 3.13.3.4.6 Remove the product sprayed on the structures and surfaces that should not be treated.
- 3.13.3.4.7 Seeding must be completed within seven (7) days of placement of the topsoil.
- 3.13.3.5 Protection
- 3.13.3.5.1 Stop all traffic on seeded areas until vegetation is established.
- 3.13.3.5.2 Remove protection as directed by the Client Representative.
- 3.13.3.6 Maintenance
- 3.13.3.6.1 The Contractor must perform the maintenance listed below for a minimal period of 12 months following the date of delivery of the Completion Certificate:
- Repair and seed once again areas of where vegetation has died as well as bare surfaces to the satisfaction of the Client Representative;
 - Install and maintain any necessary works to prevent erosion and sedimentation of soils or any other material present or installed on the site (see section 3.3 of the specifications) that could have an impact on the seeding work;
 - Mow the vegetation once during the spring and once during the summer at times validated with the Engineer;
 - Ensure adequate weed control measures to the satisfaction of the Engineer.





TechnoRem

**Public Services and
Government Services Canada**

**Implementation of environmental
mitigation measures at the former
Contrecoeur landfill**

**ANNEX A
TECHNICAL SPECIFICATIONS**

REFERENCE: R.078691.200

July 2019

**TRAFFIC MANAGEMENT
AND WORKSITE SIGNAGE
SECTION 04**

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4.1 GENERAL

4.1.1 Existing Signage

- 4.1.1.1 By taking possession of the worksite, the Contractor becomes responsible for the existing signage on the worksite, if applicable.
- 4.1.1.2 It is the responsibility of the Contractor to mask, remove, move and reinstall the existing signage, if necessary. Any intervention on existing signage must be submitted and approved by the Client Representative. Beforehand, the Contractor must report any defect with signage already in place to the Client Representative. The cost of this work must be included and distributed proportionately in the Price Table.
- 4.1.1.3 When essential for the execution of the Work, the Contractor shall remove the existing signage. Before removing signs, the Contractor must check their condition and take note of their precise location for their reinstallation. Signs belonging to the Ministère des Transports du Québec (MTQ) or the municipality of Contrecoeur must be removed with all the necessary precautions to avoid damaging them. They must be stored properly and reinstalled by the Contractor with approval from the Client. All signs damaged by the Contractor must be replaced.

4.1.2 Worksite Signage

- 4.1.2.1 The Contractor must install signs indicating the presence of a worksite to inform motorists of worksite entries and exits.
- 4.1.2.2 Work signage must comply with the requirements of Cahier des Charges et Devis Généraux (CCDG).
- 4.1.2.3 The Contractor is wholly responsible for the safety of individuals and the public within the boundaries of the work area and at the entrance of the worksite on the Rang du Ruisseau. He must therefore install and maintain a signage system adapted to the needs of the worksite and in accordance with the requirements of Highway Safety Code of Quebec.
- 4.1.2.4 The Contractor shall know applicable safety regulations that may have an impact on the Contractor's traffic control and traffic signs. The Client shall not give the Contractor any financial compensation as a result of the prescription, if applicable, of restrictions, regulations or safety guidelines from the Commission des normes, de l'équité, de la santé et de la sécurité du travail (CNESST), such as the supply and installation of additional concrete barriers for the worksite, the supply of truck mounted attenuators (TMA), the closure of extra lanes or all other measures or signage equipment required for security purposes.
- 4.1.2.5 The Contractor must, at the beginning of the work, mark all work areas deemed dangerous and all open trenches throughout the worksite.



4.1.2.6 It should be emphasized that all work performed relating to the maintenance, necessary signage during work, and so on, if necessary, is the responsibility of the Contractor.

4.1.3 Minor Nonconformance

4.1.3.1 Minor nonconformances are the following:

- Malfunctioning traffic lights;
- Malfunctioning traffic signals;
- Poorly located flaggers;
- Incorrect sign dimensions (too small) and/or visual cues;
- Non-compliant pictograms;
- Lack of barriers whenever these are required;
- Any other minor item deemed dangerous by the Client Representative.

4.1.4 Major Nonconformance

4.1.4.1 The following are major nonconformances:

- Lack of a Flagman or insufficient number of flaggers;
- Lack of a sign (including cases where the sign has fallen to the ground);
- Poorly defined work area and/or lack of visual cues;
- Lack of arrow signal when required;
- Malfunctioning traffic signals when required;
- Insufficient sign reflectivity (minimum threshold of 50 % of nominal retroreflectivity);
- Poor signal board;
- Non-functioning of traffic lights;
- when required;
- Taper too short;
- Incorrect distance between visual cues of the taper;
- distance too short between signs;
- existing signage not hidden (if applicable);
- unnecessary worksite traffic signs not hidden;
- obstacles in the taper;
- poorly placed New Jersey barrier (the barriers should be placed adjacent



to one another for the entire length);

- incorrect sign sequence;
- Dirty signs;
- Any other major item deemed dangerous by the Client Representative.

4.1.5 Signage Plans

4.1.5.1 At least seven (7) business days before beginning work, the Contractor shall submit the signage plans specified in section 10.3.1 of the CCDG for approval. When warning devices are likely to be moved often, the Client Representative can accept a signage drawing instead of a signage plan. Signage plans and drawings must be designed and developed according to the standards of the Ministère des Transports du Québec (MTQ) in effect and of the municipality of Contrecoeur, and according to the instructions of these specifications. Each plan or design must be approved by an engineer who is specialized in the field and duly authorized to practice in the province of Quebec. All plans and drawings must bear the seal and signature of this engineer. These plans and drawings must be submitted as three (3) copies in a minimum format of 279 mm x 432 mm (11" x 17"). The Contractor's signage plans and drawings must be made at the minimum scale of 1: 2,000. However, the plans and drawings showing the signage for special situations not described in Normes – Ouvrages routiers du Ministère des Transports, volume V, must be made to a scale of 1: 1,000. A plan to 1:20 000 scale must also be submitted. The plans submitted must include the following:

- work areas;
- bypass routes;
- detour lanes and/or temporary roads;
- signage.

Additionally, the Contractor shall supply the following documents:

- form (notice to residents if applicable);
- Authorization, permits and/or memoranda of understanding.

4.1.5.2 The documents submitted, including the overall plan, must be approved by the Engineer before the Contractor may begin work.

4.1.6 Plans and drawings

4.1.6.1 Signage Plans Provided by the Contractor

4.1.6.1.1 At each phase of the work, the Contractor shall submit to the Engineer five (5) copies of the signage plans accompanied by a work plan explaining the



additional measures he intends to take to control the traffic, at least seven (7) days before the signage is installed.

- 4.1.6.1.2 The signage plan must clearly indicate the temporary works carried out, the execution sequences making it possible to maintain the two-way traffic, as well as the sectors where the circulation must obligatorily take place alternately.
- 4.1.6.1.3 The Engineer may prohibit the start of work if the deadline for the submission of signage plans and drawings is not respected.
- 4.1.6.1.4 Signage plans must be signed and sealed by an engineer who is a member of the Ordre des ingénieurs du Québec.
- 4.1.6.1.5 These plans shall be at a minimum scale of 1/1000 and, for detour and/or bypass roads, where applicable, at the minimum scale of 1/2000. When available, signage plans must be drawn over base maps representing the works.
- 4.1.6.1.6 The Contractor shall also provide a version of the plans in PDF format on a minimum size of 279 mm x 432 mm (11 in. X 17 in.).

4.1.7 Traffic Management

- 4.1.7.1 The Contractor must plan and schedule the execution of the work planned under this contract in a way that does not unnecessarily impede traffic.
- 4.1.7.2 In general, local traffic must be maintained over the length of the work area corridor at all times during work. The Contractor must use appropriate work methods to maintain local traffic at all times except when no other solution is possible.
- 4.1.7.3 Traffic lanes temporarily adapted to meet this section's requirements relative to maintaining the flow of traffic must, however, remain within the rights-of-way of the existing road. All temporary traffic on private property (excluding right-of-way or easement) is prohibited, unless otherwise specified and authorized by the Client.
- 4.1.7.4 The scheduling of the Contractor's work must avoid traffic interruptions, except for specific situations for public safety, and it must maintain safe access for residents, businesses and institutions at all times during the execution of the work.



- 4.1.7.5 If Work requires it, the Contractor shall plan measures to protect and the divert traffic, including providing the services of supervisors and flaggers; installing temporary traffic lights, barricades, lighting around and in front of the equipment and the work area; and installing and maintaining the appropriate warning, danger and directional signs.
- 4.1.7.6 The Contractor needs a formal authorization from the Client Representative, the municipality of Contrecoeur and the MTQ to momentarily interrupt traffic on one or other of the driving surfaces of a street in the municipality.
- 4.1.7.7 The Contractor shall take the necessary measures to reduce dust to ensure the safe conduct of activities at all times.
- 4.1.7.8 The Contractor's rolling stock for the transport of the materials/equipment that enter or leave the worksite should adversely affect traffic as little as possible.
- 4.1.7.9 The Contractor must ensure that existing roads' load rating-maximum are adequate and that both provincial and municipal regulations are being respected. The Contractor must repair roads damaged as a result of construction work.
- 4.1.7.10 The Contractor shall ensure, in particular by advising its suppliers and subcontractors, that access to the Rang du Ruisseau for the transportation of materials and equipment is done through Saint-Antoine Street only, unless specified otherwise by the Owner.
- 4.1.7.11 The Contractor shall provide snow removal on the Site and its access roads during the Work period.
- 4.1.7.12 Once work is completed, the Contractor must remove job-site roads designated by the Client.

4.1.8 Complete closure

- 4.1.8.1 For each traffic detour, the contractor shall carry out the following activities before being authorized to divert traffic:
- Sending a notice of intervention in accordance with article 4.1.9 of this section;
 - Officially inform emergency services (local police (Régie intermunicipale de police Richelieu-Saint-Laurent), fire, ambulance and Sûreté du Québec);
 - Properly identify the detour road as previously specified.

4.1.9 Notice of Intervention and Communication plan

- 4.1.9.1 The Contractor shall notify the Client Representative, the municipality of Contrecoeur and/or the MTQ, and the Client in writing at least 72 hours in advance before each of the following steps that are subject to a notice of intervention:



-
- start and end of work for each of the work areas, including traffic information (number of available lanes, and so on);
 - beginning and end of a traffic lane closure;
 - change in worksite configuration;
 - end of the work;
 - any other pertinent information.
- 4.1.9.2 This timeframe is required in part to notify the public and partners and does not include the time necessary for approval or rejection of the traffic management and signage plans for work. Unless specified otherwise by the Client, the Contractor is responsible to notify the public and partners.
- 4.1.9.3 The notice of intervention provided by the Contractor shall specify, as appropriate, the following items:
- location of the sector covered (section or other);
 - beginning and end of the work in the sector (section or other);
 - daily work periods for the covered sector;
 - closing or not of traffic lanes, if authorized;
 - period when the traffic lights will be “out of service” and restrictions;
 - any other relevant information.
- 4.1.9.4 Following the receipt of this notice of intervention, the municipality of Contrecoeur, and/or the MTQ is responsible for notifying the public via electronic and other media.
- 4.1.9.5 Non-compliance with this procedure, particularly the aforementioned 72-hour period, will automatically cause a postponement in the commencement date of the phase in question.

4.1.10 Temporary Closure of One Lane of the Roadway (Alternating Traffic)

- 4.1.10.1 Under the conditions specified in article 4.1.7 of this section entitled “Traffic management”, the Contractor may be authorized to temporarily close one (1) lane of traffic on the roadway.
- 4.1.10.2 During this closure, the Contractor must meet the following requirements:
- The Contractor is authorized to maintain traffic on one (1) lane. Traffic must then obligatorily have an alternating flow by maintaining a roadway surface that meets previously issued criteria with a minimal width of 5.0 meters (excluding the protection area by the CNESST). In this case, worksite signage must be adjusted accordingly, and a permanent flagger (day and night, if needed) must be assigned to each end of the obstructed area;



- As an alternative to the flagmen referred to in article 10.3 of the CCDG and as previously specified, the Contractor can install a temporary traffic light system to maintain traffic. Beforehand, this system must receive approval from the Client Representative, which is conditional on confirmation of the system's effectiveness, which must be at least equivalent to that of flaggers. However, for periods when the temporary lights do not allow for a smooth flow of traffic, the Contractor must use flagmen;
- However, the Contractor shall use all necessary means to limit the length of the sections with one (1) lane (alternating traffic) to maximum of 100 meters in order to reduce wait times;
- Install arrow boards and all signs necessary to clearly indicate narrowing and deviation of the roadway in advance of the work area;
- Provide the gear and equipment necessary to avoid damaging the existing asphalt overlay.

4.1.10.3 At the end of each temporary closure, the Contractor shall remove all obstacles to restore normal traffic to the right of the segment in question. Beforehand, he must set up borders or sidewalks (if present in the first place), the rehabilitation of the asphalt overlay and all work required by the use of the traffic lane.

4.1.11 Intervention in Traffic Lanes (Worksite Entrances and Exits)

4.1.11.1 For the safety of users and workers, the Contractor must provide a sufficient number of flaggers to control worksite entrances and exits, maintain traffic and provide the necessary assistance, when required, to carriers of materials and personnel assigned to various operations (local deliveries, garbage collection and so on). The work must be planned so as to avoid repetitive and unwanted crossing maneuvers that obstruct the roadway.

4.1.12 Lateral clearance during work

4.1.12.1 The Contractor must perform the work in such a way as to reduce the presence of fixed objects along the lanes used by the users throughout the construction period.

4.1.12.2 It is prohibited to park and store machinery, tools and materials inside the side clearing area. Only temporary short-term stops are tolerated.

4.1.12.3 The lateral clearance zone is set at five (5) meters on the approaches to the site and three (3) meters inside the site. This distance is the horizontal distance between the outer edge of the taxiway and the fixed obstacle. All fixed objects within three (3) meters of the taxiway must be marked.

4.1.13 Horizontal clearance of traffic lanes

4.1.13.1 The MTQ must make the necessary arrangements to facilitate the movement of non-standard vehicles on its road network, including road construction sites.



4.1.13.2 In all cases where the width of a traffic lane and its shoulder is reduced to a width of less than five (5) meters, the Contractor shall set up a sign indicating the horizontal clearance of the taxiway (panel T-180). The measurement of this width also includes that of the lateral clearance of the signaling devices, as defined in Volume V of the MTQ Road Construction Standards.

4.1.13.3 This sign must be installed at a distance of 1.5 km from the work area.

4.1.13.4 A sign indicating the distance at which we find a reduction in the width of the driving lane must accompany this sign.

4.1.14 School Transportation

4.1.14.1 The Contractor shall display a notice (*info-camionnage*) at a weigh station or any other readily observable location one (1) day prior to the first day of school. This notice must remind carriers of the return of school transportation to the roads and to comply with obligatory stops. The Contractor also gives a similar notice to each truck operator during the transmission of the first weigh ticket on the first morning of the school year at the end of August.

4.1.14.2 The Contractor has the responsibility to ensure safe passage for students to access their residences for daily school transportation.

4.1.15 Emergency and Action Planning

4.1.15.1 The Contractor must always ensure a safe passage and corresponding access to the public, heavy and public transport vehicles, and particularly to emergency vehicles (firetrucks, ambulance, police, and so on). The Contractor must therefore provide an action plan in the event that a critical situation arises and submit it to the Client Representative and the municipality of Contrecoeur before starting work.

4.1.16 Complaints

4.1.16.1 In addition to the requirements of article 6.8 of the CCDG, during and until the reception of the Work, the Contractor shall acknowledge in writing (with a copy going to the Client Representative) within five (5) days of their receipt of claims of any individuals having made a request for damages within the boundaries of the worksite.

4.1.16.2 These claims can have been transmitted directly to the Contractor by the Client or even referred to the Contractor through the MTQ and the municipality of Contrecoeur.

4.1.16.3 The Contractor shall notify the Client Representative of follow-ups to these cases. In case of failure to follow up on cases within a reasonable timeframe, the specifications of article 6.9 of the CCDG are implemented.



4.1.17 Access for Businesses, Residents, Farmers and Emergency Services

4.1.17.1 To minimize the impact of Work on business people, residents and farmers, the Contractor shall maintain an access road wide enough to meet the needs of users at all times. If necessary and if required by a business person, each access to a business in the work area must be identified with a panel measuring at least 600 mm x 600 mm with the inscription “access to business (with the name of the business)”. Accessibility to residents and farmers must also be maintained during work.

4.1.17.2 Access to properties must not be interrupted for a period of more than 6 hours. Before discontinuing access to a business, a residence or a field, the Contractor is responsible for notifying the Client at least 24 hours in advance. If access cannot be provided to the owner before the aforementioned deadline for justifiable reasons, the Contractor must agree with the owner concerned to find a stopgap solution (temporary parking space, ramp, stairs and so on) and provide by writing the content of the agreement to the Client.

4.1.18 Communications

4.1.18.1 At all times and everywhere, the Contractor must ensure reliable telephone communication.

4.1.19 Passage of non-standard vehicles on site

4.1.19.1 The provisions necessary to facilitate the movement of non-standard vehicles on its road network, including road building sites, must be taken by the Contractor.

4.1.19.2 Oversize Class 6 and 7 vehicles exceed the minimum five (5) m requirements required above.

4.1.19.3 Consequently, if the following conditions are met, the MTQ reserves the right to allow the passage of a convoy of non-standard vehicles on a construction site:

- The Contractor is informed before 4 pm the night before when a convoy of non-standard vehicles must cross a construction site;
- The roadway within the limits of the building site provides a suitable surface for the passage of the convoy of non-standard vehicles;
- The passage of the convoy of non-standard vehicles does not require any work other than the relocation of temporary signaling equipment;
- The passage of the convoy of non-standard vehicles does not delay in a major way the work of the Contractor;



4.1.19.4 When advised, the Contractor must take the necessary measures to ensure that the equipment and personnel are on site at the time of arrival of the convoy and are mobilized so as not to delay the passage. The Contractor shall inform the supervisor in advance of the arrangements he intends to make.

4.1.20 Engine “Jake brakes”

4.1.20.1 The vehicles used in completing work or the transporting of materials in bulk should not use engine brakes in residential areas except in an emergency.





TechnoRem

**Public Services and
Government Services Canada**

**Implementation of environmental
mitigation measures at the former
Contrecoeur landfill**

**ANNEX A
TECHNICAL SPECIFICATIONS**

REFERENCE: R.078691.200

July 2019

**EXCAVATION AND BACKFILLING
SECTION 07**

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7.1 GENERAL

7.1.1 Scope of Work

7.1.1.1 The Contractor must provide the equipment, labor and materials required for the execution of all excavation and backfilling work associated with the following items:

- The pre-excavations required to confirm the existence and location of the existing buried services or any other infrastructures installed in the framework of this contract or previous work, including the existing monitoring wells to be safeguarded.
- Protection and support of existing structures that may be affected during the fulfillment of the contract.
- Work necessary for Final Capping and described in Section 23, including the grading and preparation of the surface to be covered, the implementation of new drainage ditches, the implementation of permanent circulation roads, providing and implementing a drainage layer under the geomembrane, supply and implementation of a ventilation system for biogases, the provision and placement of a protective layer over the geomembrane, and the provision and placement of a layer of topsoil.
- The development of temporary access roads required to complete the work and provide access to the perimeters of the area to be capped.
- The shoring of excavation walls.
- The removal and temporary stockpiling of materials for re-use within the framework of this contract, including the sand used for the development of the drainage layer within the framework of Final Capping.
- The removal and temporary stockpiling of excavated materials for re-use if approved by a geotechnical engineer and the Client.
- Removal, temporary stockpiling in a designated storage area (see Section 3) and the transportation of excavated materials to their disposal site if the materials cannot be re-used for backfilling excavations.
- The management and disposal of excess and waste/rubbish in accordance with the laws and regulations in effect and the requirements of these Technical Specifications.
- The provision, placing and compacting of backfill materials, bedding and coating materials for lines and any other materials required for the full completion of the work.
- Dewatering, control, pumping and treatment of water seepage inside the excavations.
- Leveling, cleaning surfaces and site rehabilitation.



- The diversion and repair of existing utilities of any structure damaged during the completion of Work.
- Removal or decommissioning of temporary pipelines and existing infrastructure.
- Any other structure planned in the bid documents or necessary to complete the Work.

7.1.1.2 All work must comply with the plans, details and specifications indicated therein.

7.1.1.3 All the prescriptions of the general specifications BNQ 1809-300 (latest version) "Construction Work - General technical clauses - work drinking water and sewer lines" and more specifically those of article 9 are an integral part of this document and must be completely adhered to along with the details in this section.

7.1.1.4 The Contractor remains responsible for implementing, supervising and coordinating all the excavation work carried out by subcontractors. All required work must comply with the details and specifications described in these Technical Specifications.

7.1.2 Protection of Utilities and Existing Structures

7.1.2.1 The Contractor must consider the location and dimensions of existing services or structures shown on maps as approximate.

7.1.2.2 The Contractor should consult the provisions of article 1.4.11 in Section 1 with respect to the location of existing structures and utilities.

7.1.2.3 The Contractor shall consult the specifications of article 1.4.12 in Section 1 for the modalities relative to the protection of utilities.

7.2 PRODUCTS AND MATERIALS

7.2.1 Granule Materials

7.2.1.1 The Contractor must refer to Section 11 of these technical provisions called "Granular Materials, Bedding and Covering" for backfill, foundation, bedding and covering materials, quality control of supply and storage and compliance certificates.

7.3 EXECUTION

7.3.1 Site Preparation

7.3.1.1 The Contractor must rid excavation area surfaces of the existing obstacles, stumps, blocks, and snow or ice within the indicated boundaries.



7.3.1.2 The Contractor shall remove surface material for re-use within the boundaries indicated for the excavation and put them in a pile according to the requirements provided in Section 3.9 of the Technical Specifications.

7.3.2 Dewatering Excavations

7.3.2.1 All excavations must be kept dry at all times and water from any source must be immediately channeled or pumped by the Contractor according to the guidelines of article 3.10 of Section 3. The Contractor will have to repair any damage whatsoever caused by water.

7.3.3 Excavation

7.3.3.1 Prior to excavation work, the Contractor must provide information on:

- Work methodology recommended during grading and surface preparation work in the framework of Final Capping to maximize the re-use of excavated material.
- The route, position and dimensions of trenches for underground networks (supply and release, biogas capture, electrical lines, instrumentation, etc.), including the blocks of concrete, concrete rooms, manholes and should install protective equipment around and above the existing structures and monitor the premises at all times during excavation work (and concreting if necessary).
- Any other information related to excavation needed to fully complete the Work.

7.3.3.2 The Contractor must provide transition zones between the different layers of sub-excavation.

7.3.3.3 The Contractor shall comply with the requirements of article 9.1.3 of standard BNQ-1809-300 relative to the slopes of all excavations and not specifically for trenches.

7.3.3.4 If necessary, shore up all excavations in accordance with the requirements of article 9.1.11 of standard BNQ-1809-300.

7.3.3.5 Debris, stones and blocks exposed on the walls and at the bottom of excavations must be removed.

7.3.3.6 Soil from the bottom of the excavation should not be altered and materials that have been destabilized by worksite operations and maneuvers when the Contractor has dug too deep should be replaced. If materials at the bottom have been altered but remain stable, spread and compact the bottom of the excavation to a density at least equal to that of the undisturbed ground.



- 7.3.3.7 If the materials inside the excavation appear unsuitable, notify the Engineer and proceed as directed.
- 7.3.3.8 The Contractor shall notify the Engineer as soon as excavations have been made to the depths or required levels for carrying out work so that he or she can do the inspection.
- 7.3.3.9 If the Engineer deems it necessary, he or she can have said excavation inspected by the Client's geotechnical engineer.
- 7.3.3.10 The Contractor will take care to protect the bottom of the excavations, ditches and trenches against moisture and rain and will at all times take great precautions to prevent a softening and/or disturbance of the beds on which concrete footings or lines must lay.
- 7.3.3.11 If work is carried out in cold weather, the Contractor must take all necessary precautions to protect excavated surfaces from freezing because it is not permitted to perform concreting on frozen or snow- or ice-covered ground.

7.3.4 Excavated Material and Debris

- 7.3.4.1 Excavated materials resulting from the grading and surface preparation for Site Capping must be reused in areas requiring backfilling if they comply with the requirements specified in Section 23. After approval from the engineer, non-reusable backfill materials must be segregated and managed according to the guidelines in article 3.9 in Section 3.
- 7.3.4.2 The waste and/or excavated material can be reused for backfilling excavations and trenches if their geotechnical properties allow a compaction according to the Rules of the Art for its intended use and if they conform to the requirements of the Technical Specifications as specified in Section 3. However, the bedding material and the aggregate used for coating the pipes should include materials specified in Section 11 and standard BNQ 1809-300 (latest version).
- 7.3.4.3 The Contractor shall remove and place reusable materials so as to not mix them with dirt and other non-reusable materials and to allow their use. Materials deemed reusable that cannot be immediately put in place during the excavation work due to excessive moisture content (recovered materials beneath underground waterbodies), must necessarily be properly stockpiled to ensure their drainage and for later re-use when backfilling trenches. Drainage water from these piles is to be managed according to the specifications provided in Section 3.10.



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- 7.3.4.4 If the cuttings and/or excavated materials are not considered reusable for backfilling trenches or excavations, the Contractor shall dispose of them in compliance with article 3.9 in Section 3 and will use the excess recoverable excavation materials he or she will have stockpiled and/or further materials planned on the schedule.
- 7.3.4.5 If reusable materials are lost through the fault of the Contractor, he or she must replace them with an equivalent volume of materials deemed acceptable by the Engineer.
- 7.3.4.6 For waste, rubbish, residual materials and hazardous materials, the Contractor must follow the guidelines of articles 3.6, 3.8 and 3.9.2, entitled “Environmental protection”, “Management of waste and residual materials” and “Hazardous Material Management” in the Section 3 of the present Technical Specifications.

7.3.5 Fill Material and Compaction

- 7.3.5.1 When the waste and/or excavated materials are used to backfill trenches or excavations, they must be returned to the original trench or excavation. In addition, the Contractor shall make the necessary arrangements to ensure the homogeneity of the replaced materials with unaltered materials.
- 7.3.5.2 When the backfill materials are different from the soil in place, excavations must meet the following requirements:
- Lengthwise Trenches in Roadways
Slope = 1 V: 1.5 H from a depth of 2.0 meters up to the level of the roadway structure
- Widthwise Trenches in Roadways
Slope = 1 V: 1.5 H from a depth of 2.0 meters up to the level of the roadway structure
- 7.3.5.3 If excess waste and/or excavated material are not considered reusable, the Contractor must use supplementary materials approved by the Engineer. However, the Contractor must demonstrate during the excavation that excavated material cannot be recovered with a notice from a geotechnical engineer.

If it is shown that the Contractor did not take the necessary measures to protect the materials, either by poor stormwater and water ingress control or by an inappropriate backfilling method, it is up to the Contractor to replace these materials.



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- 7.3.5.4 The trench backfilling work must be performed up to the original ground level prior to work and after each day's work at all times of the year.
- 7.3.5.5 In places where it is not possible to compact backfill material with conventional methods, the contractor must install, unshrinkable fill (backfill concrete) at the request of the Engineer.
- 7.3.5.6 Unshrinkable fill (backfill concrete) must be used at the request of the Engineer to fill existing cavities to ensure structure stability. The unshrinkable fill used must have the following characteristics:
- Portland cement used in the manufacture of the unshrinkable fill must be type 10 in compliance with standard CAN/CSA A5 - M "Portland cements"; the maximum amount of cement contained in unshrinkable fill must be 25 kg/m³. No cement additives are permitted.
 - The mixing water must conform to standard BNQ 2621 - 900 "Concrete in density, normal and components"; the maximum amount of maximum water contained in the unshrinkable fill must be 200 kg/m³.
 - The maximum size of the aggregates must be 20 mm.
 - Admixtures shall conform to the requirements of standard BNQ 2621-900 "concrete in density, normal and components".

7.3.6 Backfilling

- 7.3.6.1 For work related to bedding and coating, the Contractor must meet the requirements described in Section 11.
- 7.3.6.2 Before backfilling, the structures must have been inspected and approved in writing by the Engineer.
- 7.3.6.3 Areas to be backfilled must be free of debris, snow, ice, water or frozen dirt.
- 7.3.6.4 The Contractor must not use backfill materials that are frozen or contain snow, ice or debris, and which does not meet the requirements of the Technical Specifications.
- 7.3.6.5 The backfill under, around and over the works must be laid by hand until reaching a layer 300 mm thick. It is forbidden to dump materials directly on structures needing to be filled.
- 7.3.6.6 Around the foundations and walls of buildings and other similar structures at a minimum width of 1.2 metre, the Contractor must backfill with a granular material as specified in article 7.2.1 in this section, placed in layers to a maximum thickness of 300 mm and compacted to modified proctor 90%.



-
- 7.3.6.7 The Contractor must lay backfill in uniform layers not exceeding the specified thickness and must compact each layer before laying the next layer, unless otherwise directed.

7.3.7 Degree of Compaction

- 7.3.7.1 The degree of compaction required for the natural ground, soil backfills, sub-base, the lower and upper bases must comply with the requirements of the CCDG, unless specified otherwise

- 7.3.7.2 Here is a summary of these modified Proctor requirements. If there is a divergence from the plans, the plans take precedence:

Base (upper and lower):	98%
Sub-base	95%
Soil backfill and natural ground:	90%

The percentages refer to the modified Proctor test (ASTM - D 1557).

7.3.8 Construction of Temporary Access Roads

- 7.3.8.1 The Contractor shall provide temporary access roads required to complete the work and provide access to the perimeters of the area to be capped. The roads must be wide enough to allow the safe passage of at least one vehicle and include sufficient space to turn around. The materials chosen and the methods of road construction must be in accordance with the intended use for the duration of the Work. Roads must be maintained by the Contractor to allow access at any time during the work.

- 7.3.8.2 Temporary Access roads shall be implemented within the Work zone and allow the safe passage of vehicles at all times. The location and design of roads must not cause or risk causing damage to the existing or planned infrastructure within the framework of the Work.

- 7.3.8.3 In areas where geomaterials have been installed, the surface of the access roads shall be located at least 1000 mm above these geomaterials to ensure their integrity.

7.3.9 Reinstatement Work

- 7.3.9.1 Once work is completed, the Contractor shall remove excess materials and debris, spread and compact slopes and correct defects determined by the Engineer.

- 7.3.9.2 The Contractor must replace the topsoil or any other surface material as directed by the Engineer.



- 7.3.9.3 The Contractor must clean and restore existing structures or areas damaged during work as directed by the Engineer.
- 7.3.9.4 It is the responsibility of the Contractor to restore any damage that occurs during excavation work.
- 7.3.9.5 Cofferdams, shoring and cross-bracing structures must be removed.
- 7.3.9.6 The Contractor must remove excess construction materials from the worksite and return watercourses to their original state or to the state indicated by the Engineer.
- 7.3.9.7 The Contractor must repair the ditches to promote a normal flow of surface water.
- 7.3.9.8 If necessary, the Contractor must rake the surface of agricultural land so that there are no remaining stones or other debris of more than 50 mm.

7.3.10 Excess Material

- 7.3.10.1 The Contractor shall remove and transport all material deemed as unusable or surplus materials or from excavation work, including residual and hazardous materials from the site. The unnecessary accumulation of materials excavated during work must be avoided. Refer to Section 3.1.1.3 for the specific requirements.





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**ANNEX A
TECHNICAL SPECIFICATIONS**

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July 2019

**GRANULAR MATERIALS,
BEDDING AND COVERING
SECTION 11**

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11.1 GENERAL

11.1.1 Scope of the Present Section

11.1.1.1 The present section includes the technical clauses about:

- The supply, production, transport and placement of various granular materials required for the Work, except for material necessary for the Final Capping of the Site which are described in Section 23;
- The placement of bedding and the covering for work necessary to the implementation of the Work, except for the placement of bedding and covering necessary for the Final Capping of the Site which are described in Section 23.

11.1.2 Reference Documents

11.1.2.1 For the execution of the Work, the Contractor must refer to the instructions from the Requirements and General Specifications Document (CCDG) of the Ministère des Transports du Québec (MTQ), latest version.

11.1.3 Regulation and Reference Standards

11.1.3.1 During execution of the Work, the Contractor must review and comply, without however being limited to them, with the articles and clauses from the following regulations and standards:

- Regulation Respecting Pits and Quarries (Q-2, r.2 [should that be r.7]), of the Québec Government;
- Québec standard NQ 2560-114: “Civil Engineering Work – Aggregates”, Part II: “Sub-base course, capping layer, surface course and shoulder” from the Bureau de normalisation du Québec;
- Québec standard NQ 2560-114: “Civil Engineering Work – Aggregates”, Part III: “Aggregates used as a cushion, coating, separation layer and filtering medium” from the Bureau de normalisation du Québec;
- Québec standard NQ 2560-450: “Aggregates – Determination of the resistance to de-aggregation by a solution of magnesium sulfate”, from the Bureau de normalisation du Québec;
- Standard 13101: Geotextiles, du ministère des Transports du Québec.



11.1.4 Quality Control for Supply and Storage

- 11.1.4.1 The Contractor must, within seven business days before starting Work, notify the Engineer of the proposed sources for supply and the specifications of granular materials, for approbation purposes. It must allow the engineer to have access to its sources at all times in order that the engineer can confirm the quality of the granular materials that will be used.
- 11.1.4.2 If, in the opinion of the Engineer, the granular materials coming from the supply sources proposed by the Contractor do not meet the requirements of the technical clauses, the Contractor must search for other supply sources and have the quality of the materials accepted by the Engineer.
- 11.1.4.3 All granular materials imported and used on the Site for the execution of the Works shall be free from contamination, unless otherwise agreed by the Client. Granular materials must be sampled and analyzed by the Contractor or supplier to demonstrate the absence of contamination
- 11.1.4.4 If the Contractor takes its own steps for changing supply sources, it must inform the Engineer of it at least seven days in advance for purposes of approval.
- 11.1.4.5 Acceptance of a supply source does not set aside the possibility that a granular material could be refused later if it can't satisfy the requirements of the technical clauses or the Engineer.
- 11.1.4.6 The granular materials must be piled at their supply source and identified. No piling will be tolerated at the Worksite, unless previously authorized by the Client.
- 11.1.4.7 The piled granular materials must be sampled and analyzed at the cost of the supplier of the materials. The analysis must provide the properties requested in the BNQ standard NQ 2560-114 Part II and Part III. At the request the Engineer, the Contractor must provide, within a maximum of seven days before the start of work, the results of the analyses.

11.2 PRODUCTS AND MATERIALS

11.2.1 Foundation and Bedding Materials

- 11.2.1.1 All foundation materials must satisfy the requirements of CCDG Article 12.3 and the standard NQ 2560-114, Part II, except for changes specified in the present article.
- 11.2.1.2 The MG 20 (20-0 mm) type crushed stone used in the foundation must comply with the specifications stipulated in the standard NQ 2560-114, Part II after compacting, except for grain size specifications which are modified according to the following table:



MG 20 – Grain size held back

Screen (mm)	% Passing
	Crushed stone
31.5 mm	100
20 mm	90-100
14 mm	68-93
5 mm	35-55
1.25 mm	17-38
315 µm	8-17
80 µm	2.0-6.0

MG 20 - Grain size after complete execution

Screen (mm)	% Passing
	Crushed stone
31.5 mm	100
20 mm	90-100
14 mm	68-93
5 mm	35-60
1.25 mm	19-38
315 µm	9-17
80 µm	2.0-8.0

MG 56 – Grain size held back

Screen (mm)	% Passing
	Crushed stone
80 mm	100
56 mm	82-100
31.5 mm	55-80
5 mm	25-45
1.25 mm	11-30
315 µm	4-18
80 µm	2.0-6.0



MG 56 - Grain size after complete execution

Screen (mm)	% Passing
	Crushed stone
80 mm	100
56 mm	82-100
31.5 mm	55-85
5 mm	25-50
1.25 mm	11-30
315 µm	4-18
80 µm	2.0-8.0

11.2.2 Materials for Cushion and Coating

11.2.2.1 All aggregates used for cushions and covering of lines, manholes, etc. must meet the requirements for type CG 14 granular materials (conforming to standard NQ 2560-114 Part III).

11.2.2.2 However, when significant water infiltrations occur in the trench, the bedding must be made up of crushed stone. This crushed stone must meet the requirements of MTQ 2104 and must consist of hard, durable particles with a particle size of 14-20 mm and be free of organic materials and loose materials. In this situation, a nonwoven geotextile membrane approved by the Engineer must be placed on the bottom of the trench before placement of the crushed stone. Subsequently, this membrane completely covers the crushed stone put in place. The geotextile membrane must meet the following standards and specifications:

- Tensile strength (standard CAN 148.1 No.7.3) : > 800 N
- Elongation at rupture (standard CAN 148.1 No.7.3) : 45-105 %
- Tear resistance (standard CAN 4.2 No.12.2) : > 360 N
- Puncture CBR (standard ASTM D62:41) : > 2 110 N
- UV resistance (standard ASTM D4355) : 50 %/500 h

11.2.3 Class “A” Soil

11.2.3.1 Class “A” soil is made up of natural granular or nonplastic materials, such as: sand, gravel or stone. These materials are not frost susceptible and can be used in the backfill for trench excavation. Class “A” soils must satisfy the following requirements and comply with the requirements of the MTQ CCDG:

- For cushion and covering: MG 20
- For foundation: MG 20
- For sub foundation: MG 112



11.2.4 Class “B” Soil

11.2.4.1 Class “B” soil is made up of materials from the mineral kingdom, free of organic matter, pebbles of more than 56 mm diameter, bituminous concrete, and metal or solid waste, and it must have grain sizes and water concentration making it easy to compact.

11.2.5 Topsoil

11.2.5.1 Topsoil must be Type 1 conforming to the requirements of MTQ standard 9101. Topsoil must be free of ligneous debris and stones whose dimensions exceed 50 mm. At least 90% of the mass of materials of mineral origin must pass through a 5 mm screen.

11.2.5.2 The topsoil must also be free of toxic elements, growth inhibitors, coarse vegetable material of 10 mm diameter and 100 mm length counting for more than 2% of the volume of the soil.

11.2.5.3 Topsoil must be sampled and analyzed by the Contractor or the supplier in order to demonstrate conformity with the current Technical Specifications.

11.2.6 Granular Material for Sub-Foundation, Trench Backfill and Transition

11.2.6.1 This article relates to MG 112 for sub-foundation, trench backfill and transition, as applicable. It modifies and supplements the directives from the MTQ CCDG.

11.2.6.2 Excavation materials, such as sand and gravel having a grain size and water concentration making compacting easy, can be used for trench backfill up to the infrastructure line in dry period and in summer. These reusable excavation materials must be piled and then covered with impermeable tarps for optimizing their use. They must be free of organic materials, by bituminous concrete, and metal or other solid waste.

11.2.6.3 Should the Contractor use reusable excavation materials as trench and transition backfill material, the grain size specifications of MG 112 after use will have to be met. The Engineer reserves the right to ask the Contractor to perform the granulometric tests required by Québec standard NQ 2560-114, Part II.

11.2.6.4 The grain size specifications from MG 112 should be compliant with the requirements stipulated in Québec standard NQ 2560-114, Part II and do so, after use of the granular materials, except for the grain size specifications which are modified according to the following tables:



**MG 112 – Grain size held back
(Except for crushed stone)**

Screen (mm)	% Passing	
	Combined	Separated*
112 mm	100	
5 mm	35-100	100
80 µm	0-8	0-10

*If applicable to sub-foundation

**MG 112 - Grain size after complete execution
(Except for crushed stone)**

Screen (mm)	% Passing	
	Combined	Separated*
112 mm	100	
5 mm	35-100	100
80 µm	0-10	0-12

*If applicable to sub-foundation

**MG 112 – Grain size held back
(Only crushed stone)**

Screen (mm)	% Passing
112 mm	100
5 mm	30-60
80 µm	0-10

**MG 112 - Grain size after complete execution
(Only crushed stone)**

Screen (mm)	% Passing
112 mm	100
5 mm	30-60
80 µm	0-10



- 11.2.6.5 For a sub-foundation, the properties from Table 3 from the Québec standard NQ 2560-114, Part II (Category of large aggregate for sub foundation) apply once the fraction of large aggregate (>5 mm) becomes greater than 15% in the sub-foundation material.

11.2.7 Statement of Compliance

- 11.2.7.1 The Contractor must submit a statement of compliance to the Engineer showing that, at the source or in reserve, the intrinsic and additional characteristics of the granular materials satisfy the requirements of the CCDG and the present technical clauses.
- 11.2.7.2 This statement must also comprise the complete results of the grain size analysis performed according to the test method LC 21-040 starting with a sampling conforming to the test method LC 21-010 for granular material.
- 11.2.7.3 The engineer will only authorize the transport of the granular material after analysis of the statement of compliance for the materials. A statement does not release the Contractor from its responsibility to provide materials conforming to the requirements stipulated in the plans and specifications after the full placement in use on the worksite. If a defect is uncovered, a new statement can be required by the Engineer.

11.3 EXECUTION

11.3.1 General Information

- 11.3.1.1 The contractor must provide sufficient quantity of granular materials to meet the needs of all the Work.
- 11.3.1.2 The contractor must use a methodology that avoids segregation of granular materials during their storage, handling and transport.
- 11.3.1.3 The Contractor must provide a sequence and methods of work allowing the full execution of the work while also preserving the integrity of other infrastructure either existing or being executed

11.3.2 Placement of the Top Soil

- 11.3.2.1 The surface of the zones designated in Section 3, Article 3.13.3 and Section 23, Article 23.7.3 must be covered with a uniform layer of topsoil 150 mm thick after settling.
- 11.3.2.2 The topsoil placed must be settled, but not packed. The topsoil which was set aside must be crumbled before spreading it.
- 11.3.2.3 The topsoil must be spread at most seven days before the seeding work described in Section 3, Article 3.13.3.



- 11.3.2.4 The topsoil must not be placed when the conditions are unfavorable, in particular during excessive wind or when the soil is frozen or covered with snow, ice or standing water.
- 11.3.2.5 The top soil must be placed with material and equipment best suited to the work to be done so as to form a homogeneous and continuous layer. The loading, transport, emptying and spreading must be done so as to avoid any segregation. When segregation occurs, the materials must be removed and replaced by materials meeting the requirements of the present Technical Specifications.
- 11.3.2.6 Any area damaged by the action of the rain or any other cause must be repaired in keeping with the requirements of the present Technical Specifications.

11.4 FACTORY AND WORKSITE TESTS

11.4.1 Quality of the Materials and Compaction Tests

- 11.4.1.1 Compaction tests could be requested by the Engineer.
- 11.4.1.2 Noncompliance with the requirements: the test results representing the quality of the materials for the foundations and the implementation will have to satisfy the requirements of the Technical Specifications and plans. If the results of the tests done during the work indicate that the backfill materials do not meet the requirements, the work will be refused and it will be removed, rebuilt and verified again without delay.





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**CONSTRUCTION OF A CULVERT
SECTION 22**


**CONSTRUCTION OF A CULVERT ON THE
FOSSÉ MÉNARD AT CONTRECOEUR**

TENDER DOCUMENT

SECTION 22

SPECIFIC TECHNICAL CLAUSES

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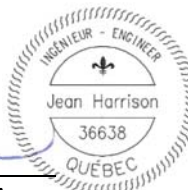


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SECTION 22

SPECIFIC TECHNICAL CLAUSES

Note: This section should be read in conjunction with Sections 01, 02, 03, 04, 07 and 11 of the Technical Specifications which also apply to culvert construction work.

22.1 DESCRIPTION OF WORK

The work consists of constructing a culvert on the Fossé Ménard watercourse near the Rang du Ruisseau in Contrecoeur.

The project includes, without being limited to:

- The work required to meet the requirements of the Technical Specifications for the protection of the environment and water bodies;
- The activities necessary to maintain traffic and signaling, including signalers;
- The removal of the palisade and part of the existing guardrail as indicated on the plans and in the Technical Specifications, and disposal;
- The installation of a temporary land retaining structure;
- The excavation and disposal of soil and waste according to the Technical Specifications;
- The acquisition of a new rectangular reinforced concrete culvert, including delivery and unloading on site with the required equipment;
- The culvert installation, the adjustment to the invert indicated on the plans, including the base, the geotextile membrane, the cutoff walls, the low walls, the granular cover and the lateral embankment, all according to the requirements of the plans and Technical Specifications;
- The placement of a matrix of substrates inside the culvert in accordance with the plan details and the requirements of the Technical Specifications to simulate the stream bed, including the matrix leak test;
- The transition and connection of the granular protection cover of the culvert to the Rang du Ruisseau road pavement according to the details of the plans and Technical Specifications requirements;
- The supply and installation of the protective embankment of culvert end slopes including the geotextile membrane in accordance with the plans and Technical Specifications;
- The installation of a new end device for the guardrail according to plans and Technical Specifications;
- The removal of the temporary land retaining structure.

22.2 WORKING METHOD

The Contractor must proceed diligently when carrying out the work in order to meet the deadlines specified in the tender documents and clear the way for traffic as quickly as possible.

He must, before starting:

- Transmit and have the Representative of the Ministry verify a traffic maintenance plan signed and sealed by an engineer member of the *Ordre des Ingénieurs du Québec* (OIQ) that meets the requirements of the *Tome V – Signalisation routière de la collection Normes – Ouvrages routiers*;
- Transmit and have the Representative of the Ministry verify an installation plan for the temporary land retaining structure signed and sealed by an engineer member of the OIQ;
- Transmit and have the Representative of the Ministry verify workshop drawings for the reinforced concrete culvert signed and sealed by an engineer member of the OIQ;
- Carry out, transmit and have verified by the Representative of the Ministry the temporary work program to prevent erosion of structures and to retain sediments within the site limits.
- Transmit and have the Representative of the Ministry check the workshop drawings and technical data sheets mentioned in these Technical Specifications.
- Perform the works (cofferdams and pumping) that will be used to dewater the work area;
- Install along the Rang du Ruisseau a temporary land retaining structure for the purpose of preserving the pavement along the Rang du Ruisseau.

The Contractor will then be able to begin the excavation work in the work area. The excavation must include the removal and disposal of all materials necessary to obtain the desired levels: top soil, rocks, slopes, bed, trees, shrubs, etc.

Unless otherwise specified, the new culvert must be installed according to the alignment, slopes and inverts indicated on the plans. The Contractor is solely responsible for the culvert installation in accordance with the requirements of the plans and Technical Specifications.

The excavation will be deep enough to allow the construction of the cutoff walls and culvert support cushion as shown on the plans. The Contractor will be responsible for identifying and recording culvert alignment elements (slopes and inverts).

If, in the course of the execution of its work, the Contractor finds an impossibility or an unforeseen difficulty in the application of the preceding rules, he must immediately notify the Representative of the Ministry.

After installation of the culvert, the Contractor will proceed with backfilling to the levels defined in the plans and with the materials indicated in the tender documents.

The Contractor must do all other work that requires the presence of anti-erosion works and the presence of cofferdams before they are dismantled.

The culvert installation works, connection with the Rang du Ruisseau Road, guardrails and culvert end-fittings will have to be done quickly to avoid an extended road closure period.

The Contractor must limit the work area as much as possible to the places necessary for the project. Thus, no work in the watercourse, beyond that planned, will be tolerated. Any damage resulting from such action on the part of the Contractor shall be corrected by him, at his expense and to the satisfaction of the Representative of the Ministry.

22.3 COFFERDAM INSTALLATION

The Contractor shall install cofferdams upstream and downstream to isolate the work area in order to allow the installation of the culvert on a dry surface.

The upstream cofferdam will be installed first to promote the natural drainage of the sector and then downstream cofferdam will be put in place.

The cofferdam with a height of about 750 mm and a width of about 3,750 mm shall consist of stones of 100 to 300 mm in diameter.

A 0.72 mm thick PVC waterproof membrane with a tensile strength at break of 12.8 N/mm will be used to waterproof the structure.

The membrane will be deposited on the wet side of cofferdams for a length at least equivalent to the height of the cofferdam and will be ballasted with stones at the bottom of the watercourse. The membrane will finally be retained by an additional ballast on the top of the cofferdam.

The pumping of the water located between the cofferdams is necessary to allow work on a dry surface. Any water originating from a work area must not, at any time, contain more than 25 mg/l of suspended solids when released to the watercourse. The Contractor shall isolate the siphon pump within the area to be pumped, in a clean bed of stone.

To prevent fish from being trapped inside the dewatered area, the fish must be collected and transferred to a section of flowing water. Pumped water will be directed to an area of dense, undisturbed herbaceous vegetation located more than 10 meters from a natural watercourse, where it will be filtered.

At the end of the works, the cofferdams will be removed by proceeding first downstream and then upstream to allow a gradual ingress of water towards the structure.

22.4 LAND RETAINING STRUCTURE

The Contractor shall set up a land retaining structure along the Rang du Ruisseau to protect the roadway from any damage.

The Contractor shall submit the required data sheets as well as the manufacturer's instructions and documentation for the selected land retention structure. The data sheets must indicate the characteristics of the products, the performance criteria, the dimensions, the limits and the finish.

Submitted workshop drawings must bear the seal and signature of an engineer member of the OIQ.

The Contractor shall submit to the Representative of the Ministry for verification all details regarding the method and sequence of implementation of the land retaining structure prior to commencing work.

The contractor will proceed with the dismantling and disposal of the land retaining structure at the end of the works.

22.5 EXCAVATION

Carry out the excavation work required to install the culvert, regardless of the materials encountered.

Excavation slopes must meet the requirements of the CNESST.

Do not reshape the soil or rock below the load-bearing surfaces. In order to keep the maximum load capacity of the exposed ground, it is forbidden to perform excavations using a toothed bucket. It is required to excavate any disturbed soil located at the bottom of the trench and replace it with the granular material used for bedding purposes, at the expense of the Contractor.

If the soil bearing capacity is unsatisfactory, additional excavation work will be authorized in writing and paid for by the terms established for the additional work.

The excavated material cannot be reused for backfilling the culvert and must be transported and disposed of, at the Contractor's expense, according to the Technical Specifications.

22.6 RECTANGULAR REINFORCED CONCRETE CULVERT (RCC)

The proposed prefabricated culvert will be rectangular in shape, 18.00 m long, and made of reinforced concrete. The culvert must be delivered in modules consisting of upper and lower parts that will be assembled on site in accordance with the manufacturer's recommendations and the Technical Specifications. The RCC will have a range of 5,000 mm and a height of 3,000 mm. The nominal thickness of the wall will be 400 mm.

The RCC attachment bars will be galvanized. Sealing membrane strips and other culvert accessories must be in accordance with manufacturer's recommendations and applicable CAN / CSA, ASTM and MTQ standards.

The reinforcement of the culvert's high and low parts and the RCC's accessories will be dimensioned to allow the passage of a CL-625 type overload, considering the culvert granular protection cover minimum thickness of 300 mm.

The Contractor must submit for approval workshop drawings signed and sealed by an engineer member of the OIQ. Shop drawings prepared in accordance with CAN / CSA-A23.4 CSA A23.3 must indicate, show or include the following.

- The calculation notes of the elements designed by the manufacturer.
- Details of concrete elements, reinforcement and joining elements.
- Methods for handling and installation.
- Holes, sleeves, parts to be drawn and associated reinforcements.

Only prefabricated elements produced under the CPCQA Factory Certification Program will be accepted. In addition, the factory certification must remain valid throughout the period of manufacturing and installation of these elements, and until the end of the warranty period.

Manufacturers of precast concrete components must be certified in accordance with the precast concrete factory certification procedures established by CSA before submitting their bid. They must also expressly state in their tender that their factories are duly certified in the appropriate category of products, which is prefabricated structural concrete products.

The concrete mixture and the materials used in its preparation must meet the requirements of the CSA A23.1/A23.4 standards:

- Binders in accordance with CAN / CSA-A3001: type GUB-SF.

- Compressive strength at 28 days: 35 MPa
- Occluded air: 6 to 9%
- Maximum nominal size of coarse aggregate: 14 mm
- "E/L" ratio: 0.4
- Reinforcing steel standard to CSA G30.18, Nuance 400W
- Minimum overlap of the frame: 50 mm

Manufacturing of prefabricated components must meet the following requirements: CAN/CSA-A23.4, including Annexes A and B, MNL-116 and MNL-117 PCI manuals and certification requirements of the CPCQA Certification Program.

Each prefabricated element must bear the date of casting and the corresponding identification mark on the shop drawings and to be used to specify the location. These marks must be affixed to a non-visible part of the element once the work is completed.

Pour the elements into rigid molds of exact dimensions designed to withstand high frequency vibrations. Provide reinforcement anchors and ancillary elements in accordance with workshop drawings. Incorporate the anchors, shims and built-in elements necessary for work planned on other sections. Compact the concrete using vibration during its installation in order to obtain an adequate density. Provide openings and voids required for flashing, anchors and crampons. Maintain a consistent and uniform appearance.

Install anchors, lifting hooks, shear bars, spacers and other flush-fitting elements or fittings required for a complete and rigid installation. Each element must comply with the requirements of local codes. The dimensioning of the lifting hooks will allow the panels to be lifted safely considering the dimensions of the elements and their weight. Where possible, conceal anchors and built-in elements.

22.7 PLACEMENT OF THE CULVERT

The Contractor must provide all the signage necessary to maintain traffic flow in the area and signalers will be present at the site, if required. The Contractor must comply with the specifications of Volume V "Signalisation routière" of the MTMDÉT.

The Contractor shall submit to the Representative of the Ministry, for verification a detailed and scaled signage plan five consecutive business days prior to the commencement of the work. These plans must be signed and sealed by an engineer member of the OIQ.

The Contractor shall use appropriate lifting equipment to safely unload and install the culvert sections. The Contractor will have to provide for traffic management.

Install prefabricated units within the allowable tolerances specified in CAN/CSA-A23.4. These tolerances cannot in any case be cumulated.

Before assembling them, arrange the prefabricated elements according to the prescribed lines and levels, respecting the permissible tolerances.

Put in place the sealing systems (putty, waterproof membranes, ...) in accordance with the manufacturer's instructions.

Fasten the prefabricated elements as indicated on the workshop drawings.

Fasten the prefabricated elements using bolts secured to the nuts according to the manufacturer's instructions.

Tighten the bolted joints evenly by applying the specified torque.

22.8 GEOTEXTILE MEMBRANE

The Contractor must provide for the supply and installation of type V geotextile membrane at various work locations. The Type V membrane must comply with the requirements of Standard 13101, Volume VII, "*Matériaux*" (Materials) of the MTQ (*Ministère des Transports du Québec: Québec Ministry of Transportation*) "*Ouvrages routiers*" (Road Structures) collection. The geotextile membrane is installed in the following places:

- Under the granular access road layer and between the embankment and the side embankment as an anti-contaminant layer.
- At the joints of the RCC prefabricated modules.
- Under the culvert granular support pad.
- Under the riprap of the culvert end.

22.9 CUTOFF WALL AND LOW WALL

The Contractor must provide for the supply and installation of cutoff wall and low wall at each end of the RCC. Both walls will be of reinforced concrete and will be an integral part of the RCC. These will be the same width and must be anchored to the RCC according to the manufacturer's requirements.

The dimensions of the low wall and the cutoff wall must conform to the details of the plans.

22.10 BACKFILL

The foundation floor will be compacted to at least 90% of the modified Proctor test prior to placement of the geotextile membrane.

Granular materials used for backfilling must comply with the recommendations of article 22.13 of these Technical Specifications.

Recycled materials made from concrete residues, bituminous mixes and brick must not be used as foundation material, backfill or cover because they can attack the seal material and create corrosion.

22.11 RIPRAP AGAINST EROSION

The Contractor shall proceed with the staking of the ends of the culvert in accordance with the requirements of the plan and other requirements in the Technical Specifications. The stones will be placed according to the specified dimensions and thickness, on the slope of the ends of the culvert.

The stone should be placed so as to ensure a uniform coating and not show irregular piling on the surface.

22.12 STREAM BED SIMULATION

The Contractor shall proceed with the construction of a matrix of fixed substrate within the culvert to simulate the stream bed. The simulation will allow maintaining or recreating the natural stream

conditions within the culvert. The substrate matrix of the simulated bed will consist of different granular materials and will have to be sized according to the recommendations of Fisheries and Oceans Canada, Guidelines for watercourse crossings in Quebec (2016 edition), the requirements of the specifications and detailed plans.

The bed areas directly upstream and downstream of the culvert will be developed using the same concepts as inside.

The grain size of the substrate matrix must comply with the recommendations of article 22.13 of the Technical Specifications.

The simulated bed can be constructed using material taken from a natural till deposit (unstratified glacial sediments) or be constituted by a mixture of different granular materials if they cover the D_{0-100} range.

22.13 GRANULAR MATERIAL

The Contractor must provide for the supply and installation of the granular materials necessary for carrying out various works. In general, the granular material used will conform to the granulometric range NQ 2560-114-II / 2002, Table 1, for the granular road, base, coating and covering. In general, the substrate matrix of the simulated stream bed must comply with the recommendations of Fisheries and Oceans Canada, Guidelines for watercourse crossings in Quebec (2016 edition).

For the granular road:

- Granular structure of the road (before the protective covering): a layer of crushed stone 600 mm thick, compacted to 95% MP in 150 mm layers.
- Granular structure of the road (after the protective covering): a 300 mm thick layer of crushed stone MG-56, topped with a 300 mm thick layer MG-20, all compacted at 95% MP by layers of 150 mm.

For the culvert foundation:

- A supporting 450 mm thick layer made of MG-20 granular material, compacted at least 95% MP by 150 mm layers.
- Lateral embankment in MG-20 granular material according to the standard detail of the plan, and compacted at least to 90% MP in 150 mm layers. It is important to ensure that the materials are firmly in contact with the entire surface of the RCC. Spreading granular materials should be parallel to the work and even on both sides.

For the culvert cover:

- Protective cover of MG-20 granular material, according to the standard detail of the plan, compacted at least to 90% MP in 15 mm layers.

For the embankment of the slopes at the ends of the culvert:

- Granular material of size 100-200, compliant with the 14501 Standard, volume VII, "Matériaux" (Materials) of the "Ouvrages routiers" (Road Structures) collection of the MTQ, 300 mm thick.

For the granular matrix of the bed substrate of the stream bed:

- The matrix of the granular substrate should:

For stability have:

- Min. 16-20% stable sediment, 100-year flood.
- Ratio from Barnard *et al.* (2013):
 $D_{100} \approx 2.5 D_{84} \approx 6.25 D_{50}$
- Max. 25% of particles <2 mm.

For sealing:

- a continuous and well graded (poorly sorted) grain size distribution;
- Fuller-Thompson Equation (1907):
 $P / 100 = [D / D_{100}]^m$
Where **P**: percentage of particles smaller than D;
D: size of a particle;
D₁₀₀: size of the largest particle;
m: parameter that modulates the particle size distribution
- Min. 5-10% of particles $\leq 80 \mu\text{m}$;
- A leak test must be carried out following the recommendations of subsection 3.3.2.2, f of Fisheries and Oceans Canada, Guidelines for watercourse crossings in Quebec (2016 edition).

22.14 TRANSITION WITH EXISTING PAVEMENT STRUCTURE

When connecting to an existing pavement structure, the Contractor must achieve, over a distance of 300 mm, a transition of "1H: 1V" at existing and new granular foundations.

All expenses incurred in the realization of this article and which cannot be included in a specific article of the Tender Price Table, must be distributed in the various articles of the Tender Price Table.

22.15 DAMAGED EXISTING PAVEMENT

Any paving surface located outside the work area, whether private or public, damaged by the Contractor, shall be repaired at its expense to the satisfaction of the Engineer.

22.16 GUARD RAIL

The Contractor shall remove semi-rigid guard rails with double corrugated steel profile, including wood studs and end devices, and dispose of them in accordance with the applicable regulation.

The Contractor shall, at its expense, use a company specialized in the matter to design the new guardrail configuration. The design shall provide for the provision and installation of a new end device, all in accordance with the requirements and specifications of the standard drawings of Chapter 3 of Volume VIII, "*Ouvrages d'art*" (Structures) of the "*Ouvrages routiers*" (Roadworks) series of MTQ and the CCDG.

22.17 GROUND CLEARING AND CLEANING

Areas of land already developed, located in the vicinity of the work area and which have been damaged by the work, must be restored, by the Contractor, to their state before the work. The Contractor shall also, at the end of the work, proceed to complete cleaning of the site and all surfaces soiled by the work, including the pavement structure.

All costs associated with the application of this section shall be allocated to the various sections of the bid schedule, as no additional fees will be paid to the Contractor for site remediation.



TechnoRem

AECOM

**Public Services and
Government Services Canada**

**Implementation of environmental
mitigation measures at the former
Contrecoeur landfill**

**ANNEX A
TECHNICAL SPECIFICATIONS**

REFERENCE: R.078691.200

July 2019

**FINAL CAP
SECTION 23**

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23.1 GENERAL

23.1.1 Work Description

The work described in this section shall include the complete supply of labor, materials, equipment and execution of all the work necessary for the capping of the cell, as shown in drawings R_078691_S23_P001 to R_078691_S23_P005 and as indicated in these specifications.

The work to be executed shall include, among other things, the following items:

- The grading and preparation of the surface;
- The construction of new drainage ditch;
- The supply and placement of a draining layer under the geomembrane;
- The supply and placement of a biogas ventilation system;
- The supply and placement of the geomembrane including all the required welds in factory and on site;
- The control of the tightness of the welds;
- The supply and placement of a synthetic drain above the geomembrane;
- The supply and placement of a protective and drainage layer on top of the geomembrane;
- The supply and placement of a topsoil layer;
- The construction of new circulation road;
- The implementation of attenuation measures presented in Appendix 1-4.

23.1.2 Protective Measures

During the work, protect the existing roads, monitoring wells, electric lines, underground piping and surface piping and also the geomembrane and any other infrastructure placed in the context of the present assignment. Repair any damage. Respect all attenuation measures described in Appendix 1-4 during the work.

23.2 GRADING AND PREPARATION OF THE SURFACE

23.2.1 General Information

The work for grading and preparation of the surface of the cells as well as the construction for the drainage ditches shall be done as shown in the drawings and as specified in this section.

This work comprises, without limitation, the following items:

- Grubbing and brush clearing from the work area;
- The grading of the surface of the cells;

- The profiling of surfaces where circulation roads must be arranged;
- The construction of drainage ditches;
- The construction of anchor trenches on lateral slopes;
- The placement of nonwoven geotextile on surfaces to be capped;
- The installation of a geotextile on the profiled surfaces for the development of the circulation roads;
- The placement of a draining sand layer in the areas being capped.

23.2.2 Materials

23.2.2.1 General Information

- 23.2.2.1.1 The Contractor is fully responsible for the sources of materials whether they come from the site or from outside. All backfill material shall be made of hard and durable particles and shall not contain organic material, snow, ice or other materials not complying with the requirements of the present section.
- 23.2.2.1.2 All materials shall be such as specified and approved by the Engineer before their transport onto the site. Any material placed without approval from the Engineer shall be removed and disposed of off-site.
- 23.2.2.1.3 The analyses and tests required for the approval of the materials shall be provided by the Contractor.

23.2.2.2 Sand

The sand used for laying the draining layer on the surface of the areas being capped shall not comprise any particle with dimensions over 10 mm and shall have a hydraulic conductivity of at least 5×10^{-3} cm/s. For that purpose, the Contractor shall provide the Engineer for approval at least one grain size analysis representative of each batch of 5,000 m³ of sand used and the results of at least one permeability test done on a representative sample of sand.

23.2.2.3 Type 1 Geotextile

The Type 1 geotextile used under the draining layer and the circulation road shall be of nonwoven type. It shall meet or exceed the following technical requirements. All tests must be carried out in compliance to the Canadian General Standards Board (CGSB).

- | | | |
|---------------------|--------------------|-----------|
| • Tearing strength | (CAN 4.4 No. 12.2) | 400 N |
| • Tensile strength | (CAN148.1 No. 7.3) | 1000 N |
| • Permeability | (CAN148.1 No. 4) | 0.23 cm/s |
| • Bursting Strength | (CAN 4.2 No. 11.1) | 2.67 kN |

-
- Elongation at rupture (CAN148.1 No. 7.3) 50-105 %

Before the start of installation work, the Contractor shall submit to the Engineer copies of documentation pertaining to quality control carried out during fabrication of geotextile rolls. In addition, the documentation must clearly allow the establishment of the history of each geotextile roll produced as to the identification of the base products used.

The Engineer reserves the right, in case of doubt, to have the geotextile rolls tested in an independent laboratory.

23.2.3 Execution

23.2.3.1 General Information

- 23.2.3.1.1 The work of grading and preparation of the surfaces of the cells shall be done before placement of the geomembrane. The Contractor shall provide a sequence and work methods allowing the complete implementation of the Work and the management for waste and excess soil according to the requirements of Section 3.
- 23.2.3.1.2 The Contractor shall provide work methods reflecting the presence of monitoring wells and trees that need to be preserved and of all other infrastructure or equipment already built or implemented during the Work. The existing monitoring wells to be maintained are presented in Appendix 1-6.
- 23.2.3.1.3 The Contractor shall also provide the layout of the temporary access required by the equipment and machinery for executing various phases of the work.
- 23.2.3.1.4 Before commencing work, the Contractor shall submit to the Engineer for approval the methods of work that he intends to use to carry out the profiling and surface preparation work.

23.2.3.2 Grubbing and Brush Clearing

- 23.2.3.2.1 Preliminary wood clearing work in sectors subject to capping was carried out in the spring of 2019. Only tree stumps and shrub stems were left in place following wood clearing. Before execution of the grading work (article 23.2.3.3), the surface of the areas which have to be capped and the drainage ditches which have to be profiled shall be grubbed and the brush cleared in order to eliminate any stump or vegetation extending past the surface of the land.
- 23.2.3.2.2 The work consists of cutting below or near the existing soil level the standing trees (if applicable), brush, shrubs, roots, stumps

and also partially buried logs and of eliminating the felled trees and also the debris strewn over the soil.

23.2.3.2.3 Stumps over 100 mm in diameter shall be pulled out to a depth of at least 200 mm.

23.2.3.2.4 Vegetable type materials removed during the grubbing and brush clearing work shall be chipped and spread on the land according to the Engineer's directives.

23.2.3.2.5 Any material coming from the work that cannot be shipped shall be managed in compliance with the directives of Section 3.

23.2.3.3 Grading of the Surface and the Drainage Ditches

23.2.3.3.1 The surface of the areas needing to be capped as well as those where circulation roads need to be implemented shall be graded. In some areas, new drainage ditches will also have to be laid out. This work shall be done as shown in the drawings R_078691_S23_P001, R_078691_S23_P002 and R_078691_S23_P004.

23.2.3.3.2 The Contractor shall provide appropriate grading equipment for the execution of the various phases of the grading work. In all cases, the equipment shall make it possible to do the grading work as specified. In the case of ditches, the equipment shall be provided with cutting-edge buckets (ditching bucket) in order to obtain a smooth surface on the walls and bottom.

23.2.3.3.3 For the execution of the work, the Contractor shall recommend a methodology to optimize the reuse of excavated material in areas requiring backfill. The excess material which cannot be reused for backfill shall, after approval of the Engineer, be segregated and managed according to the instructions from Section 3.

23.2.3.3.4 If required, and after approval from the Engineer, sand shall be used to complete backfill of zones required for surface grading works.

23.2.3.4 Construction of Anchor Trenches on Lateral Slopes

23.2.3.4.1 On lateral slopes, anchor trenches shall be constructed as shown in drawings R_078691_S23_P002 and R_078691_S23_P004. The Contractor is required to have the position and depth of each trench approved by the Engineer before going ahead with the placement of the geotextile (article 23.2.3.5.2).

23.2.3.4.2 This work shall be done using backhoes provided with cutting-edge buckets (ditching bucket) with which to obtain a smooth and undisturbed surface of the walls and bottom of the trenches.

23.2.3.4.3 Excavated material from trenches shall be reused for grading surfaces in areas requiring backfill (section 23.2.3.3.3). This excavated material cannot be reused for backfill purposes of anchor trenches.

23.2.3.5 Placement of Type 1 Geotextile

23.2.3.5.1 Storage and Handling

23.2.3.5.1.1 The Contractor is solely responsible for the storage and handling of geotextile rolls during the installation on the worksite. The Contractor shall provide a storage area with which to assure the safety of the workers and the protection of the materials against any mechanical abuse, breakage and theft. The geotextile shall be adequately protected in order to prevent the damage and/or deterioration of the material.

23.2.3.5.1.2 The mode of transport to the worksite as well as the unloading and handling techniques shall assure the integrity of the rolls as shall recommended by the manufacturer. Upon its arrival on the worksite, the Contractor shall indicate the following information on each roll so as to include it in its report:

- Product type;
- Roll dimensions;
- Material thickness;
- Roll number.

23.2.3.5.1.3 The Contractor shall document the quality control and a copy shall be returned to the Engineer for purposes of acceptance. Any problem and any damage found on the rolls shall lead to repair or exclusion if necessary. The rolls found to be unacceptable shall be promptly returned to the sender. Any damaged material shall be replaced or repaired to the Engineer's satisfaction.

23.2.3.5.2 Installation

23.2.3.5.2.1 The profiled areas to be capped and those where traffic roads are to be implemented shall be covered with a type 1 geotextile, as shown in drawings R_078691_S23_P001 and R_078691_S23_P004.

- 23.2.3.5.2.2 The Contractor shall submit the following documentation to the Engineer:
- The plan for on-site assembly of the geotextile panels were each roll is identified with a number;
 - Certification of acceptance of the surfaces. This certification can however be segmented so as to only accept a portion of the surfaces at a time.

No geotextile panel can be placed before the assembly plan has been accepted by the Engineer.

- 23.2.3.5.2.3 No panel may be deployed without prior verification of the surfaces by the Contractor. A written certificate of acceptance of the surfaces shall be submitted at the end of each day of work and it shall cover the portion of cell covered by the geosynthetics. The Engineer reserves the right to accept or refuse the surface of the bedding. Prior to the placement of the geotextile panels, the Contractor shall remove and discard from areas to be covered any debris, vegetation, snow, ice or other materials not in accordance with the requirements of this Quotation. Geotextile panels should not be placed on frozen or wet ground.

- 23.2.3.5.2.4 The placement techniques recommended by the Contractor shall prevent any damage to the geotextile. Any technique found inadequate by the Engineer will have to be corrected by the Contractor. The method used for placement of the geotextile shall minimize the folds (especially the differential folds between adjacent panels).

- 23.2.3.5.2.5 Following its placement, each panel will have to be clearly numbered by the Contractor. The numbering method recommended by the Contractor shall allow quickly retracing the history of each of the panels. In order to assure complete continuity and allow an adequate assembly, adjacent geotextile panels will have to overlap by at least 150 mm.

- 23.2.3.5.2.6 The Contractor shall provide work methods and equipment required for the placement of geotextile panels in anchor trenches, so as to allow the geotextile to follow perfectly the walls and bottom of all anchor trenches, as shown on drawing R_078691_S23_P004.

- 23.2.3.5.2.7 Following its placement, each panel will be visually verified by the Contractor in order to identify any damaged surface or any surface with abnormal appearance. Any panel or panel portion which is

damaged shall be repaired or replaced to the satisfaction of the Engineer.

23.2.3.5.2.8 The placement of each panel shall be annotated by the Contractor on an “as built” plan. Once completed, this plan shall be submitted to the Engineer for approval purposes.

23.2.3.5.2.9 Following placement of the panels, adequate loads (for example sandbags or tires) shall be placed on the geotextile in order to prevent lifting by the wind.

23.2.3.5.2.10 The Contractor is responsible for supplying and placing geotextile panels until the final acceptance of the geotextile work by the Engineer. This acceptance is only authorized after the Engineer’s approval of all quality control documents required by this document and submitted by the Contractor.

23.2.3.5.2.11 For this purpose, no covering or backfilling of the geotextile panels is authorized before final acceptance of the work by the Engineer. This final acceptance however can be segmented so as to only cover a portion of the surface of the completed work.

23.2.3.6 Placement of the Draining Layer

23.2.3.6.1 Once graded, the surface of the areas needing a final cap shall be covered with a 300 mm thick layer of sand, such as shown in the drawing R_078691_S23_P002.

23.2.3.6.2 The draining sand layer shall also be used for backfilling anchor trenches, as indicated in drawing R_078691_S23_P004.

23.2.3.6.3 Before the placement of the draining layer, the Contractor shall remove and dispose outside the backfill areas any debris, vegetation, snow, ice or other materials not complying with the requirements of the present Specifications.

23.2.3.6.4 The sand shall be placed with material and equipment best suited to the work to be done so as to form a homogeneous and continuous layer. The loading, transport, emptying and spreading shall be done so as to avoid any segregation. When segregation occurs, the materials shall be removed and replaced by materials meeting the requirements of the present Specifications.

23.2.3.6.5 The Contractor is fully responsible for the protection, maintenance and repair of the drainage layer throughout the duration of the work. He must plan and implement methods to control or minimize erosion of the protective layer. The Contractor must submit to the Engineer prior to the start of the work a description

of the erosion protection methods he intends to implement. Any area damaged by the action of the rain or any other cause shall be repaired in keeping with the requirements of the present Specification.

23.3 BIOGAS VENTILATION SYSTEM

23.3.1 General Information

23.3.1.1 The work described in this section shall include the complete supply of labor, materials, equipment and execution of all the work necessary for laying of the biogas ventilation system, as shown in the drawing R_078691_S23_P005 and as specified in this section.

23.3.1.2 The work described in this section comprises, without limitation, the following items:

- Excavation of trenches;
- Installing collection pipes;
- Backfilling trenches;
- Installing vents.

23.3.2 Materials

23.3.2.1 General Information

23.3.2.1.1 The Contractor is fully responsible for the sources of materials whether they come from the site or from outside. All backfill material shall be made of hard and durable particles and shall not contain organic material, snow, ice or other materials not complying with the requirements of the present specifications.

23.3.2.1.2 All materials shall be such as specified and approved by the Engineer before their transport onto the site. Any material placed without approval from the Engineer shall be removed and disposed of off-site.

23.3.2.1.3 The analyses and tests required for the approval of the materials shall be provided by the Contractor.

23.3.2.2 Clean Stone

Clean stone used around vents shall satisfy the requirements for coarse aggregate for cement concrete, 14-28 mm gauge from the Cahier des charges et devis généraux du Québec (CCDG), 2015 version.

23.3.2.3 Type 2 Geotextile

Type 2 geotextile used around vents shall be of nonwoven type. It must meet or exceed the following technical requirements. Testing must be done according to the Canadian General Standards Board (CGSB).

- | | | |
|-------------------------|--------------------|----------|
| • Tearing strength | (CAN 4.4 No. 12.2) | 360 N |
| • Tensile strength | (CAN148.1 No. 7.3) | 800 N |
| • Permeability | (CAN148.1 No. 4) | 0.2 cm/s |
| • Elongation at rupture | (CAN148.1 No. 7.3) | 45-105 % |

The Contractor shall submit to the Engineer prior to the start of the installation work, the copies of the documentation of his quality checks carried out during the manufacture of the geotextile rolls. In addition, this documentation must clearly allow the establishment of the history of each roll of geotextile produced as to the identification of the basic products used.

The Engineer reserves the right, in case of doubt, to have the geotextile rolls tested in an independent laboratory.

23.3.2.4 Collecting Pipes

Perforated pipes used for the construction of the biogas collection system shall be of the HDPE agricultural drain type, have a compressive stiffness of not less than 210 kPa and be covered with a polyester knit fabric having a Filtration opening diameter (FOS) of 450 µm. They must have a diameter of 100 mm.

23.3.2.5 PVC Pipes

The solid pipes used for laying out vents shall be Schedule 40 type PVC and have a diameter of 100 mm.

23.3.2.6 Fittings for Perforated Pipes

The fittings used for laying out the perforated HDPE pipes shall be HDPE and compatible with the pipes to be connected.

23.3.2.7 Elbows and Plugs for Solid Pipes

The elbows and plugs used at the ends of the vents shall be made of PVC and compatible with PVC pipes.

23.3.3 Execution

23.3.3.1 General Information

- 23.3.3.1.1 The Contractor shall provide work methods reflecting the presence of monitoring wells that need to be preserved and of all other infrastructure or equipment already built or implemented during the Work. The existing monitoring wells to be decommissioned before the work are presented in Appendix 1-6.
- 23.3.3.1.2 The Contractor shall also provide the layout of the temporary access required by the equipment and machinery for executing various phases of the work and also the arrangements necessary for the protection of the geomembrane or other elements of the final cap.
- 23.3.3.1.3 Before commencing the work, the Contractor must submit to the Engineer for approval, the methods of work that he intends to use to develop the biogas ventilation system

23.3.3.2 Trenches

- 23.3.3.2.1 The trenches will have to be excavated and have sections as shown in drawing R_078691_S23_P005. The Contractor is required to have the position and depth of the trench approved by the Engineer before going ahead with the placement of the collecting system (article 23.3.3.3).
- 23.3.3.2.2 This work shall be done using backhoes provided with cutting-edge buckets (ditching bucket) with which to obtain a smooth and undisturbed surface of the walls and bottom of the trenches. Sand excavated during this work shall be temporarily set aside in order to be used again to backfill the trenches (article 23.3.3.3).
- 23.3.3.2.3 The Contractor shall prevent runoff of surface water into the trenches and recover precipitation water accumulated inside the trenches into watertight tanks. This water shall be managed according to the directives from Section 3.

23.3.3.3 Collecting Pipes

- 23.3.3.3.1 The perforated collecting pipes shall be installed at the bottom of trenches, as shown in drawing R_078691_S23_P005.
- 23.3.3.3.2 Before placement in the trenches, the lines and fittings shall be cleaned of debris accumulated inside and inspected in order to uncover any defect. The defective pipes and fittings shall be removed from the worksite or repaired to the satisfaction of the Engineer.

23.3.3.3.3 The installation and assembly of the pipes shall be done according to the manufacturer's recommendations.

23.3.3.3.4 Once the collecting pipes are placed and the level and alignment verified, the trenches shall be backfilled with the excavated sand coming from the excavation of the trenches. Backfilling the trenches before the Engineer has accepted the installation of the collecting pipes is prohibited.

23.3.3.4 Vents

23.3.3.4.1 The vents shall be installed as shown in drawing R_078691_S23_P005.

23.3.3.4.2 During installation, the vertical HDPE pipes shall be placed inside holes of at least 1 meter × 1 meter (1 m x 1 m) dug in the soil, down to the required depth. One excavated, the bottom and walls of the holes shall be covered with a separation geotextile.

23.3.3.4.3 Before their placement inside the holes, the lower portion of the pipes shall be perforated such that they comprise 10 mm diameter openings below the level of the surface. The lower end of the pipes shall also be provided with a bottom plug.

23.3.3.4.4 Once the pipes are placed in the bottom of the holes, the annular space between the pipes and the walls of the holes shall be filled using clean stone up to the surface of the soil.

23.3.3.4.5 During the work, the Contractor shall perform verifications to confirm that the pipes are plumb. A 180° elbow shall be installed at the upper end of the pipes.

23.3.3.4.6 The surface of the holes filled with clean stone shall be covered with a protective geotextile.

23.3.3.4.7 During the vent installation work, the Contractor shall provide a work methodology and sequence which take into account the existence of the collecting pipes located inside a mass of clean stone surrounding the evacuation chimneys.

23.4 GEOMEMBRANE

23.4.1 General Information

23.4.1.1 Subject

The work to be performed includes the supply and installation of an HDPE geomembrane over the top and slopes of the zones to be capped, such as shown in the drawings and specified in the Specifications.

23.4.1.2 Information

- 23.4.1.2.1 At least one week before beginning installation of the geomembrane, provide the Engineer:
- Copies of the manufacturer's data sheets and certifications of the properties and tests done to comply with Article 23.4.2 of the present section.
 - Installation drawing showing the types of joints and showing the details of connections to the structures. This drawing shall be prepared by the Contractor and submitted to the Engineer for review.
 - The schedule for the work.
 - A written guarantee from the manufacturer stating that for a minimum period of 20 years the geomembrane will retain its physical properties.
- 23.4.1.2.2 At the latest, one month after installation of the geomembrane, provide the Engineer:
- A written guarantee from the Contractor stating that for a period of 10 years the welds and also the connections to the structures will maintain their tightness.
 - As built drawings and also the quality control report for the product and the welds.

23.4.2 Materials

23.4.2.1 Raw Materials

- 23.4.2.1.1 The geomembrane shall be made of new, high-quality plastic and high density polyethylene (HDPE). The plastic shall meet the following technical requirements:
- Density (ASTM D1505/D792 Meth. B) >0.932 g/cm³
 - Fluidity Index (ASTM D1238 Condition E) 1.0 g/10 min maximum
- 23.4.2.1.2 These tests shall be done by the manufacturer with a frequency of one test per mix (batch).
- 23.4.2.1.3 No recovered polymer may be added to the plastic (however, the use of recycled polymer during the manufacturing process is allowed if cleanliness measures are respected and if the recycled polymer has the same composition as the plastic and if the addition does not exceed 2% by weight).

23.4.2.2 Rolls

Before the beginning of installation work, the manufacturer of the geomembrane rolls shall submit to the Engineer the copies of the documentation of its quality controls done during fabrication of the geomembrane rolls. Additionally, this documentation shall clearly allow the establishment of the history of each geomembrane roll produced as to the identification of the base plastics used.

23.4.2.2.1 The textured geomembrane (HDPE) shall have a 1.0 mm nominal thickness and shall meet or exceed the following technical requirements. The tests shall be done according to ASTM, FTMS (Federal Test Methods Standards, U.S.A.) and NSF (National Sanitation Foundation, "Standards for Flexible Membrane Liners", Standard Number 54).

- | | | |
|-------------------------------------|----------------------|--------------------------|
| • Thickness | (ASTM D5994) | 1.0 mm |
| • Minimum height of roughness | (ASTM D7466) | 0.25 mm |
| • Density | (ASTM D1505) | >0.940 g/cm ³ |
| • Tensile strength at elastic limit | (ASTM D6693 Type IV) | 14.5 KN/m minimum |
| • Tensile strength at rupture | (ASTM D6693) | 10 KN/m minimum |
| • Elongation at elastic limit | (ASTM D6693) | 12% minimum |
| • Elongation at rupture | (ASTM D6693) | 100% minimum |
| • Tearing strength | (ASTM D1004) | 125 N minimum |
| • Puncture strength | (ASTM D4833) | 267 N minimum |

23.4.2.2.2 During manufacturing, the geomembrane shall be tested by the manufacturer every 4,000 m².

23.4.2.2.3 Additionally, the geomembrane shall:

- Be made of unreinforced high density polyethylene (HDPE) containing a maximum of 3% by weight of additives.
- Not have surface striations, roughness, perforations or bubbles.
- Be produced so as to be free of holes, folds, concentrations of raw materials or any sign of contamination with foreign matter.

23.4.2.3 Preassembly of Geomembrane Panels

The preassembly of geomembrane panels is defined as any assembly done off-site. Preassembly can be necessary for forming specific geometric pieces or for large-size panels.

Before the beginning of installation work, the preassemble of geomembrane panels shall submit the following documentation to the Engineer for purposes of acceptance:

- Copies of the documentation for quality control done during preassembly of the geomembrane panels. Additionally, this documentation shall clearly allow the establishment of the history of each preassembled geomembrane panel as to the identification of the geomembrane rolls used.

23.4.2.4 Joints Formed in Factory and at the Worksite

23.4.2.4.1 The joints formed in factory and at the worksite shall meet the following technical requirements.

- Shear strength (ASTM D6392) 14 KN/m minimum
- Peeling resistance (ASTM D6392) 9 KN/m minimum

23.4.2.4.2 The manufacturer or Contractor shall do one destructive test on every 150 m of joints. The destructive tests performed shall comply with Article 23.4.3.2.5.

23.4.3 Execution

23.4.3.1 Storage and Handling

23.4.3.1.1 The Contractor is solely responsible for the storage and handling of geomembrane rolls during the installation on the worksite. The Contractor shall provide a storage area with which to assure the safety of the workers and the protection of the materials against any mechanical abuse, breakage and theft. The geomembrane shall be adequately protected in order to prevent the damage and/or deterioration of the material.

23.4.3.1.2 The mode of transport to the worksite as well as the unloading and handling techniques shall assure the integrity of the rolls as shall recommended by the manufacturer. Upon its arrival on the worksite, the Contractor shall indicate the following information on each roll so as to include it in its report:

- Product type;
- Roll dimensions;
- Material thickness;
- Roll number.

23.4.3.1.3 The Contractor shall document the quality control and a copy shall be returned to the Engineer for purposes of acceptance. Any problem and any damage found on the rolls shall lead to repair or exclusion if necessary. The rolls found to be unacceptable shall be promptly returned to the sender. Any damaged material shall be replaced or repaired to the Engineer's satisfaction.

23.4.3.2 Installation

23.4.3.2.1 The Contractor shall submit the following documentation to the Engineer:

- The plan for on-site assembly of the geomembrane panels where each roll is identified with a number;
- Certification of acceptance of the surfaces. This certification can however be segmented so as to only accept a portion of the surfaces at a time.

23.4.3.2.2 No geomembrane panel can be placed before the assembly plan has been accepted by the Engineer.

23.4.3.2.3 Placement of the geomembranes:

- Any panel deployed during one day shall be assembled during the same day. No panel may be deployed if it cannot be assembled during the same day.
- No panel may be deployed without prior verification of the surfaces by the Contractor. For this purpose, all objects, stones or roots which could damage the panels shall be removed from the bedding. A written certificate of acceptance of the surfaces shall be submitted at the end of each day of work and it shall cover the portion of cell covered by the geosynthetics. The Engineer reserves the right to accept or refuse the surface of the bedding.
- The placement techniques recommended by the Contractor shall prevent any damage to the geomembrane. Any technique found inadequate by the Engineer will have to be corrected by the Contractor. The method used for placement of the geomembrane shall minimize the folds (especially the differential folds between adjacent panels).
- Following its placement, each panel will have to be clearly numbered by the Contractor. The numbering method recommended by the Contractor shall allow quickly retracing the history of each of the panels. In order to assure complete continuity and allow an adequate assembly, adjacent geomembrane panels will have to overlap by at least 150 mm.

- Following its placement, each panel will be visually verified by the Contractor in order to identify any damaged surface or any surface with abnormal appearance. Any panel or panel portion which is damaged shall be repaired or replaced to the satisfaction of the Engineer.
- The placement of each panel shall be annotated by the Contractor on an “as built” plan. Once completed, this plan shall be submitted to the Engineer for approval purposes.
- Following placement of the panels, adequate loads (for example sandbags or tires) shall be placed on the geomembrane in order to prevent lifting by the wind.

23.4.3.2.4 Assembly of the Panels

- Only assembly techniques by double thermal welds (dual track welded seams) are allowed, except for connections with lines and infrastructure where single welds by chemical fusion, adhesive or thermal fusion are accepted. Only staff whose technical or professional information will have been submitted and approved by the Engineer during the qualification of the participants are allowed to supervise and operate assembly and quality control equipment.
- Assembly of the panels is only allowed after completion of the following procedures:
 - Suitable alignment of the panels;
 - Cleanness of the assembly surfaces;
 - Drying of the assembly surfaces (the Contractor shall continually remove any liquid found on the sections ready to be welded and/or to receive membranes);
 - Calibration of the assembly equipment.
- The welding of the joints cannot be done at an ambient temperature below 0°C or during precipitation.
- At the beginning of each day and following drastic changes in climatic conditions, the calibration of all the assembly equipment shall be done and documented by the Contractor according to the following procedures:
 - The calibration of the equipment shall be done by tests conducted directly on geomembrane samples under the same atmospheric conditions as those anticipated during the assembly of the panel;
 - The Contractor gathers a sample about 600 mm long for which the weld is centered along the width of the sample;
 - These samples shall be tested on the worksite using a calibrated portable strain gauge.

- The Contractor then documents all the weld parameters for each of the calibrated equipment:
 - Date and time;
 - Device identification;
 - Technician identification;
 - Melting point;
 - Feed speed;
 - Quantitative results from the mechanical tests.
- No assembly equipment may be used without prior conclusive calibration test. All documentation from the calibration tests done by the Contractor shall be submitted to the Engineer for approval purposes.
- The Contractor shall document the assembly of the geomembrane panels by reading the following information for each weld performed:
 - Date and time;
 - Weld identification;
 - Identification of the corresponding panels;
 - Identification of the equipment used;
 - Identification of the corresponding calibration;
 - Technician identification.
- A copy of this documentation shall be submitted to the Engineer for approval purposes.

23.4.3.2.5 Holes for Pipes or Infrastructure

- Openings shall be laid out in the area where pipes or other structures pass through the geomembrane. These openings shall have rounded corners so as to prevent any propagation of tears. In the area of the openings, the geomembrane shall be weighted down with sandbags or tires in order to prevent any lifting due to the wind and this shall be done until placement of connections to the pipes or structures.
- Unless indicated otherwise, the Contractor shall perform the connection to the pipes and infrastructure passing through the geomembrane and supply the materials, equipment and labor required for this work.
- Each connection shall be made up of the same materials that specified for the geomembrane, that is a 1.0 mm thick HDPE membrane. Connections shall be assembled by chemical fusion, adhesive or thermal welds according to the Engineer's directives. The connections shall be perfectly placed and adjusted so as to avoid the formation of folds at the interface with the geomembrane, as shown in the drawing R_078691_S23_P004. The geomembrane under the connection shall remain in contact with the underlying soil.

- Any unsatisfactory connection shall be replaced or repaired according to the Engineer's instructions.

23.4.3.2.6 Nondestructive Testing

- Each weld made on the worksite shall be the subject of a nondestructive test in order to verify the complete continuity. In the case of single welds, tests using a vacuum chamber shall be done according to the ASTM D-5641-94 (2006) standard "Standard practice for Geomembrane Seam Evaluation by Vacuum Chamber".
- In the case of double welds (dual track welded seams), the channel located between the two welds shall be sealed at each end and pressurized using a compressor and manometer. These pressure hold tests inside the channel shall be done conforming to the ASTM D5820-95 (2001) e1 standard "Standard practice for Pressurized Air Chanel Evaluation of Dual Seamed Geomembranes".
- The contractor shall document these nondestructive tests by reading the following information for each tested weld.
- Date and time;
 - Weld identification;
 - Identification of the equipment used;
 - Test results;
 - Technician identification.
- A copy of this documentation shall be submitted to the Engineer for approval purposes.
- Any defective weld or partial weld shall be repaired.

23.4.3.2.7 Destructive Testing

- Destructive testing shall be done by the Contractor in order to verify the mechanical resistance the welds of the geomembrane panels assembled on the worksite. The frequency of one test for every 150 m of weld is required. In each area indicated, the contractor shall collect a sample at least 0.45 m long by 0.3 m wide and whose weld is centered along the width of the sample.
- The Contractor shall work with the services of a laboratory in order to perform the verification of the mechanical strength of the welds. Five specimens 25 mm wide collected at each end of the sample shall be tested for peeling resistance and shearing strength according to the standard ASTM D6392. Among these, four specimens shall meet or exceed the requirements relating to the peeling resistance and shearing strength specified in Article 23.4.3.2.5. The fifth specimen shall meet or exceed 80% of these values. Additionally, the requirements

from the ASTM D6392 standard relating to the percentage separation from peeling and also the rupture mode shall also be satisfied.

- Following at least one negative result, the contractor shall proceed with the identification of the scope of the corresponding noncompliant welds according to the method of its choice. The recommended method shall however provide the certainty that each weld is delimited on either side by satisfactory laboratory tests.
- Any defective weld or partial weld shall be repaired. The Contractor shall document all its destructive test procedures by reading all the following information and a copy of it shall be submitted to the Engineer for purposes of approval:
 - Date and time of collection;
 - Identification of the destructive test;
 - Weld identification;
 - Quantitative results of the mechanical strength tests;
 - Technician identification;
 - Location of the destructive test.

23.4.3.2.8 Defects and Repairs

- Defective welds shall be repaired by reconstruction. Very small openings in the geomembrane can be repaired by welding whereas the larger defects shall be corrected by patching. The patches shall be round or oval, made of the same geomembrane and extend past the edge of the defects by at least 75 mm.
- The reconstruction of joints shall be done by cutting the existing weld and welding a replacement strip.
- Each repair shall be tested by nondestructive methods.

23.4.3.2.9 Acceptance of the Work

- The Contractor is responsible for supplying and placing geomembrane panels until the final acceptance of the geomembrane work by the Engineer. This acceptance is only authorized after the Engineer's approval of all quality control documents required by this document and submitted by the Contractor.
- For this purpose, no covering or backfilling of the geomembrane panels is authorized before final acceptance of the work by the Engineer. This final acceptance however can be segmented so as to only cover a portion of the surface of the completed work.

23.5 SYNTHETIC DRAIN

23.5.1 General Information

23.5.1.1 Subject

The work to be performed includes the supply and installation of a synthetic drain on the lateral slopes of the cells, such as shown on the drawings R_078691_S23_P003 and R_078691_S23_P004 and specified in the present section.

23.5.1.2 Information

23.5.1.2.1 At least one week before beginning installation of the synthetic drain, provide the Engineer:

- Copies of the manufacturer's data sheets and certifications of the properties and tests done to comply with requirements in Article 23.5.2 of this Specification.
- Installation drawing showing the types of joints and showing the details of connections to the structures, if needed. This drawing shall be prepared by the Contractor and submitted to the Engineer for approval.
- The schedule for the work.
- A written guarantee from the manufacturer stating that for a minimum period of 10 years the synthetic drain will retain its physical properties.

23.5.1.2.2 At the latest, one month after installation of the synthetic drain, provide the Engineer:

- As built drawings and also the quality control report for the product.

23.5.2 Materials

23.5.2.1 The synthetic drain shall consist of a geocomposite made up of a geonet covered with nonwoven geotextiles adhered on both sides of the geonet. It shall meet or exceed the following technical requirements. The tests shall be done according to ASTM, FTMS (Federal Test Methods Standards, U.S.A.) and NSF (National Sanitation Foundation, "Standards for Flexible Membrane Liners", Standard Number 54).

23.5.2.1.1 Geonet

- | | | |
|-------------|--------------|-----------------------------------|
| • Thickness | (ASTM D5199) | 5.6 mm ± 10% |
| • Density | (ASTM D1505) | 0.94 g/cm ³
minimum |
| • Tensile | (ASTM D5035) | 7.9 KN/m |

	strength		minimum
	• Transmissivity	(ASTM D4716)	$1 \times 10^{-3} \text{ m}^2/\text{sec}$ minimum
23.5.2.1.2	Geotextile		
	• Tearing resistance	(ASTM D3786)	267 N minimum
	• Grab strength	(ASTM D4632)	668 N
	• Permeability	(ASTM D4491)	$4.8 \times 10^{-1} \text{ m}^2/\text{sec}$
	• Mullen Bursting Strength	(ASTM 3786)	2.2 kPa
	• Ultimate elongation	(ASTM D4632)	50%
23.5.2.1.3	Composite		
	• Transmissivity	(ASTM D4716)	$1 \times 10^{-4} \text{ m}^2/\text{sec}$
23.5.2.2	Before the beginning of installation work, the Contractor shall submit to the Engineer the copies of the documentation of its quality controls done during fabrication of the synthetic drain rolls. Additionally, this documentation shall clearly allow the establishment of the history of each synthetic drain roll produced as to the identification of the base products used.		
23.5.2.3	The Engineer reserves the right, in case of doubt, to have the synthetic drain rolls tested in an independent laboratory.		

23.5.3 Execution

23.5.3.1 Storage and Handling

23.5.3.1.1 The Contractor is solely responsible for the storage and handling synthetic drain rolls during the installation on the worksite. The Contractor shall provide a storage area with which to assure the safety of the workers and the protection of the materials against any mechanical abuse, breakage and theft. The synthetic drain shall be adequately protected in order to prevent the damage and/or deterioration of the material.

23.5.3.1.2 The mode of transport to the worksite as well as the unloading and handling techniques shall assure the integrity of the rolls as recommended by the manufacturer. Upon its arrival on the worksite, the Contractor shall indicate the following information on each roll so as to include it in its report:

- Product type;
- Roll dimensions;

- Material thickness;
- Roll number.

23.5.3.1.3 The Contractor shall document the quality control and a copy shall be returned to the Engineer for purposes of acceptance. Any problem and any damage having been found on the rolls shall lead to repair or exclusion if necessary. The rolls found to be unacceptable shall be promptly returned to the sender. Any damaged material shall be replaced or repaired to the Engineer's satisfaction.

23.5.3.2 Installation

23.5.3.2.1 The Contractor shall submit the following documentation to the Engineer:

- The plan for on-site assembly of the synthetic drain panels where each panel is identified with a number;
- Certification of acceptance of the surfaces. This certification can however be segmented so as to only accept a portion of the surfaces at a time.

23.5.3.2.2 No synthetic drain panel can be placed before the assembly plan has been accepted by the Engineer.

23.5.3.2.3 Placement of the Synthetic Drain

- Any panel deployed during one day shall be assembled during the same day. No panel may be deployed if it cannot be assembled during the same day.
- No panel may be deployed without prior verification of the surfaces by the Contractor. A written certificate of acceptance of the surfaces shall be submitted at the end of each day of work and it shall cover the portion of land covered by the geosynthetics. The Engineer reserves the right to accept or refuse the surface of the bedding.
- The placement techniques recommended by the Contractor shall prevent any damage to the synthetic drain and the underlying geomembrane. Any technique found inadequate by the Engineer shall be corrected by the Contractor. The method used for placement of the synthetic drain panels shall minimize the folds (especially the differential folds between adjacent strips).
- Following its placement, each panel shall be clearly numbered by the Contractor. The numbering method recommended by the Contractor shall allow quickly retracing the history of each of the panels. In order to assure complete continuity and allow

an adequate assembly, adjacent synthetic drain panels will have to overlap by at least 150 mm.

- Following its placement, each panel shall be visually verified by the Contractor in order to identify any damaged surface or any surface with abnormal appearance. Any panel or panel portion which is damaged shall be repaired or replaced to the satisfaction of the Engineer.
- The placement of each panel shall be annotated by the Contractor on an “as built” plan. Once completed, this plan shall be submitted to the Engineer for approval purposes.
- Following placement of the panels, adequate loads (for example sandbags or tires) shall be placed on the synthetic drain in order to prevent lifting by the wind.

23.5.3.2.4 Assembly of the Strips on the Worksite

- Each synthetic drain panel shall be attached to the adjacent panels by means of nylon attachment-cables installed on the worksite. The separation of the attachments shall be 0.9 m on slopes and 1.5 m on the flats.

23.5.3.2.5 Acceptance of the Work

- The Contractor is responsible for supplying and placing synthetic drain panels until the final acceptance of the synthetic drain work by the Engineer. This acceptance is only authorized after the Engineer’s approval of all quality control documents required by this section of the Specifications and submitted by the Contractor.
- For this purpose, no covering or backfilling of the synthetic drain panels is authorized before final acceptance of the work by the Engineer. This final acceptance however can be segmented so as to only cover a portion of the surface of the completed work.

23.6 PROTECTIVE AND DRAINAGE LAYER

23.6.1 General Information

The work for placement of the protective layer on the surfaces made impermeable shall be done such as shown in the drawing R_078691_S23_P004 and as specified in this section

23.6.2 Materials

23.6.2.1 General Information

- 23.6.2.1.1 The Contractor is fully responsible for the sources of materials whether they come from the site or from outside. All backfill material shall be made of hard and durable particles and shall not contain organic material, snow, ice or other materials not complying with the requirements of the present section.
- 23.6.2.1.2 All materials shall be such as specified and approved by the Engineer before their transport onto the site. Any material placed without approval from the Engineer shall be removed and disposed of off-site.
- 23.6.2.1.3 The analyses and tests required for the approval of the materials shall be provided by the Contractor.

23.6.2.2 Sand

The sand used for laying the protective layer on the surface of the areas being capped shall not comprise any particle with dimensions over 10 mm and shall have a hydraulic conductivity of at least 5×10^{-3} cm/s. For that purpose, the Contractor shall provide the Engineer for approval at least one grain size analysis representative of each batch of 5000 m³ of sand used and the results of at least one permeability test done on a representative sample of sand.

23.6.2.3 Net Stone

The net stone used for the development of the drainage layer at the foot of the slopes of the cell must meet the requirements for large aggregates for concrete cement, caliber 14-28 mm of the specifications and general specifications of Quebec (CCDG), edition 2015

23.6.2.4 Type 1 Geotextile

The Type 1 geotextile used under the draining layer and the circulation road shall be of nonwoven type. It shall meet or exceed the following technical requirements. All tests must be carried out in compliance to the Canadian General Standards Board (CGSB).

- | | | |
|-------------------------|--------------------|-----------|
| • Tearing strength | (CAN 4.4 No. 12.2) | 400 N |
| • Tensile strength | (CAN148.1 No. 7.3) | 1000 N |
| • Permeability | (CAN148.1 No. 4) | 0,23 cm/s |
| • Bursting Strength | (CAN 4.2 No. 11.1) | 2,67 kN |
| • Elongation at rupture | (CAN148.1 No. 7.3) | 50-105 % |

Before the start of installation work, the Contractor shall submit to the Engineer copies of documentation pertaining to quality control carried out during fabrication of geotextile rolls. In addition, the documentation must clearly allow the establishment of the history of each geotextile roll produced as to the identification of the base products used.

The Engineer reserves the right, in case of doubt, to have the geotextile rolls tested in an independent laboratory.

23.6.3 Execution

23.6.3.1 General Information

23.6.3.1.1 The execution of the work described in the present technical section shall be done after the placement of the geomembrane and synthetic drain. The Contractor shall provide a sequence and methods of work allowing the full execution of this work while also preserving the integrity of the geomembrane, synthetic drain, biogas ventilation system or any other existing infrastructure.

23.6.3.1.2 The Contractor shall also provide the layout of the temporary access required by the equipment and machinery for executing various phases of the work.

23.6.3.2 Placement of the Protective Layer

23.6.3.2.1 The surface of the areas needing a final cap shall be covered with a 0.45 m thick homogeneous layer of sand, such as shown in the drawing R_078691_S23_P004.

23.6.3.2.2 Prior to the placement of the protective layer, the Contractor shall remove and discard any debris, vegetation, snow, ice or other material outside the embankment areas that does not comply with the requirements of this Specification. The protective layer should not be placed on frozen or wet ground

23.6.3.2.3 The sand shall be placed with material and equipment best suited to the work to be done so as to form a homogeneous and continuous layer. The loading, transport, emptying and spreading shall be done so as to avoid any segregation. When segregation occurs, the materials shall be removed and replaced by materials meeting the requirements of the present Specifications.

23.6.3.2.4 The Contractor is fully responsible for the protection, maintenance and repair of the protective layer throughout the duration of the work and during the period of establishment of the vegetation providing protection against erosion (section 3). During this period, he must plan and implement methods to control or

minimize erosion of the protective layer. The Contractor must submit to the Engineer prior to the start of the work a description of the erosion protection methods he intends to implement. Any area damaged by the action of the rain or any other cause shall be repaired in keeping with the requirements of the present Specifications.

23.6.3.3 Setting up a Drainage Layer at the Foot of the Slope

- 23.6.3.3.1 A clean stone peripheral drainage layer shall be placed at the foot of the lateral slopes of the cell, as shown in drawing R_078691_S23_P004.
- 23.6.3.3.2 The clean stone shall be placed directly on the synthetic drain so as to form a uniform layer of 300 mm across the entire width of the road.
- 23.6.3.3.3 The clean stone shall be placed without compaction. The installation procedure and the equipment used must be adapted so as not to damage the underlying geomaterials (geomembrane and synthetic drain).
- 23.6.3.3.4 The surface of the net stone shall be covered with a type 1 geotextile. The placement of the Type 1 geotextile shall be in accordance with the requirements of section 23.2.3.5

23.7 TOP SOIL

23.7.1 General Information

The work for placement of the top soil layer on the capped surfaces shall be done such as shown in the drawing R_078691_S23_P004 and as specified in this section

23.7.2 Materials

23.7.2.1 General Information

- 23.7.2.1.1 The Contractor is fully responsible for the sources of materials whether they come from the site or from outside.
- 23.7.2.1.2 All materials shall be such as specified and approved by the Engineer before their transport onto the site. Any material placed without approval from the Engineer shall be removed and disposed of off-site.
- 23.7.2.1.3 The analyses and tests required for the approval of the materials shall be provided by the Contractor.

23.7.2.2 Topsoil

- 23.7.2.2.1 Topsoil used on the surface of the areas being covered shall be Type 1 conforming to the requirements of article 11.2.5 of the Section 11 of the present Specifications.

23.7.3 Execution

23.7.3.1 General Information

- 23.7.3.1.1 The work described in the present technical section shall be done after the placement of the set of elements making up the final cap. The Contractor shall provide a sequence and methods of work allowing the full execution of this work while also preserving the integrity of the protective layer, geomembrane, synthetic drain, biogas ventilation system or any other existing infrastructure.
- 23.7.3.1.2 The Contractor shall also provide the layout of the temporary access required by the equipment and machinery for executing various phases of the work.

23.7.3.2 Placement of the Top Soil

- 23.7.3.2.1 The surface of the capped areas shall be covered with a 0.15 m thick uniform layer of top soil, such as shown in the drawing R_078691_S23_P004.
- 23.7.3.2.2 The topsoil shall be spread at most seven days before the seeding work described in article 3.13.3 of Section 3.
- 23.7.3.2.3 The top soil shall not be spread on frozen or wet soil.
- 23.7.3.2.4 The top soil shall be placed with material and equipment best suited to the work to be done so as to form a homogeneous and continuous layer. The loading, transport, emptying and spreading shall be done so as to avoid any segregation. When segregation occurs, the materials shall be removed and replaced by materials meeting the requirements of the present specifications.
- 23.7.3.2.5 The topsoil placed shall be compacted, but not packed. The topsoil which was set aside, shall be crumbled before spreading it.
- 23.7.3.2.6 The apparent density of the soil after spreading shall not exceed 1,800 kg/m³.
- 23.7.3.2.7 The Contractor shall be fully responsible for the protection, maintenance and repair of topsoil throughout the duration of the Work and during the erosion protection establishment period. (section 3). During this period, he must plan and implement methods to control or minimize erosion of topsoil. The Contractor

must submit to the Engineer prior to the start of the work a description of the erosion protection methods he intends to implement. Any area damaged by the action of the rain or any other cause shall be repaired in keeping with the requirements of the present specification.

23.8 CIRCULATION ROADS

23.8.1 General information

Circulation roads shall be provided, as shown in drawings R_078691_S23_P003 and R_078691_S23_P004 and as specified in this section.

23.8.2 Materials

23.8.2.1 General

- 23.8.2.1.1 The Contractor is solely responsible for the sources of materials that come from the site or from outside.
- 23.8.2.1.2 All materials must be as specified and approved by the Engineer prior to transportation to the site. Any material put in place without the approval of the Engineer must be removed and disposed off site.
- 23.8.2.1.3 The analyzes and tests required for the approval of materials shall be provided by the Contractor.

23.8.2.2 Crushed Stone 0-56 mm

The crushed stone required for the development of the wearing course at the traffic paths shall have a grain size in the range 0-56 mm. The crushed stone must consist of hard and strong particles and be free from organic matter or other deleterious substances.

23.8.3 Execution

23.8.3.1 General

- 23.8.3.1.1 The Contractor shall provide a sequence and methods of work for the complete performance of the work described in this section while preserving the integrity of the protective layer, the geomembrane, the synthetic drain, the system biogas or any other existing infrastructure.
- 23.8.3.1.2 The Contractor shall also provide for the temporary access required by the equipment and machinery for the completion of the various phases of the work.

23.8.3.2 Setting up the Granular Layer

- 23.8.3.2.1 The granular layer may not be placed directly on the surface of existing soils or other granular materials previously installed. The surface on which the granular layer is to be laid must have been previously covered with a Type 1 geotextile in accordance with the requirements of sections 23.2.3.5.2.1 and 23.6.3.3.4.
- 23.8.3.2.2 The crushed stone 0-56 mm shall be placed directly on the Type 1 geotextile so as to form a uniform layer of 300 mm over the entire width of the road, as shown in drawing R_078691_S23_P004.
- 23.8.3.2.3 The crushed stone shall be placed in a single layer compacted to 95% of the Modified Proctor. The installation procedure and the equipment used must be adapted so as not to damage the underlying geomaterials (geotextile, synthetic drain, geomembrane).



TechnoRem

**Public Services and
Government Services Canada**

**Implementation of environmental
mitigation measures at the former
Contrecoeur landfill**

**ANNEX A
TECHNICAL SPECIFICATIONS**

REFERENCE: R.078691.200

July 2019

**FENCE
SECTION 79**

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79.3.1 Installation	4



79.1 GENERAL

79.1.1 Scope of Work

79.1.1.1 The work described in this section includes the supply, delivery, and installation as well as guarantees for the fences and gates needed for the Project. Construction details appear in Drawing R_078691-S79-P001 while the approximate location and configuration of the protective fence can be seen in Drawing R_078691-S79-P002.

79.1.1.2 The exact location of the fence must be determined by the Contractor and submitted to the Client for approval. The fence shall be completely located within Site limits and its location shall take into account infrastructures, existing or installed during the Work, in particular the Final Site Capping, slopes and ditches.

79.1.2 Reference Standards

79.1.2.1 ASTM A53/A53M, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.

79.1.2.2 ASTM A90/A90M, Standard Test Method for Weight [Mass] of Coating on Iron and Steel items with Zinc or Zinc-Alloy Coatings.

79.1.2.3 ASTM A121, Standard Specification for Zinc-Coated (Galvanized) Steel Barbed Wire.

79.1.2.4 A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

79.1.2.5 ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

79.1.2.6 CAN/CGSB - 138.1, Fabric for Chain Link Fence.

79.1.2.7 CAN/CGSB - 138.2, Steel Framework for Chain Link Fence.

79.1.2.8 CAN/CGSB - 138.3, Installation of Chain Link Fence.

79.1.2.9 CAN/CGSB - 138.4, Gates for Chain Link Fence.

79.1.2.10 CAN/CGSB-1.181, Ready-Mixed Organic Zinc-Rich Coating.

79.1.2.11 CSA A23.2/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.



79.2 PRODUCTS AND MATERIALS

79.2.1 Materials

79.2.1.1 Concrete mix

- Strength: 25 MPa at 28 days
- Entrained air: 6% ± 1%
- Nominal coarse aggregate size: 20 mm.
- Conform to CSA A23.1.

79.2.1.2 Fence

- The fabric of the fence must be tiled, 50 mm x 50 mm of dip-galvanized wire, 9 gauge, to CAN/CGSB - 138.1.
- Each strand of the fence's fabric must be able to withstand a tensile test of 550 MPa.
- The height of the fence must be 1.83 m (6 ft) from the ground. To facilitate maintenance, the base of the fence's chain link fabric should be located 102 mm above the ground surface.
- The intermediate fenceposts must be galvanized O-rail posts, 60.3 mm in diameter. They are placed at 2.4m c.t.c., measured parallel to the ground.
- The endposts and brace posts must be made of standard galvanized pipe, schedule 40, with an outer diameter of 88.9 mm in diameter, with minimum weight of 11.22 kg/m linear.
- The posts must be made up of continuously welded pipe and include a minimum of 550 g of zinc per square meter of surface (ASTM A90 - 69L 178).
- The tubal spacer should consist of high-strength, galvanized schedule 40 pipe with an outer diameter of 43 mm and a minimum weight of 2.48 kg/m linear.
- The ties should be simple strands, made of aluminum or steel wire 5 mm in diameter, galvanized, and consistent with requirements for chain link fabric.
- The frame of the gates must be made of electric resistance welded galvanized pipe 43 mm in diameter. The fabric must be the same as the fence's. 33 mm spacers must be installed as needed depending on the dimensions of the gate. The gate will include malleable cast iron hinges, latches, stops, and all other necessary hardware and must conform to the standard CAN/CGSB - 138.4, "Gates for Chain Link Fence." Single or double gate latches must be constructed so as to receive a lock which can be opened or closed from the outside and inside.
- The gates must have a height of 1.83 m (6 ft) from the ground.



- All metal parts must be galvanized according to the CAN/CGSB - 138.2 standard.
- The tension bars used to stretch the fence must have dimensions of at least 3 mm x 20 mm as their section and be made of galvanized steel.
- The assembly parts and hardware must be made of an alloy of melted aluminum, galvanized steel, or malleable or ductile cast-iron. Post caps to seal the tops must be fixed firmly on poles and support the top crossbar. Turnbuckles must be press-forged.

79.2.1.3 Padlocks

- The Contractor shall provide six (6) padlocks and six (6) chains with nine (9) master keys.

79.2.1.4 Panels

- The Contractor must install on each of the three gates, two (2) “no entry” panels which will be provided by the Client. These panels have dimensions of 600 mm x 300 mm, unless otherwise specified by the Client.
- The Contractor must provide and install on the fence every fifty (50) metres, a panel with the dimensions of 600 mm x 300 mm.
- The lettering must be black on a white background, engraved on waterproof material with the following text:

Gouvernement du Canada/Government of Canada

Accès interdit

No entry

79.3 EXECUTION

79.3.1 Installation

- 79.3.1.1 The Contractor must refer to Drawing R_078691-S79-P002 for the approximate location of the fence and gates and Drawing R_078691-S79-P001 for details.
- 79.3.1.2 The Contractor must build the fence to the standard CAN/CGSB - 138.3 "Installation of Chain Link Fence".
- 79.3.1.3 The intermediate posts shall be driven 950 mm into concrete and all the other posts (angle, end, corner, etc.) shall be driven 1280 mm into concrete.



-
- 79.3.1.4 In any ground other than bedrock, the bases must be cast in "SONOTUBE" concrete tubes for their full height. Concrete finishing at the top of the tubes must be done in such a way as to avoid the presence of standing water and to minimize infiltration.
- 79.3.1.5 The spacing between each post, intermediate or otherwise, must be 2.4 meters. All posts must be installed plumb, upright, aligned, and at the center of the concrete bases.
- 79.3.1.6 The brace posts must be installed every 30 meters maximum, wherever the fence changes direction and at locations where the 2.4 meter spacing cannot be applied.
- 79.3.1.7 The chain link fabric must be set on the outside face of the posts with regard to the Site, and attached to the posts at all 300 mm. Make at least two twists on the ties.
- 79.3.1.8 All fittings and accessories required for the erection of the fence should be installed.
- 79.3.1.9 The fence must be tensioned to the maximum tension permitted without deforming the meshes or decreasing the size of the material, and must then be linked to the posts and the horizontal crosspieces.
- 79.3.1.10 All bolts must be riveted.
- 79.3.1.11 The caps of the poles must form a rain-proof seal.
- 79.3.1.12 End posts must be installed at the ends of the fence and near buildings, and on both sides of the gates.
- 79.3.1.13 Spacers must be installed between the end, gate, and nearest middle posts. Place them in the middle of the panel parallel to the surface of the ground. Place the spacers in the same way on each side of the angle and anchor posts.
- 79.3.1.14 An angle post 88.9 mm in diameter with two (2) brace ties must be installed when the alignment change exceeds a 30° angle.
- 79.3.1.15 Gate stops must be installed in the center and on each side of the doors to limit opening at 90° or another angle of opening given by the Engineer.
- 79.3.1.16 The two gates located along the Rang du Ruisseau must be double gates allowing an opening clearance of 7 m at minimum. The rear gate must be a simple gate.

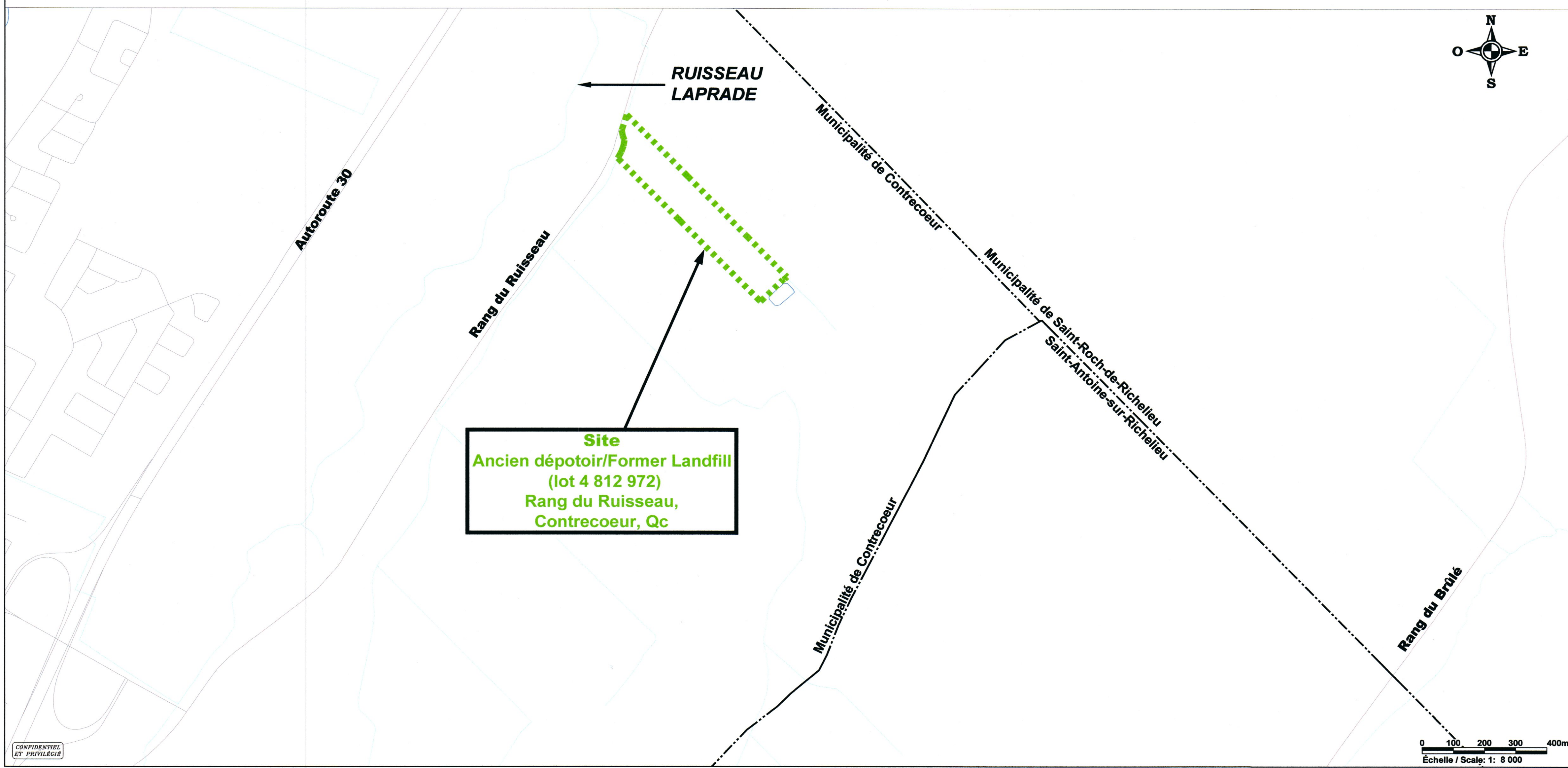
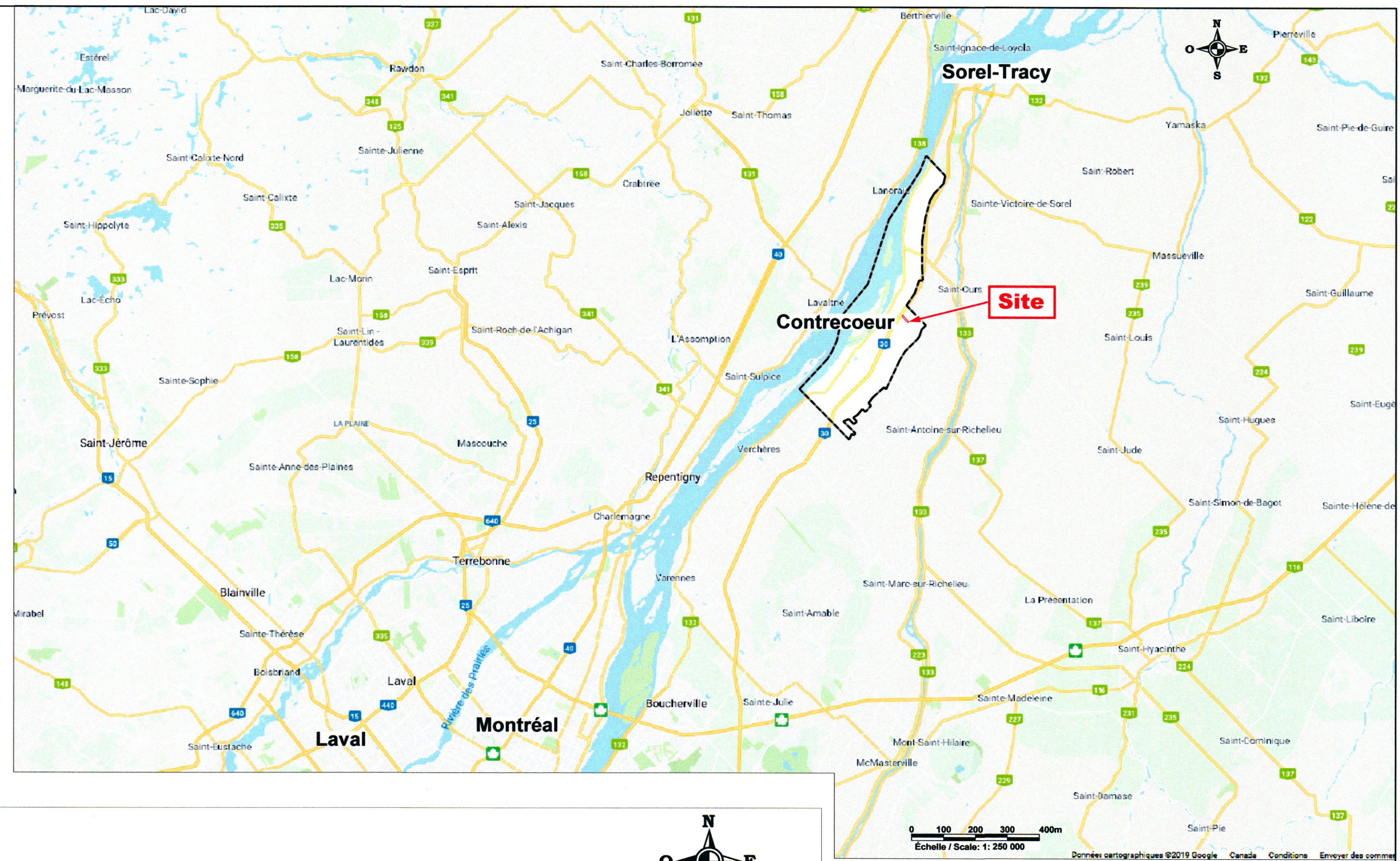


- 79.3.1.17 Damaged galvanized surfaces should be repaired according to the following procedure: Clean surfaces with a wire brush, removing the cracked and peeling zinc layers, then apply to the damaged surfaces two (2) layers of Galvicon or an equivalent zinc-rich paint approved by the Engineer.
- 79.3.1.18 The Contractor shall provide an appropriate method with regards to the type of soil present on the site for digging the holes necessary for the installation of poles.
- 79.3.1.19 In no event may the concrete bases be seated on soft or soggy ground. In the presence of clayey soils, the base of the holes required for pole installation should be enlarged to avoid lifting problems due to freeze-thaw cycles. The locations and details of these bases must be approved by the Engineer.
- 79.3.1.20 Backfilling around the posts must be done with the excavated material and the whole must be compacted to the same density as the adjoining ground.



APPENDIX 1-1

TECHNICAL DRAWINGS



Révision / Revision	Date	Description	Dessiné / Drawn	Révisé / Revised	Appr.
01	2019-06-19	Émis pour soumission / Issued for tender	D.L.	M.-A.C.	M.-A.C.
00	2019-05-30	Émis pour commentaires / Issued for comments	D.L.	M.-A.C.	M.-A.C.

Scale / Échelle	Scale / Échelle	Scale / Échelle
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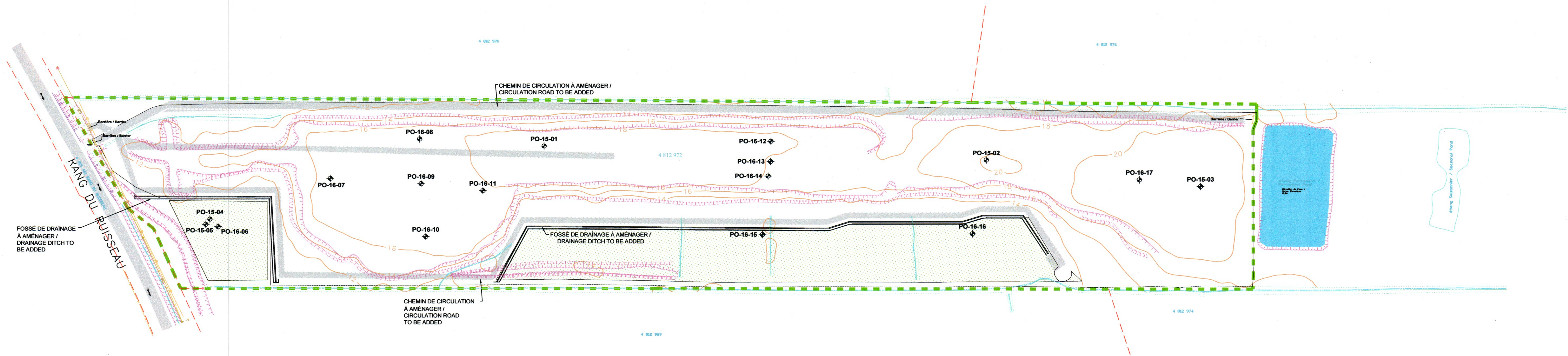
Client: Travaux publics et Services gouvernementaux Canada / Public Works and Government Services Canada

Projet / Project: MISE EN PLACE DE MESURES DE MITIGATION À L'ANCIEN DÉPOTOIR DE CONTRECOEUR / IMPLEMENTATION OF ENVIRONMENTAL MITIGATION MEASURES AT THE FORMER CONTRECOEUR LANDFILL

Titre / Subtitle: LOCALISATION GÉNÉRALE DU SITE / GENERAL SITE LOCATION

Echelle graphique / Graphic scale: Telles qu'indiquées / As shown	
Date: 2019-05-16	Dessiné par: D.Larivée
Format: A1 (594 x 841mm) / (23 3/8" x 33")	Projeté par: M.-A.Carrier, ing.
Échelles: 1:8 000	Révisé par: M.-A.Carrier, ing.
Échelle: 1:250 000	Projet / Project: R.078691
	Dessin / Drawing: R.078691-S01-P001
	Vérifié par: J.-M.Lauzon, ing.





Légende:

- Limite de lot / Lot limit
- 4 812 972 Numéro de lot / Lot number
- Clôture / Fence
- Palissade existante / Existing Palisade
- Étendue d'eau / Body of water
- Haut de talus / Top of embankment
- Bas de talus / Bottom of embankment
- Ponceau / Culvert
- Bord de fossé / Edge of ditch
- Centre du fossé / Center of ditch
- 18- Courbe topographique / Topographic contour
- Glissière / Crash barrier
- Ligne aérienne de services (Électricité, téléphone) / Aerial service lines (electricity, phone)
- Limite de la zone des travaux / Limit of work area
- Zone végétalisée et partiellement boisée à conserver / Green and partially wooded area
- ◆ Puits d'observation / Monitoring well

01	2019-06-19	Émis pour soumission / Issued for tender	D.L.	M.-A.C.	M.-A.C.
00	2019-05-30	Émis pour commentaires / Issued for comments	D.L.	M.-A.C.	M.-A.C.

Revision / Revision	Date	Description	Dessiné / Drawn	Révisé / Revised	Appr.
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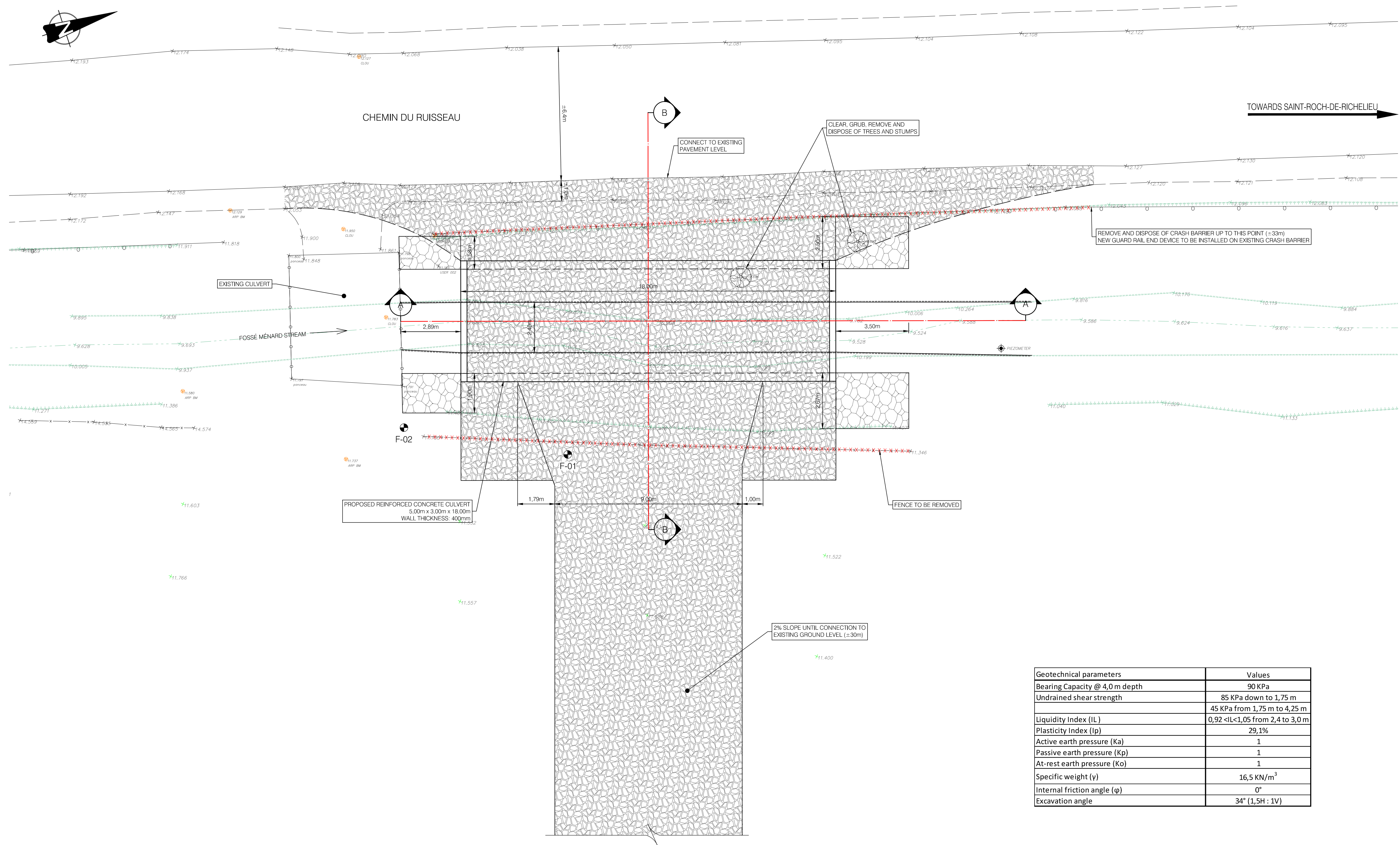
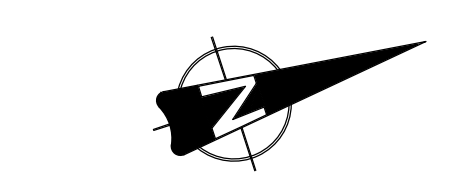
Scieur / Seal: 	Scieur / Seal: 	Scieur / Seal:
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Client: Travaux publics et Services gouvernementaux Canada / Public Works and Government Services Canada

Projet / Project: MISE EN PLACE DE MESURES DE MITIGATION À L'ANCIEN DÉPÔTOIR DE CONTRECOEUR / IMPLEMENTATION OF ENVIRONMENTAL MITIGATION MEASURES AT THE FORMER CONTRECOEUR LANDFILL

Titre / Subtitle: TOPOGRAPHIE DU SITE ET LOCALISATION DES INFRASTRUCTURES EXISTANTES ET À VENIR / SITE TOPOGRAPHY, EXISTING INFRASTRUCTURES AND UPCOMING INFRASTRUCTURES

	Echelle graphique: / Graphic scale:	
	Date: 2019-06-03	Dessiné par: / Drawn by: D.Larivée
	Format: A1 (594 x 841mm) / (23 1/4" x 33")	Projeté par: / Planned by: M.-A. Carrier, ing.
	Échelles: / Scales: 1:1 300	Révisé par: / Revised by: M.-A. Carrier, ing.
	Projet / Project: R.078691 Dessin / Drawing: R.078691-S01-P002	Vérifié par: / Verified by: J.-M. Lauzon, ing.

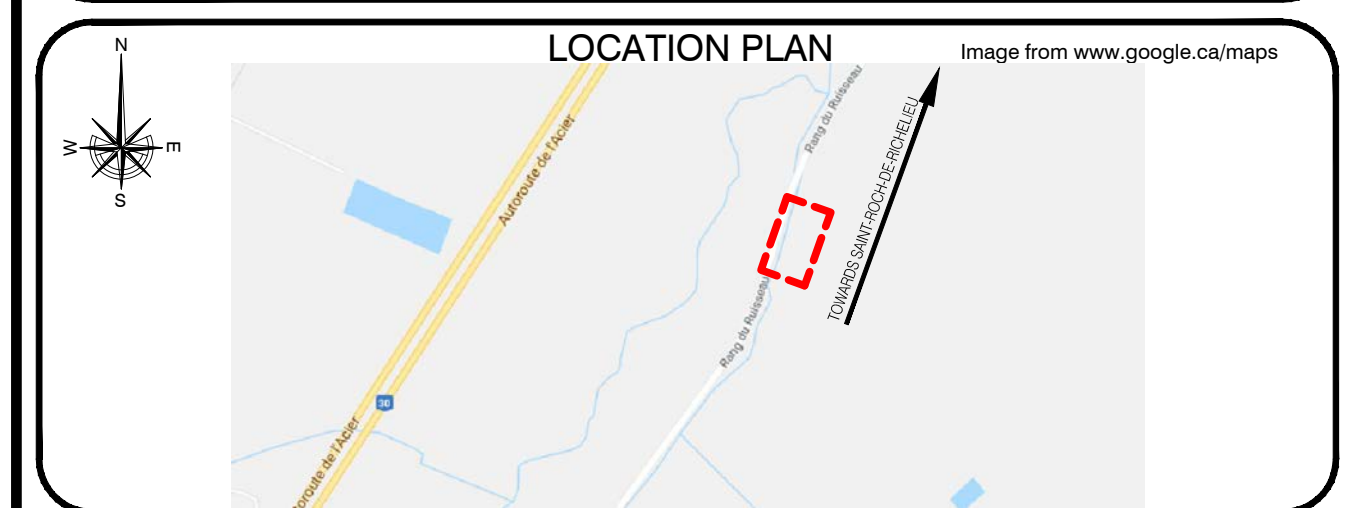


COMPLEMENTARY LEGEND

- PROPOSED MG-20 CRUNCHED STONE
- PROPOSED RIPRAP
- TO BE DEMOLISHED, TO BE REMOVED

LEGEND

EXISTING		PROJECTED
	WATERMAIN PIPE	
	STORM SEWER PIPE	
	SANITARY SEWER PIPE	
	COMBINED SEWER PIPE	
	SEWER PRESSURE PIPE	
	CULVERT	
	STORM SEWER MANHOLE / MANHOLE-CATCH BASIN	
	CATCH BASIN	
	SANITARY SEWER MANHOLE	
	VALVE, VALVE MANHOLE CHAMBER	
	WATER INLET VALVE	
	FIRE HYDRANT	
	REDUCER, CAP	
	FENCE	
	SIMPLE FENCE GATE, DOUBLE FENCE GATE	
	SURFACE ELEVATION	
	DRAINAGE AXIS SLOPE	
	SURVEY MARKER	
	TOP OF SLOPE	
	TOE OF SLOPE	
	DITCH (CENTER)	
	PAVING	
	CURB, SIDEWALK	
	CRASH BARRIER	
	CENTER LINE / AXIS	
	RIPARIAN BUFFER ZONE	
	PROPERTY LINE	
	RIGHT-OF-WAY	
	PROPERTY BOUNDARY MARKER	
	BUILDING	
	UNDERGROUND, AERIAL HO NETWORK	
	ACCES MANHOLE / BOX HYDRO-QUÉBEC	
	UNDERGROUND, AERIAL BELL NETWORK	
	ACCES MANHOLE / BOX BELL CANADA	
	ELECTRIC POST, GUY	
	GAS PIPE	
	GAS ACCES MANHOLE, GAS VALVE	
	LAMP POST, STREET LAMPS	
	PRIVATE ELEVTRIC WIRE/CONDUCT	
	TREE, HEDGE	
	TRAFFIC SIGN	



SCALE: 1:100

SURVEY MARKER:

Geotechnical parameters	Values
Bearing Capacity @ 4,0m depth	90 KPa
Undrained shear strength	85 KPa down to 1,75 m
Liquidity Index (IL)	45 KPa from 1,75 m to 4,25 m
Plasticity Index (Ip)	29,1%
Active earth pressure (Ka)	1
Passive earth pressure (Kp)	1
At-rest earth pressure (Ko)	1
Specific weight (γ)	16,5 KN/m³
Internal friction angle (φ)	0°
Excavation angle	34° (1,5H : 1V)

NO.	DATE	BY	REVISIONS
00	2019-07-09	J.H.	CALL FOR TENDER

GROUPE DGS
Experts-Conseils

301 Boulevard Industriel
Châteauguay (QC) J6J 4Z2
Tel: (450) 891-9101 Fax: (450) 891-7929

CLIENT: **TECHNOREM**
4701 RUE LOUIS-B. MAYER
LAVAL (QC) H7P 6G5

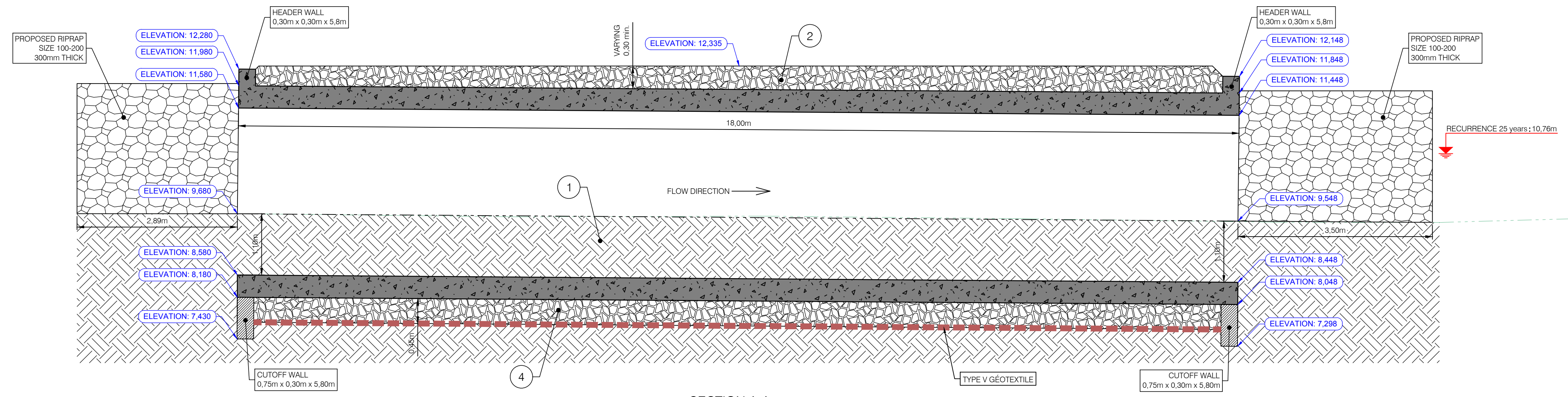
ENGINEER'S SEAL:

DRAWN BY: S. BOVIN
DESIGNED BY: J. HARRISON, ing.
APPROVED BY: J. HARRISON, ing.
DATE: 2019-06-03

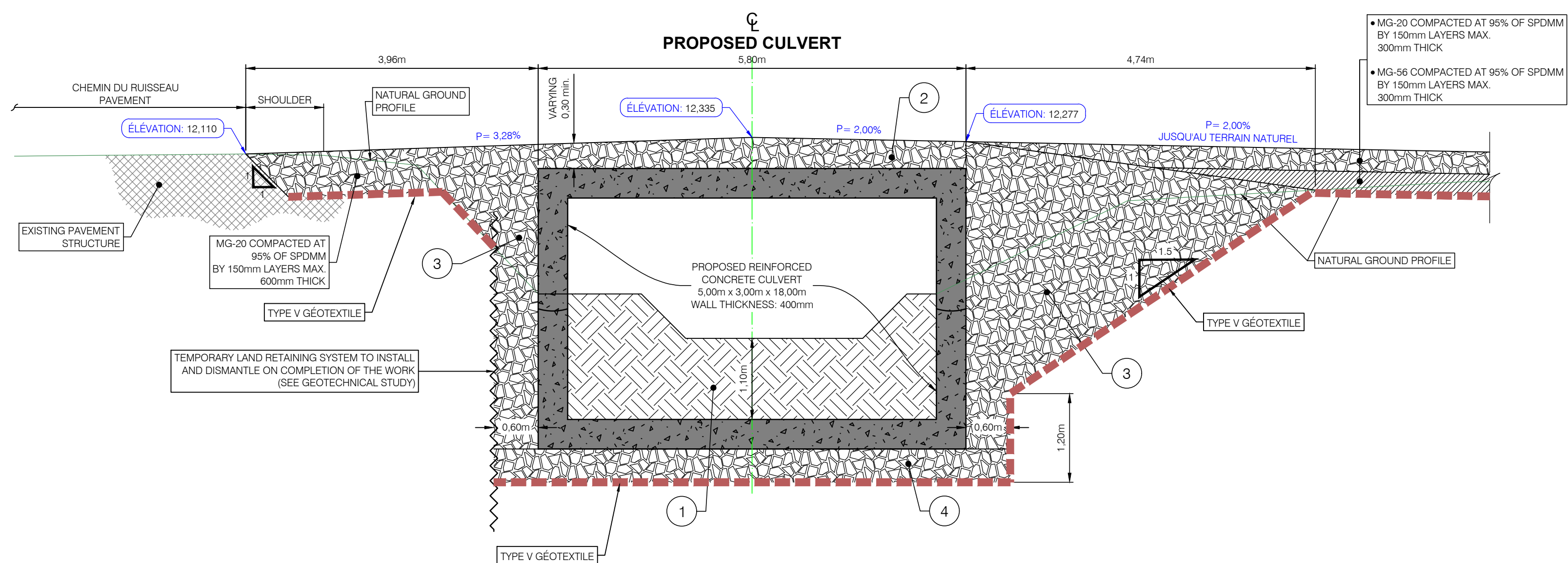
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TITLE: **PROPOSED CULVERT PLAN**

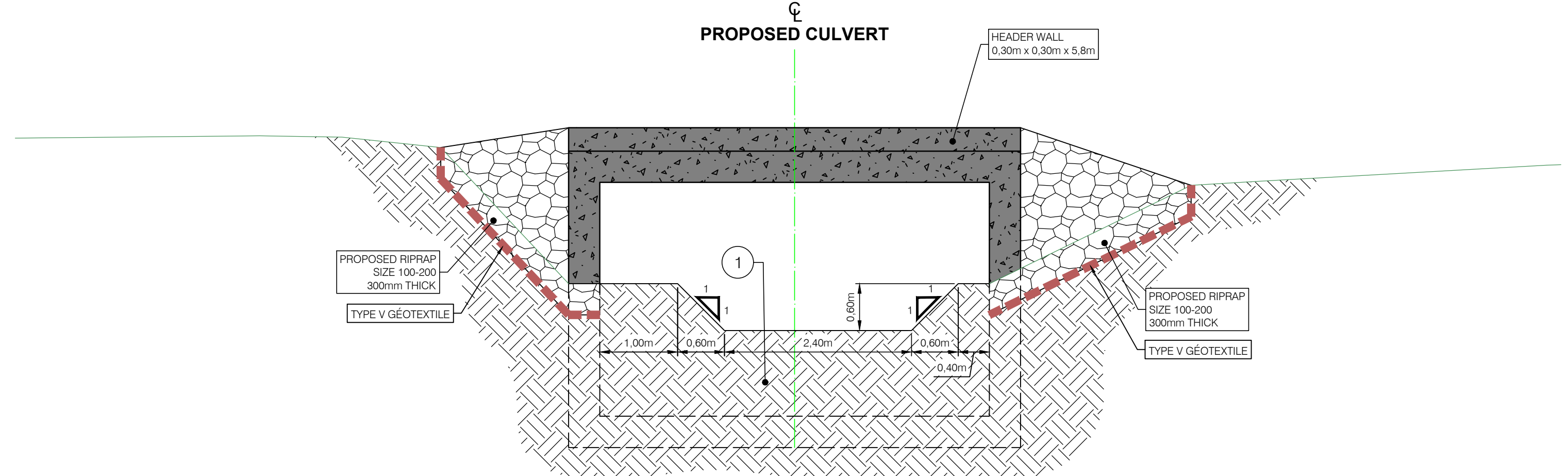
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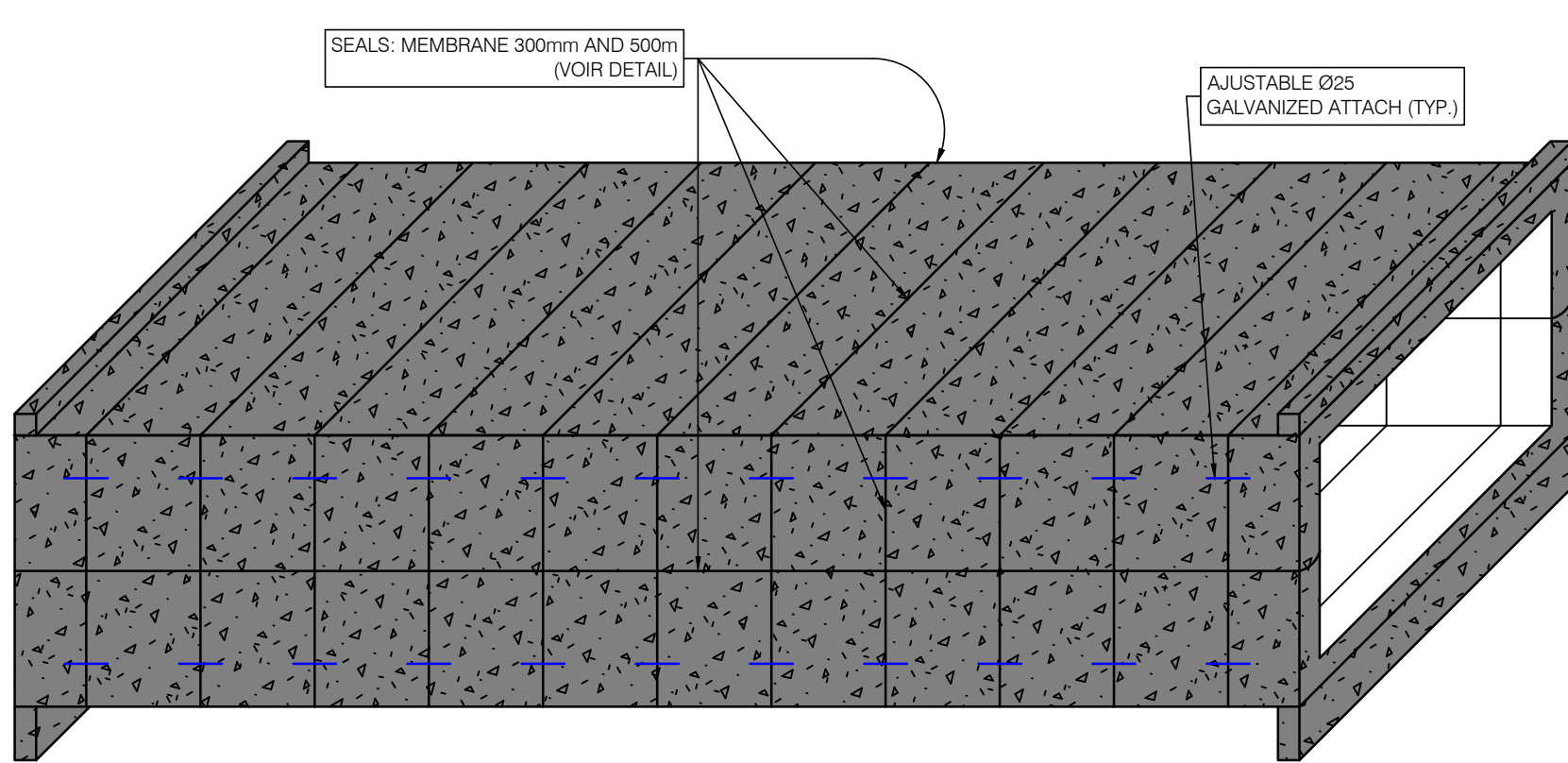
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N.T.S.



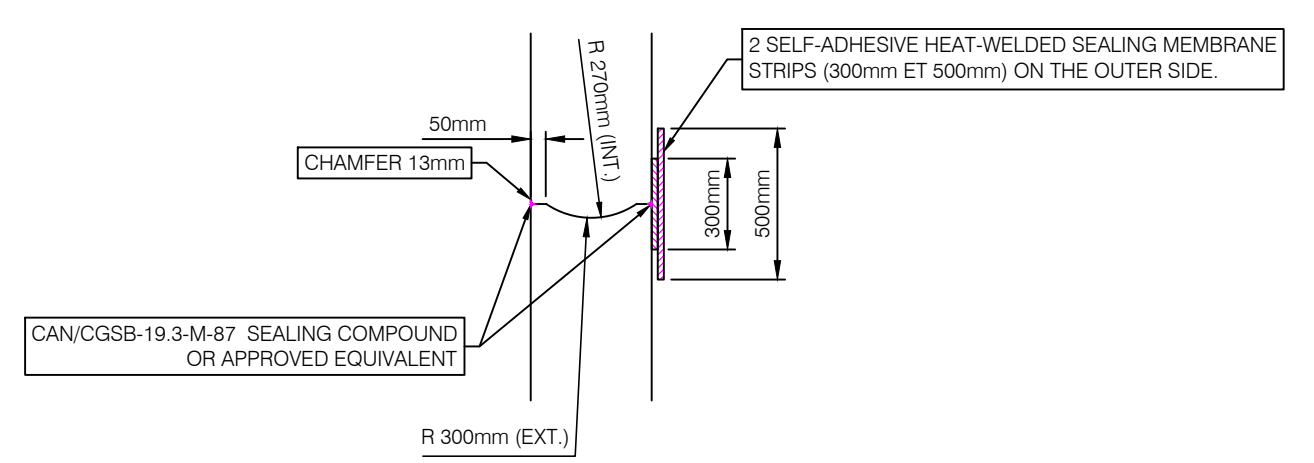
SECTION B-B
N.T.S.



DETAIL - PROPOSED RIPRAP
N.T.S.



DETAIL - CULVERT SEALS
N.T.S.

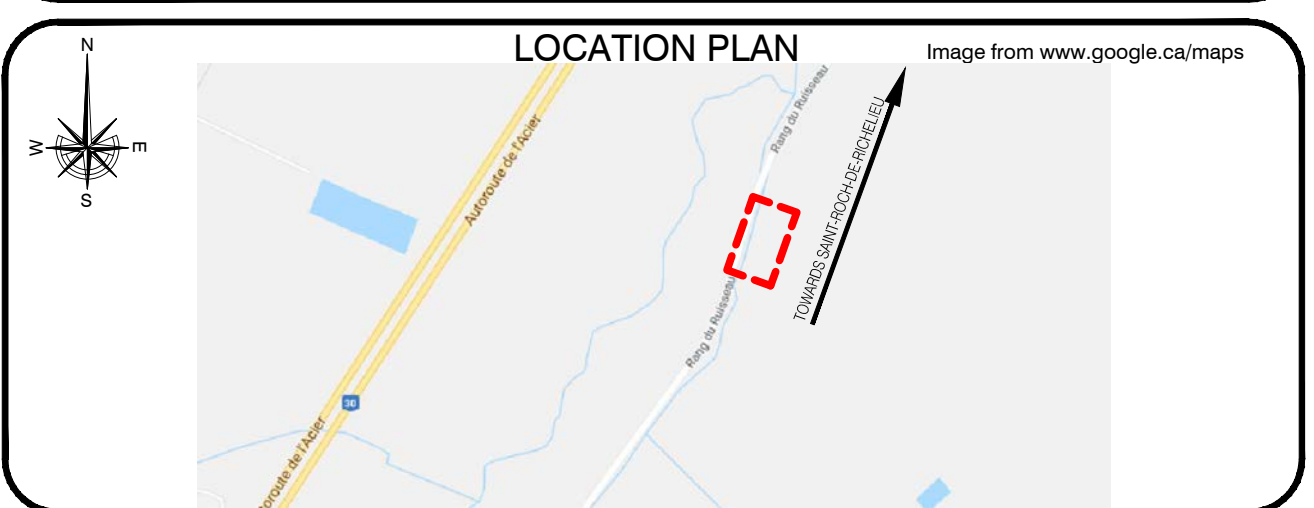


DETAIL - SEALS
N.T.S.

1. RESTORED STREAMBED MATERIALS ACCORDING TO THE SPECIFICATION AND TO PÊCHES ET OCÉANS CANADA 2016, LIGNES DIRECTRICES POUR LES TRAVERSÉES DE COURS D'EAU AU QUÉBEC.
2. CULVERT GRANULAR COVER
MG-20 CRUNCHED STONE
COMPACTED BY 150mm LAYERS MAX.
THE FIRST LAYER: COMPACTED AT 90% OF SPDM
SUBSEQUENT LAYERS: COMPACTED AT 95% OF SPDM
3. LATERAL BACKFILL
MG-20 CRUNCHED STONE
COMPACTED AT 90% OF SPDM BY 150mm LAYERS MAX.
4. BEDDING
MG-20 CRUNCHED STONE
COMPACTED AT 95% OF SPDM BY 150mm LAYERS MAX.
450mm THICK

LEGEND

EXISTING	LEGEND	PROJECTED
— A —	WATERMAIN PIPE	— A —
— P —	STORM SEWER PIPE	— P —
— S —	SANITARY SEWER PIPE	— S —
— C —	COMBINED SEWER PIPE	— C —
— R —	SEWER PRESSURE PIPE	— R —
—	CULVERT	—
—	STORM SEWER MANHOLE / MANHOLE-CATCH BASIN	—
—	CATCH BASIN	—
—	SANITARY SEWER MANHOLE	—
—	VALVE, VALVE MANHOLE CHAMBER	—
—	WATER INLET VALVE	—
—	FIRE HYDRANT	—
—	REDUCER, CAP	—
—	FENCE	—
—	SIMPLE FENCE GATE, DOUBLE FENCE GATE	—
—	SURFACE ELEVATION	—
—	DRAINAGE AXIS SLOPE	—
—	SURVEY MARKER	—
—	TOP OF SLOPE	—
—	TOE OF SLOPE	—
—	DITCH (CENTER)	—
—	PAVING	—
—	CURB, SIDEWALK	—
—	CRASH BARRIER	—
—	CENTER LINE / AXIS	—
—	RIPARIAN BUFFER ZONE	—
—	PROPERTY LINE	—
—	RIGHT-OF-WAY	—
—	PROPERTY BOUNDARY MARKER	—
—	BUILDING	—
—	UNDERGROUND, AERIAL HO NETWORK	—
—	ACCES MANHOLE / BOX HYDRO-QUÉBEC	—
—	UNDERGROUND, AERIAL BELL NETWORK	—
—	ACCES MANHOLE / BOX BELL CANADA	—
—	ELECTRIC POST, GUY	—
—	GAS PIPE	—
—	GAS ACCES MANHOLE, GAS VALVE	—
—	LAMP POST, STREET LAMPS	—
—	PRIVATE ELEVTRIC WIRE/CONDUCT	—
—	TREE, HEDGE	—
—	TRAFFIC SIGN	—



SCALE: N.T.S.

NO.	DATE	BY	REVISIONS
00	2019-07-09	J.H.	CALL FOR TENDER

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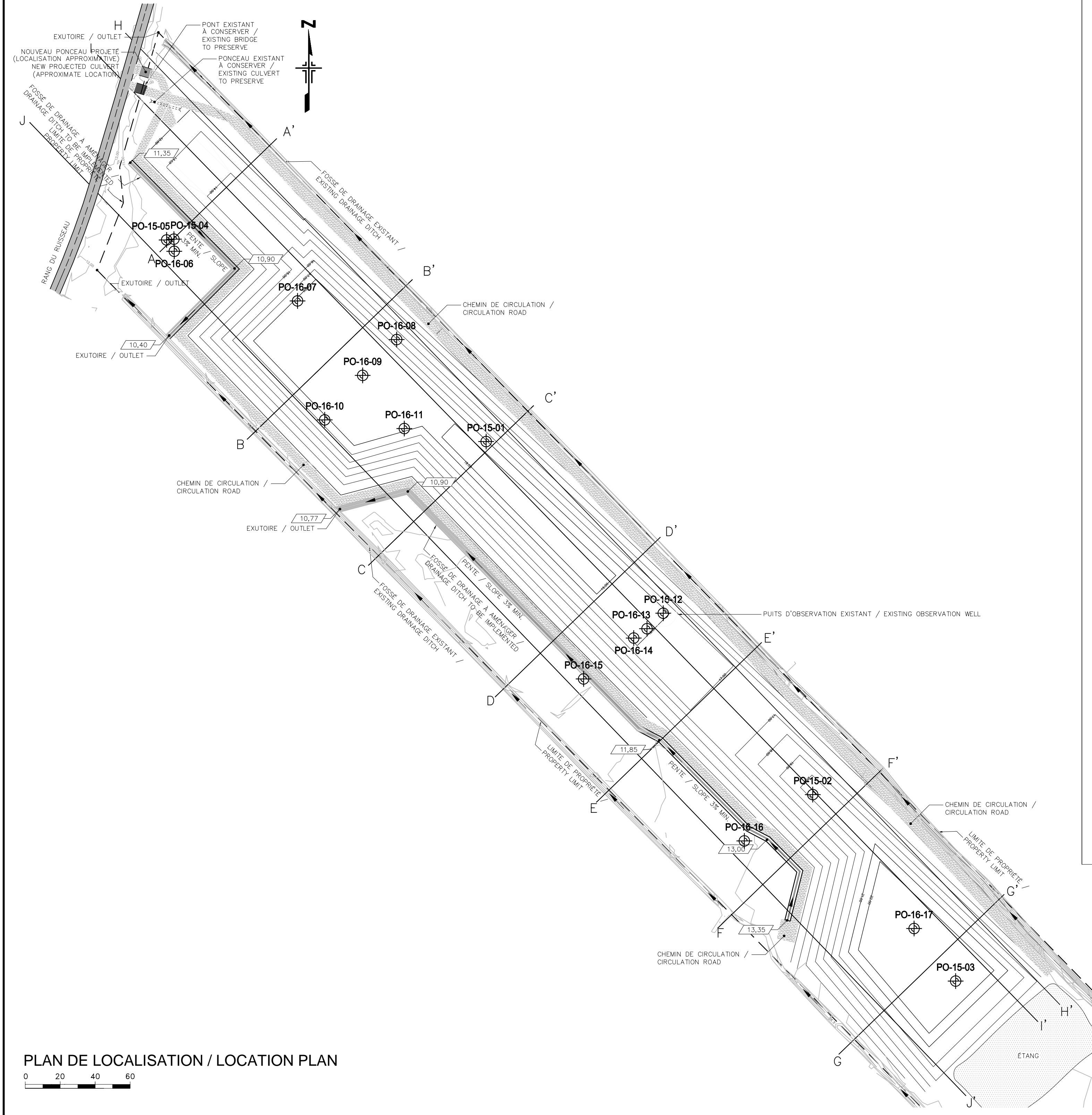
301 Boulevard Industriel
Châteauguay (Qc) J6J 4Z2
Tel: (450) 891-9101 Fax: (450) 891-7929

CLIENT: TECHNOREM
4701 LOUIS-B. MAYER STREET
LAVAL (QC) H7P 6G5

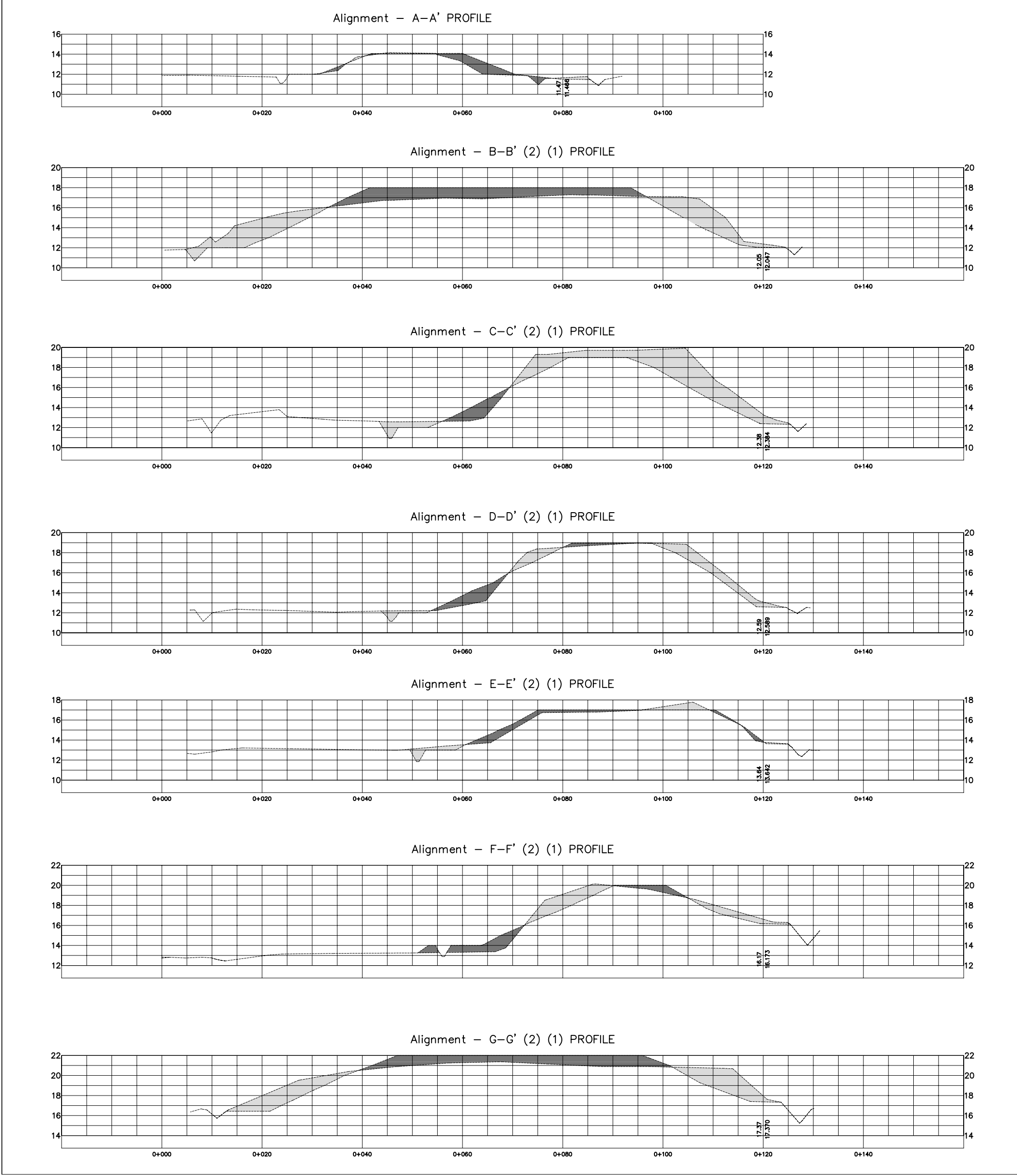
ENGINEER'S SEAL:
S. BOVIN
DESIGNED BY: J. HARRISON, ing.
APPROVED BY: J. HARRISON, ing.
DATE: 2019-06-03

PROJECT: CULVERT CONSTRUCTION ON FOSSE MÉNARD STREAM AT CONTRECOEUR

TITLE: SECTIONS AND DETAILS

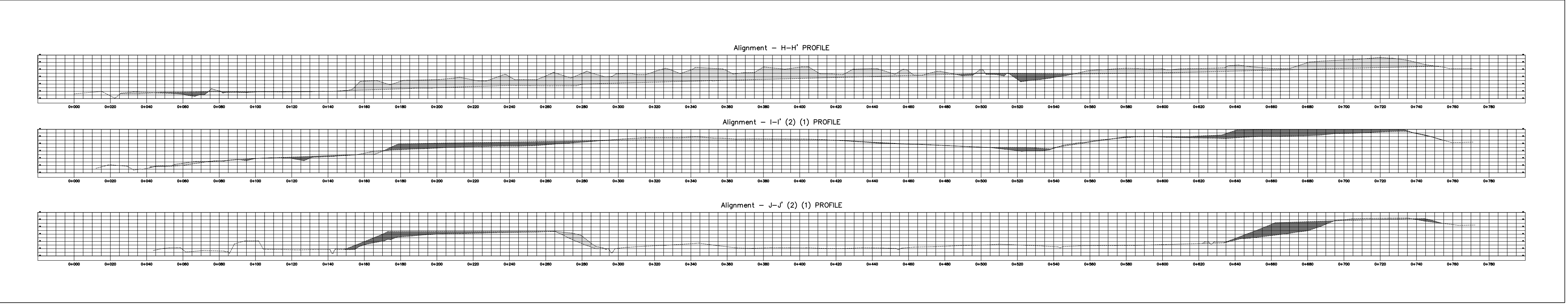


PLAN DE LOCALISATION / LOCATION PLAN
0 20 40 60



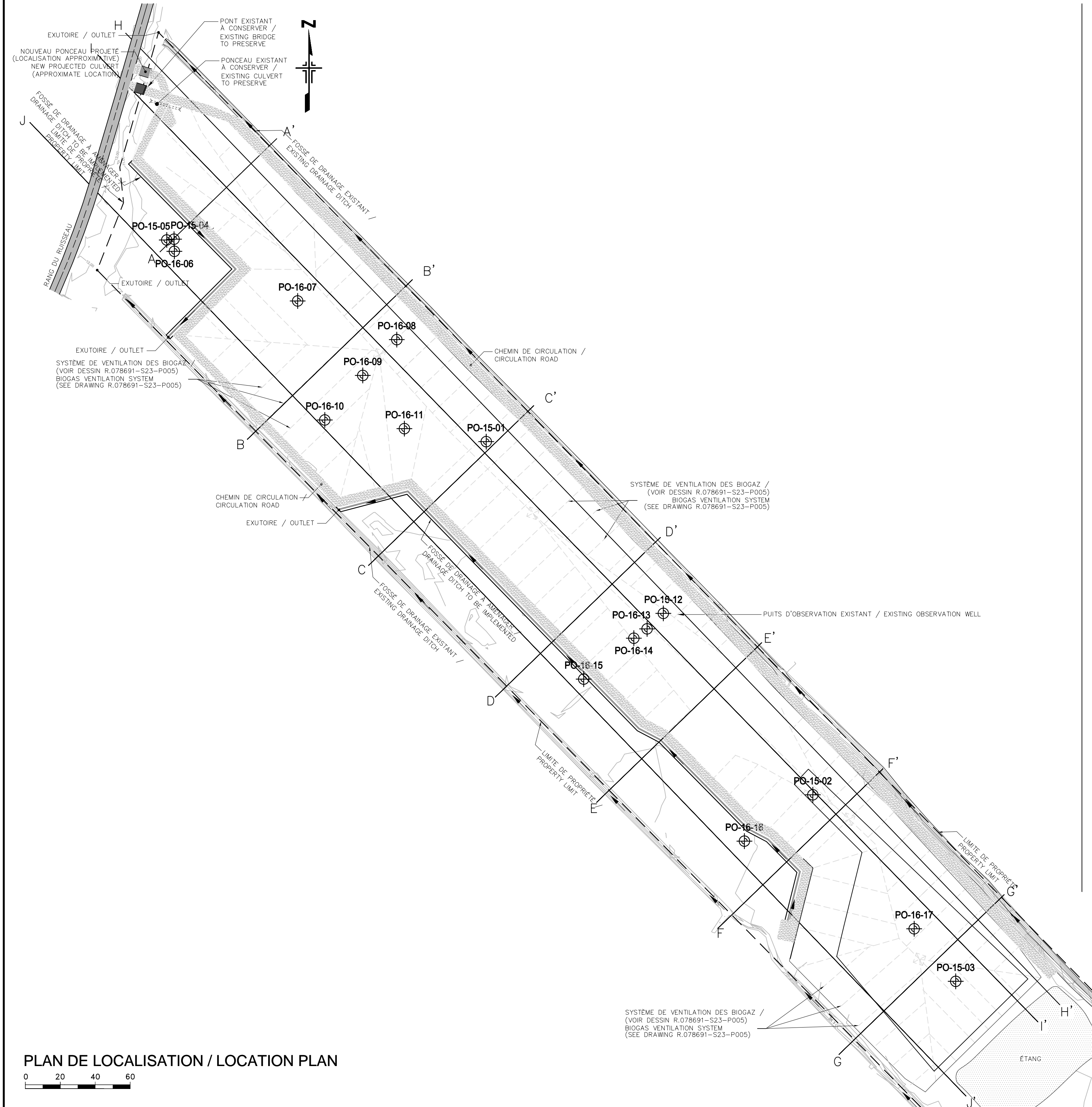
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- PUIS D'OBSERVATION EXISTANT / EXISTING OBSERVATION WELL
- DÉBLAI / EXCAVATED SOIL
- REMBLAI / FILL MATERIAL

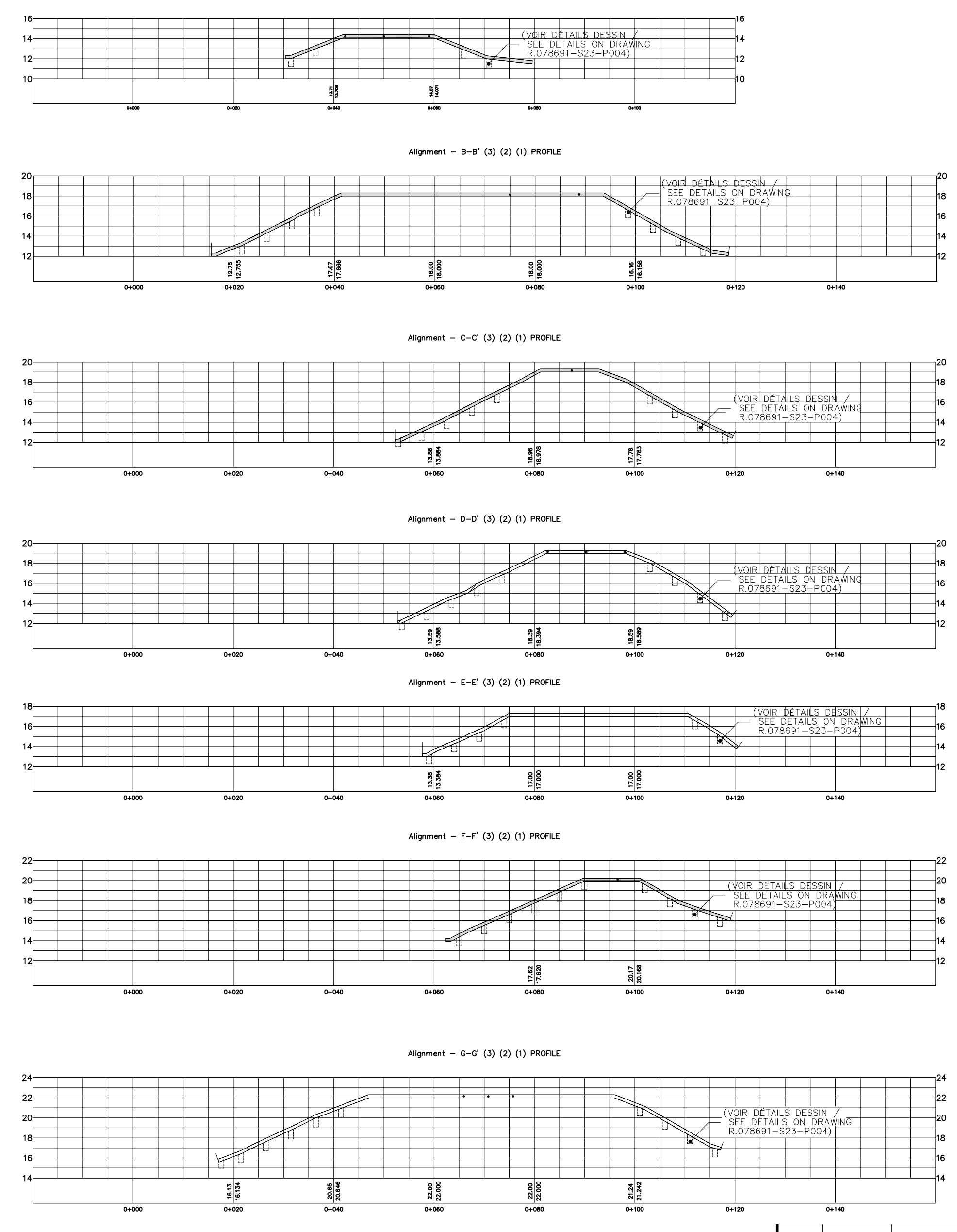


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REV. REV.	DATE	DESCRIPTION	DESSINÉ DRAWN	RÉVISÉ REVISED	APPR.
SCEAU: SEAL:		SCEAU: SEAL:	SCEAU: SEAL:		
		<p>CLIENT: Travaux publics et Services gouvernementaux Canada / Public Works and Government Services Canada</p> <p>PROJET: MISE EN OEUVRE DES MESURES DE MITIGATION À L'ANCIEN DÉPÔTOIR DE CONTRECŒUR / IMPLEMENTATION OF ENVIRONMENTAL MITIGATION MEASURES AT THE FORMER CONTRECŒUR</p> <p>TITRE: TRAVAUX DE PROFILAGE / LEVELING AND REPROFILING WORK SUBTITLE: SITE LOCATION PLAN / PLAN VIEW AND CROSS-SECTIONS</p>			
AECOM Consultants Inc. 85, rue Sainte-Catherine Ouest Montréal (Québec) Canada H2X 3P4 www.aecom.com		TechnoRem Inc. 4701, rue Louis-B-Mayer Laval (Québec) Canada H7P 6G5 www.technorem.com		<p>ECHELLE GRAPHIQUE: 0 20 40 60m GRAPHIC SCALE CETTE ECHELLE SERT UNIQUEMENT POUR L'OBTENTION DE DIMENSION APPROXIMATIVE POUR INFORMATION / THIS SCALE IS ONLY FOR APPROXIMATE DIMENSION FOR INFORMATION</p> <p>FORMAT: A1 23.4 X 33.1 (59.4 X 84.1)</p> <p>PROJETÉ PAR: B.ZAVOIANU RÉVISÉ PAR: C.ROBITAILLE</p> <p>DESSINÉ PAR: B.ZAVOIANU VÉRIFIÉ PAR: C.ROBITAILLE</p> <p>PROJET / PROJECT: R.0000000 SECTION / SECTION: 500 DATE: R.00000-500-P001</p>	

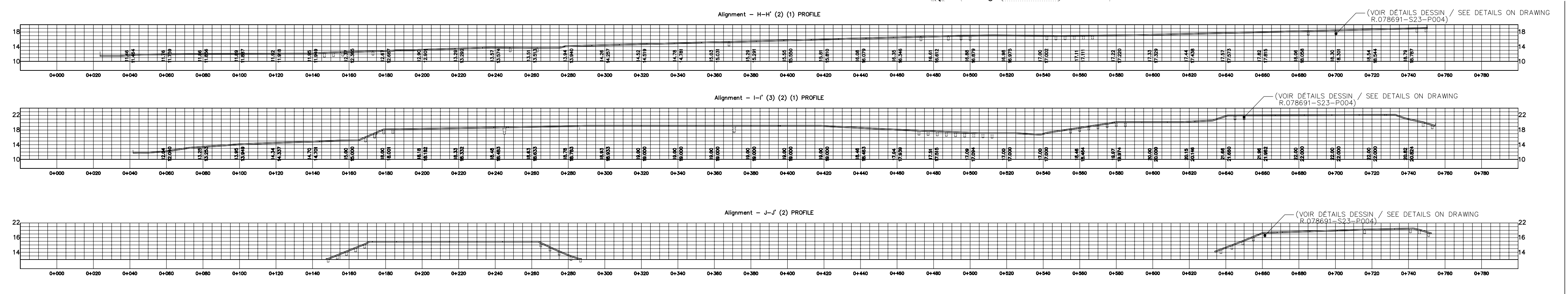
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PLAN DE LOCALISATION / LOCATION PLAN
0 20 40 60



LÉGENDE
PUITS D'OBSERVATION EXISTANT / EXISTING OBSERVATION WELL



01	2019/06/19	EMIS POUR SOUMISSION / ISSUED FOR TENDER	B.Z.	C.R.	C.R.
00	2019/05/29	EMIS POUR COMMENTAIRES / ISSUED FOR COMMENTS	B.Z.	C.R.	C.R.
REV.	DATE	DESCRIPTION	DESSINÉ / DRAWN	RÉVISÉ / REVISED	APPR.
SCEAU:	SEAL:	SCEAU:	SEAL:	SCEAU:	SEAL:

Claude Robitaille
 131274
 2019.06.19

CLIENT:

 Travaux publics et Services gouvernementaux Canada / Public Works and Government Services Canada

PROJET: MISE EN OEUVRE DES MESURES DE MITIGATION À L'ANCIEN DÉPÔTOIR DE CONTRECŒUR / IMPLEMENTATION OF ENVIRONMENTAL MITIGATION MEASURES AT THE FORMER CONTRECŒUR
TITRE: TRAVAUX DE PROFILAGE / LEVELING AND REPROFILING WORK (AVEC COUCHE DE SABLE 0.30m) / (WITH 0.30m SAND LAYER)
SUBTITRE: VUE EN PLAN ET COUPES / PLAN VIEW AND CROSS-SECTIONS

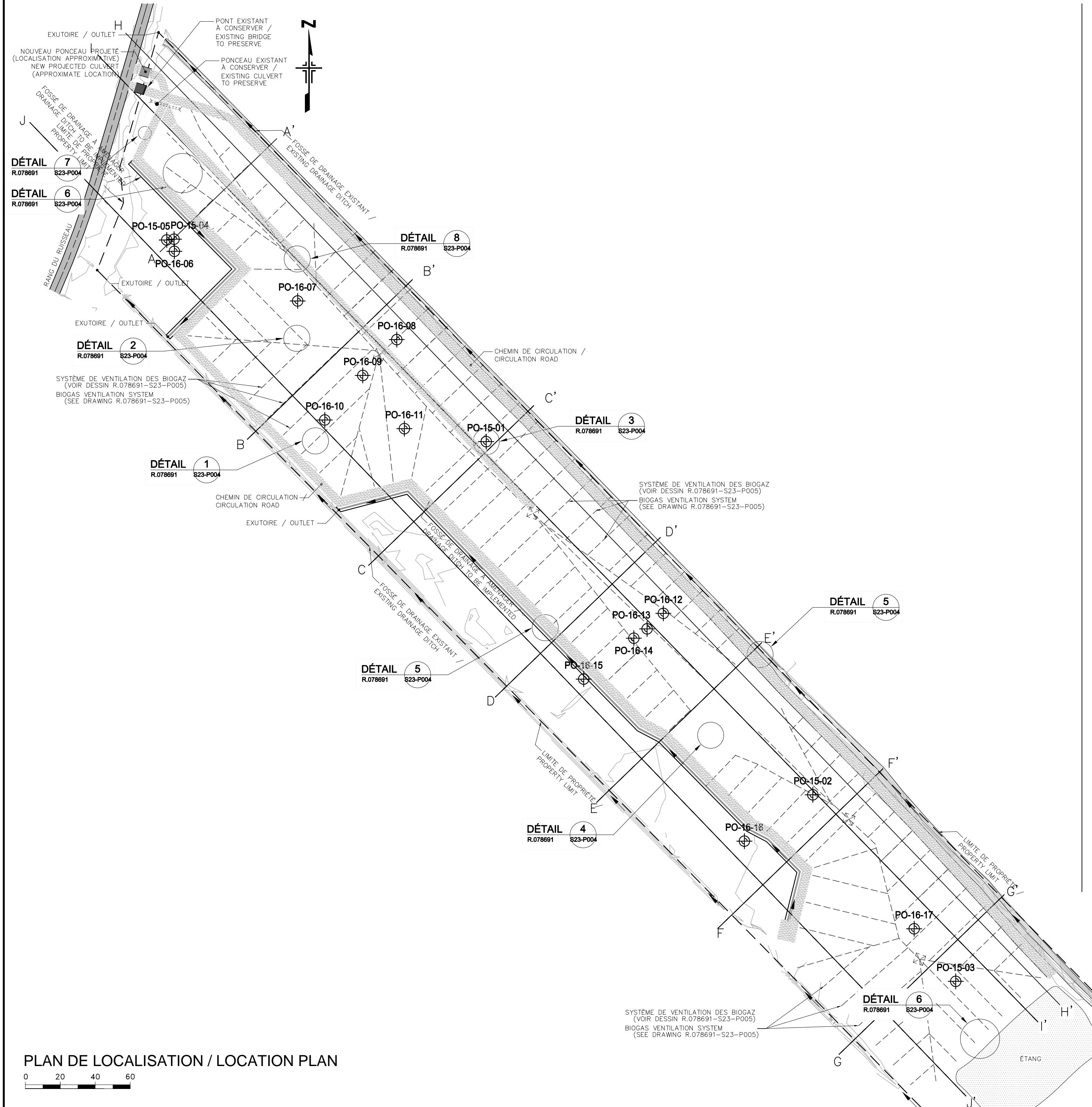
AECOM
 AECOM Consultants Inc.
 85, rue Sainte-Catherine Ouest
 Montréal (Québec) Canada
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 www.aecom.com

TechnoRem
 TechnoRem Inc.
 4701, rue Louis-B-Mayer
 Laval (Québec) Canada
 H1P 4G5
 www.technorem.com

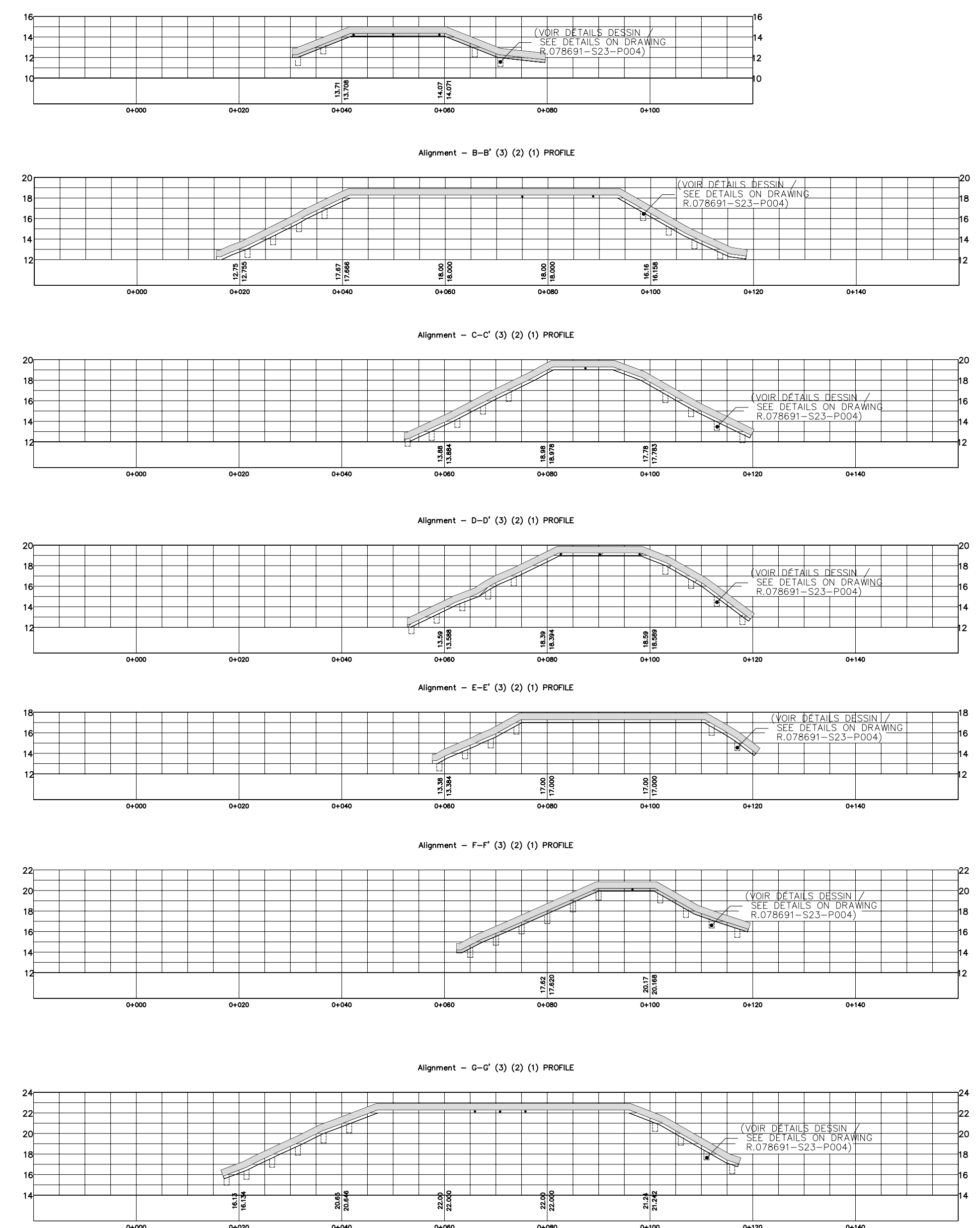
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RÉVISÉ PAR: C.ROBITAILLE
DESSINÉ PAR: B.ZAVOIANU
VÉRIFIÉ PAR: C.ROBITAILLE
PROJET / PROJECT: R.078691
PLAN NO. / DRAWING No.: R.078691-S23-P002
SECTION / SECTION: H1P 4G5
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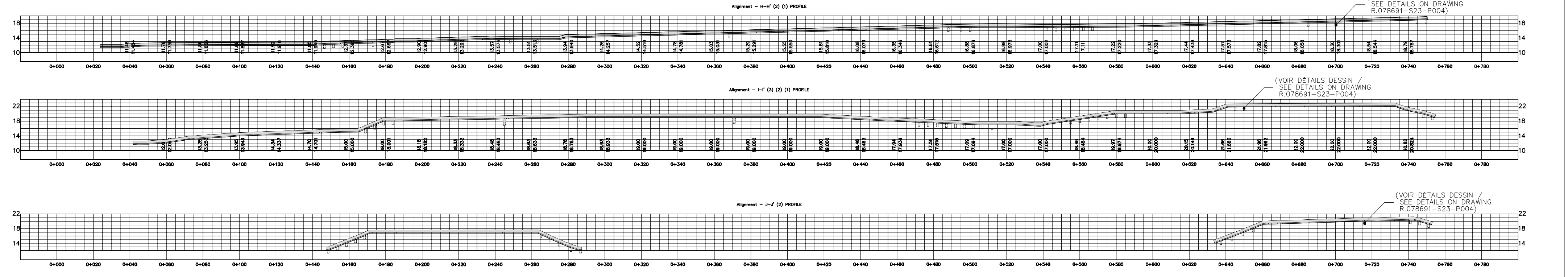


PLAN DE LOCALISATION / LOCATION PLAN
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LÉGENDE

- PUIS D'OBSERVATION EXISTANT / EXISTING OBSERVATION WELL
- ÉVENT / VENT
- SYSTÈME DE VENTILLATION DES BIOGAZ / BIOGAS VENTILATION SYSTEM



01	2019/06/19	EMIS POUR SOUMISSION / ISSUED FOR TENDER	B.Z.	C.R.	C.R.
00	2019/05/29	EMIS POUR COMMENTAIRES / ISSUED FOR COMMENTS	B.Z.	C.R.	C.R.
REV.	DATE	DESCRIPTION	DESSINÉ DRAWN	RÉVISÉ REVISED	APPR.
SEAL:		SEAL:		SEAL:	

CLIENT: Travaux publics et Services gouvernementaux Canada / Public Works and Government Services Canada

PROJET / TITLE: MISE EN OEUVRE DES MESURES DE MITIGATION A L'ANCIEN DÉPÔTOIR DE CONTRECŒUR / IMPLEMENTATION OF ENVIRONMENTAL MITIGATION MEASURES AT THE FORMER CONTRECŒUR

TITRE / SUBTITLE: RECOUVERMENT FINAL / FINAL CAPPING
 VUE EN PLAN ET COUPES / PLAN VIEW AND CROSS-SECTIONS

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 Laval (Québec) Canada
 H7P 6G5
 www.technorem.com

ÉCHELLE GRAPHIQUE: 0 20 40 60m
 GRAPHIC SCALE
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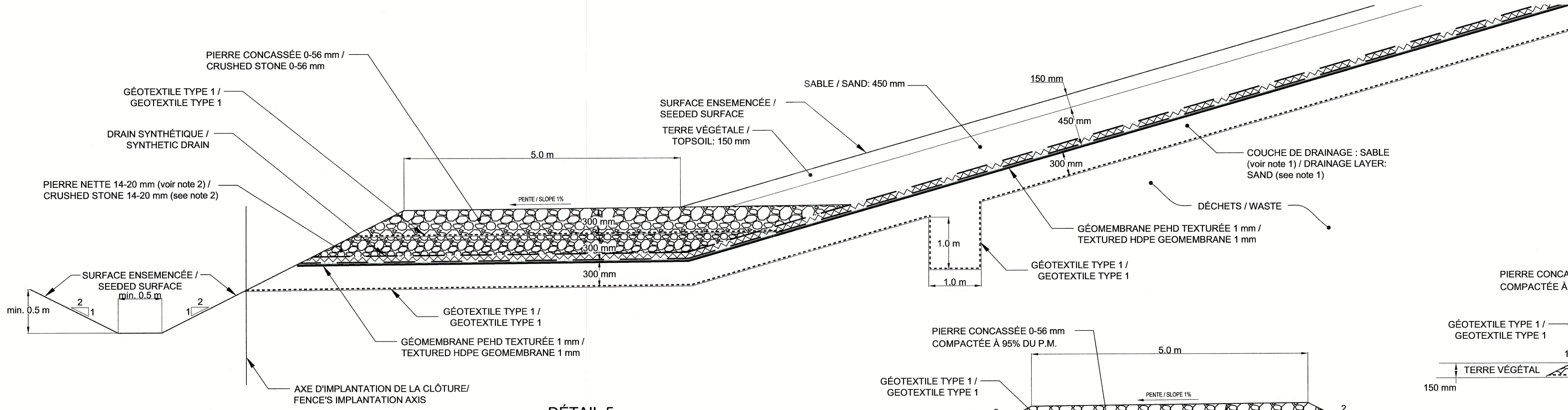
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 PROJECTED BY: B.ZAVOIANU
 DRAWING BY: B.ZAVOIANU
 PROJECT: R.078691
 SECTION: S23

RÉVISÉ PAR: C.ROBITAILLE
 VERIFIÉ PAR: C.ROBITAILLE
 PLAN NO.: R.078691-S23-P003
 DRAWING NO.: R.078691-S23-P003
 DATE:

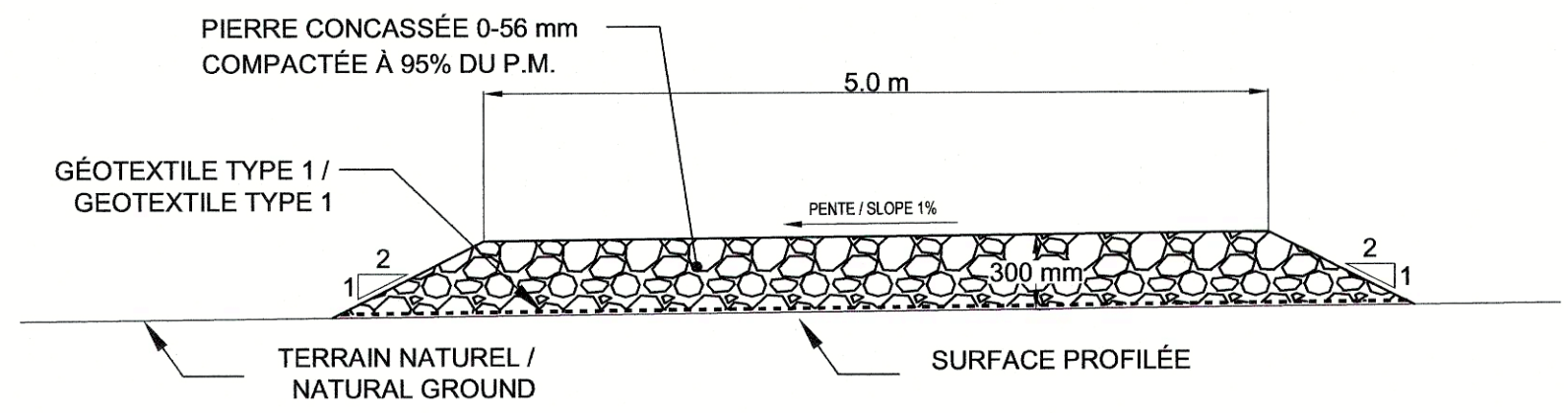
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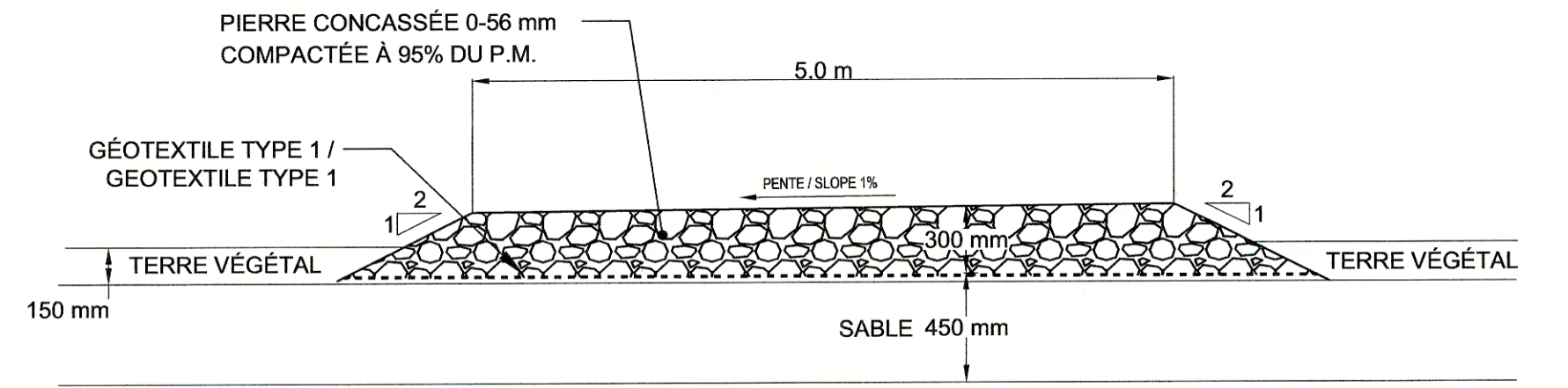
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- La pierre nette doit satisfaire aux exigences pour le gros granulat pour béton de ciment, calibre 14-28 mm du Cahier des charges et devis généraux du Québec (CCDG), édition 2015. / The crushed stone must meet the requirements for the coarse cement concrete aggregate, 14-28 mm in size, of the Cahier des charges et devis généraux du Québec (CCDG), édition 2015.



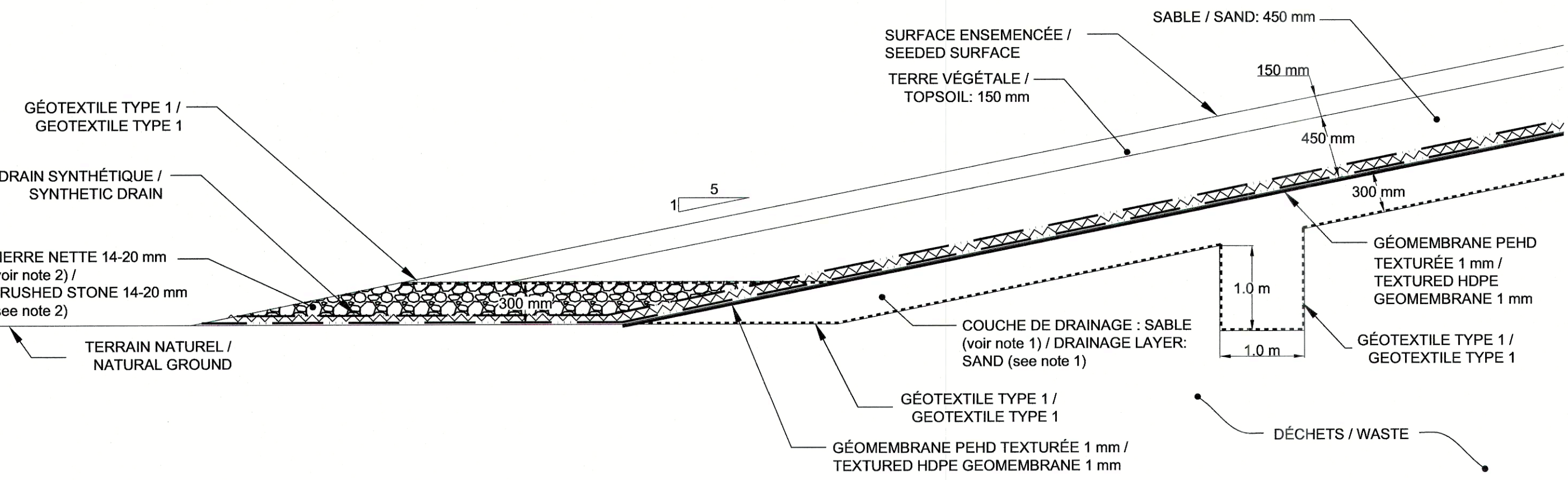
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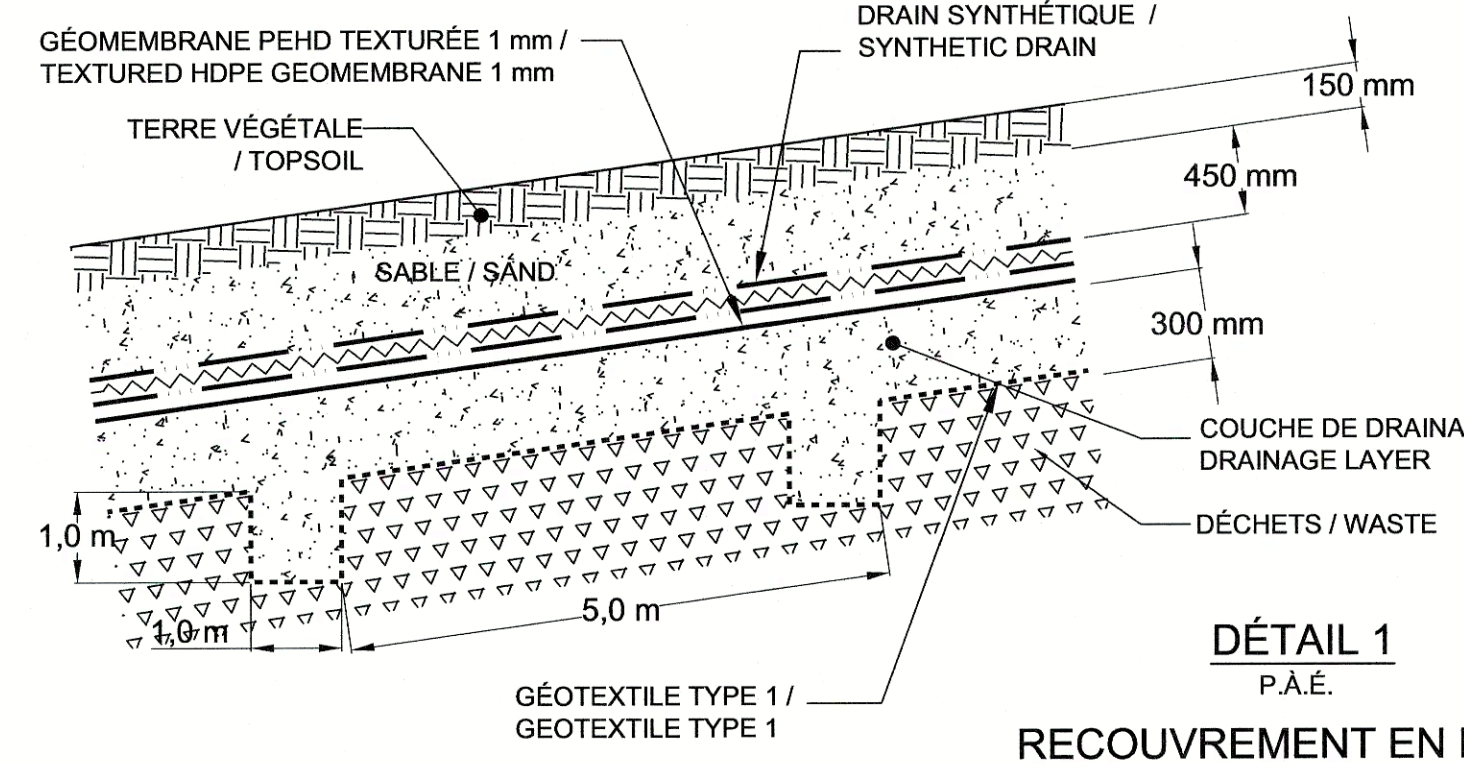
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CHEMIN DE CIRCULATION
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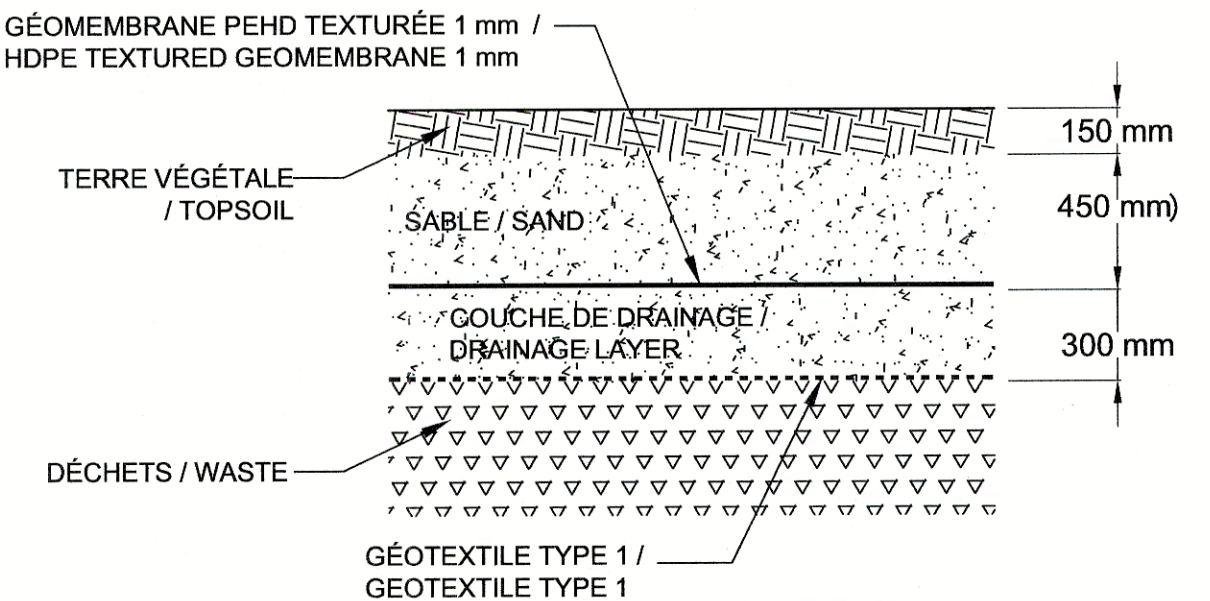
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RECouvreMENT FINAL
P.A.É.



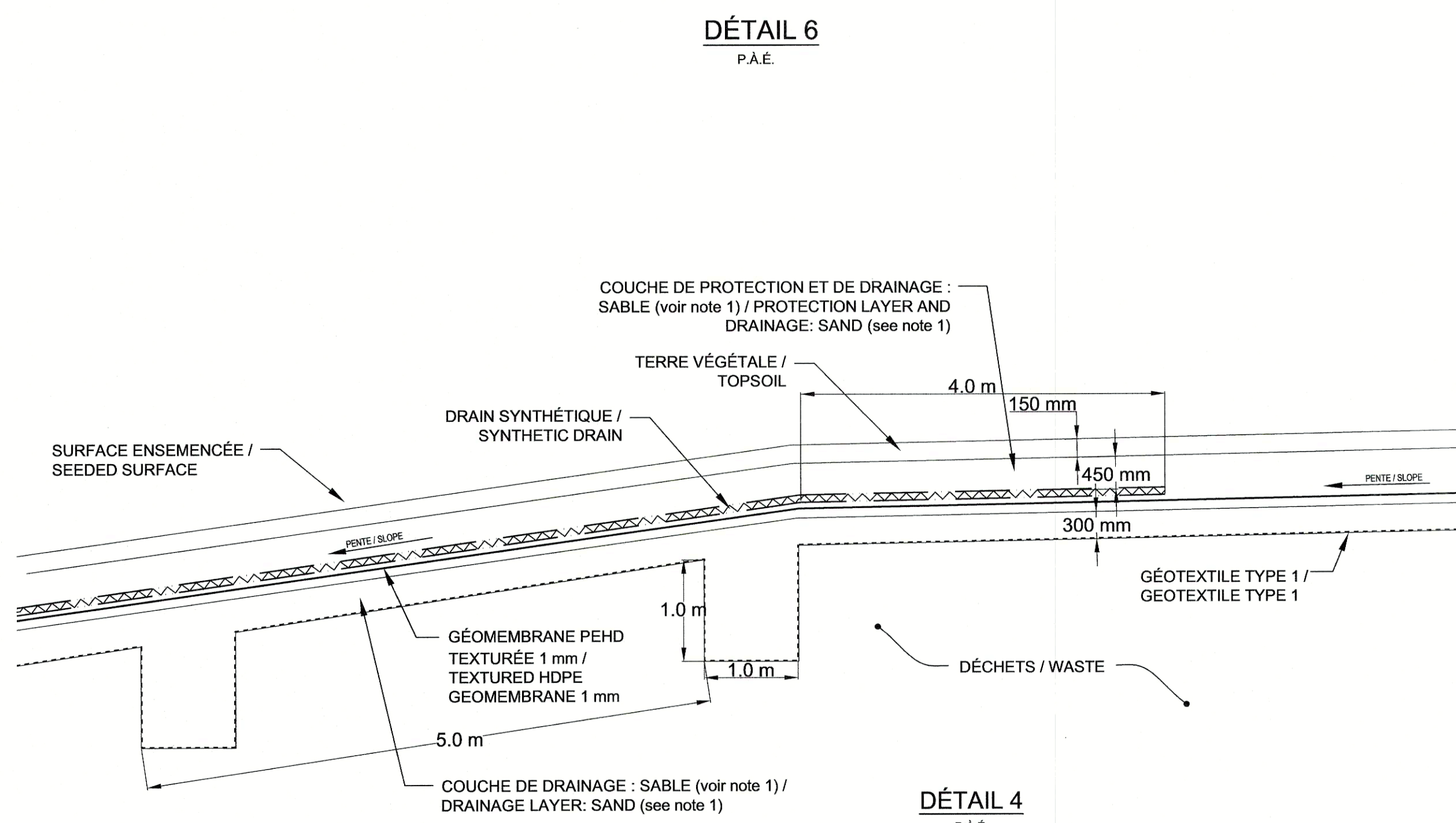
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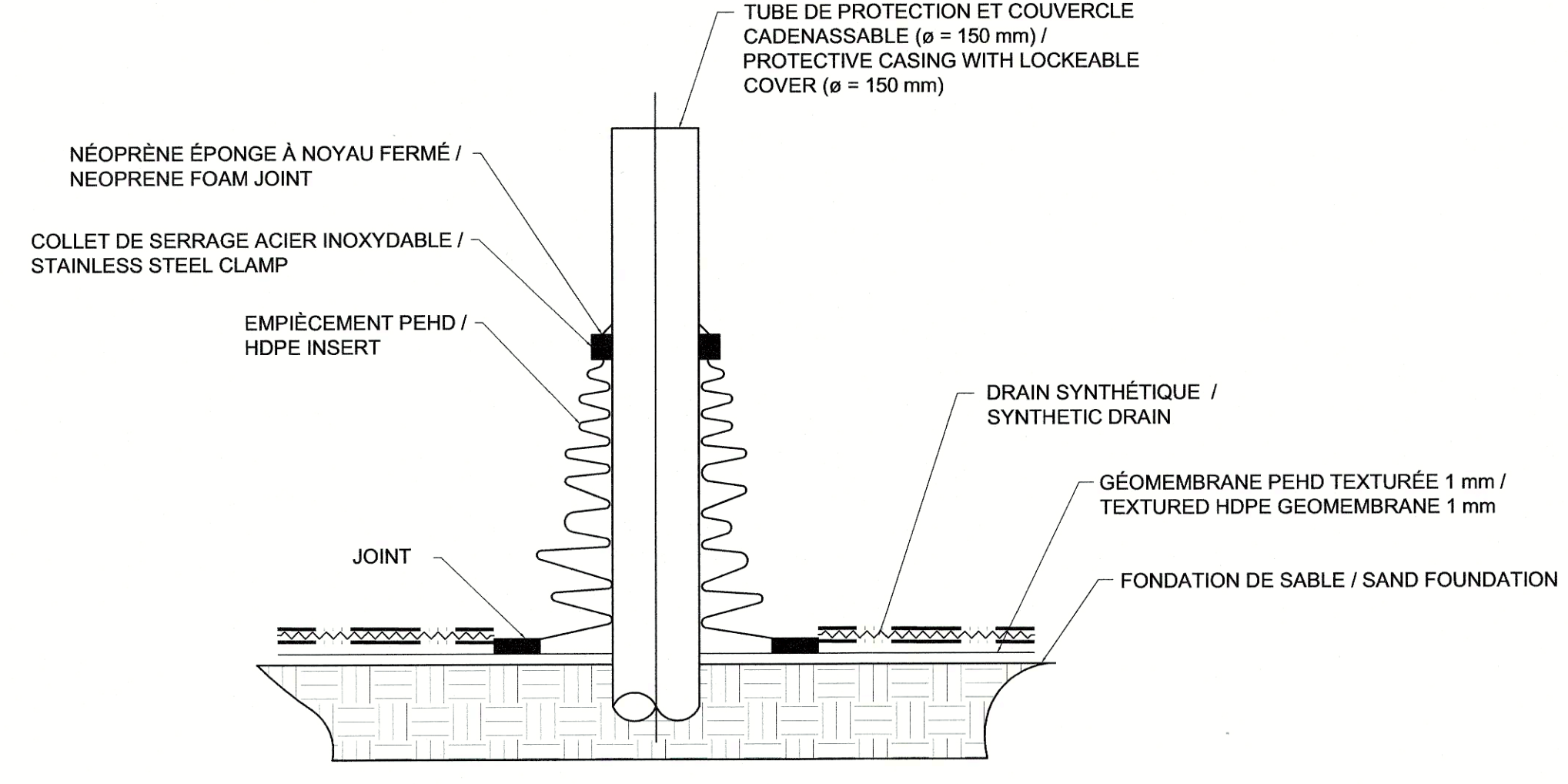
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RECouvreMENT EN PENTE /
CAPPING - SLOPED SECTION
P.A.É.



DÉTAIL 2
TOIT DU RECouvreMENT /
CAPPING - TOP SECTION
P.A.É.



DÉTAIL 4
P.A.É.
ZONE DE CHANGEMENT
DE PENTE / AREA OF
SLOPE CHANGING



DÉTAIL 3
P.A.É.
PUITS EXISTANT /
EXISTING WELL

REV. / REV.	DATE	DESCRIPTION	DESSINE / DRAWN	REVISE / REVISED	APPR.
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00	2019/06/19	EMIS POUR SOUMISSION / ISSUED FOR TENDER	F.M.	C.R.	C.R.
00	2019/05/28	EMIS POUR COMMENTAIRES / ISSUED FOR COMMENTS	F.M.	C.R.	C.R.

SCEAU: SEAL: [Signature]

2019.07.22

CLIENT: Travaux publics et Services gouvernementaux Canada / Public Works and Government Services Canada

PROJET: MISE EN OEUVRE DES MESURES DE MITIGATION À L'ANCIEN DÉPOTOIR DE CONTRECOEUR / IMPLEMENTATION OF ENVIRONMENTAL MITIGATION MEASURES AT THE FORMER CONTRECOEUR

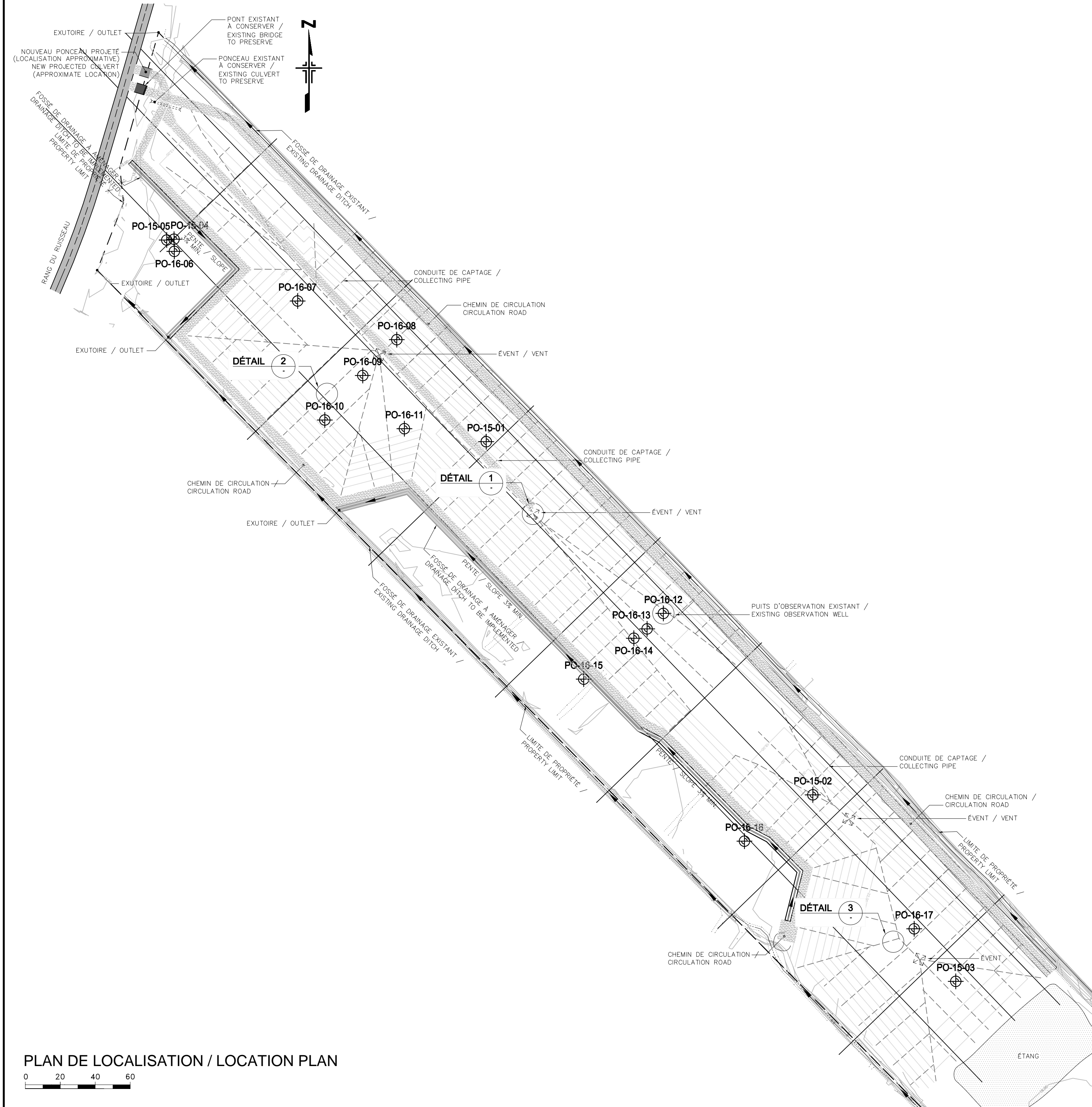
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COUPES ET DETAILS / CROSS-SECTIONS AND DETAILS

AECOM TechnoRem Inc.

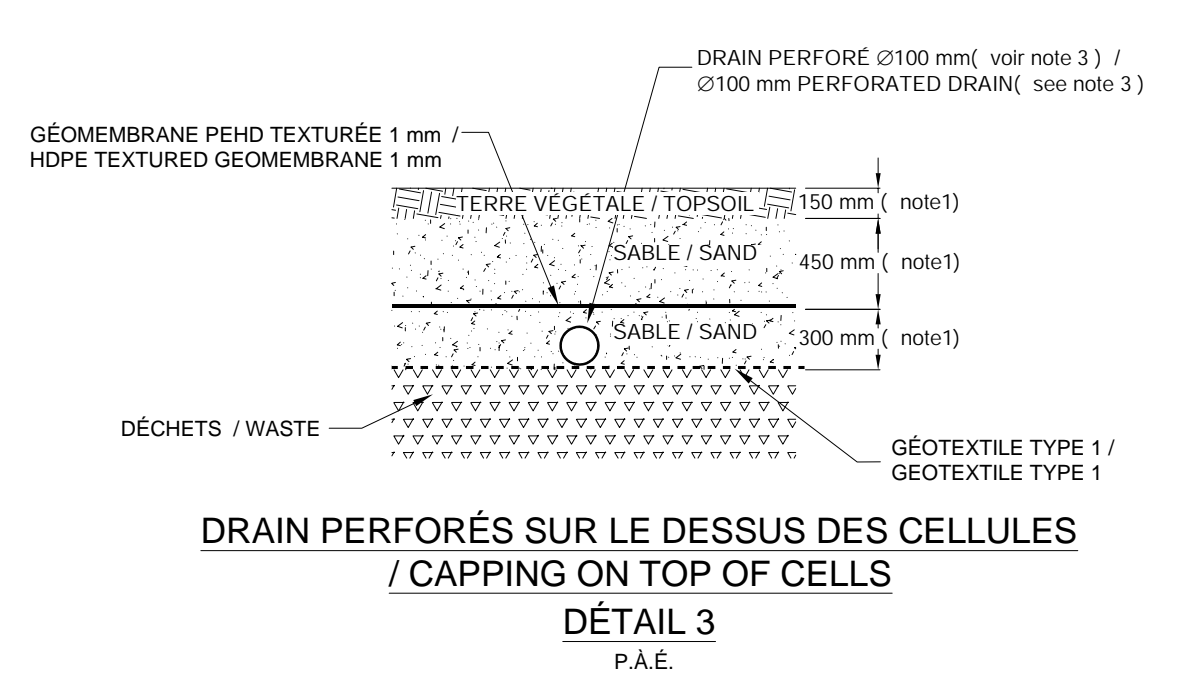
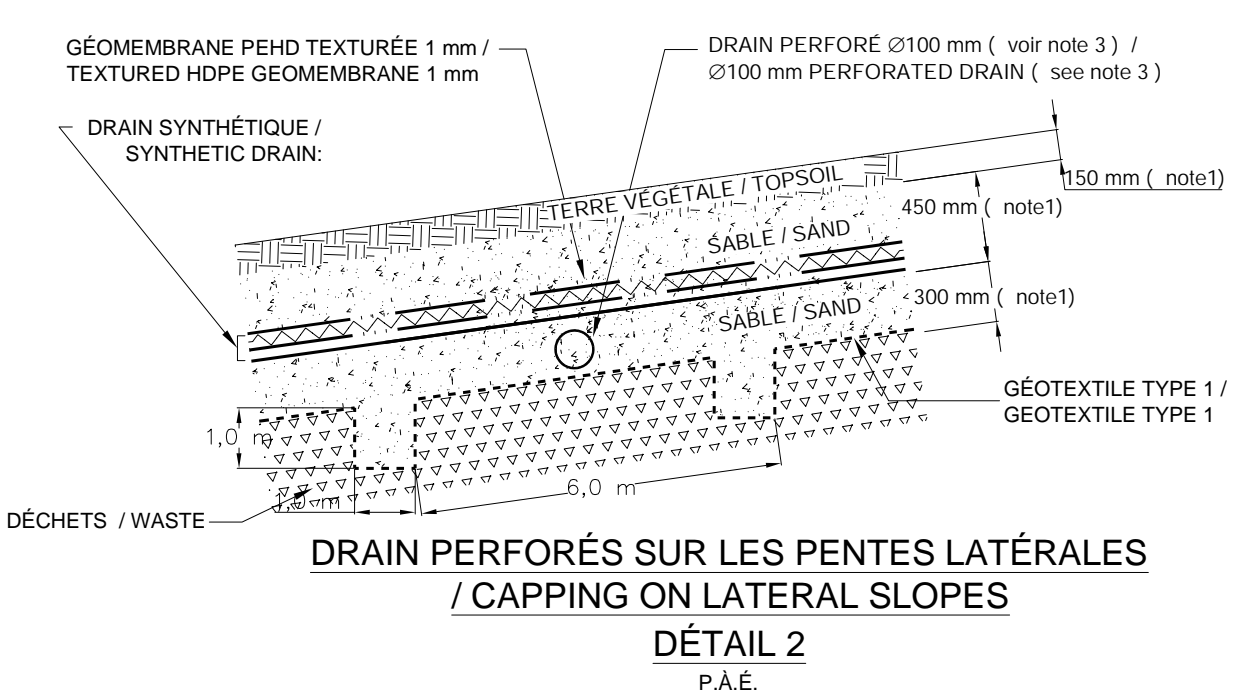
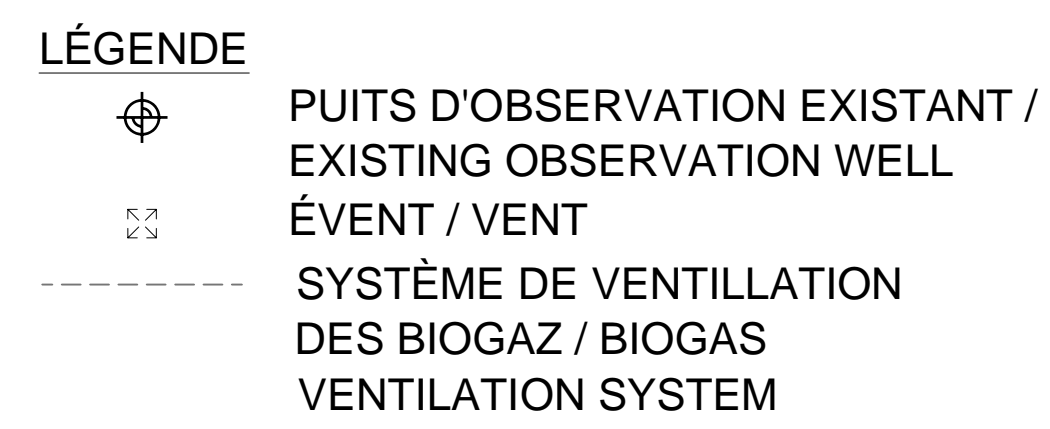
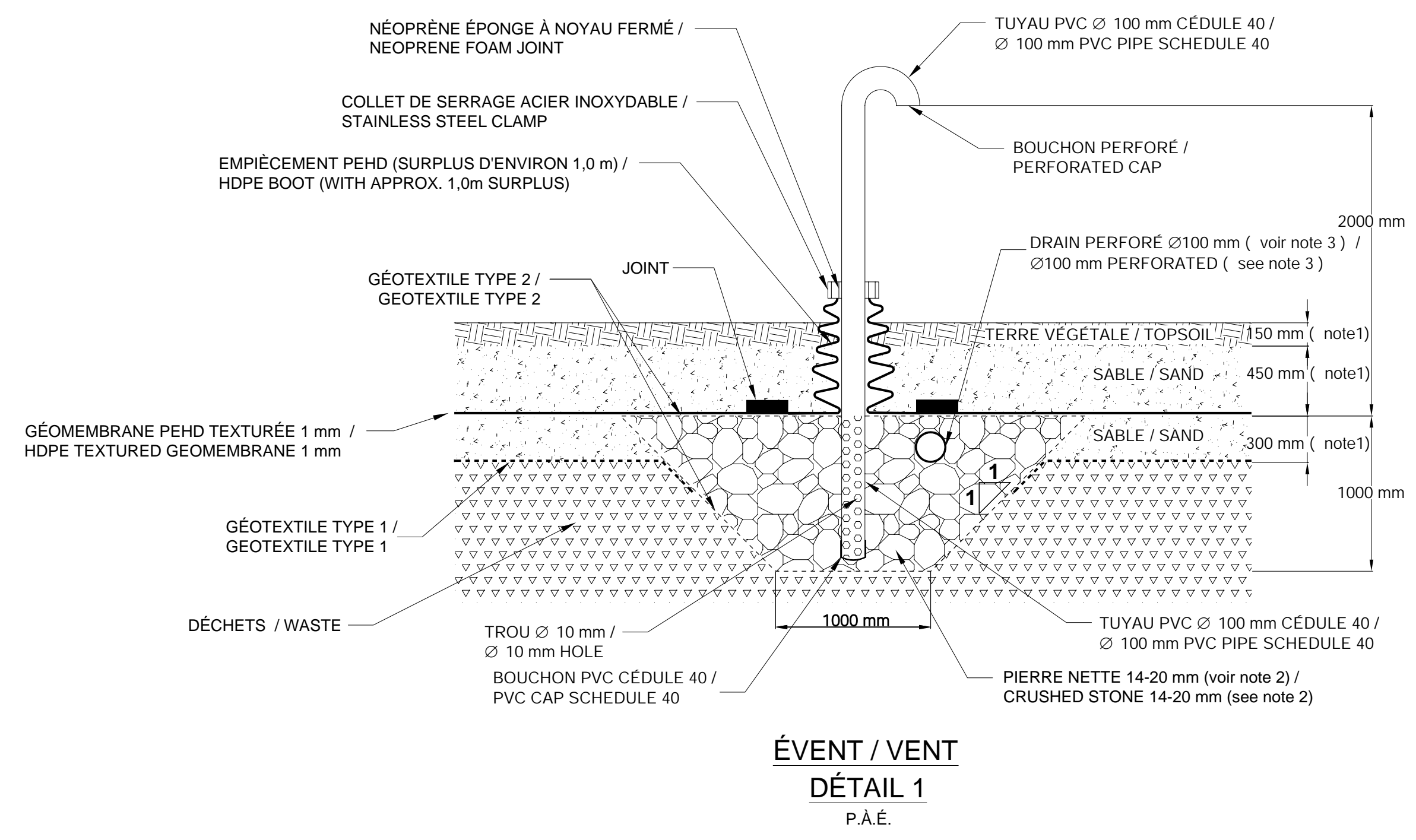
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DESSINÉ PAR: F.MOISAN / DRAWING BY: F.MOISAN
DATE: / PROJECT: R.07869 / PLAN NO.: / DRAWING No.: R.078691-S23-P004

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- Notes:
- Le sable utilisé ne doit comporter aucune particule de dimension supérieure à 10 mm et doit posséder une conductivité hydraulique d'au moins 5×10^{-3} cm/s. / The sand used must not contain any particles larger than 10 mm and must have a hydraulic conductivity of at least 5×10^{-3} cm / s.
 - La pierre nette utilisée autour des cheminées d'évacuation doit satisfaire aux exigences pour le gros granulat pour béton de ciment, calibre 14-28 mm du Cahier des charges et devis généraux du Québec (CCDG), édition 2015. / The crushed stone used around the vents must meet the requirements for coarse cement concrete aggregate, 14-28 mm size, Cahier des charges et devis généraux du Québec (CCDG), édition 2015.
 - Les conduites perforées utilisées pour l'aménagement du système de captage des biogaz doivent être en PEHD, possédant une rigidité en compression d'au moins 210kPa et être enrobées d'un tricot de polyester possédant un FOS de 450µm. / The perforated pipes used for the biogas capture system must be made of HDPE, have a rigidity of 210kPa and be covered with a polyester knit with a FOS of 450µm.



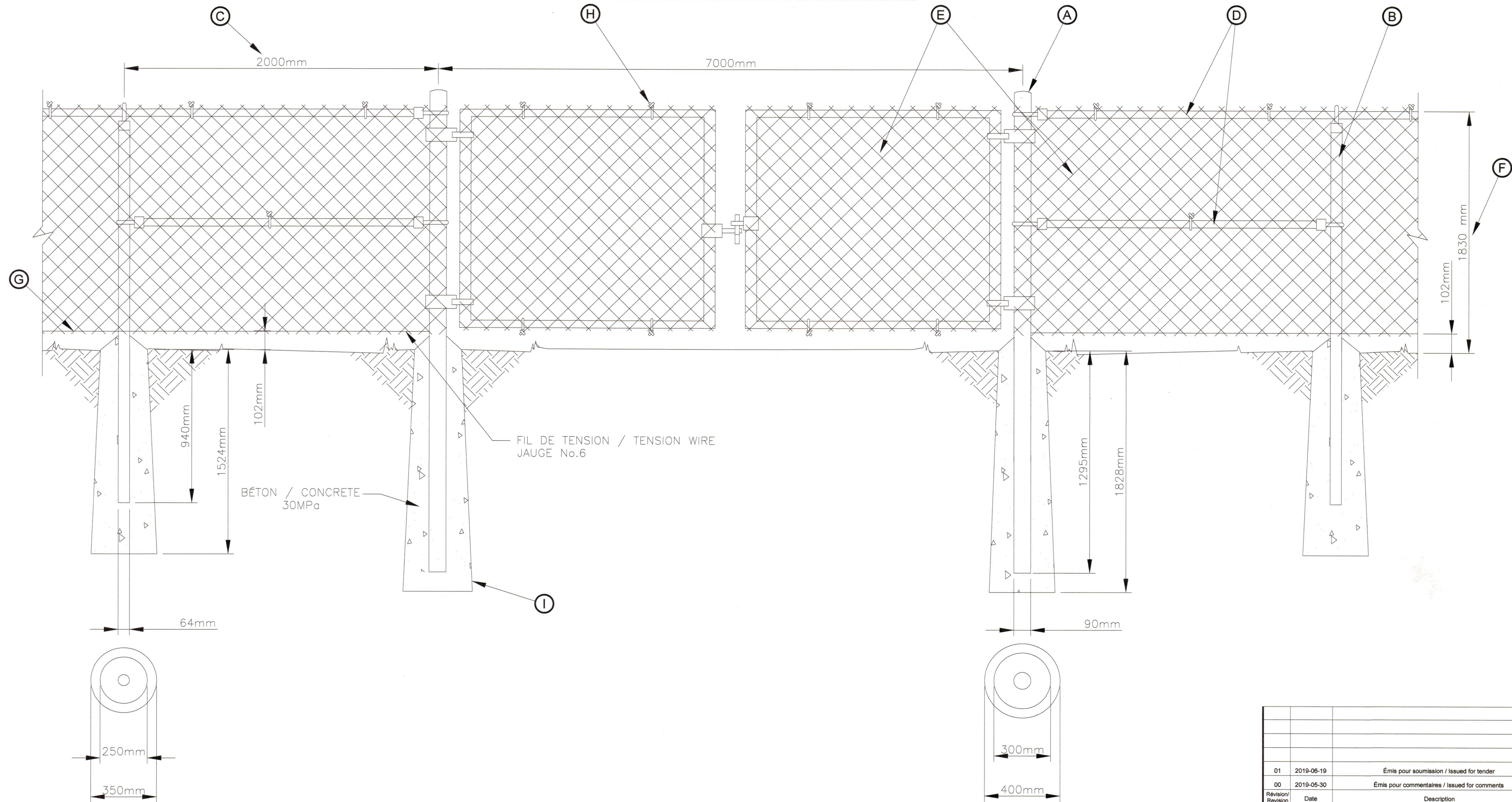
PLAN DE LOCALISATION / LOCATION PLAN
0 20 40 60



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00	2019/05/29	ÉMIS POUR COMMENTAIRES / ISSUED FOR COMMENTS	B.Z.	C.R.	C.R.
REV. REV.	DATE	DESCRIPTION	DESSINÉ DRAWN	RÉVISÉ REVISED	APPR.
SCEAU: SEAL:			SCEAU: SEAL:		SCEAU: SEAL:
CLIENT:					Public Works and Government Services Canada
PROJET: MISE EN OEUVRE DES MESURES DE MITIGATION À L'ANCIEN DÉPÔTOIR DE CONTRECOEUR / IMPLEMENTATION OF ENVIRONMENTAL MITIGATION MEASURES AT THE FORMER CONTRECOEUR					
TITRE: SUBTITRE: SYSTÈME DE VENTILATION DE BIOGAZ / BIOGAS VENTILATION SYSTEM VUE EN PLAN ET DÉTAILS / PLAN VIEW AND DETAILS					
AECOM Consultants Inc. 85, rue Sainte-Catherine Ouest Montréal (Québec) Canada H2Z 3K4 www.aecom.com			TechnoRem Inc. 4701, rue Louis-B-Mayer Laval (Québec) Canada H1P 6G5 www.technorem.com		
ECHELLE GRAPHIQUE: GRAPHIC SCALE CETTE ECHELLE SERT UNIQUEMENT POUR L'OBTENTION DE DIMENSION APPROXIMATIVE POUR INFORMATION / THIS SCALE IS ONLY FOR APPROXIMATE DIMENSION FOR INFORMATION			ÉCHELLE: SCALE: FORMAT: A1 23.4 X 33.1 (594 X 841) PROJETÉ PAR: PLANNED BY: B.ZAVOIANU RÉVISÉ PAR: REVISED BY: C.ROBITAILLE DESSINÉ PAR: DRAWING BY: B.ZAVOIANU VÉRIFIÉ PAR: VERIFIED BY: C.ROBITAILLE PROJET / PROJECT: R.078691 PLAN NO. / DRAWING No.: R.078691-S23-P005 DATE:		

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Vue de la clôture entourant le site depuis l'extérieur du site /
View of the fence surrounding the site from the exterior of the site

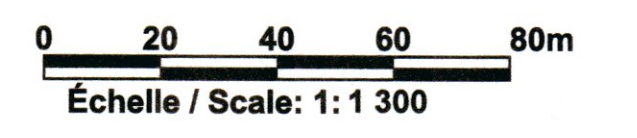
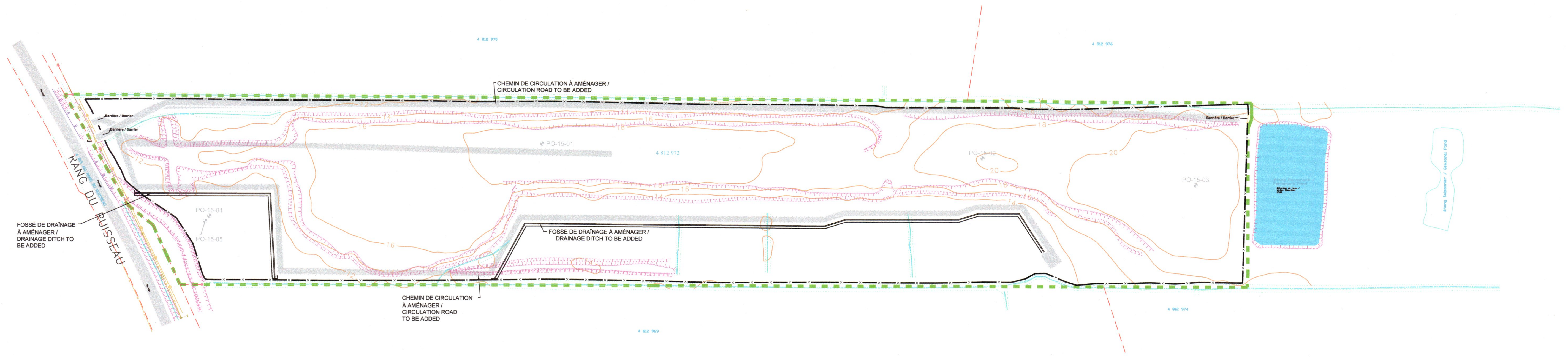


SPÉCIFICATIONS / SPECIFICATIONS

- A) POTEUX TERMINAUX DE BOUT ET DE COIN 90mm, 91m C/C MAX. /
END AND CORNER TERMINAL POSTS 90mm, 91m C/C MAX.
- B) POTEUX INTERMÉDIAIRES 60mm ϕ /
INTERMEDIATE POSTS 60mm ϕ
- C) DISTANCE ENTRE LES POTEUX 2400mm C/C /
DISTANCE BETWEEN POSTS 2400mm C/C
- D) TUYAUX HORIZONTAUX BARRE DE SOMMET 40mm, ENTRETOISE 40mm /
HORIZONTAL CROSSPIECES 40mm TOP BAR, SPACER 40mm
- E) MAILLE 50mm ϕ JAUGE No.9 / MESHES 50mm ϕ GAUGE No.9
- F) HAUTEUR / HEIGHT: 1830mm
- G) FIL DE TENSION / TENSION WIRE (JAUGE No.6)
- H) ATTACHE MAILLAGE-POTEAU
- I) VOIR ARTICLE 79.3.1.19 POUR LES EXIGENCES RELATIVES AUX BASES DES POTEAUX

Revision / Revision	Date	Description	Dessiné / Drawn	Révisé / Revised	Appr.
01	2019-06-19	Émis pour soumission / issued for tender	D.L.	M.-A.C.	M.-A.C.
00	2019-05-30	Émis pour commentaires / issued for comments	D.L.	M.-A.C.	M.-A.C.

Niveau: Seal: 	Niveau: Seal:	Niveau: Seal:
Client:  Travaux publics et Services gouvernementaux Canada / Public Works and Government Services Canada		
Projet: MISE EN PLACE DE MESURES DE MITIGATION À L'ANCIEN DÉPÔTOIR DE CONTRECOEUR / IMPLEMENTATION OF ENVIRONMENTAL MITIGATION MEASURES AT THE FORMER CONTRECOEUR LANDFILL		
Titre: DÉTAIL DE LA CLÔTURE / FENCE DETAIL		
		Échelle graphique: Graphic scale: Date: 2019-05-29 Dessiné par: D.Larivée Format: A1 (594 x 841mm) / (23 3/8" x 33") Paper size: A1 (594 x 841mm) / (23 3/8" x 33") Projeté par: M.-A.Carrier, Ing. Échelles: Aucune / None Révisé par: M.-A.Carrier, Ing. Projet / Project: R.078601 Dessin / Drawing: R.078601-579-P001 Vérifié par: J.-M.Lauzon, Ing.



Légende:

- Limite de lot / Lot limit
- 4 812 972 Numéro de lot / Lot number
- Clôture / Fence
- Palissade existante / Existing Palisade
- Clôture à aménager (à 1 m du bord du talus, côté site) / Fence to be installed (at 1 m from the embankment, on the side of the Site)
- Étendue d'eau / Body of water
- Haut de talus / Top of embankment
- Bas de talus / Bottom of embankment
- Ponceau / Culvert
- Bord de fossé / Edge of ditch
- Centre du fossé / Center of ditch
- 18 Courbe topographique / Topographic contour
- Glissière / Crash barrier
- Ligne aérienne de services (Électricité, téléphone) / Aerial service lines (electricity, phone)
- Limite de la zone des travaux / Limit of work area

Revision/	Date	Description	Dessiné	Révisé	Appr.
01	2019-06-19	Émis pour soumission / Issued for tender	D.L.	M.-A.C.	M.-A.C.
00	2019-05-30	Émis pour commentaires / Issued for comments	D.L.	M.-A.C.	M.-A.C.

Sceau: 	Sceau: 	Sceau:
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Client: Travaux publics et Services gouvernementaux Canada / Public Works and Government Services Canada
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Projet: MISE EN PLACE DE MESURES DE MITIGATION À L'ANCIEN DÉPOTOIR DE CONTRECOEUR / IMPLEMENTATION OF ENVIRONMENTAL MITIGATION MEASURES AT THE FORMER CONTRECOEUR LANDFILL

Titre: EMPLACEMENT DE LA CLÔTURE / LOCATION OF THE FENCE

	Échelle graphique: / Graphic scale:	Dessiné par: / Drawn by: D.Larivée
	Date: 2019-05-29	Projeté par: / Planned by: M.-A.Carrier, ing.
	Format: / Paper size: A1 (594 x 841mm) / (23 3/8" x 33")	Révisé par: / Revised by: M.-A.Carrier, ing.
	Echelles: / Scales: 1:1 300	Vérifié par: / Verified by: J.-M.Lauzon, ing.
	Projet / Project: R.078691	
	Dessin / Drawing: R.078691-S79-P002	

APPENDIX 1-2
PREVIOUS STUDIES

**ÉVALUATION ENVIRONNEMENTALE DE SITE – PHASE
III, PROPRIÉTÉ DE L’ANCIEN DÉPOTOIR DE
CONTRECOEUR (TECHNOREM, 2017)**

EXECUTIVE SUMMARY

TechnoRem was retained by Public Work and Government Services Canada (PWGSC) to conduct a Phase III environmental assessment, in view of elaborating rehabilitation scenarios for the site of the former Contrecoeur landfill. With an area of 165,435 m², the site has been used as an industrial landfill between 1972 and 1996. Previous environmental work at the site revealed the presence of residual and hazardous materials, in addition to soils, sediments, groundwater and surface water impacted with one or more inorganic (metals, chlorides, fluorides, etc.) or organic contaminants (PH C₁₀-C₅₀, PAHs, VOCs, PCBs, dioxins/furans, etc.).

The main objectives of the project were to collect additional data to better define the site environmental portrait and evaluate the best rehabilitation or management options.

Geology and Hydrogeology

At the location of residual material accumulations, the soil stratigraphy comprises a 0.4 m thick fill layer of clayey silt covering residual materials (automotive fluff: nonferrous automobile shredder residue, tires, drums, ashes, bricks, etc.) with a thickness reaching 7.2 m, which overly clayey native soils, or silty to sandy soils in the southeast part of the site.

The site is located between the Richelieu River (2.4 km to the east) and Laprade stream (180 m to northwest). Drainage ditches bound the site along its northeast, southwest and northwest limits. A 2,800 m² artificial pond and a seasonal pond are present at the limit with the site wooded part (southeast).

The two (2) main hydrostratigraphic units at the site are the saturated portion of residual material accumulations (unconfined water table) and the underlying, more or less silty, native clays (aquitarde). Permeability tests indicated mean hydraulic conductivity of 2.18×10^{-6} m/s in the residual materials and 3.37×10^{-10} m/s in the clay unit.

Groundwater flow in the residual material accumulations is radial with a mean horizontal gradient ranging from 0.008 to 0.05 m/m. In the clayey unit, the main flow component is vertical. Artesian pressure was noted in a well nest located near the site northwest limit.

Quality of Residual Material and Soils

Leachate tests conducted on residual material samples indicated that they are not hazardous materials according to the Hazardous Material Bylaw.

Soils that showed concentrations above the CCME Canadian Soil Quality Guidelines (CSQG) or alternative standards (for example: A criteria of the MDDELCC *Guide d'intervention*) include the fill layer covering the residual materials and the native soils underlying the residual materials, down to 1.4 m. The main contaminants include

metals, PH C₁₀-C₅₀, PAHs, F2-F3 fractions, VOCs, PCBs and dioxins and furans (DF). Soils in drainage ditches exhibit concentrations above CSQG for some metals.

The revised quantities of residual and hazardous materials are estimated to 198,800 m³ and 3,330 m³, respectively, whereas contaminated soils total 25,650 m³ (excluding native clayey soils with elevated concentrations for some metals (B, Cr, Ni) that could be natural in origin).

Quality of Surface Water and Groundwater

The compilation of available analytical data on surface waters indicates exceedances for metals, DF, suspended matter and BOD₅. Toxicity testing conducted on surface water sample collected at the site outlet revealed no toxicity.

Groundwater from wells located within the residual material accumulations is contaminated with metals, chlorides, fluorides, cyanides, sulfides, PCBs, DF, PAHs, VOCs, PH C₁₀-C₅₀, and F1-F2 fractions. Groundwater from wells installed in native soils, outside the residual material accumulations, are impacted by metals, and in some cases (PO-15-05), by sulfides, ammoniacal nitrogen, PAH and DF. Some high metal concentrations could be natural in origin and related to saline groundwater found in Champlain Sea clay deposits.

Biogas Survey

The biogas survey conducted in 2016 confirmed the presence of methane, which was measured in relatively high concentrations (above 30% LEL) in wells distributed over the whole residual material accumulations.

Conceptual Model

- The site hydrostratigraphy is composed of two (2) main units: 1) an unconfined water table represented by the saturated portion of residual materials, and 2) the underlying aquitard composed of native clayey to silty deposits, down to 15 m.
- Rain water infiltrating the residual materials dissolves various inorganic and organic contaminants. This water flows radially in the residual material accumulations and is collected, along with runoff waters, by the drainage ditches bounding the site that empty into the stream running along the northwest site limit.
- In the native clay unit ($K = 3.4 \times 10^{-10}$ m/s), groundwater only flows a few centimetres per year, with the main flow component being vertical, under the influence of gravity.
- Part of the high metal concentrations observed in the clayey unit could be natural in origin, being associated with the Champlain Sea deposits and saline groundwater.
- Anaerobic decomposition of organic wastes that could be present in the residual material accumulations could generate biogases such as methane and carbon dioxide.

Mathematical Model

A groundwater flow model was developed by using the SEEP2D two-dimensional numerical code. The model, calibrated with the groundwater level data collected in November 2016, allows estimating an incoming flow equal to 10.5 m³/d. The simulation results indicate that surface waterproofing would significantly lower the volume of water entering vertically. On an annual basis, the mean quantity of infiltration water would decrease by nearly 90 %, from 3,150 m³ to 360 m³.

Management and Rehabilitation Scenarios

The preliminary presentation and evaluation of the groundwater confinement and treatment technologies allowed elaborating different management scenarios for the site of the former Contrecoeur landfill, based on the conceptual model developed. The retained scenarios are the followings:

- Scenario 1: Surface waterproofing, toxicological and ecotoxicological risk analysis, and environmental monitoring.
- Scenario 2: Surface water pumping and treatment, toxicological and ecotoxicological risk analysis, and environmental monitoring.
- Scenario 3: Excavation and offsite disposal of residual materials and contaminated soils and environmental monitoring.

The cost estimates for each scenario are presented in a separated document.

**GEOTECHNICAL INVESTIGATION - PROPOSED NEW
CULVERT, CREEK "FOSSÉ MÉNARD, LOT 4 812 972,
CONTRECOEUR (LABORATOIRE GS, 2019)**



**Géotechnique – Environnement – Béton de ciment
Béton bitumineux - Expertise – Surveillance - Gestion de projets**

**GEOTECHNICAL INVESTIGATION
(SOIL RECOGNITION)**

**PROPOSED NEW CULVERT
CREEK “FOSSÉ MÉNARD “
LOT 4 812 972
IN CONTRECOEUR, (QUÉBEC)**

(N/RÉF. : ES19003-02)



**GEOTECHNICAL INVESTIGATION
(SOIL RECOGNITION)**

PROPOSED NEW CULVERT
CREEK “FOSSÉ MÉNARD “
LOT 4 812 972
IN CONTRECOEUR, (QUÉBEC)

Prepared by :

LABORATORY GS INC.
301 Boulevard Industriel
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J6J 4Z2

Tél. : (450) 699-5824

June 27, 2019

O/Ref. : ES19003-02

Châteauguay, June 27, 2019

GROUPE DGS
301, boulevard Industriel
Châteauguay (Québec) J6J 4Z2

To the attention of Mr. Jean Harrison, P. Eng., M.Sc. A.

OBJECT: Geotechnical Investigation (soil recognition)
Proposed New Culvert, creek Fossé Ménard in Contrecoeur, (Québec).

O/Ref. : ES19003-02

Sir,

According to your request, Laboratoire GS has provided a Geotechnical Investigation for the proposed new culvert as cited above. We are therefore pleased to send you our report.

The purpose of this study was to carry out a geotechnical investigation to determine the nature and properties of the materials required for the construction of the culvert.

Section 5.0 of this report summarizes the recommendations for the construction project.

This report sets out the reasons and data for our opinion.

We thank you for giving us the opportunity to serve you and look forward to working with you again on future projects.

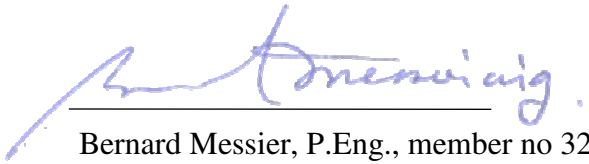
LABORATORY GS INC.

Geotechnical Investigation (soil recognition)

Proposed New Culvert, on Creek "Fossé Ménard" in Contrecoeur, (Québec).

If additional information is needed, do not hesitate to contact us. Hoping that all conform to your requirements, we kindly ask you to accept, Sir, the expression of our most distinguished feelings.

GS CONSULTANTS



Bernard Messier, P.Eng., member no 32745

LABORATORY GS INC.

Geotechnical Investigation (soil recognition)

Proposed New Culvert, on Creek "Fossé Ménard" in Contrecoeur, (Québec).

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Geotechnical Investigation (soil recognition)

Proposed New Culvert, on Creek "Fossé Ménard" in Contrecoeur, (Québec).

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LABORATORY GS INC.

Geotechnical Investigation (soil recognition)

Proposed New Culvert, on Creek "Fossé Ménard" in Contrecoeur, (Québec).

1.0 INTRODUCTION

The technical and professional services of GS CONSULTANTS have been retained by Jean Harrison, P. Eng., M.Sc.A., Senior partner on behalf of DGS Experts Group, to carry out a geotechnical study (soil recognition) in anticipation of a project to install a new culvert on the Fossé Ménard watercourse, with respect to lot 4 812 972 of the Cadastre du Québec, in Contrecoeur, Quebec

The work was carried out in accordance with budget proposal number PB19092ES dated May 20, 2019 and accepted on May 23, 2019, by Mr. Jean Harrison.

Geological Information

The study area is located in the "Queenston" geological group, specifically the Bécancour Formation, composed mainly of red clay shale, green sandstone, siltstone, gypsum and anhydrite according to the Information System (SIGÉOM, 2018).).

According to Surficial Map No DPV499 "Compilation of Quaternary Geology" published by the Department of Energy and Resources, the surficial deposits would consist of Champlain Sea firm to stiff Clay of high sensitivity, sometimes covered with a thin layer of sand (less than a meter). The bedrock is more than 6 m deep.

This report contains the methodology of the site work, a description of the soil stratigraphy in place at the various drill holes, reports the results obtained and presents conclusions and recommendations related to the field.

2.0 METHOD OF INVESTIGATION

The field program of investigation was carried out on June 4, 2019. It mainly involved the execution of two boreholes identified as F-1 and F-2.

Drilling was carried out using a conventional drill provided by the company "Forage André Roy" based in Saint-Isidore (Quebec). The drilling procedure consisted of augering to the required depths at the selected locations, and sampling and testing the overburden. Drilling reached a depth of 4.2 meters.

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Geotechnical Investigation (soil recognition)

Proposed New Culvert, on Creek "Fossé Ménard" in Contrecoeur, (Québec).

Soil sampling was performed using a standardized split core sampler of 38 mm ID and 600 mm length. The "N" index of the standard penetration test (NQ2501-140) was determined continuously in the borehole.

Soil samples were taken from each of the stratigraphic units encountered and some were subjected to laboratory tests to determine their geotechnical characteristics and properties.

Three (3) particle size analyzes by sedimentation in accordance with NQ2501-025, three (3) consistency limit tests (according to BNQ 2501-092), and water content determination tests (according to BNQ 2501-092). LC21-201) were performed on some of the samples taken.

3.0 BOREHOLES LOCATION

Drill location was conducted north of the existing culvert and east side of the Creek. The final location of the drilling was confirmed based on the responses obtained following a tracking request sent to Info-Excavation.

The attached sketch in Appendix "B" represents approximately the location of the drilling on the site.

The surface elevations appearing on the drilling reports in Appendix "A" refer to the geodesic elevations of the surface of the ground to the right of the drillings. All of this information can be found on the location sketch attached in Appendix "B" to this report.

4.0 OBSERVATIONS

The nature and characteristics of soils were determined from the field work.

The survey reports included in Appendix "A" should be referred to for a detailed description of the soils encountered, while the following paragraphs provide a summary of the results obtained in the boreholes.

Descriptions of the samples taken were made according to a soil classification based on a visual examination which may, as appropriate, be confirmed by field or laboratory tests. This classification involves the use of the judgment and interpretation of the personnel who performed the examination of the materials. These can be presumed fair and correct according to the usual practice in the field of geotechnics. In addition, the term "depth" used in this report always refers to the surface of the land at the time of our work.

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Geotechnical Investigation (soil recognition)

Proposed New Culvert, on Creek "Fossé Ménard" in Contrecoeur, (Québec).

If one tries to characterize the site in its totality, from the stratigraphic point of view, one can identify the various layers of soils following:

4.1 Topsoil

On the surface, there is a layer of topsoil 100 mm thick at borehole F-1 only.

4.2 Heterogeneous Fill

Under the topsoil at the right of the F-1 drill hole, and at the surface at drill hole F-2, the soil is a silty clay fill of gray color, very stiff. The fill extends to a depth of 0.6 m.

4.3 Silt and Clay

Under the heterogeneous backfill, we find a clay and gray silt deposit, until the end of drill hole at a 4.2 m depth. The deposit is of "stiff to very stiff" consistency up to 1.8 m, and generally "firm" thereafter.

Table 1 illustrates the various percentages of clay, silt, sand and gravel found in the different soil layers as well as the associated geotechnical indices. The deposit is classified as CH and MH in the Unified Classification System (USCS).

Table 1 : Geotechnical profile of soils present on the site

Sample no	Depth. (m)	Cu (KPa)	USCS Class.	% clay, silt, sand et gravel				Atterberg Limits				
				Clay	Silt	Sand	Gravel	W%	W _L %	W _P %	PI	LI
F-1/CF-3	1,2-1,8	85	MH	53	47	0	0	40,8	58,2	30,2	28,0	0,38
F-1/CF-5	2,4-3,0	12	CH	61	39	0	0	54,4	57,0	26,0	30,9	0,92
F-1/CF-6	3,0-3,6	49	CH	56	44	0	0	55,3	54,0	25,6	28,4	1,05

Undrained shear strength (CU) was measured in situ using a Nilcon vane apparatus. The values obtained are showed in Table 2 below:

The clay and silt samples F-1 / CF5 and CF-6 have a liquidity index close to 1.0, which means that when this clay is remolded, it will behave like a viscous liquid. This situation will cause excavation difficulties and will require very gentle slopes. Excavations will be discussed in section 5.6.

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Geotechnical Investigation (soil recognition)

Proposed New Culvert, on Creek "Fossé Ménard" in Contrecoeur, (Québec).

Table 2 : Undrained shear strength (Cu) in kPa

Depth (m)	F-01	Consistency
1,75	85	Stiff
3,25	49	Firm
3,75	42	Firm
4,25	44	Firm

5.0 CONCLUSIONS AND RECOMMENDATIONS

According to the information provided by the client, a culvert of rectangular shape with a height of 3800 mm and a range of 5000 mm will be installed in the alignment of the Fossé Ménard, in continuity with the existing culvert to the north. The total length of the culvert will be 18.0 meters.

The excavations will likely reach a depth of 7.6 m. At these depths, the excavations will be made, for the most part, in the firm clay and silt layer.

5.1 Available Bearing Capacity

According to the information provided by the client, the culvert base will be at geodesic elevation 8.00 m (approximately 4.0 meters deep). At that depth, the culvert raft will rest on the surface of a controlled backfill that would be constructed from the top of the firm clay layer.

Based on the stratigraphy observed in the two boreholes, the bottom of the excavation should be at an elevation not exceeding 7.6 m. The controlled backfill shall be constructed using "MG-20"-size crushed stone, in successive layers of 150 mm thickness each, for a total thickness of approximately 450 mm. Each layer should be compacted to a minimum of 95% of the value of the Modified Proctor Test (see section 5.4).

The following are the ultimate limit state (ULS) and the Service limit state (SLS) values that can be used for the culvert raft design.

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Geotechnical Investigation (soil recognition)

Proposed New Culvert, on Creek "Fossé Ménard" in Contrecœur, (Québec).

Table 3 : Service limit state (SLS) and ultimate limit state (ULS) values

Service Limit State (SLS) (KPa)	Ultimate limit state (ULS) (KPa)	Weighted geotechnical resistance (ϕR_n) (KPa)
90	270	135

5.2 Lateral thrust of the soil behind the retaining structures

In firm to stiff clay, the excavation slopes could stand near vertical for the last 1.2 m from the bottom of the excavation. On the other hand due to the Liquidity Index of the clay at that depth, it is possible that the walls will not stand vertical. A test trench should be made near the work site to verify the behavior of the excavation. Subsequently slopes to the surface should not exceed 34° or 1V: 1.5H.

If it is impossible to proceed with the work with open trenches, a temporary support system must be put in place. As this is a temporary work, the contractor is responsible for its design. Given the depth of the excavations and the soft slopes required in the clay, and having a liquidity index close to 1.0 (see Section 4.3), it will likely be necessary to use a sheet pile wall support. The following parameters will be used to calculate the soil pressure behind the retaining wall, either sheet piles or diaphragm walls:

Table 4 : Geotechnical parameters to be used for the support walls

Depth	Parameter	Sheet pile	Molded walls
0,0 à 4,0 m	Active Earth Pressure coefficient of soils (K_a)	1,0	
	Passive Earth Pressure coefficient of soils (K_p)	1,0	
	Coefficient of Earth Pressure at rest (K_o)	1,0	
	Density (γ)	16,5 KN/m ³	
	Internal friction angle (ϕ')	0°	

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Geotechnical Investigation (soil recognition)

Proposed New Culvert, on Creek "Fossé Ménard" in Contrecoeur, (Québec).

5.3 Stability against uplift from the bottom of the excavation

The bottom of the excavation will be at a depth of about 4.0 meters, either within the clay layer and is firm. Remember that the clay and silt have liquidity index values close to 1.0 between 2.4 and 3.6 m depth meaning that the clay can behave like a viscous liquid, when reworked.

Hydrostatic pressure may cause instability (erosion, uplift, or bumpiness) from the bottom of the excavation. To avoid this risk of instability, the sheet piles should be stuck sufficiently under the bottom of the excavation if a granular layer is found at shallow depth below the bottom of the excavation.

5.4 Support cushion

According to the standardized drawing number 001 of chapter 4 "Installation of Rectangular Culverts in Reinforced Concrete (PBA)" of Volume III - Structures of the Ministère des Transports du Québec, and taking into consideration the dimensions of the culvert and the nature of the soil of infrastructure, a support cushion composed of MG-20 type crushed stone, compacted to a minimum of 95% of the Modified Proctor in layers of 150 mm must be set up under the culvert. This support cushion must be at least 450 mm thick and must exceed the 600 mm pipe on each side.

Beforehand, a Texel-type geotextile membrane or equivalent should be put in place at the bottom of the excavation before the granular cushion is put in place.

Before the placement of the granular cushion, we recommend that the excavation bottom be inspected by competent geotechnical personnel who will ensure that it is placed on the appropriate strata and undisturbed soil. All precautions should be taken to avoid reworking or disturbing the excavation bottom. In addition, it is recommended to avoid excavations during rainy periods or to leave excavated surfaces exposed to rain.

5.5 Lateral backfilling

The sides of the culvert shall be backfilled with MG-20 granular material compacted to a minimum of 90% of the modified Proctor per 150 mm layer to a height equivalent to that of the culvert, that is 3800 mm from the support cushion.

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Geotechnical Investigation (soil recognition)

Proposed New Culvert, on Creek "Fossé Ménard" in Contrecoeur, (Québec).

5.6 Cover material

The top of the culvert should be backfilled with MG-20 granular material compacted to a minimum of 90% of the 150 mm layer modified Proctor. The overlap must exceed the top of the culvert with a height of at least 600 mm over the entire span of the pipe. Slopes of 1V: 1.5H must be profiled in the granular cover on both sides of the culvert.

5.7 Excavation backfilling

The silty gray clay backfill may be reused for backfilling the excavation to the infrastructure line, which must be compacted to a minimum of 90% of the Modified Proctor by 300 mm layers, if water content allows its compaction.

5.8 Pavement structure

To allow the flow of water to a permanent and effective drainage system, it is recommended to maintain a crown on all compacted surfaces. Such measures will prevent the accumulation of water in the foundations thus helping to reduce the harmful action of frost.

Since this is a temporary unpaved road, the contractor is responsible for its construction. In addition, regular maintenance should be carried out so that the path is practicable at any time of the year. Table 5, below, presents the recommended structure above the culvert and for the access road.

Table 5 : Uncoated Pavement Structure Recommended

Type of materials	Thickness (mm)	(%) compaction
Superior Foundation-Crushed Stone MG-20	300	95 % OPM
Sub-foundation - Crushed stone MG-112 or MG-56	300	95 % OPM
Geotextile Texel type	-	-
Total	600	

The types of materials given in this section refer to the NQ 2560 114 II / 2000 standard as well as to the 4201 and 4202 standards of the Ministère des Transports du Québec and must meet the requirements set out therein.

5.9 Excavation sides slopes

As noted in Section 5.2, in firm to steep clay, excavation slopes could stand vertical for the last 1.2 m from the bottom of the excavation.

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Geotechnical Investigation (soil recognition)

Proposed New Culvert, on Creek "Fossé Ménard" in Contrecoeur, (Québec).

On the other hand due to the indices of liquidity of the clay to this depth, it is possible that the walls do not stand in the vertical. A test trench should be made near the work site to verify the behavior of the excavation. Subsequently slopes to the surface should not exceed 34° or 1V: 1.5H.

If it is impossible to proceed with the work with open trenches, a temporary support system must be put in place. As this is a temporary work, the contractor is responsible for its design.

If excavations without earth retaining structures remain open for prolonged periods, it is recommended that daily inspections be conducted to detect the risks of clay creep, and to determine the measures to be taken to correct the anomalies.

Means, such as placing fabric on the excavation walls, must nevertheless be implemented to protect the slopes against erosion due to inclement weather. In addition, the water level will likely be located at geodesic elevation of 10 m. It is recommended that a pumping system be provided to evacuate runoff and seepage water that may accumulate at the bottom of the excavations, depending on the climatic conditions prevailing at the time of the work and for the purpose of carrying out the work in the driest possible environment.

It is recommended not to park or authorize the movement of heavy vehicles at the edge of the excavations at a distance of less than 3 meters from the top of the walls to minimize vibrations that could destabilize the excavation walls.

It is also important to keep a distance of at least 1.2 meters between the edge of the excavation and the base of the stacks of materials stored on site. This condition must be respected at all times unless special studies are performed for each specific case.

6.0 STATEMENT OF LIMITATIONS

The description and properties of the soils presented in this report are only guaranteed where the surveys were conducted. Thus, the conclusions and recommendations are subject to this limitation. Conditions encountered at other locations on the site may differ from those observed at the location of the surveys.

The spacing and type of survey, as well as the sampling frequency, were chosen to meet the project requirements, taking into account budget and schedule constraints.

LABORATORY GS INC. SHALL BE PROMPTLY NOTIFIED IN WRITING OF ANY DISCREPANCIES DETECTED BETWEEN THE SOIL CHARACTERISTICS DESCRIBED IN THIS REPORT AND THOSE ENCOUNTERED IN FUTURE WORK.

LABORATORY GS INC.

Geotechnical Investigation (soil recognition)

Proposed New Culvert, on Creek "Fossé Ménard" in Contrecoeur, (Québec).

LABORATORY GS INC. HAS PREPARED THIS REPORT TO MEET THE NEEDS OF "**GROUPE DGS EXPERTS-CONSEILS**". ANYONE OTHER THAN "**GROUPE DGS EXPERTS-CONSEILS**" AND / OR ITS REPRESENTATIVES MUST NOT USE THIS REPORT WITHOUT HAVING PREVIOUSLY CONSULTED **LABORATORY GS INC.**

The work performed as part of this study should not be considered valid to describe a situation subsequent to the date of said work.

This report is not considered and interpreted and should not be considered or interpreted as a legal document.

The study may not be used in conjunction with any other environmental study unless the written consent of LABORATORY GS INC. Any unauthorized and unauthorized use of this report or any part of this report renders it null and void in its content and recommendations.

We certify that we have no interest in a real estate transaction or financing request supported by this report.

Our firm cannot be held responsible for the presence of contamination. It cannot also guarantee that the site could not be contaminated in the future by various events.

7.0 MODIFICATIONS AND INSPECTION

The conclusions and recommendations are based on the information that is described in this report. Any changes in the nature, location or design of the project should be communicated to us in writing so that we can assess whether these changes result in a modification of the conclusions and recommendations previously made.

Please also note that GS CONSULTANTS offers a complete service of monitoring and quality control. We will be happy to provide you with a fee schedule upon request.

LABORATORY GS INC.

Geotechnical Investigation (soil recognition)


Proposed New Culvert, on Creek "Fossé Ménard" in Contrecoeur, (Québec).

8.0 PROFESSIONAL STAFF

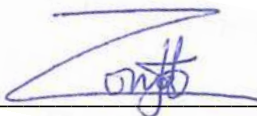
This report has been prepared by Mr. Bernard Messier, Senior Engineer (permit number 32745). He graduated with a Bachelor of Engineering degree from the Polytechnic School of the University of Montréal in 1978. He also holds a Bachelor's degree in Earth Sciences (Geology-UQAM) obtained in 1973 and has completed several courses in the environmental sciences.

Mr. Zongo, an engineer graduated from the University of Moncton in 2016 and who has completed a Master degree in geotechnical engineering and road infrastructure from the ETS in 2018 participated in writing this report.

Laboratory GS Inc.



Bernard Messier, ing. Member # 32745



Rodrigue Zongo ing.jr.

LABORATORY GS INC.

Geotechnical Investigation (soil recognition)

Proposed New Culvert, on Creek "Fossé Ménard" in Contrecoeur, (Québec).

APPENDIX A

Boreholes Logs and Symbols and Terms Explanations (6 pages)

Forage N°: F-1

Nom du projet: Étude Géotechnique (Reconnaissance des sols)

Coordonnées géodésiques: X: 327961,772

N° du projet: 19003-02

Y: 5080850,561

Nom du requérant: Groupe DGS

Z: 11,763

Site des sondages: Forage effectué sur le Rang du ruisseau , Contrecoeur, Qc.

Plan de localision No: CR19003-02

Entrepreneur: Forage André Roy

Date du sondage: 2019-06-04

Préparé par: Alexandre Paquette, T.P.

Profondeur du sondage: 4,20 mètres

ÉTAT DE L'ÉCHANTILLON		TERMINOLOGIE	INDICE DE QUALITÉ DU ROC	NIVEAU D'EAU				ANALYSES CHIMIQUES							
<input checked="" type="checkbox"/> Remanié <input checked="" type="checkbox"/> Perdu <input type="checkbox"/> Carottage <input checked="" type="checkbox"/> Tube mince	"Traces" <10% "Un peu" 10-20% "Adjectif (...eux)" 20-35% "Et" 35-50% DÉFINITION N=Indice de pénétration standard	% RQD <25 25-50 50-75 75-90 90-100	Très faible Faible Moyenne Bonne Excellente	Date: 25-juin-19	Prof: 1,7 m	ML: Métaux lourds HAP: Hydrocarbures aromatiques polycycliques HPC10-C50: Hydrocarbures pétroliers C-10 à C-50 HAM: Hydrocarbures aromatiques monocycliques									
TYPE D'ÉCHANTILLON		CLASSIFICATION (SYSTÈME UNIFIÉ)		CONSISTANCE DES SOLS COHÉRENTS		RÉSISTANCE AU CISAILEMENT (Cu)		INDICE "N"							
CF- Cuillère fendue TM- Tube mince CR- Échantillon par forage au diamant	Très lâche 0-4 Lâche 4-10 Compact 10-30 Dense 30-50 Très dense >50	Silt et argile <0,08mm Sable 0,08mm-5mm Gravier 5mm-75mm Cailloux 75mm-200mm Blocs >200mm	Très molle Molle Ferme Raide Très raide Dense	<10 Kpa 10-25 Kpa 25-50 Kpa 50-100 Kpa 100-200 Kpa >200 Kpa	0-2 2-4 4-8 8-15 15-30 >30										
INDICE DE CONTAMINATION VISUEL ET OLFACTIF															
I - Inodore / L - Légère / M - Moyenne / P - Persistante II - Inexistante / D - Disséminé / IM - Imbibé															
PROFONDEUR (M)	ÉLÉVATION (M)	STRATIGRAPHIE			ÉCHANTILLONS				RÉSULTATS D'ESSAIS						
		DESCRIPTION DU SOL ET DU ROC			ÉTAT	TYPE NO	RÉCUPÉRATION	Nombre de coups ou RQD	INDICE "N"	Obs. Visuelle	Obs. Olfactive	Analyse	Résultats	Niveau d'eau	Wp = Teneur en eau Wp = Limite plastique Wl = Limite de liquidité
		Niveau du sol: 11,763 mètres													
	11,063	100 mm de terre végétale sur un remblai d'argile silteuse, très raide.				CF-1	50	3 9 7	16	I	I				
	11,163	Argile et silt gris, raide à très raide jusqu'à 1,8 m. Le dépôt est généralement ferme par la suite.				CF-2	50	3 6 4 4	10	I	I				
		Ip=28,0% Ic=0,38				CF-3	100	4 4 3 4	7	I	I	SED 19555 LIM 19555			49,8 30,2 58,2 85
		Ip=30,9% Ic=0,92				CF-4	100	1 1 1 1		I	I				54,4 26 57
		Ip=28,4% Ic=1,05				CF-5	100	1 1 1 1	2	I	I	SED 19556 LIM 19556			49 25,6 54
		Ip=28,4% Ic=1,05				CF-6	100	1 1 1 1	2	I	I	SED 19557 LIM 19557			42 44
		Ip=28,4% Ic=1,05				CF-7	100	1 1 1	1	I	I				
	7,563	Fin du forage @ 4,20 mètres													

REMARQUE: Piézomètre installé à 4,2 m : Crépine de 4,2 à 2,7 m, Lanterne de sable de 4,2 à 2,4 m et bouchon de bentonite de 2,4 à 1,8 m.



RAPPORT DE SONDAGE

Forage N°: F-2

Nom du projet: Étude Géotechnique (Reconnaissance des sols)

Coordonnées géodésiques: X: 327965,420

N° du projet: 19003-02

Y: 5080857,642

Nom du requérant: Groupe DGS

Z: 11,585

Site des sondages: Forage effectué sur le Rang du ruisseau , Contrecoeur, Qc.

Plan de localision No: CR19003-02

Entrepreneur: Forage André Roy

Date du sondage: 2019-06-04

Préparé par: Alexandre Paquette, T.P.

Profondeur du sondage: 4,20 mètres

ÉTAT DE L'ÉCHANTILLON		TERMINOLOGIE	INDICE DE QUALITÉ DU ROC	NIVEAU D'EAU	ANALYSES CHIMIQUES							
<input checked="" type="checkbox"/> Remanié <input type="checkbox"/> Perdu <input type="checkbox"/> Carottage <input checked="" type="checkbox"/> Tube mince	"Traces" <10% "Un peu" 10-20% "Adjectif (...eux)" 20-35% "Et" 35-50%	% RQD <25 25-50 50-75 75-90 90-100	Très faible Faible Moyenne Bonne Excellente	Date:	ML: Métaux lourds	HAP: Hydrocarbures aromatiques polycycliques						
DÉFINITION N=Indice de pénétration standard		CLASSIFICATION (SYSTÈME UNIFIÉ) Silt et argile <0,08mm Sable 0,08mm-5mm Gravier 5mm-75mm Cailloux 75mm-200mm Blocs >200mm		CONSISTANCE DES SOLS COHÉRENTS Très molle Molle Ferme Raide Très raide Dense	RESISTANCE AU CISAILEMENT (Cu) <10 Kpa 10-25 Kpa 25-50 Kpa 50-100 Kpa 100-200 Kpa >200 Kpa	INDICE "N" 0-2 2-4 4-8 8-15 15-30 >30						
TYPE D'ÉCHANTILLON CF- Cuillère fendue TM- Tube mince CR- Échantillon par forage au diamant		INDICE DE CONTAMINATION VISUEL ET OLFACTIF I - Inodore / L - Légère / M - Moyenne / P - Persistante II - Inexistante / D - Disséminé / IM - Imbibé		RÉSULTATS D'ESSAIS Wp = Teneur en eau Wp = Limite plastique Wl = Limite de liquidité								
PROFONDEUR (M)	ÉLÉVATION (M)	STRATIGRAPHIE		ÉCHANTILLONS				Obs. Visuelle	Obs. Olfactive	Analyse	Résultats	Niveau d'eau
		DESCRIPTION DU SOL ET DU ROC	ÉTAT	TYPE NO	RÉCUPÉRATION	Nombre de coups ou RQD	INDICE "N"					
	10,985		Remblai d'argile silteuse, très raide.		CF-1	50	1 4 4 6	N 8	I	I		
1			Argile et silt gris, raide à très raide jusqu'à 1,8 m. Le dépôt est généralement ferme par la suite.		CF-2	30	3 4 4	B 7	I	I		
				CF-3	50	1 1 1	N 2	I	I			
2				CF-4	50	1 1	B 1	1	I	I		
				CF-5	100	1 1	B 1	1	I	I		
3				CF-6	100	1 1 1	N 1	1	I	I		
				CF-7	100	1 1 1	B 1	1	I	I		
4	7,385			Fin du forage @ 4,20 mètres								
5												

REMARQUE:

SYMBOLS AND TERMS

SOIL DESCRIPTION

Behavioural properties, such as structure and strength, take precedence over particle gradation in describing soils. Terminology describing soil structure are as follows:

Desiccated	-	having visible signs of weathering by oxidation of clay minerals, shrinkage cracks, etc.
Fissured	-	having cracks, and hence a blocky structure.
Varved	-	composed of regular alternating layers of silt and clay.
Stratified	-	composed of alternating layers of different soil types, e.g. silt and sand or silt and clay.
Well-Graded	-	Having wide range in grain sizes and substantial amounts of all intermediate particle sizes (see Grain Size Distribution).
Uniformly-Graded	-	Predominantly of one grain size (see Grain Size Distribution).

The standard terminology to describe the strength of cohesionless soils is the relative density, usually inferred from the results of the Standard Penetration Test (SPT) 'N' value. The SPT N value is the number of blows of a 63.5 kg hammer, falling 760 mm, required to drive a 51 mm O.D. split spoon sampler 300 mm into the soil after an initial penetration of 150 mm.

Relative Density	'N' Value	Relative Density %
Very Loose	<4	<15
Loose	4-10	15-35
Compact	10-30	35-65
Dense	30-50	65-85
Very Dense	>50	>85

The standard terminology to describe the strength of cohesive soils is the consistency, which is based on the undisturbed undrained shear strength as measured by the in situ or laboratory vane tests, penetrometer tests, unconfined compression tests, or occasionally by Standard Penetration Tests.

Consistency	Undrained Shear Strength (kPa)	'N' Value
Very Soft	<12	<2
Soft	12-25	2-4
Firm	25-50	4-8
Stiff	50-100	8-15
Very Stiff	100-200	15-30
Hard	>200	>30

SYMBOLS AND TERMS (continued)

SOIL DESCRIPTION (continued)

Cohesive soils can also be classified according to their "sensitivity". The sensitivity is the ratio between the undisturbed undrained shear strength and the remoulded undrained shear strength of the soil.

Terminology used for describing soil strata based upon texture, or the proportion of individual particle sizes present is provided on the Textural Soil Classification Chart at the end of this information package.

ROCK DESCRIPTION

The structural description of the bedrock mass is based on the Rock Quality Designation (RQD).

The RQD classification is based on a modified core recovery percentage in which all pieces of sound core over 100 mm long are counted as recovery. The smaller pieces are considered to be a result of closely-spaced discontinuities (resulting from shearing, jointing, faulting, or weathering) in the rock mass and are not counted. RQD is ideally determined from NXL size core. However, it can be used on smaller core sizes, such as BX, if the bulk of the fractures caused by drilling stresses (called "mechanical breaks") are easily distinguishable from the normal in situ fractures.

RQD %	ROCK QUALITY
90-100	Excellent, intact, very sound
75-90	Good, massive, moderately jointed or sound
50-75	Fair, blocky and seamy, fractured
25-50	Poor, shattered and very seamy or blocky, severely fractured
0-25	Very poor, crushed, very severely fractured

SAMPLE TYPES

SS	-	Split spoon sample (obtained in conjunction with the performing of the Standard Penetration Test (SPT))
TW	-	Thin wall tube or Shelby tube
PS	-	Piston sample
AU	-	Auger sample or bulk sample
WS	-	Wash sample
RC	-	Rock core sample (Core bit size AXT, BXL, etc.). Rock core samples are obtained with the use of standard diamond drilling bits.

SYMBOLS AND TERMS (continued)

GRAIN SIZE DISTRIBUTION

MC%	-	Natural moisture content or water content of sample, %
LL	-	Liquid Limit, % (water content above which soil behaves as a liquid)
PL	-	Plastic limit, % (water content above which soil behaves plastically)
PI	-	Plasticity index, % (difference between LL and PL)
D _{xx}	-	Grain size which xx% of the soil, by weight, is of finer grain sizes These grain size descriptions are not used below 0.075 mm grain size
D ₁₀	-	Grain size at which 10% of the soil is finer (effective grain size)
D ₆₀	-	Grain size at which 60% of the soil is finer
C _c	-	Concavity coefficient = $(D_{30})^2 / (D_{10} \times D_{60})$
C _u	-	Uniformity coefficient = D_{60} / D_{10}

C_c and C_u are used to assess the grading of sands and gravels:

Well-graded gravels have: $1 < C_c < 3$ and $C_u > 4$

Well-graded sands have: $1 < C_c < 3$ and $C_u > 6$

Sands and gravels not meeting the above requirements are poorly-graded or uniformly-graded.

C_c and C_u are not applicable for the description of soils with more than 10% silt and clay (more than 10% finer than 0.075 mm or the #200 sieve)

CONSOLIDATION TEST

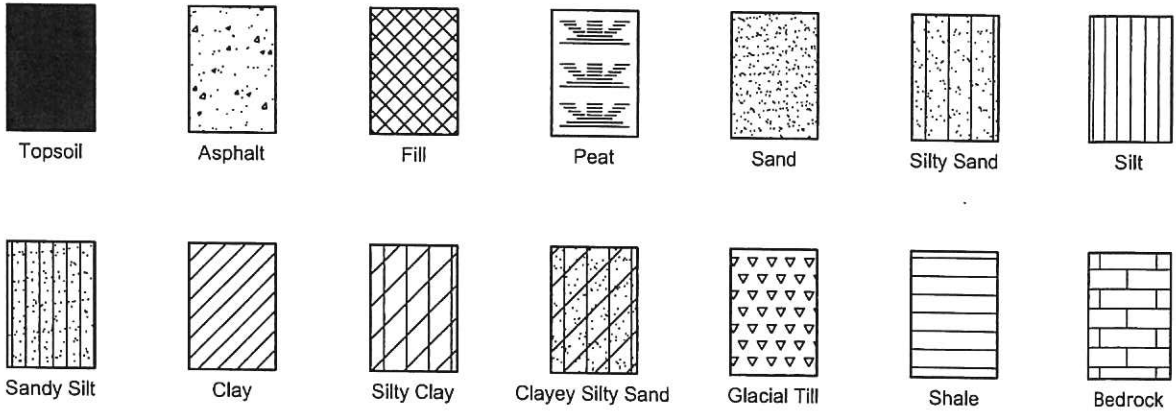
p' _o	-	Present effective overburden pressure at sample depth
p' _c	-	Preconsolidation pressure of (maximum past pressure on) sample
C _{cr}	-	Recompression index (in effect at pressures below p' _c)
C _c	-	Compression index (in effect at pressures above p' _c)
OC Ratio		Overconsolidation ratio = p'_c / p'_o
Void Ratio		Initial sample void ratio = volume of voids / volume of solids
W _o	-	Initial water content (at start of consolidation test)

PERMEABILITY TEST

k	-	Coefficient of permeability or hydraulic conductivity is a measure of the ability of water to flow through the sample. The value of k is measured at a specified unit weight for (remoulded) cohesionless soil samples, because its value will vary with the unit weight or density of the sample during the test.
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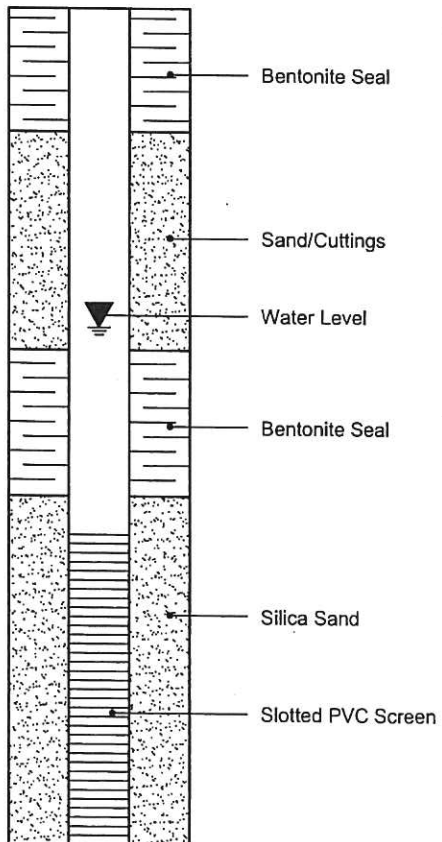
SYMBOLS AND TERMS (continued)

STRATA PLOT

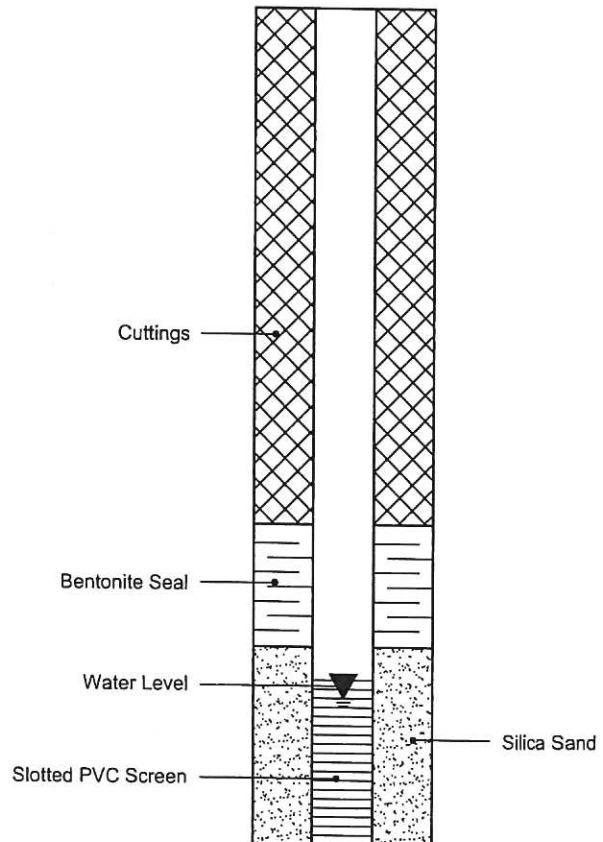


MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION



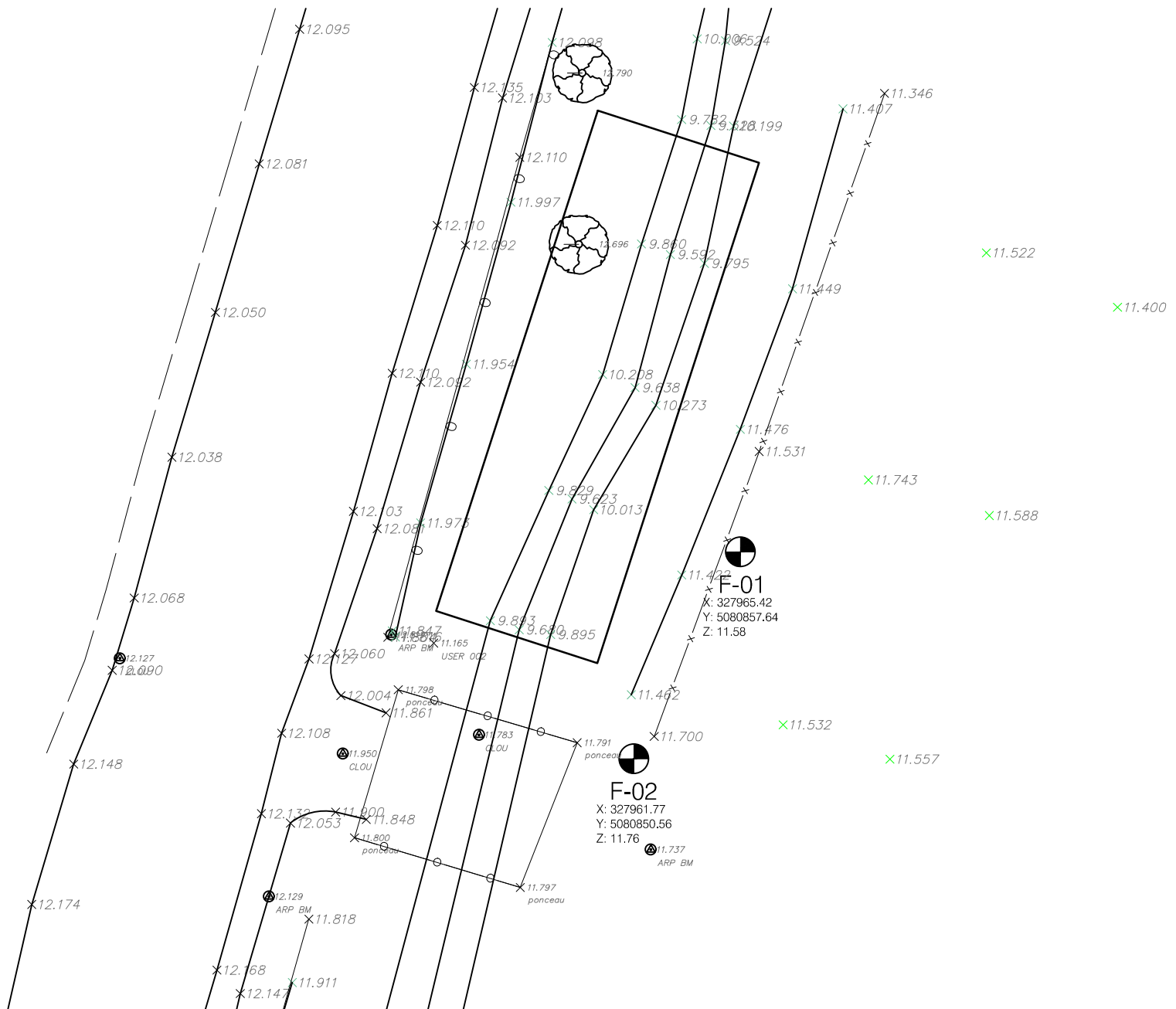
LABORATORY GS INC.

Geotechnical Investigation (soil recognition)

Proposed New Culvert, on Creek "Fossé Ménard" in Contrecoeur, (Québec).

APPENDIX B

Boreholes Location Plan (1 page)



LABORATOIRE



301, Boul. Industriel, Châteauguay (Québec) J6J 4Z2
 tél.: (450)699-5824 fax.: (450)691-7929

TITRE: CROQUIS DE LOCALISATION DES FORAGES

PROJET: ÉTUDE GÉOTECHNIQUE (RECONNAISSANCE DES SOLS)
 PROJET DE MISE EN PLACE D'UN NOUVEAU PONCEAU, COURS D'EAU FOSSÉ MÉNARD À CONTRECŒUR, (QUÉBEC).

CLIENT: JEAN HARRISON, ing. M. Sc. A.
 GROUPE DGS

APPROUVÉ PAR:
 BERNARD MESSIER, ing.

ÉCHELLE:
 AUCUNE

DOSSIER:
 ES19003-02

DESSINÉ PAR:
 EULOGIE MA BI

DATE:
 2019-06-26

CROQUIS:
 CR19003-02



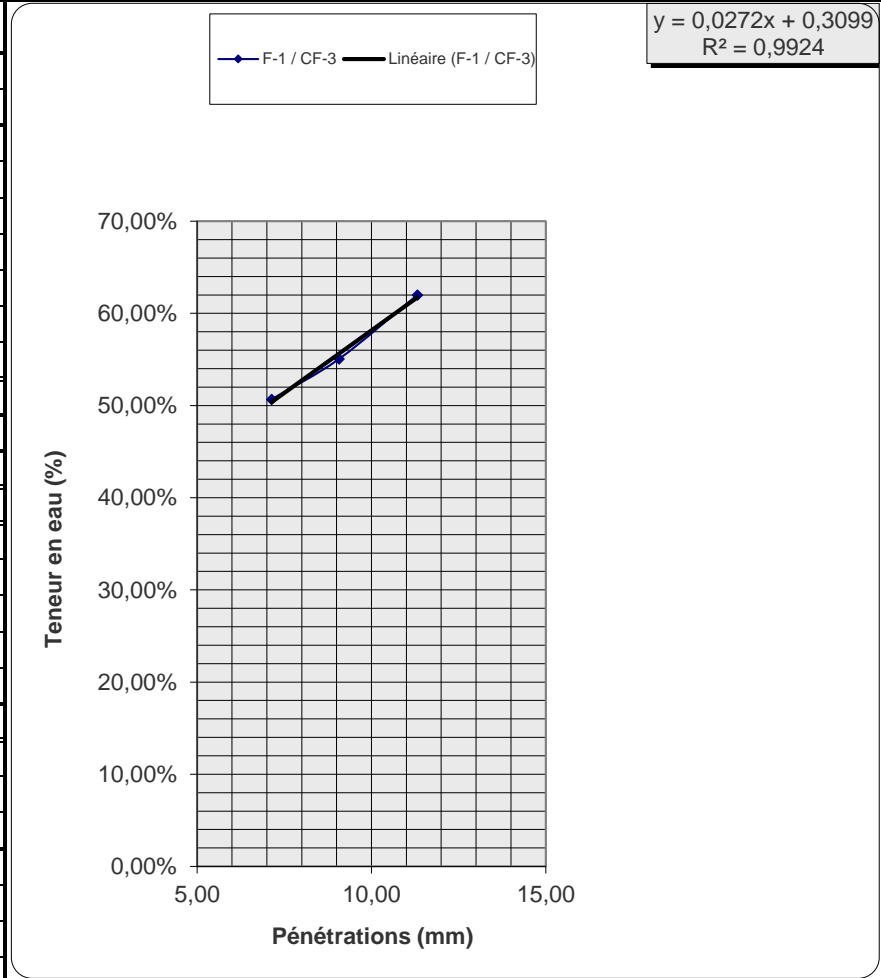
Limites de consistance & Résistance au cisaillement non drainé (Cu)

Numéro de dossier : 19003-02

Numéro de laboratoire : 19555

Calcul cône 100g à 30°

Masse du cône 100 g :	-
Constante du cône 100 g :	-
Nom de l'échantillon :	-
Teneur en eau W_0 (%) :	-
Série de calcul # Lab :	-
Nombre de pénétration :	-
Pénétration #1 (mm) :	-
Pénétration #2 (mm) :	-
Pénétration #3 (mm) :	-
\sum des carrés :	-
Cu (non-remanié) :	-
<i>Limite de liquidité</i>	
Teneur en eau (%)	Pénétration (mm)
50,68%	7,13
55,05%	9,07
62,00%	11,32
Sensibilité	-
Teneur en eau naturelle	40,8%
<i>Limite de plasticité</i>	
Teneur en eau (%)	
29,91%	
30,56%	
Limite de liquidité W_L :	58,2%
Limite de plasticité W_P :	30,2%
Indice de plasticité I_p :	28,0%
Indice de liquidité I_L :	0,38



Calcul cône 60g à 60°

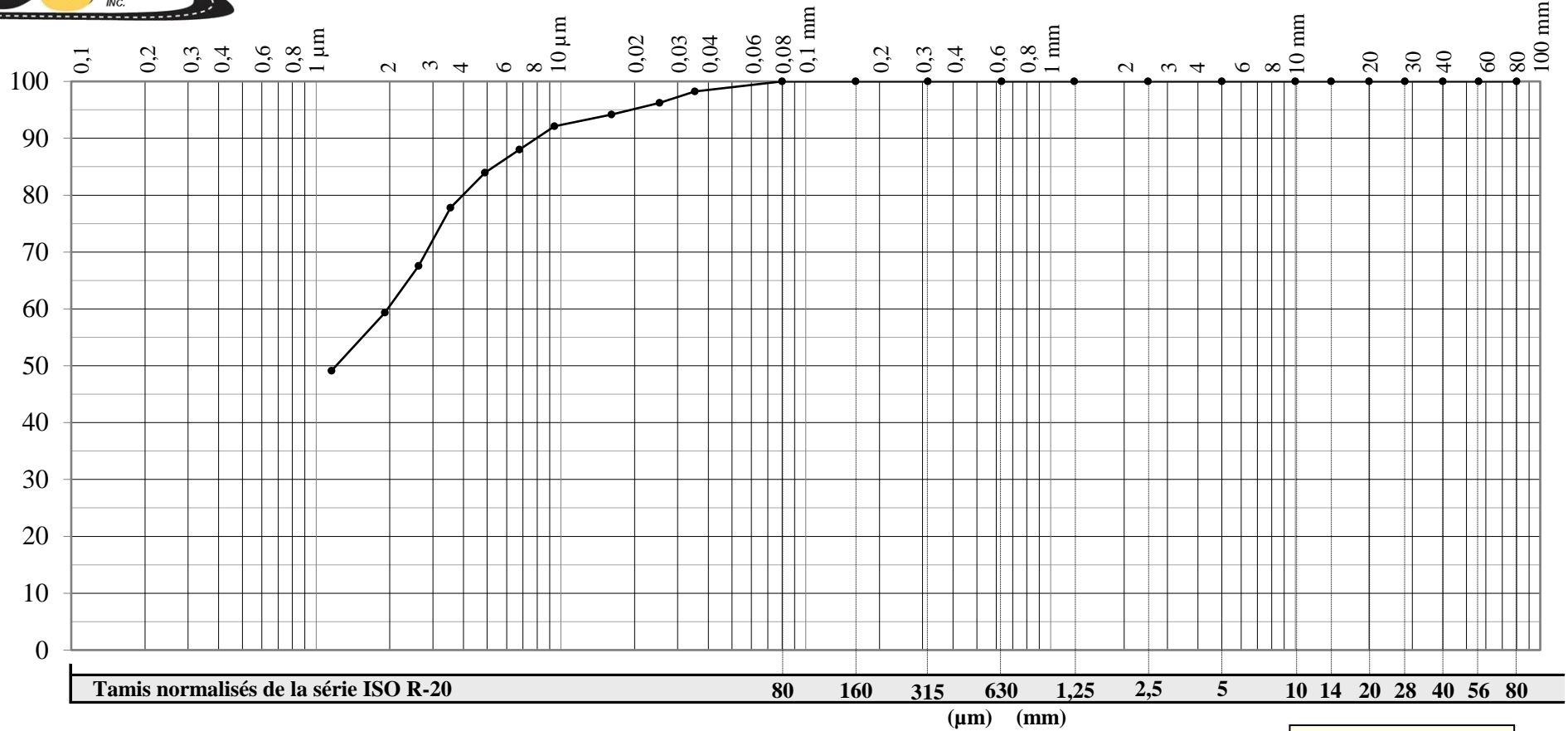
Calcul cône 10g à 60°

Calcul cône 400g à 30°

Masse du cône 60 g :	-	Masse du cône 10 g :	-	Masse du cône 400 g :	-
Constante du cône 60 g :	-	Constante du cône 10 g :	-	Constante du cône 400 g :	-
Nom de l'échantillon :	-	Nom de l'échantillon :	-	Nom de l'échantillon :	-
Teneur en eau W_0 (%) :	-	Teneur en eau W_0 (%) :	-	Teneur en eau W_0 (%) :	-
Série de calcul # Lab :	-	Série de calcul # Lab :	-	Série de calcul # Lab :	-
Nombre de pénétration :	-	Nombre de pénétration :	-	Nombre de pénétration :	-
Pénétration #1 (mm) :	-	Pénétration #1 (mm) :	-	Pénétration #1 (mm) :	-
Pénétration #2 (mm) :	-	Pénétration #2 (mm) :	-	Pénétration #2 (mm) :	-
Pénétration #3 (mm) :	-	Pénétration #3 (mm) :	-	Pénétration #3 (mm) :	-
\sum des carrés :	-	\sum des carrés :	-	\sum des carrés :	-
Cu (remanié) :	-	Cu (remanié) :	-	Cu (non-remanié) :	-



COURBE GRANULOMÉTRIQUE PAR SÉDIMENTOMÉTRIE



Argile	Silt	Sable
--------	------	-------

NORMES
LC 21-040
NQ 2501-025

Identification de l'essai

Client : GROUPE DGS	F : 1	Date : 2019-06-19
Projet no : 19003-02	CF : 5	Essai no : 19556
Projet : Ponceau de Contrecoeur		Réalisé par : D.B.
		W% : 54,4
Description de l'échantillon : -		

% de corrélation entre les textures de sol

Argile :	61	
Silt :	39	Véifié par :
Sable :	0	 Philippe Normand, Chef de laboratoire
Gravier :	0	



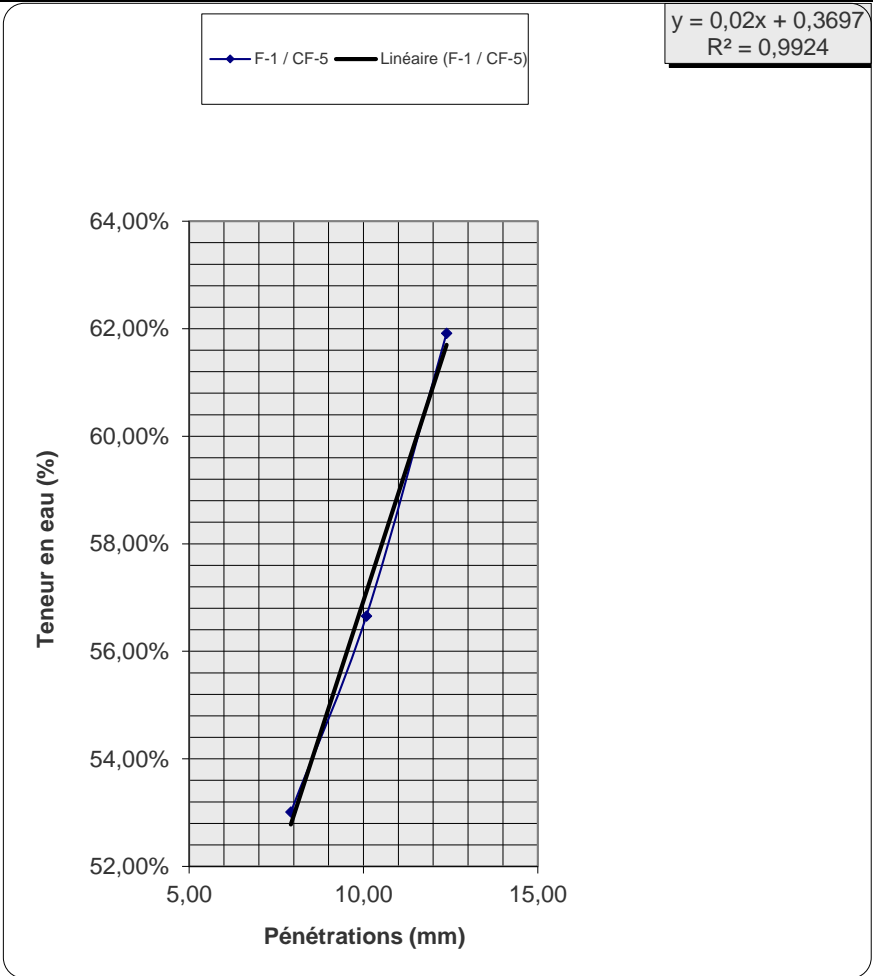
Limites de consistance & Résistance au cisaillement non drainé (Cu)

Numéro de dossier : 19003-02

Numéro de laboratoire : 19556

Calcul cône 100g à 30°

Masse du cône 100 g :	-
Constante du cône 100 g :	-
Nom de l'échantillon :	-
Teneur en eau W_0 (%) :	-
Série de calcul # Lab :	-
Nombre de pénétration :	-
Pénétration #1 (mm) :	-
Pénétration #2 (mm) :	-
Pénétration #3 (mm) :	-
\sum des carrés :	-
Cu (non-remanié) :	-
<i>Limite de liquidité</i>	
Teneur en eau (%)	Pénétration (mm)
53,01%	7,92
56,66%	10,08
61,92%	12,38
Sensibilité	-
Teneur en eau naturelle	54,4%
<i>Limite de plasticité</i>	
Teneur en eau (%)	
26,39%	
25,68%	
Limite de liquidité W_L :	57,0%
Limite de plasticité W_P :	26,0%
Indice de plasticité I_p :	30,9%
Indice de liquidité I_L :	0,92



Calcul cône 60g à 60°

Calcul cône 10g à 60°

Calcul cône 400g à 30°

Masse du cône 60 g :	-	Masse du cône 10 g :	-	Masse du cône 400 g :	-
Constante du cône 60 g :	-	Constante du cône 10 g :	-	Constante du cône 400 g :	-
Nom de l'échantillon :	-	Nom de l'échantillon :	-	Nom de l'échantillon :	-
Teneur en eau W_0 (%) :	-	Teneur en eau W_0 (%) :	-	Teneur en eau W_0 (%) :	-
Série de calcul # Lab :	-	Série de calcul # Lab :	-	Série de calcul # Lab :	-
Nombre de pénétration :	-	Nombre de pénétration :	-	Nombre de pénétration :	-
Pénétration #1 (mm) :	-	Pénétration #1 (mm) :	-	Pénétration #1 (mm) :	-
Pénétration #2 (mm) :	-	Pénétration #2 (mm) :	-	Pénétration #2 (mm) :	-
Pénétration #3 (mm) :	-	Pénétration #3 (mm) :	-	Pénétration #3 (mm) :	-
\sum des carrés :	-	\sum des carrés :	-	\sum des carrés :	-
Cu (remanié) :	-	Cu (remanié) :	-	Cu (non-remanié) :	-



Limites de consistance & Résistance au cisaillement non drainé (Cu)

Numéro de dossier : 19003-02

Numéro de laboratoire :

19557

Calcul cône 100g à 30°

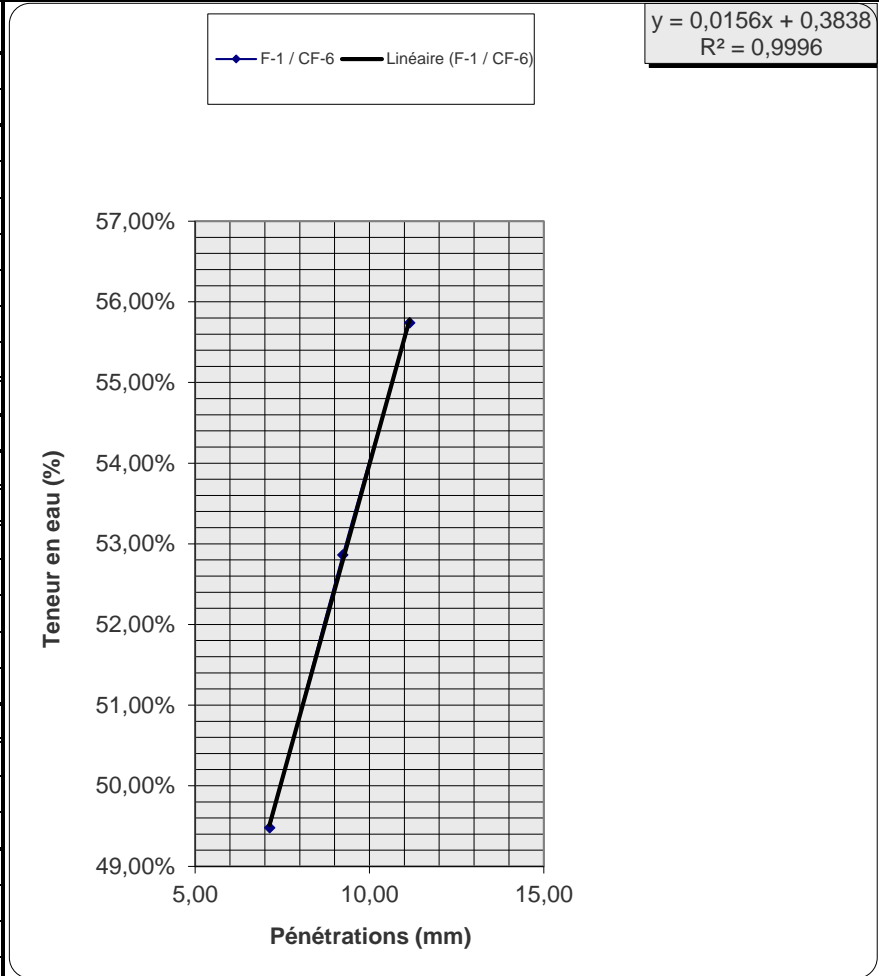
Masse du cône 100 g :	-
Constante du cône 100 g :	-
Nom de l'échantillon :	-
Teneur en eau W_0 (%) :	-
Série de calcul # Lab :	-
Nombre de pénétration :	-
Pénétration #1 (mm) :	-
Pénétration #2 (mm) :	-
Pénétration #3 (mm) :	-
\sum des carrés :	-
Cu (non-remanié) :	-

Limite de liquidité

Teneur en eau (%)	Pénétration (mm)
49,48%	7,13
52,86%	9,23
55,74%	11,15
Sensibilité	-
Teneur en eau naturelle	55,3%

Limite de plasticité

Teneur en eau (%)	
25,68%	
25,53%	
Limite de liquidité W_L :	54,0%
Limite de plasticité W_P :	25,6%
Indice de plasticité I_p :	28,4%
Indice de liquidité I_L :	1,05



Calcul cône 60g à 60°

Calcul cône 10g à 60°

Calcul cône 400g à 30°

Masse du cône 60 g :	-	Masse du cône 10 g :	-	Masse du cône 400 g :	-
Constante du cône 60 g :	-	Constante du cône 10 g :	-	Constante du cône 400 g :	-
Nom de l'échantillon :	-	Nom de l'échantillon :	-	Nom de l'échantillon :	-
Teneur en eau W_0 (%) :	-	Teneur en eau W_0 (%) :	-	Teneur en eau W_0 (%) :	-
Série de calcul # Lab :	-	Série de calcul # Lab :	-	Série de calcul # Lab :	-
Nombre de pénétration :	-	Nombre de pénétration :	-	Nombre de pénétration :	-
Pénétration #1 (mm) :	-	Pénétration #1 (mm) :	-	Pénétration #1 (mm) :	-
Pénétration #2 (mm) :	-	Pénétration #2 (mm) :	-	Pénétration #2 (mm) :	-
Pénétration #3 (mm) :	-	Pénétration #3 (mm) :	-	Pénétration #3 (mm) :	-
\sum des carrés :	-	\sum des carrés :	-	\sum des carrés :	-
Cu (remanié) :	-	Cu (remanié) :	-	Cu (non-remanié) :	-

LABORATORY GS INC.

Geotechnical Investigation (soil recognition)

Proposed New Culvert, on Creek "Fossé Ménard" in Contrecoeur, (Québec).

APPENDIX C

Laboratory Sedimentation Sieving Test Results
And Atterberg Limits Consistency Test Results
(6 pages)

APPENDIX 1-3

**BOREHOLE AND WELL LOG REPORTS
AND HYDRAULIC TESTS DATA**

Client: TPSGC

Projet: Phase III, Ancien dépotoir

No. de projet: PR16-75

Localisation: Contrecoeur

Méthode de forage: Tarière évidée

Foré par: Foraspec inc.

Date du forage: 2016-10-26

Élévation du sol (m): 11,92

Élévation de la margelle (CPV) (m): 12,87

Prof. du niveau d'eau (/ CPV) (m): 3,07

Coordonnée Est (MTM Nad 83) (m): 327975,26

Coordonnée Nord (MTM Nad 83) (m): 5080756,57

Diamètre du forage (mm): 203

Élévation (m)	Profondeur (m)	Description géologique et environnementale	Symbole	Échantillon				Concentration		Odeur	Analyses de laboratoire	Schéma du puits	Détails de construction du puits
				Numéro	Type	N/R.Q.D	Récupération %	COV (ppm)	100				
12.92	-1											Couvercle protecteur hors sol	
	0	Surface du sol											
		Sol naturel: Silt argileux, traces de sable, présence de matière organique, brun foncé devenant gris-brun, lâche, humide, pas d'odeur.		1		9	PO				Métaux, Hg, BPC, D et F	Ciment bentonite	
11.16	1	Argile silteuse grise-brune, molle, humide devenant saturée, pas d'odeur.		2		3	PO					Tubage en CPV de 51 mm de diamètre	
10.4	2	Grise, saturée.		3		3	PO			Métaux		Bouchon de bentonite humectée	
	3			4		2	PO			Métaux		Élévation du niveau d'eau en date du 2016-11-29 : 9,80 m	
	4			5		2	PO					Sable de silice grade 1	
	4			6		2	PO					Crépine en CPV de 51 mm de diamètre	
7.36		Fin du sondage											

Client: TPSGC

Projet: Phase III, Ancien dépotoir

No. de projet: PR16-75

Localisation: Contrecoeur

Méthode de forage: Tarière évidée

Foré par: Foraspec inc.

Date du forage: 2016-10-27

Élévation du sol (m): 16,37

Élévation de la margelle (CPV) (m): 17,26

Prof. du niveau d'eau (/ CPV) (m): 4,41

Coordonnée Est (MTM Nad 83) (m): 328045,79

Coordonnée Nord (MTM Nad 83) (m): 5080728,19

Diamètre du forage (mm): 203

Élévation (m)	Profondeur (m)	Description géologique et environnementale	Symbole	Échantillon				Concentration		Odeur	Analyses de laboratoire	Schéma du puits	Détails de construction du puits
				Numéro	Type	N/R.Q.D	Récupération %	COV (ppm)	100				
17.37	-1												
16.17	0	Surface du sol Remblai: Sable fin à moyen, présence de matière organique, gris, sec, pas d'odeur. Matière résiduelle formée de résidus de déchiquetage de voitures (fluff).		1		12	PO				Métaux		Couvercle protecteur hors sol
	1												Ciment bentonite
	1												Tubage en CPV de 51 mm de diamètre
	1												Bouchon de bentonite humectée
	2												Sable de silice grade 1
	3												Crépine en CPV de 51 mm de diamètre
	4												Élévation du niveau d'eau en date du 2016-11-29 : 12,85 m
11.478	5	Sol naturel: Silt argileux, gris, humide, lâche, pas d'odeur.		2		7	PO				Métaux		
11.04		Fin du sondage											
	6												

Client: TPSGC

Projet: Phase III, Ancien dépotoir

No. de projet: PR16-75

Localisation: Contrecoeur

Méthode de forage: Tarière évidée

Foré par: Frospec inc.

Date du forage: 2016-10-24

Élévation du sol (m): 17,27

Élévation de la margelle (CPV) (m): 18,21

Prof. du niveau d'eau (/ CPV) (m): 5,06

Coordonnée Est (MTM Nad 83) (m): 328102,49

Coordonnée Nord (MTM Nad 83) (m): 5080706,09

Diamètre du forage (mm): 203

Élévation (m)	Profondeur (m)	Description géologique et environnementale	Symbole	Échantillon				Concentration		Odeur	Analyses de laboratoire	Schéma du puits	Détails de construction du puits
				Numéro	Type	N/R.Q.D	Récupération %	COV (ppm)	100				
17.37	-1												
16.17	0	<p>Surface du sol</p> <p>Remblai: Sable fin à moyen, présence de matière organique, gris-brun, compact, sec, pas d'odeur. Matière résiduelle formée de résidus de déchetage de voitures (fluff).</p>		1	12	PO				Métaux, D et F		<p>Couvercle protecteur hors sol</p> <p>Ciment bentonite</p> <p>Tubage en CPV de 51 mm de diamètre</p> <p>Bouchon de bentonite humectée</p> <p>Sable de silice grade 1</p> <p>Crépine en CPV de 51 mm de diamètre</p> <p>Élévation du niveau d'eau en date du 2016-11-29 : 13,15 m</p>	
10.87	6	<p>Sol naturel: Argile silteuse grise, humide, raide, pas d'odeur.</p>		2	8	PO				Métaux			
10.27	6	Fin du sondage											
	7												

Client: TPSGC

Projet: Phase III, Ancien dépotoir

No. de projet: PR16-75

Localisation: Contrecoeur

Méthode de forage: Tarière évidée

Foré par: Foraspec inc.

Date du forage: 2016-10-25

Élévation du sol (m): 17,46

Élévation de la margelle (CPV) (m): 18,26

Prof. du niveau d'eau (/ CPV) (m): 4,85

Coordonnée Est (MTM Nad 83) (m): 328083,03

Coordonnée Nord (MTM Nad 83) (m): 5080685,60

Diamètre du forage (mm): 203

Élévation (m)	Profondeur (m)	Description géologique et environnementale	Symbole	Échantillon				Concentration		Odeur	Analyses de laboratoire	Schéma du puits	Détails de construction du puits
				Numéro	Type	N/R.Q.D	Récupération %	COV (ppm)	100				
18.46	-1												
17.21	0	<p>Surface du sol</p> <p>Remblai: Sable fin à moyen, traces de silt et d'argile, présence de matière organique, brun-gris, lâche, humide, pas d'odeur.</p> <p>Matière résiduelle formée de résidus de déchetage de voitures (fluff).</p> <p>Une analyse de lixiviation a été faite sur la matière résiduelle.</p>		1	7	PO				Métaux, Hg, BPC		<p>Couvreclé protecteur hors sol</p> <p>Ciment bentonite</p> <p>Tubage en CPV de 51 mm de diamètre</p> <p>Bouchon de bentonite humectée</p> <p>Crépine en CPV de 51 mm de diamètre</p> <p>Élévation du niveau d'eau en date du 2016-11-29 : 13,41 m</p> <p>Sable de silice grade 1</p>	
11.86	6	<p>Sol naturel: Argile silteuse grise, humide, raide, pas d'odeur.</p>		3	9	PO				Métaux, Hg, BPC			
	7	Fin du sondage											

Client: TPSGC

Projet: Phase III, Ancien dépotoir

No. de projet: PR16-75

Localisation: Contrecoeur

Méthode de forage: Tarière évidée

Foré par: Foraspec inc.

Date du forage: 2016-10-25

Élévation du sol (m): 16,80

Élévation de la margelle (CPV) (m): 17,60

Prof. du niveau d'eau (/ CPV) (m): 4,89

Coordonnée Est (MTM Nad 83) (m): 328061,31

Coordonnée Nord (MTM Nad 83) (m): 5080660,14

Diamètre du forage (mm): 203

Élévation (m)	Profondeur (m)	Description géologique et environnementale	Symbole	Échantillon				Concentration		Odeur	Analyses de laboratoire	Schéma du puits	Détails de construction du puits
				Numéro	Type	N/R.Q.D	Récupération %	COV (ppm)	100				
17.8	-1												
	0	Surface du sol											
16.55		Remblai: Sable fin à moyen et silt avec un peu d'argile, présence de matière organique, gris, humide, pas d'odeur. Matière résiduelle formée de résidus de déchetage de voitures (fluff).		1	10	PO				Métaux, BPC		Couvercle protecteur hors sol Ciment bentonite Tubage en CPV de 51 mm de diamètre Bouchon de bentonite humectée Sable de silice grade 1 Crépine en CPV de 51 mm de diamètre Élévation du niveau d'eau en date du 2016-11-29 : 12,71 m	
11.92	5	Sol naturel: Silt argileux, traces de sable fin, gris, humide, lâche, pas d'odeur.		2	7	PO				Métaux			
11.47		Fin du sondage											
	6												

Client: TPSGC

Projet: Phase III, Ancien dépotoir

No. de projet: PR16-75

Localisation: Contrecoeur

Méthode de forage: Tarière évidée

Foré par: Foraspec inc.

Date du forage: 2016-10-25

Élévation du sol (m): 17,63

Élévation de la margelle (CPV) (m): 18,51

Prof. du niveau d'eau (/ CPV) (m): 5,28

Coordonnée Est (MTM Nad 83) (m): 328106,85

Coordonnée Nord (MTM Nad 83) (m): 5080655,18

Diamètre du forage (mm): 203

Élévation (m)	Profondeur (m)	Description géologique et environnementale	Symbole	Échantillon				Concentration		Odeur	Analyses de laboratoire	Schéma du puits	Détails de construction du puits
				Numéro	Type	N/R.Q.D	Récupération %	COV (ppm)	100				
18.63	-1												
17.48	0	<p>Surface du sol</p> <p>Remblai: Sable fin à moyen, présence de matière organique, traces de matière résiduelle, gris, sec, pas d'odeur. Matière résiduelle formée de résidus de déchiquetage de voitures (fluff).</p>		1		15	PO				Métaux, Hg, BPC		<p>Couvercle protecteur hors sol</p> <p>Ciment bentonite</p> <p>Tubage en CPV de 51 mm de diamètre</p> <p>Bouchon de bentonite humectée</p> <p>Sable de silice grade 1</p> <p>Crépine en CPV de 51 mm de diamètre</p> <p>Élévation du niveau d'eau en date du 2016-11-29 : 13,23 m</p>
12.29	5	<p>Sol naturel: Silt argileux, un peu de sable, humide, raide, pas d'odeur.</p>		2		9	PO				Métaux, BPC		
11.53	6	Fin du sondage											

Client: TPSGC

Projet: Phase III, Ancien dépotoir

No. de projet: PR16-75

Localisation: Contrecoeur

Méthode de forage: Tarière évidée

Foré par: Foraspec inc.

Date du forage: 2016-10-25

Élévation du sol (m): 18,49

Élévation de la margelle (CPV) (m): 19,51

Prof. du niveau d'eau (/ CPV) (m): 6,09

Coordonnée Est (MTM Nad 83) (m): 328254,98

Coordonnée Nord (MTM Nad 83) (m): 5080549,56

Diamètre du forage (mm): 203

Élévation (m)	Profondeur (m)	Description géologique et environnementale	Symbole	Échantillon				Concentration		Odeur	Analyses de laboratoire	Schéma du puits	Détails de construction du puits
				Numéro	Type	N/R.Q.D	Récupération %	COV (ppm)	100				
19.47	-1												
18.07	0	Surface du sol											
	0	Remblai: Sable fin silteux, traces d'argile, présence de matière organique, gris, lâche, sec, pas d'odeur. Matière résiduelle formée de résidus de déchetage de voitures (fluff).		1	6	PO				Métaux, Hg, BPC		Couvercle protecteur hors sol Ciment bentonite Tubage en CPV de 51 mm de diamètre Bouchon de bentonite humectée Sable de silice grade 1 Crépine en CPV de 51 mm de diamètre Élévation du niveau d'eau en date du 2016-11-29 : 13,42 m	
	1												
	2												
	3												
	4												
	5												
12.37	6	Sol naturel: Argile silteuse verdâtre sur 10 cm, devenant grise, humide, raide, légère odeur.		2	9	LO				Métaux, HP, F1-F4, COV HAP			
11.61	7	Fin du sondage											

Client: TPSGC

Projet: Phase III, Ancien dépotoir

No. de projet: PR16-75

Localisation: Contrecoeur

Méthode de forage: Tarière évidée

Foré par: Foraspec inc.

Date du forage: 2016-10-25

Élévation du sol (m): 17,67

Élévation de la margelle (CPV) (m): 18,69

Prof. du niveau d'eau (/ CPV) (m): 5,09

Coordonnée Est (MTM Nad 83) (m): 328245,69

Coordonnée Nord (MTM Nad 83) (m): 5080540,71

Diamètre du forage (mm): 203

Élévation (m)	Profondeur (m)	Description géologique et environnementale	Symbole	Échantillon				Concentration		Odeur	Analyses de laboratoire	Schéma du puits	Détails de construction du puits
				Numéro	Type	N/R.Q.D	Récupération %	COV (ppm)	100				
19.47	-1												
18.32	0	<p>Surface du sol</p> <p>Remblai: Sable fin à moyen, présence de matière organique, brun, dense, humide, pas d'odeur. Matière résiduelle formée de résidus de déchetage de voitures (fluff). Une analyse de lixiviation a été faite sur la matière résiduelle.</p>		1	33	PO				Métaux		<p>Couvercle protecteur hors sol</p> <p>Ciment bentonite</p> <p>Tubage en CPV de 51 mm de diamètre</p> <p>Bouchon de bentonite humectée</p> <p>Sable de silice grade 1</p> <p>Élévation du niveau d'eau en date du 2016-11-29 : 13,60 m</p> <p>Crépine en CPV de 51 mm de diamètre</p>	
12.37	6	<p>Sol naturel: Argile silteuse grise, humide, très molle, pas d'odeur.</p>		3	0	PO				Métaux			
11.61	7	Fin du sondage											

Client: TPSGC

Projet: Phase III, Ancien dépotoir

No. de projet: PR16-75

Localisation: Contrecoeur

Méthode de forage: Tarière évidée

Foré par: Foraspec inc.

Date du forage: 2016-10-25

Élévation du sol (m): 17,61

Élévation de la margelle (CPV) (m): 18,66

Prof. du niveau d'eau (/ CPV) (m): 5,11

Coordonnée Est (MTM Nad 83) (m): 328238,10

Coordonnée Nord (MTM Nad 83) (m): 5080535,35

Diamètre du forage (mm): 203

Élévation (m)	Profondeur (m)	Description géologique et environnementale	Symbole	Échantillon				Concentration		Odeur	Analyses de laboratoire	Schéma du puits	Détails de construction du puits
				Numéro	Type	N/R.Q.D	Récupération %	COV (ppm)	100				
18.46	-1												
17.26	0	<p>Surface du sol</p> <p>Remblai: Sable fin et silt, présence de matière organique, brun-gris, lâche, humide, pas d'odeur. Matière résiduelle formée de résidus de déchetage de voitures (fluff).</p>		1		9	PO				Métaux	<p>Couvercle protecteur hors sol</p> <p>Ciment bentonite</p> <p>Tubage en CPV de 51 mm de diamètre</p> <p>Bouchon de bentonite humectée</p> <p>Crépine en CPV de 51 mm de diamètre</p> <p>Élévation du niveau d'eau en date du 2016-11-29 : 13,55 m</p> <p>Sable de silice grade 1</p>	
11.86	6	<p>Sol naturel: Silt avec un peu d'argile à silt sableux avec un peu d'argile, traces de gravier, humide, lâche, légère odeur.</p> <p>Fin du sondage</p>		2/20		9	LO				Métaux, HP, BPC, HAP, COV, F1-F4, pH		
11.36	6												
	7												

Client: TPSGC

Élévation du sol (m): 12,22

Projet: Phase III, Ancien dépotoir

Élévation de la margelle (CPV) (m): 13,14

No. de projet: PR16-75

Prof. du niveau d'eau (/ CPV) (m): 4,41

Localisation: Contrecoeur

Coordonnée Est (MTM Nad 83) (m): 328209,42

Méthode de forage: Tarière évidée

Coordonnée Nord (MTM Nad 83) (m): 5080511,97

Foré par: Foraspec inc.

Diamètre du forage (mm): 203

Date du forage: 2016-10-26

Élévation (m)	Profondeur (m)	Description géologique et environnementale	Symbole	Échantillon				Concentration		Odeur	Analyses de laboratoire	Schéma du puits	Détails de construction du puits
				Numéro	Type	N/R.Q.D	Récupération %	COV (ppm)	100				
12,92	-1											Couvercle protecteur hors sol	
	0	Surface du sol											
		Sol naturel: Silt argileux, présence de matière organique, brun foncé devenant gris-brun, lâche, humide, pas d'odeur.		1		4	PO				Métaux, Hg, BPC, BTEX, F1-F4	Ciment bentonite	
11,16	1	Argile silteuse grise-brune, traces de sable fin, molle, humide devenant saturée à 1,2 m, pas d'odeur.		2		2	PO					Tubage en CPV de 51 mm de diamètre	
10,4	2	Argile silteuse grise, saturée, très molle, pas d'odeur.		3/30		0	PO			Métaux		Bouchon de bentonite humectée	
	3			4		0	PO			Métaux			
	4			5		0	PO					Sable de silice grade 1	
				6		0	PO					Élévation du niveau d'eau en date du 2016-11-16 : 8,73 m	
7,36		Fin du sondage										Crépine en CPV de 51 mm de diamètre	

Client: TPSGC

Projet: Phase III, Ancien dépotoir

No. de projet: PR16-75

Localisation: Contrecoeur

Méthode de forage: Tarière évidée

Foré par: Foraspec inc.

Date du forage: 2016-10-26

Élévation du sol (m): 12,97

Élévation de la margelle (CPV) (m): 13,86

Prof. du niveau d'eau (/ CPV) (m): 4,04

Coordonnée Est (MTM Nad 83) (m): 328301,36

Coordonnée Nord (MTM Nad 83) (m): 5080419,32

Diamètre du forage (mm): 203

Élévation (m)	Profondeur (m)	Description géologique et environnementale	Symbole	Échantillon				Concentration		Odeur	Analyses de laboratoire	Schéma du puits	Détails de construction du puits
				Numéro	Type	N/R.Q.D	Récupération %	COV (ppm)	100				
12.92	-1											Couvercle protecteur hors sol	
	0	Surface du sol											
		Sol naturel: Silt argileux avec traces de sable fin et présence de matière organique, lâche, devenant une argile silteuse grise-brune, molle, humide devenant saturé à la base, pas d'odeur.		1		4	PO				Métaux, HP, F1-F4. BTE.	Ciment bentonite	
11.16		Traces de lits millimétriques de sable fin et moyen, traces d'oxydation, très molle.		2		2	PO					Tubage en CPV de 51 mm de diamètre	
10.72		Argile silteuse grise.		3		0	PO					Bouchon de bentonite humectée	
	2			4		0	PO						
	3			5		0	PO					Élévation du niveau d'eau en date du 2016-11-16 : 9,82 m	
	4			6		0	PO					Sable de silice grade 1	
												Crépine en CPV de 51 mm de diamètre	
7.36		Fin du sondage											

Client: TPSGC

Projet: Phase III, Ancien dépotoir

No. de projet: PR16-75

Localisation: Contrecoeur

Méthode de forage: Tarière évidée

Foré par: Foraspec inc.

Date du forage: 2016-10-25

Élévation du sol (m): 20,74

Élévation de la margelle (CPV) (m): 21,81

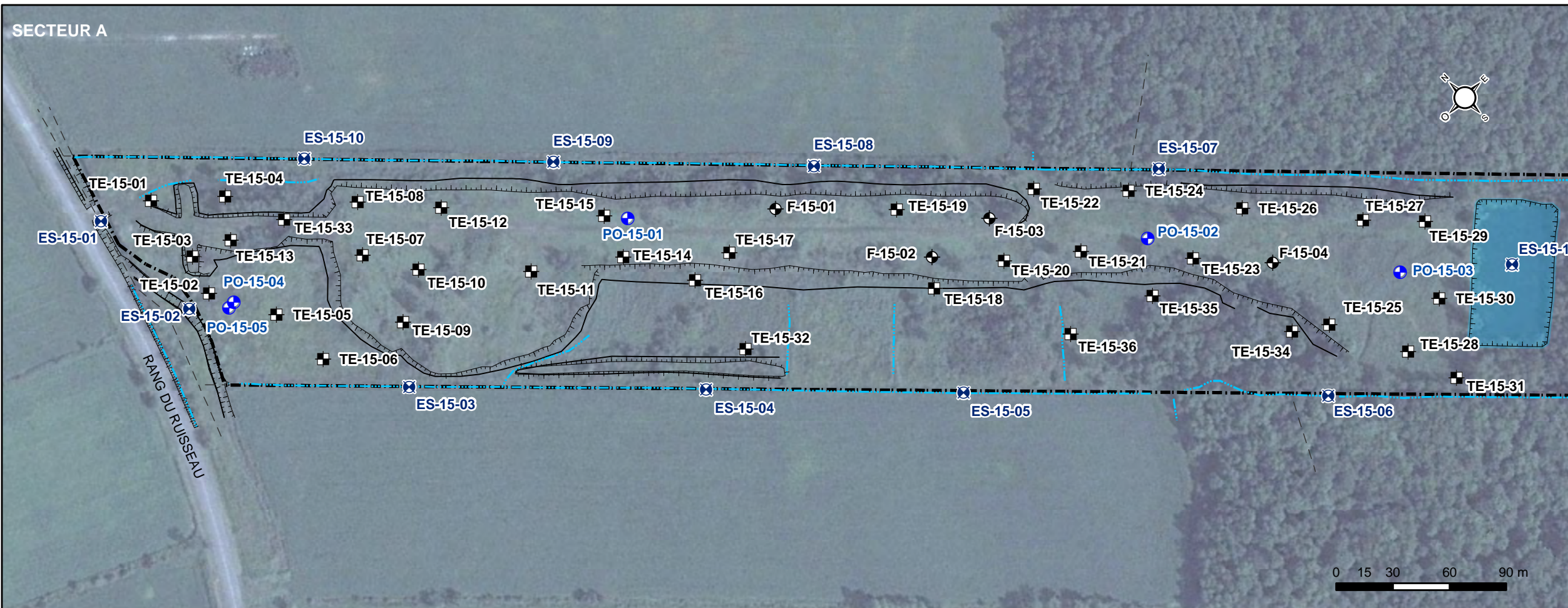
Prof. du niveau d'eau (/ CPV) (m): 5,16

Coordonnée Est (MTM Nad 83) (m): 328398,46

Coordonnée Nord (MTM Nad 83) (m): 5080369,22

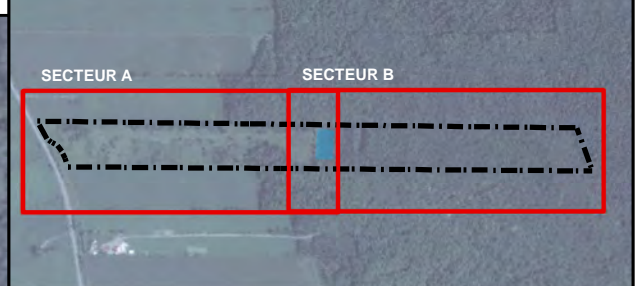
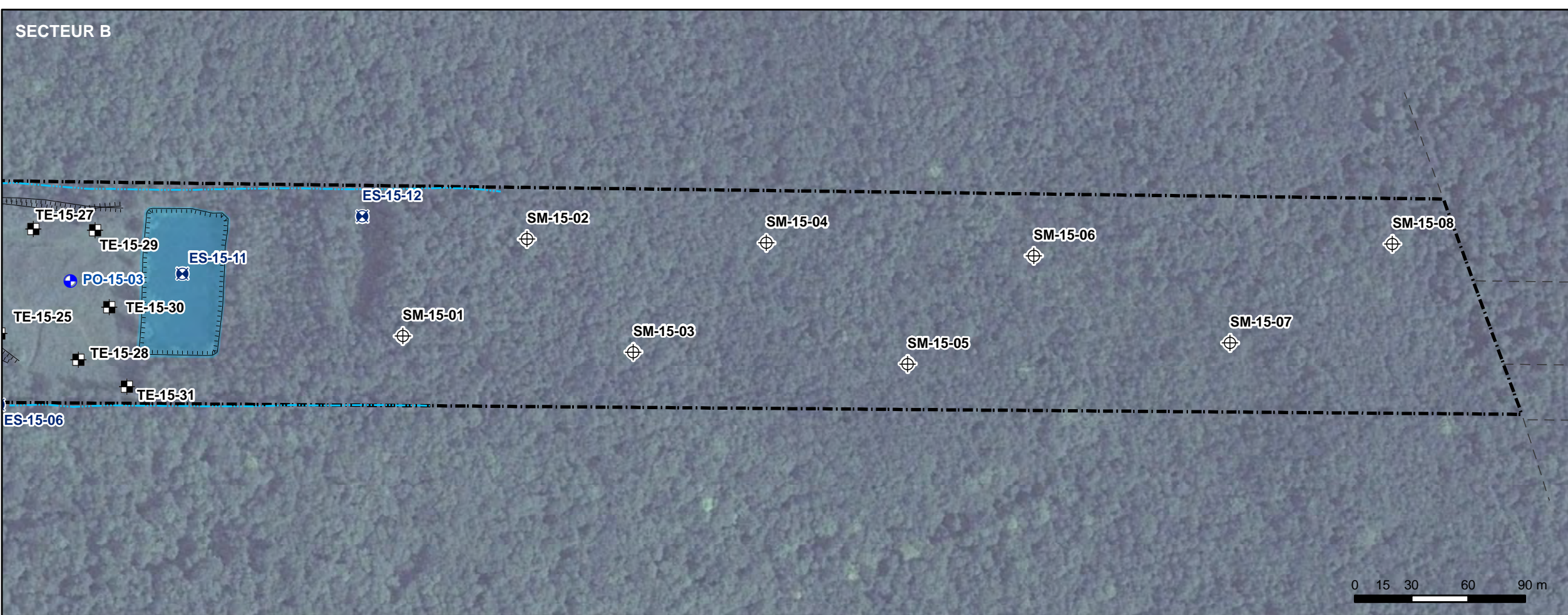
Diamètre du forage (mm): 203

Élévation (m)	Profondeur (m)	Description géologique et environnementale	Symbole	Échantillon				Concentration		Odeur	Analyses de laboratoire	Schéma du puits	Détails de construction du puits
				Numéro	Type	N/R.Q.D	Récupération %	COV (ppm)	100				
21.74	-1												
20.49	0	Surface du sol											
	0	Remblai: Sable fin à moyen, traces de silt et d'argile, présence de matière organique, brun-gris, compact, humide, pas d'odeur. Matière résiduelle formée de cendre, présence de moules à chaussure, de plastique fondu et de pièces de métal.		1	29	PO				HP, F1-F4, HAP, pH COV, Métaux, D et F		Couvercle protecteur hors sol	
	1											Ciment bentonite	
	1											Tubage en CPV de 51 mm de diamètre	
	1											Bouchon de bentonite humectée	
	2											Sable de silice grade 1	
	3											Crépine en CPV de 51 mm de diamètre	
	4											Élévation du niveau d'eau en date du 2016-11-29 : 16,65 m	
15.86	5	Sol naturel: Sable fin silteux, traces d'argile, gris, lâche, saturé, pas d'odeur.		2	9	PO				Métaux, Hg			
	6			3	8	PO							
14.64	6	Fin du sondage											
	7												



Légende

- Limite de site à l'étude
- Étendue d'eau
- Bas de talus
- Haut de talus
- Forage (CIMA+, 2015)
- Puits d'observation (CIMA+, 2015)
- Sondage manuel (CIMA+, 2015)
- Station d'échantillonnage d'eau de surface et de sédiments (CIMA+, 2015)
- Tranchée (CIMA+, 2015)



**Caractérisation
environnementale**

FIGURE 2
EMPLACEMENT GÉNÉRAL DES TRANCHÉES,
FORAGES, PUIXS D'OBSERVATION, STATIONS
D'ÉCHANTILLONNAGE DE SÉDIMENTS ET
D'EAU DE SURFACE

Ancien dépotoir (lot 4 812 972)
Rang du Ruisseau, Contrecoeur, Qc

Projet n° M02681J 31 août 2016
 Préparé par : Martine Sirois
 Réalisé par : Sylvie Leclerc
 Vérifié par : Martin Durocher

Sources : Lessard & Doyon, AG, Déc. 2015
 Fond de plan extrait ESRI DeLorme et HERE

Client: TPSGC

Projet n°: M02681J

Nom du projet: Ancien dépôt Pagé

Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur

Coordonnées / Élévations:

X: 327982.23

Projection : MTM8

Y: 5080832.34

Météo:

T°: 1°C

Z: 11.499 m

Compagnie: Excavation LFG

Équipement:

Type de forage: Pelle Mécanique

Équip. d'échantillonnage: Excavation

Terminologie

traces	< 10 %
un peu	10 - 20 %
adjectif ("...eux")	20 - 35 %
et	35 - 50 %

Classification

Silt et argile	< 0,08 mm
Sable	0,08 - 5 mm
Gravier	5 - 80 mm
Cailloux	80 - 300 mm
Blocs	> 300 mm

Compacité

Très lâche	0 - 4
Lâche	4 - 10
Compact	10 - 30
Dense	30 - 50
Très dense	>50

Indice 'N'

Type d'échantillon

Analyses

CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:
CF Cuillère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	RMD Lixiviation (mat. dangereuses)
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	SED. Analyse sédimentologique
TS Tube Shelby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50	
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)	
		IPP Identification des produits pétroliers	
		Mercure Mercure	

Profondeur Élévation (m)	Matrice de sols	Stratigraphie	Échantillon		Indices de contamination				Analyses	Duplicata
			N° échantillon	COV (ppm)	Faible	Moyenne	Fort	Disseminé		
0										
0.05 11.45		Végétation herbacée								
0.50 11.00		Remblai : Silt argileux gris foncé avec gravier et radicelles en traces, lâche et humide	(0,0-0,5)							
1		Argile grise avec gravier et silt en traces, ferme à molle, humide	(0,5-1,5)						A.C.	
2		Devenant lisse, molle et saturée en eau Venue d'eau à 1,6 m : eau claire, brunâtre, aucune irisation et aucune odeur	(1,5-2,5)						A.C.	
3		Fin de la tranchée à 3,0 m.	(2,5-3,0)							

Cliant: TPSGC **Coordonnées / Élévations:**
Projet n°: M02681J X: 327969.22 Projection : MTM8
Nom du projet: Ancien dépotoir Pagé Y: 5080775.95 Météo: T°: 1°C
Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur Z: 11.977 m

Compagnie:	Terminologie	Classification	Compacité	Indice 'N'
Excavation LFG	traces < 10 %	Silt et argile < 0,08 mm	Très lâche	0 - 4
Équipement:	un peu 10 - 20 %	Sable 0,08 - 5 mm	Lâche	4 - 10
Type de forage: Pelle Mécanique	adjectif ("...eux") 20 - 35 %	Gravier 5 - 80 mm	Compact	10 - 30
Équip. d'échantillonnage: Excavation	et 35 - 50 %	Cailloux 80 - 300 mm	Dense	30 - 50
		Blocs > 300 mm	Très dense	>50

Type d'échantillon	Analyses			
CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:	
CF Cullière fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.	
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	RMD Lixiviation (mat. dangereuses)	
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	SED. Analyse sédimentologique	
TS Tube Sherby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50		
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)		
		IPP Identification des produits pétroliers		
		Mercure Mercure		

Profondeur Élévation (m)	Matrice de sols	Stratigraphie	N° échantillon	Indices de contamination				Analyses	Duplicata	
				COV (ppm)	Odeur					
			Faible		Moyenne	Fort	Disséminé	Saturé		
0										
0,05 11,93		Végétation herbacée								
0,50 11,48		Remblai : Silt argileux avec du gravier et des radicelles en traces, gris foncé, friable et humide	(0,0-0,5)						A.C.	
1		Argile grise avec gravier et silt en traces, ferme à molle, humide	(0,5-1,5)							
1,50 10,48		Argile grise, fracturée et molle, très humide à saturée en eau	(1,5-2,5)							
2		Venue d'eau à 2,2 m : eau claire, aucune irisation et aucune odeur								
3		Devenant lisse, molle et saturée en eau à 2,5 m	(2,5-3,5)							
3,50 8,48		Fin de la tranchée à 3,5 m.								

Cliant: TPSGC **Coordonnées / Élévations:**
Projet n°: M02681J X: 327976.91 Projection : MTM8
Nom du projet: Ancien dépôt Pagé Y: 5080796.15 Météo: T°: -4°C
Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur Z: 13.611 m

Compagnie: Excavation LFG	Terminologie	Classification	Compacité	Indice 'N'
Équipement:	traces < 10 %	Silt et argile < 0,08 mm	Très lâche	0 - 4
Type de forage: Pelle Mécanique	un peu 10 - 20 %	Sable 0,08 - 5 mm	Lâche	4 - 10
Équip. d'échantillonnage: Excavation	adjectif ("...eux") 20 - 35 %	Gravier 5 - 80 mm	Compact	10 - 30
	et 35 - 50 %	Cailloux 80 - 300 mm	Dense	30 - 50
		Blocs > 300 mm	Très dense	>50

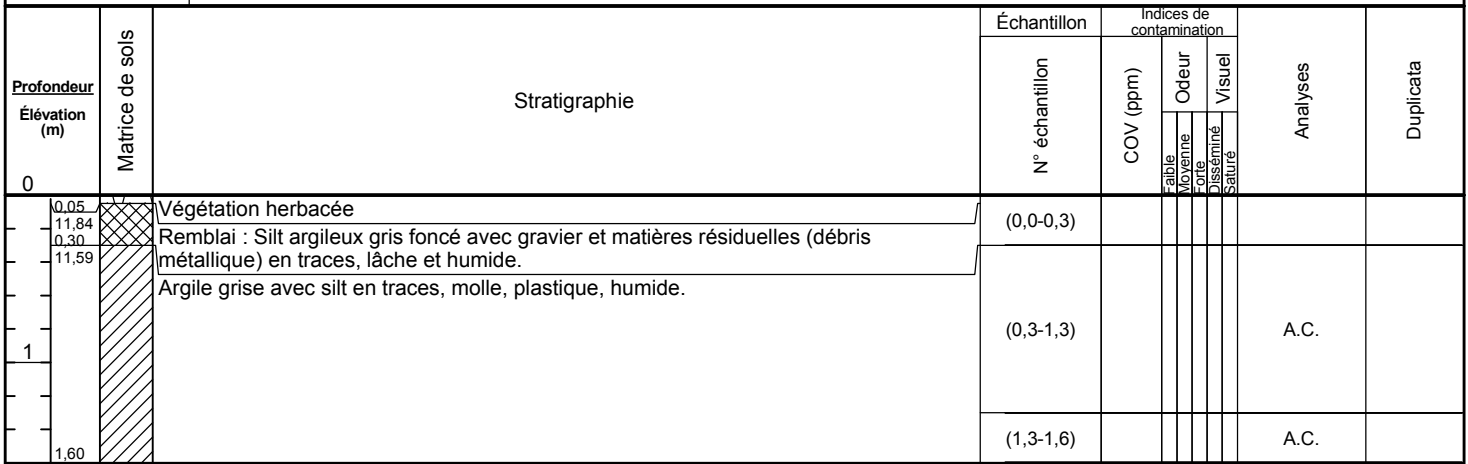
Type d'échantillon	Analyses			
CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:	
CF Cuillère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.	
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	RMD Lixiviation (mat. dangereuses)	
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	SED. Analyse sédimentologique	
TS Tube Sherby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50		
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)		
		IPP Identification des produits pétroliers		
		Mercure Mercure		

Profondeur Élévation (m)	Matrice de sols	Stratigraphie	Échantillon		Indices de contamination				Analyses	Duplicata
			N° échantillon	COV (ppm)	Faible	Moyenne	Fort	Disseminé		
0										
0,05 13,56		Végétation herbacée								
		Remblai : Silt argileux gris avec gravier et matières résiduelles (débris métallique) en traces, lâche et humide	(0,0-1,0)							
1			(1,0-1,7)					A.C.	DUP-08	
1,70 11,91		Argile grise avec silt en traces, lâche et humide.								
2 2,00		Traces d'oxydation.	(1,7-2,0)							
11,61		Fin de la tranchée à 2,0 m.								

Cliant: TPSGC	Coordonnées / Élévations:	
Projet n°: M02681J	X: 328011.43	Projection : MTM8
Nom du projet: Ancien dépôt Pagé	Y: 5080806.32	Météo: T°: -4°C
Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur	Z: 11.89 m	

Compagnie: Excavation LFG	Terminologie	Classification	Compacité	Indice 'N'
Équipement:	traces < 10 %	Silt et argile < 0,08 mm	Très lâche	0 - 4
Type de forage: Pelle Mécanique	un peu 10 - 20 %	Sable 0,08 - 5 mm	Lâche	4 - 10
Équip. d'échantillonnage: Excavation	adjectif ("...eux") 20 - 35 %	Gravier 5 - 80 mm	Compact	10 - 30
	et 35 - 50 %	Cailloux 80 - 300 mm	Dense	30 - 50
		Blocs > 300 mm	Très dense	>50

Type d'échantillon	Analyses			
CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:	
CF Cuillère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.	
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	RMD Lixiviation (mat. dangereuses)	
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	SED. Analyse sédimentologique	
TS Tube Shelby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50		
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)		
		IPP Identification des produits pétroliers		
		Mercuré Mercure		



Cliant: TPSGC

Projet n°: M02681J

Nom du projet: Ancien dépôt Pagé

Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur

Coordonnées / Élévations:

X: 327986.47

Projection : MTM8

Y: 5080743.01

Météo:

T°: 1°C

Z: 11.767 m

Compagnie: Excavation LFG

Équipement:

Type de forage: Pelle Mécanique

Équip. d'échantillonnage: Excavation

Terminologie

traces	< 10 %
un peu	10 - 20 %
adjectif ("...eux")	20 - 35 %
et	35 - 50 %

Classification

Silt et argile	< 0,08 mm
Sable	0,08 - 5 mm
Gravier	5 - 80 mm
Cailloux	80 - 300 mm
Blocs	> 300 mm

Compacité

Très lâche	0 - 4
Lâche	4 - 10
Compact	10 - 30
Dense	30 - 50
Très dense	>50

Indice 'N'

Type d'échantillon

Analyses

CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:
CF Cuillère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	RMD Lixiviation (mat. dangereuses)
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	SED. Analyse sédimentologique
TS Tube Sherby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50	
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)	
		IPP Identification des produits pétroliers	
		Mercure Mercure	

Profondeur Élévation (m)	Matrice de sols	Stratigraphie	Échantillon		Indices de contamination				Analyses	Duplicata
			N° échantillon	COV (ppm)	Faible	Moyenne	Fort	Visuel		
0										
0,05 11,72		Végétation herbacée								
		Remblai : Silt argileux gris-brun avec gravier et radicules en traces, lâche, humide.	(0,0-0,7)						A.C.	
0,70 11,07		Argile grise avec silt en traces, ferme à molle, très humide à saturée en eau.								
1		Venue d'eau à 1,2 m : eau claire, aucune irisation et aucune odeur	(0,7-1,7)						A.C.	
1,70 10,07		Fin de la tranchée à 1,7 m.								

Cliant: TPSGC

Projet n°: M02681J

Nom du projet: Ancien dépôt Pagé

Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur

Coordonnées / Élévations:

X: 327987.33

Projection : MTM8

Y: 5080708.9

Météo:

T°: 1°C

Z: 11.855 m

Compagnie: Excavation LFG

Équipement:

Type de forage: Pelle Mécanique

Équip. d'échantillonnage: Excavation

Terminologie

traces	< 10 %
un peu	10 - 20 %
adjectif ("...eux")	20 - 35 %
et	35 - 50 %

Classification

Silt et argile	< 0,08 mm
Sable	0,08 - 5 mm
Gravier	5 - 80 mm
Cailloux	80 - 300 mm
Blocs	> 300 mm

Compacité

Très lâche	0 - 4
Lâche	4 - 10
Compact	10 - 30
Dense	30 - 50
Très dense	>50

Indice 'N'

Type d'échantillon

Analyses

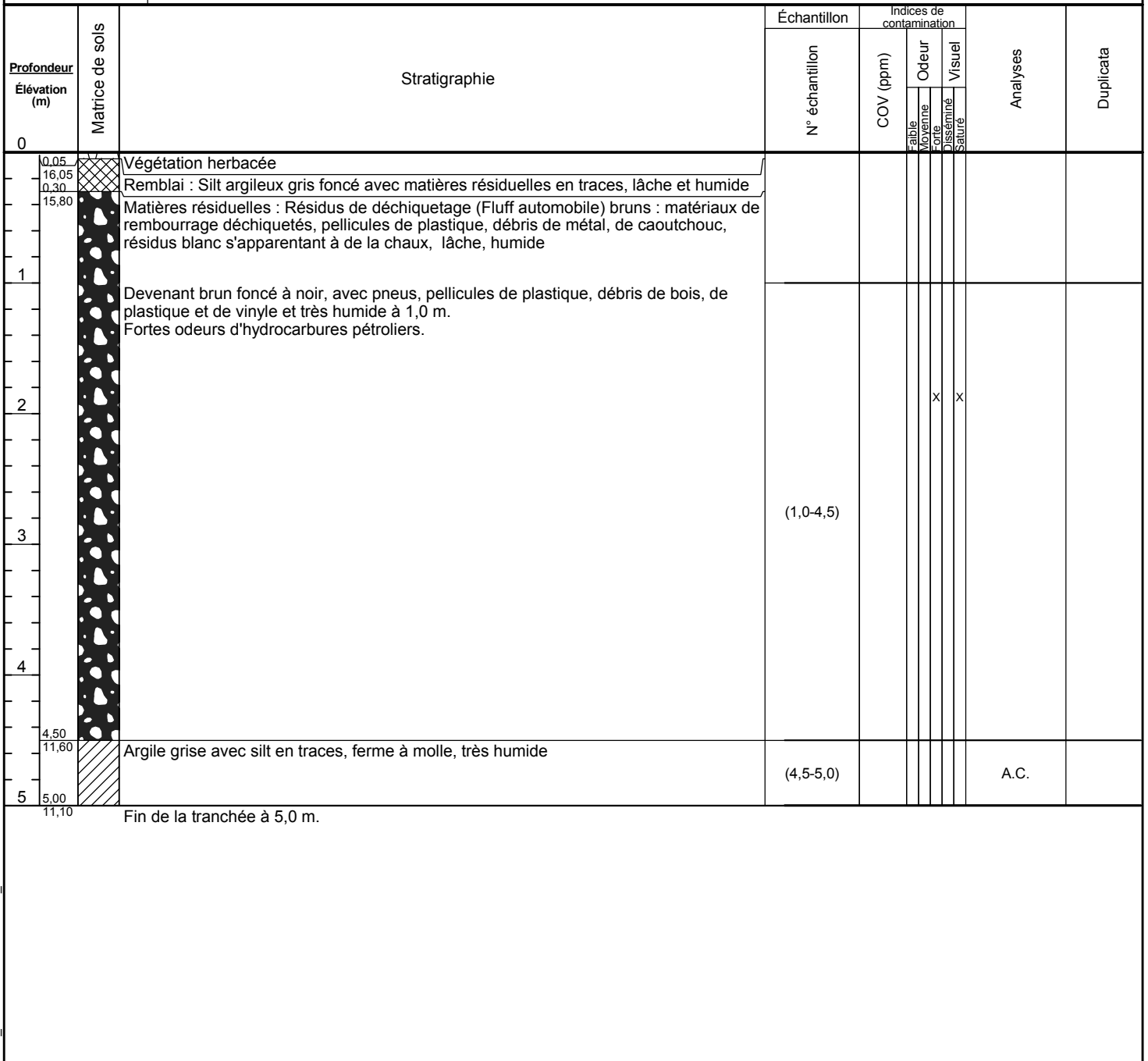
CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:
CF Cuillère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	RMD Lixiviation (mat. dangereuses)
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	SED. Analyse sédimentologique
TS Tube Shelby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50	
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)	
		IPP Identification des produits pétroliers	
		Mercure Mercure	

Profondeur Élévation (m)	Matrice de sols	Stratigraphie	Échantillon		Indices de contamination				Analyses	Duplicata
			N° échantillon	COV (ppm)	Faible	Moyenne	Fort	Disseminé		
0										
0,05 11,81		Végétation herbacée								
0,50 11,36		Remblai : Silt argileux gris foncé avec gravier et radicelles en traces, lâche et humide.	(0,0-0,5)						A.C.	
1		Argile gris-brun avec silt et radicelles en traces, ferme, très humide.	(0,5-1,5)							
1,50 10,36		Venue d'eau à 1,2 m : eau claire, aucune irisation et aucune odeur								
		Fin de la tranchée à 1,5 m.								

Cliant: TPSGC **Coordonnées / Élévations:**
Projet n°: M02681J X: 328040.88 Projection : MTM8
Nom du projet: Ancien dépôt Pagé Y: 5080732.88 Météo: T°: 4°C
Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur Z: 16.096 m

Compagnie:	Terminologie	Classification	Compacité	Indice 'N'
Excavation LFG	traces < 10 %	Silt et argile < 0,08 mm	Très lâche	0 - 4
Équipement:	un peu 10 - 20 %	Sable 0,08 - 5 mm	Lâche	4 - 10
Type de forage: Pelle Mécanique	adjectif ("...eux") 20 - 35 %	Gravier 5 - 80 mm	Compact	10 - 30
Équip. d'échantillonnage: Excavation	et 35 - 50 %	Cailloux 80 - 300 mm	Dense	30 - 50
		Blocs > 300 mm	Très dense	>50

Type d'échantillon	Analyses			
CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:	
CF Cuillère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.	
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	RMD Lixiviation (mat. dangereuses)	
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	SED. Analyse sédimentologique	
TS Tube Sherby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50		
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)		
		IPP Identification des produits pétroliers		
		Mercure Mercure		



Client: TPSGC

Projet n°: M02681J

Nom du projet: Ancien dépôt Pagé

Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur

Coordonnées / Élévations:

X: 328058.84 Projection : MTM8

Y: 5080754.83

Météo:

T°: 3°C

Z: 16.103 m

Compagnie: Excavation LFG

Équipement:

Type de forage: Pelle Mécanique

Équip. d'échantillonnage: Excavation

Terminologie

traces < 10 %
un peu 10 - 20 %
adjectif ("...eux") 20 - 35 %
et 35 - 50 %

Classification

Silt et argile < 0,08 mm
Sable 0,08 - 5 mm
Gravier 5 - 80 mm
Cailloux 80 - 300 mm
Blocs > 300 mm

Compacité

Très lâche 0 - 4
Lâche 4 - 10
Compact 10 - 30
Dense 30 - 50
Très dense >50

Indice 'N'

Type d'échantillon

Analyses

CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:
CF Cuillère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc,
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	RMD Lixiviation (mat. dangereuses)
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	SED. Analyse sédimentologique
TS Tube Sherby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50	
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)	
		IPP Identification des produits pétroliers	
		Mercure Mercure	

Profondeur Élévation (m)	Matrice de sols	Stratigraphie	Échantillon		Indices de contamination				Analyses	Duplicata
			N° échantillon	COV (ppm)	Faible	Moyenne	Fort	Visuel		
0										
0,05 16,05 0,15 15,95	Végétation herbacée		(0,0-0,15)							A.C.
1	Remblai : Silt argileux gris foncé, avec matières résiduelles en traces, lâche et humide Matières résiduelles : Résidus de déchetage (Fluff automobile) bruns : matériaux de rembourrage déchiquetés, pellicules de plastique, débris de métal, de caoutchouc, résidus blanc s'apparentant à de la chaux, brun, lâche, humide		(0,15-1,9)							
2	Devenant brunes foncées à noires, avec pneus, débris de bois, de plastique et de vinyle, pare-choc chromé, et très humide à 1,9 m. Odeurs modérées d'hydrocarbures pétroliers.		(1,9-4,2)			X		X		
3										
4	Venue d'eau à 3,8 m : eau grisâtre, aucune irisation, aucun film huileux. Odeur d'hydrocarbures pétroliers faibles à modérées.		(4,2-4,6)							A.C.
4,20 11,90 4,60 11,50	Argile grise avec silt en traces, ferme, saturé en eau.									
	Fin de la tranchée à 4,6 m.									

Client: TPSGC

Projet n°: M02681J

Nom du projet: Ancien dépôt Pagé

Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur

Coordonnées / Élévations:

X: 328030.87

Projection : MTM8

Y: 5080692.75

Météo:

T°: 3°C

Z: 16.185 m

Compagnie: Excavation LFG

Équipement:

Type de forage: Pelle Mécanique

Équip. d'échantillonnage: Excavation

Terminologie

traces	< 10 %
un peu	10 - 20 %
adjectif ("...eux")	20 - 35 %
et	35 - 50 %

Classification

Silt et argile	< 0,08 mm
Sable	0,08 - 5 mm
Gravier	5 - 80 mm
Cailloux	80 - 300 mm
Blocs	> 300 mm

Compacité

Très lâche	0 - 4
Lâche	4 - 10
Compact	10 - 30
Dense	30 - 50
Très dense	>50

Indice 'N'

Type d'échantillon

Analyses

CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:
CF Cuillère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	RMD Lixiviation (mat. dangereuses)
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	SED. Analyse sédimentologique
TS Tube Shelby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50	
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)	
		IPP Identification des produits pétroliers	
		Mercure Mercure	

Profondeur Élévation (m)	Matrice de sols	Stratigraphie	Échantillon		Indices de contamination				Analyses	Duplicata	
			N° échantillon	COV (ppm)	Odeur	Visuel	FAIBLE	MOYENNE			FORTE
0											
0,05		Végétation herbacée									
16,14		Remblai : Silt argileux gris foncé avec matières résiduelles en traces (bloc de béton 0,4x0,6 m et débris de métal), lâche et humide.	(0,0-0,4)								
0,40		Matières résiduelles : Résidus de déchetage (Fluff automobile) bruns : matériaux de rembourrage déchetés, pellicules de plastique, débris de métal, de caoutchouc, résidus blanc s'apparentant à de la chaux, lâche, humide.	(0,4-1,4)								
15,79											
1											
2											
2			(1,4-2,4)								
3		Devenant brunes foncées à noires avec pneus, tissus, ceinture de sécurité, débris de bois, de plastique et de vinyle et très humide à 2,4 m. Odeurs modérées d'hydrocarbures pétroliers.	(2,4-3,4)								
3											
4		Devenant saturées en eau huileuse à 3,8 m. Venue d'eau grisâtre, aucune irisation, faiblement huileuse, odeurs d'hydrocarbures pétroliers modérées à fortes.	(3,4-4,4)								
4											
4,40		Argile gris-brun, avec silt en traces, ferme, saturée. Légères odeurs d'hydrocarbures pétroliers.	(4,4-5,4)							A.C.	
11,79											
5											
5,40		Argile grise, ferme à molle, saturée.	(5,4-6,0)							A.C.	
10,79											
6		Fin de la tranchée à 6,0 m.									
6,00											
10,19											

Client: TPSGC

Projet n°: M02681J

Nom du projet: Ancien dépôt Pagé

Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur

Coordonnées / Élévations:

X: 328056.39

Projection : MTM8

Y: 5080706.71

Météo:

T°: 5°C

Z: 16.772 m

Compagnie: Excavation LFG

Équipement:

Type de forage: Pelle Mécanique

Équip. d'échantillonnage: Excavation

Terminologie

traces	< 10 %
un peu	10 - 20 %
adjectif ("...eux")	20 - 35 %
et	35 - 50 %

Classification

Silt et argile	< 0,08 mm
Sable	0,08 - 5 mm
Gravier	5 - 80 mm
Cailloux	80 - 300 mm
Blocs	> 300 mm

Compacité

Très lâche	0 - 4
Lâche	4 - 10
Compact	10 - 30
Dense	30 - 50
Très dense	>50

Indice 'N'

Type d'échantillon

Analyses

CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:
CF Cuillère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	RMD Lixiviation (mat. dangereuses)
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	SED. Analyse sédimentologique
TS Tube Sherby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50	
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)	
		IPP Identification des produits pétroliers	
		Mercure Mercure	

Profondeur Élévation (m)	Matrice de sols	Stratigraphie	Échantillon		Indices de contamination					Analyses	Duplicata	
			N° échantillon	COV (ppm)	Faible	Moyenne	Fort	Disséminé	Visuel			
0												
0.05		Végétation herbacée										
16.72		Remblai : Silt argileux gris foncé avec matières résiduelles en traces, lâche et humide.										
0.30		Matières résiduelles brunes : Résidus de déchetage (Fluff automobile) : matériaux de rembourrage déchiquetés, pellicules de plastique, débris de métal, de caoutchouc, résidus blanc s'apparentant à de la chaux, lâche, humide.										
16.47		Devenant brunes foncées à noires avec pneus, tissus, ceinture de sécurité, débris de bois, de plastique et de vinyle et très humide à 1,0 m. Odeurs modérées d'hydrocarbures pétroliers.	(1,0-2,0)				X		X			
1												
2												
3												
4		Devenant saturées en eau huileuse à 3,8 m. Venue d'eau noirâtre, aucune irisation, faiblement huileuse, présence de résidus noir en surface. Faible odeur d'hydrocarbures pétroliers.	(4,0-4,7)				X		X			
4.70												
12.07		Argile grise avec silt en traces, ferme à molle. Saturée en eau huileuse avec faibles odeurs d'hydrocarbures pétroliers.	(4,7-5,0)				X		X	A.C.	DUP-4	
5		Fin de la tranchée à 5,0 m.										
5.00												
11.77												

Cliant: TPSGC **Coordonnées / Élévations:**
Projet n°: M02681J X: 328097.8 Projection : MTM8
Nom du projet: Ancien dépôt Pagé Y: 5080663.94 Météo: T°: 0°C
Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur Z: 17.594 m

Compagnie:	Terminologie	Classification	Compacité	Indice 'N'
Excavation LFG	traces < 10 %	Silt et argile < 0,08 mm	Très lâche	0 - 4
Équipement:	un peu 10 - 20 %	Sable 0,08 - 5 mm	Lâche	4 - 10
Type de forage: Pelle Mécanique	adjectif ("...eux") 20 - 35 %	Gravier 5 - 80 mm	Compact	10 - 30
Équip. d'échantillonnage: Excavation	et 35 - 50 %	Cailloux 80 - 300 mm	Dense	30 - 50
		Blocs > 300 mm	Très dense	>50

Type d'échantillon	Analyses			
CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:	
CF Cuillère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.	
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	RMD Lixiviation (mat. dangereuses)	
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	SED. Analyse sédimentologique	
TS Tube Sherby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50		
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)		
		IPP Identification des produits pétroliers		
		Mercure Mercure		

Profondeur Élévation (m)	Matrice de sols	Stratigraphie	Échantillon		Indices de contamination				Analyses	Duplicata
			N° échantillon	COV (ppm)	Faible	Moyenne	Fort	Disséminé		
0										
0,05 17,54		Végétation herbacée.								
0,40 17,19		Remblai : Silt argileux gris avec radicelles, gravier et matières résiduelles en traces (débris de métal), lâche et humide	(0,0-0,4)							A.C.
1		Matières résiduelles brunes : Résidus de déchetage (Fluff automobile) : matériaux de rembourrage déchiquetés, pellicules de plastique, débris de métal, de caoutchouc, résidus blanc s'apparentant à de la chaux, lâche, humide Devenant brunes foncées à noires avec pneus, tissus, ceinture de sécurité, débris de bois, de plastique et de vinyle et très humide à 0,6 m.								
2		Odeurs modérées d'hydrocarbures pétroliers.					X	X		
3			(0,6-5,4)							
4										
5		Devenant saturées en eau huileuse à 4,6 m. Venue d'eau grisâtre, faiblement huileuse, odeurs modérées d'hydrocarbures pétroliers.								
5,40 12,19		Argile grise avec silt en traces, ferme à molle, saturée en eau huileuse.					X			
5,70 11,89		Odeurs modérées d'hydrocarbures pétroliers et/ou de décomposition.	(5,4-5,7)							
		Fin de la tranchée à 5,7 m.								

Cliant: TPSGC

Projet n°: M02681J

Nom du projet: Ancien dépôt Pagé

Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur

Coordonnées / Élévations:

X: 328088

Projection : MTM8

Y: 5080721.18

Météo:

T°: 3°C

Z: 17.108 m

Compagnie: Excavation LFG

Équipement:

Type de forage: Pelle Mécanique

Équip. d'échantillonnage: Excavation

Terminologie

traces	< 10 %
un peu	10 - 20 %
adjectif ("...eux")	20 - 35 %
et	35 - 50 %

Classification

Silt et argile	< 0,08 mm
Sable	0,08 - 5 mm
Gravier	5 - 80 mm
Cailloux	80 - 300 mm
Blocs	> 300 mm

Compacité

Très lâche	0 - 4
Lâche	4 - 10
Compact	10 - 30
Dense	30 - 50
Très dense	>50

Indice 'N'

Type d'échantillon

Analyses

CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:
CF Cuillère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc,
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	RMD Lixiviation (mat. dangereuses)
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	SED. Analyse sédimentologique
TS Tube Shelby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50	
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)	
		IPP Identification des produits pétroliers	
		Mercure Mercure	

Profondeur Élévation (m)	Matrice de sols	Stratigraphie	Échantillon		Indices de contamination				Analyses	Duplicata
			N° échantillon	COV (ppm)	Faible	Moyenne	Fort	Visuel		
0										
0,05 17,06		Végétation herbacée	(0,0-0,3)							
1		Matières résiduelles brunes : Résidus de déchetage (Fluff automobile) : matériaux de rembourrage déchiquetés, pellicules de plastique, débris de métal, de caoutchouc, résidus blanc s'apparentant à de la chaux, lâche, humide Devenant brunes foncées noires, avec 15% de débris de bois à 0,3 m. Odeurs modérées d'hydrocarbures pétroliers.								
2		Devenant avec pneus, garnitures de portières, ceinture de sécurité, débris de béton, de bois, de plastique et de vinyle et très humide à 1,3 m. Odeurs modérées d'hydrocarbures pétroliers.								
3			(0,3-4,8)							
4										
4,80 12,31		Venue d'eau à 4,7 m								
5		Argile grise avec silt en traces, ferme, humide.	(4,8-5,5)						A.C.	
5,50 11,61		Fin de la tranchée à 5,5 m.								

Client: TPSGC

Projet n°: M02681J

Nom du projet: Ancien dépôt Pagé

Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur

Coordonnées / Élévations:

X: 327997.24

Projection : MTM8

Y: 5080787.98

Météo:

T°: 9°C

Z: 14.077 m

Compagnie: Excavation LFG

Équipement:

Type de forage: Pelle Mécanique

Équip. d'échantillonnage: Excavation

Terminologie

traces	< 10 %
un peu	10 - 20 %
adjectif ("...eux")	20 - 35 %
et	35 - 50 %

Classification

Silt et argile	< 0,08 mm
Sable	0,08 - 5 mm
Gravier	5 - 80 mm
Cailloux	80 - 300 mm
Blocs	> 300 mm

Compacité

Très lâche	0 - 4
Lâche	4 - 10
Compact	10 - 30
Dense	30 - 50
Très dense	>50

Indice 'N'

Type d'échantillon

Analyses

CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:
CF Cuillère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	RMD Lixiviation (mat. dangereuses)
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	SED. Analyse sédimentologique
TS Tube Shelby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50	
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)	
		IPP Identification des produits pétroliers	
		Mercure Mercure	

Profondeur Élévation (m)	Matrice de sols	Stratigraphie	Échantillon		Indices de contamination				Analyses	Duplicata
			N° échantillon	COV (ppm)	Faible	Moyenne	Fort	Disséminé		
0										
0.05 14.03		Végétation herbacée.								
		Remblai : Silt argileux gris-brun avec gravier en traces, lâche et humide.	(0,0-0,9)							
1		Devenant brun avec un peu de gravier et des matières résiduelles (briques, béton, métal) et cailloux en traces à partir de 0,9 m.	(0,9-1,7)				x			
1.70 12.38		Remblai : Silt argileux gris foncé avec un peu de gravier, compact et humide. Faibles odeurs d'hydrocarbures pétroliers.	(1,7-2,4)		x				A.C.	
			(2,4-2,7)						A.C.	
2.70 11.38		Argile grise avec gravier et silt en traces, ferme à molle, humide.	(2,7-3,5)							
3.50 10.58		Fin de la tranchée à 3,5 m.								

Client: TPSGC **Coordonnées / Élévations:**
Projet n°: M02681J X: 328137.61 Projection : MTM8
Nom du projet: Ancien dépôt Pagé Y: 5080634.97 Météo: T°: 2°C
Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur Z: 19.345 m

Compagnie:	Terminologie	Classification	Compacité	Indice 'N'
Excavation LFG	traces < 10 %	Silt et argile < 0,08 mm	Très lâche	0 - 4
Équipement:	un peu 10 - 20 %	Sable 0,08 - 5 mm	Lâche	4 - 10
Type de forage: Pelle Mécanique	adjectif ("...eux") 20 - 35 %	Gravier 5 - 80 mm	Compact	10 - 30
Équip. d'échantillonnage: Excavation	et 35 - 50 %	Cailloux 80 - 300 mm	Dense	30 - 50
		Blocs > 300 mm	Très dense	>50

Type d'échantillon	Analyses			
CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:	
CF Cuillère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.	
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	RMD Lixiviation (mat. dangereuses)	
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	SED. Analyse sédimentologique	
TS Tube Shelby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50		
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)		
		IPP Identification des produits pétroliers		
		Mercuré Mercure		

Profondeur Élévation (m)	Matrice de sols	Stratigraphie	Échantillon		Indices de contamination				Analyses	Duplicata
			N° échantillon	COV (ppm)	Faible	Moyenne	Fort	Visuel		
0										
0,05 19,30		Végétation herbacée.								
0,60 18,75		Remblai : Silt argileux gris foncé avec radicelles, gravier et matières résiduelles en traces (débris de métal), lâche et humide.								
1		Matières résiduelles brunes : Résidus de déchetage (Fluff automobile) : matériaux de rembourrage déchetés, pellicules de plastique, débris de métal, de caoutchouc, résidus blanc s'apparentant à de la chaux, lâche, humide Devenant brunes foncées noires avec fils électrique, débris de bois, de plastique, de vinyle, ordures ménagères (sacs de plastique, emballage alimentaire en plastique, en métal, en carton, canette), tissus, pneus, pellicules de plastique, garnitures de portières, ceinture de sécurité, très humide à 0,7 m. Odeurs modérées d'hydrocarbures pétroliers.								
2						X	X			
3										
4										
5										
6										
6,00 13,35		Fin de la tranchée à 6,0 m. Limite de l'excavatrice.								

Client: TPSGC

Projet n°: M02681J

Nom du projet: Ancien dépôt Pagé

Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur

Coordonnées / Élévations:

X: 328145.75

Projection : MTM8

Y: 5080657.35

Météo:

T°: 3°C

Z: 19.22 m

Compagnie: Excavation LFG

Équipement:

Type de forage: Pelle Mécanique

Équip. d'échantillonnage: Excavation

Terminologie

traces	< 10 %
un peu	10 - 20 %
adjectif ("...eux")	20 - 35 %
et	35 - 50 %

Classification

Silt et argile	< 0,08 mm
Sable	0,08 - 5 mm
Gravier	5 - 80 mm
Cailloux	80 - 300 mm
Blocs	> 300 mm

Compacité

Très lâche	0 - 4
Lâche	4 - 10
Compact	10 - 30
Dense	30 - 50
Très dense	>50

Indice 'N'

Type d'échantillon

Analyses

CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:
CF Cuillère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	RMD Lixiviation (mat. dangereuses)
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	SED. Analyse sédimentologique
TS Tube Shelby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50	
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)	
		IPP Identification des produits pétroliers	
		Mercure Mercure	

Profondeur Élévation (m)	Matrice de sols	Stratigraphie	Échantillon		Indices de contamination				Analyses	Duplicata
			N° échantillon	COV (ppm)	Faible	Moyenne	Fort	Visuel		
0										
0.05 19,17		Végétation herbacée.								
0.50 18,72		Remblai : Silt argileux gris foncé avec radicelles, gravier et matières résiduelles en traces (débris de métal), lâche et humide.	(0,0-0,5)							A.C.
1		Matières résiduelles brunes : Résidus de déchetage (Fluff automobile) : matériaux de rembourrage déchetés, pellicules de plastique, débris de métal, de caoutchouc, résidu blanc s'apparentant à de la chaux, lâche, humide. Devenant brunes foncées noires, avec pneus, garnitures de portières, ceinture de sécurité, débris de béton, bois et vinyle et très humide à 0,9 m. Odeurs modérées d'hydrocarbures pétroliers. Devenant avec 50% d'ordures ménagères (sacs de plastique, emballage alimentaire en plastique, en métal, en carton, canette) et huileuses à 1,2 m.				X	X			
2			(1,2-2,2)			X	X			
3		Horizon de débris de bois à 2,2 m. présence de Quelques barils de métaux contenant un boue rougeâtre.								
4										
5										
6		Devenant noires avec de l'argile en traces, saturées à 5,7 m. Eau grisâtre à rougeâtre, présence d'un film mousseux rougeâtre en surface, huileux. Odeurs modérées de produits chimiques.	(5,7-6,2)			X	X			
6.20 13,02		Fin de la tranchée à 6,2 m. Limite de l'excavatrice.								

Client: TPSGC **Coordonnées / Élévations:**
Projet n°: M02681J X: 328155.62 Projection : MTM8
Nom du projet: Ancien dépôt Pagé Y: 5080599.5 Météo: T°: 3°C
Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur Z: 12.852 m

Compagnie: Excavation LFG	Terminologie	Classification	Compacité	Indice 'N'
Équipement:	traces < 10 %	Silt et argile < 0,08 mm	Très lâche	0 - 4
Type de forage: Pelle Mécanique	un peu 10 - 20 %	Sable 0,08 - 5 mm	Lâche	4 - 10
Équip. d'échantillonnage: Excavation	adjectif ("...eux") 20 - 35 %	Gravier 5 - 80 mm	Compact	10 - 30
	et 35 - 50 %	Cailloux 80 - 300 mm	Dense	30 - 50
		Blocs > 300 mm	Très dense	>50

Type d'échantillon	Analyses			
CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:	
CF Cuillère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.	
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	RMD Lixiviation (mat. dangereuses)	
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	SED. Analyse sédimentologique	
TS Tube Sherby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50		
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)		
		IPP Identification des produits pétroliers		
		Mercure Mercure		

Profondeur Élévation (m)	Matrice de sols	Stratigraphie	Échantillon N° échantillon	Indices de contamination				Analyses	Duplicata
				COV (ppm)	Odeur				
		Faible	Moyenne		Fort	Disséminé	Saturé		
0									
0,05 12,80		Végétation herbacée.							
		Remblai : Silt argileux gris foncé avec matières résiduelles en traces (briques et débris de métal), lâche et humide.	(0.0-0.5)					A.C.	
0,50 12,35		Venue d'eau à 0,5 m : eau noirâtre, présence d'irisation, film huileux, odeurs d'hydrocarbures pétroliers modérées.	(0.5-0.8)						
0,80 12,05		Matière organique en décomposition noire et silt, avec radicules en traces, lâche et saturée.							
1 1,00		Présence d'irisation argentée, odeurs modérées d'hydrocarbures pétroliers.	(0.8-1.0)					A.C.	
		Argile grise avec silt en traces, ferme à molle, saturée en eau noire huileuse.							
		Odeurs modérées d'hydrocarbures pétroliers.	(1.0-1.3)					A.C.	
		Argile grise, ferme et fissurée, saturée en eau noire huileuse.							
		Odeurs modérées d'hydrocarbures pétroliers.							
		Devenant lisse et molle à 1,3 m.	(1.3-2.2)						
2 2,20									
10,65		Fin de la tranchée à 2,2 m.							

Client: TPSGC

Projet n°: M02681J

Nom du projet: Ancien dépôt Pagé

Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur

Coordonnées / Élévations:

X: 328178.9

Projection : MTM8

Y: 5080596.78

Météo:

T°: -4°C

Z: 19.63 m

Compagnie: Excavation LFG

Équipement:

Type de forage: Pelle Mécanique

Équip. d'échantillonnage: Excavation

Terminologie

traces	< 10 %
un peu	10 - 20 %
adjectif ("...eux")	20 - 35 %
et	35 - 50 %

Classification

Silt et argile	< 0,08 mm
Sable	0,08 - 5 mm
Gravier	5 - 80 mm
Cailloux	80 - 300 mm
Blocs	> 300 mm

Compacité

Très lâche	0 - 4
Lâche	4 - 10
Compact	10 - 30
Dense	30 - 50
Très dense	>50

Indice 'N'

Type d'échantillon

Analyses

CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:
CF Cuillère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc,
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	RMD Lixiviation (mat. dangereuses)
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	SED. Analyse sédimentologique
TS Tube Sherby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50	
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)	
		IPP Identification des produits pétroliers	
		Mercure Mercure	

Profondeur Élévation (m)	Matrice de sols	Stratigraphie	Échantillon N° échantillon	Indices de contamination				Analyses	Duplicata	
				COV (ppm)	Odeur	Visuel				
				Faible	Moyenne	Fort	Disséminé	Saturé		
0		Végétation herbacée.								
0.05 19,58		Remblai : Silt argileux gris-brun avec radicules et gravier en traces, lâche et humide.	(0.0-0.7)							
0.70 18,93		Matières résiduelles brunes : Résidus de déchetage (Fluff automobile) : matériaux de rembourrage déchiquetés, pellicules de plastique, débris de métal, de caoutchouc, lâche, humide Devenant brunes foncées noires, avec tissus, pneus, garnitures de portières, ceinture de sécurité, débris, de béton, de bois, de plastique et de vinyle à 0,85 m. Odeurs modérées d'hydrocarbures pétroliers.				X		X		
1		Devenant avec 50% d'ordures ménagères (sacs de plastique, emballage alimentaire en plastique, en métal, en carton, canette) à 2,0 m.	(0.85-5.2)							
2										
3										
4		Horizon de débris de bois à 4,0 m. Quelques barils de métal.								
5										
5.70 13,93		Devenant avec 20% de boue rougeâtre à 5,2 m.	(5.2-5.7)				X	X		
		Fin de la tranchée à 5,7 m. Limite de l'excavatrice.								

Cliant: TPSGC

Projet n°: M02681J

Nom du projet: Ancien dépôt Pagé

Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur

Coordonnées / Élévations:

X: 328241.94

Projection : MTM8

Y: 5080506.96

Météo:

T°: 3°C

Z: 12.59 m

Compagnie: Excavation LFG

Équipement:

Type de forage: Pelle Mécanique

Équip. d'échantillonnage: Excavation

Terminologie

traces	< 10 %
un peu	10 - 20 %
adjectif ("...eux")	20 - 35 %
et	35 - 50 %

Classification

Silt et argile	< 0,08 mm
Sable	0,08 - 5 mm
Gravier	5 - 80 mm
Cailloux	80 - 300 mm
Blocs	> 300 mm

Compacité

Très lâche	0 - 4
Lâche	4 - 10
Compact	10 - 30
Dense	30 - 50
Très dense	>50

Indice 'N'

Type d'échantillon

Analyses

CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:
CF Cuillère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	RMD Lixiviation (mat. dangereuses)
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	SED. Analyse sédimentologique
TS Tube Sherby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50	
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)	
		IPP Identification des produits pétroliers	
		Mercure Mercure	

Profondeur Élévation (m)	Matrice de sols	Stratigraphie	Échantillon		Indices de contamination				Analyses	Duplicata
			N° échantillon	COV (ppm)	Faible	Moyenne	Fort	Visuel		
0										
0,05		Végétation herbacée.								
12,54		Remblai hétérogène brun-noir ; Matière organique en décomposition et silt avec radicales en traces, ou silt argileux brun avec matières résiduelles en traces (poudre rougeâtre), lâche et humide.	(0.0-0.4)		X			X		A.C.
0,40		Argile grise striée de noir, silt en traces, ferme et humide.	(0.4-1.0)		X			X		A.C.
12,19		Devenant lisse et molle à 1,0 m.	(1.0-1.8)			X		X		
1,80		Fin de la tranchée à 1,8 m.								
10,79										

Client: TPSGC

Projet n°: M02681J

Nom du projet: Ancien dépôt Pagé

Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur

Coordonnées / Élévations:

X: 328257.54

Projection : MTM8

Y: 5080550.43

Météo:

T°: -1°C

Z: 18.546 m

Compagnie: Excavation LFG

Équipement:

Type de forage: Pelle Mécanique

Équip. d'échantillonnage: Excavation

Terminologie

traces	< 10 %
un peu	10 - 20 %
adjectif ("...eux")	20 - 35 %
et	35 - 50 %

Classification

Silt et argile	< 0,08 mm
Sable	0,08 - 5 mm
Gravier	5 - 80 mm
Cailloux	80 - 300 mm
Blocs	> 300 mm

Compacité

Très lâche	0 - 4
Lâche	4 - 10
Compact	10 - 30
Dense	30 - 50
Très dense	>50

Indice 'N'

Type d'échantillon

Analyses

CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:
CF Cuillère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	RMD Lixiviation (mat. dangereuses)
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	SED. Analyse sédimentologique
TS Tube Sherby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50	
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)	
		IPP Identification des produits pétroliers	
		Mercure Mercure	

Profondeur Élévation (m)	Matrice de sols	Stratigraphie	Échantillon		Indices de contamination				Analyses	Duplicata
			N° échantillon	COV (ppm)	Faible	Moyenne	Forte	Disseminé		
0										
0,05 18,50		Végétation herbacée.								
0,50 18,05		Remblai : Silt argileux gris foncé avec matières résiduelles en traces, lâche et humide.								
1		Matières résiduelles brunes : Résidus de déchetage (Fluff automobile) : matériaux de rembourrage déchetés, pellicules de plastique, débris de métal, de caoutchouc, lâche, humide.								
2		Devenant brunes foncées noires avec tissus, pneus, garnitures de portières, ceintures de sécurité, débris de béton, bois et vinyle à 1,1 m. Odeurs modérées d'hydrocarbures pétroliers.								
3										
4										
5										
6										
6,00 12,55		Devenant saturées en eau huileuse à 5,9 m. Venue d'eau grisâtre, présence d'irisation, huileuse, faible odeur de produit chimique.								
6,50 12,05		Argile grise avec silt en traces, ferme à molle, saturée en eau huileuse. Faibles odeurs d'hydrocarbures pétroliers.							A.C.	DUP-12
		Fin de la tranchée à 6,5 m.								

Client: TPSGC

Projet n°: M02681J

Nom du projet: Ancien dépôt Pagé

Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur

Coordonnées / Élévations:

X: 328278.43

Projection : MTM8

Y: 5080491.2

Météo:

T°: -1°C

Z: 16.76 m

Compagnie: Excavation LFG

Équipement:

Type de forage: Pelle Mécanique

Équip. d'échantillonnage: Excavation

Terminologie

traces	< 10 %
un peu	10 - 20 %
adjectif ("...eux")	20 - 35 %
et	35 - 50 %

Classification

Silt et argile	< 0,08 mm
Sable	0,08 - 5 mm
Gravier	5 - 80 mm
Cailloux	80 - 300 mm
Blocs	> 300 mm

Compacité

Très lâche	0 - 4
Lâche	4 - 10
Compact	10 - 30
Dense	30 - 50
Très dense	>50

Indice 'N'

Type d'échantillon

Analyses

CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:
CF Cuillère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	RMD Lixiviation (mat. dangereuses)
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	SED. Analyse sédimentologique
TS Tube Sherby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50	
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)	
		IPP Identification des produits pétroliers	
		Mercure Mercure	

Profondeur Élévation (m)	Matrice de sols	Stratigraphie	Échantillon		Indices de contamination				Analyses	Duplicata
			N° échantillon	COV (ppm)	Faible	Moyenne	Forte	Disséminé		
0										
0,05		Végétation herbacée.								
16,71		Remblai : Silt argileux gris foncé avec matières résiduelles en traces, lâche et humide.	(0.0-0.4)							A.C.
0,40		Matières résiduelles brunes : Résidus de déchetage (Fluff automobile) : matériaux de rembourrage déchiquetés, pellicules de plastique, débris de métal, de caoutchouc, compact, humide	(0.4-0.7)					X		A.C.
16,36		Devenant brunes foncées noires avec pneus, garnitures de portières, ceinture de sécurité, débris de bois, vinyle à 0,7 m. Odeurs fortes d'hydrocarbures pétroliers, lâche, humide.						X	X	
1										
2										
3		Présence d'environ 20 barils en métal écrasés et endommagés (capacité variant entre 115 et 150 Litres) contenant une boue noire avec des irisation argentée à 2,5 m.						X	X	
3,50		Devenant saturées à 3,0 m Venue d'eau grisâtre à rouge, présence d'une couche mouseuse en surface, forte odeur de produits chimique.	(2.5-3.5)							
13,26		Matières résiduelles brunes foncées noires et silt argileux et gravier (s'apparentant à de l'enrobé bitumineux), lâches et saturées.	(3.5-3.6)					X	X	A.C.
3,60		Présence d'irisation, forte odeurs de bitume.								
13,16		Fin de la tranchée à 3,6 m. car présence de barils et de matières résiduelles saturées en eau huileuse. Risque d'endommager les barils.								

Client: TPSGC

Projet n°: M02681J

Nom du projet: Ancien dépôt Pagé

Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur

Coordonnées / Élévations:

X: 328310.79

Projection : MTM8

Y: 5080466.03

Météo:

T°: 9°C

Z: 18.419 m

Compagnie: Excavation LFG

Équipement:

Type de forage: Pelle Mécanique

Équip. d'échantillonnage: Excavation

Terminologie

traces	< 10 %
un peu	10 - 20 %
adjectif ("...eux")	20 - 35 %
et	35 - 50 %

Classification

Silt et argile	< 0,08 mm
Sable	0,08 - 5 mm
Gravier	5 - 80 mm
Cailloux	80 - 300 mm
Blocs	> 300 mm

Compacité

Très lâche	0 - 4
Lâche	4 - 10
Compact	10 - 30
Dense	30 - 50
Très dense	>50

Indice 'N'

Type d'échantillon

Analyses

CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:
CF Cuillère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc,
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	RMD Lixiviation (mat. dangereuses)
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	SED. Analyse sédimentologique
TS Tube Sherby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50	
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)	
		IPP Identification des produits pétroliers	
		Mercure Mercure	

Profondeur Élévation (m)	Matrice de sols	Stratigraphie	Échantillon		Indices de contamination				Analyses	Duplicata
			N° échantillon	COV (ppm)	Faible	Moyenne	Fort	Visuel		
0										
0.10 18,32		Végétation herbacée								
1		Matières résiduelles brunes : une cinquantaine de pneus de grande dimension dans une matrice de sable moyen avec silt en traces, lâche, humide.	(0.1-2.0)							A.C.
2		Matières résiduelles brunes foncées noires : Résidus de déchetage (Fluff automobile) : matériaux de rembourrage déchetés, tissus, pneus, pellicules de plastique, débris de métal, de béton, de caoutchouc, de bois, de plastique et de vinyle, ordures ménagères (sacs de plastique, emballage alimentaire en plastique, en métal, en carton, canette), lâche, humide. Odeurs modérées d'hydrocarbures pétroliers.	(2.0-4.8)		X		X			
3										
4										
5		Devenant avec un peu d'argile noire, molle, saturée en eau et hydrocarbures pétroliers, à 4,8 m. Venue d'eau noire, présence d'irisation argentée, huileuse. Odeurs modérées d'hydrocarbures pétroliers.	(4.8-5.0)		X		X			
5.00 13,42		Fin de la tranchée à 5,0 m. Limite de l'excavatrice.								

Client: TPSGC

Projet n°: M02681J

Nom du projet: Ancien dépôt Pagé

Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur

Coordonnées / Élévations:

X: 328316.53

Projection : MTM8

Y: 5080506.97

Météo:

T°: 0°C

Z: 14.476 m

Compagnie: Excavation LFG

Équipement:

Type de forage: Pelle Mécanique

Équip. d'échantillonnage: Excavation

Terminologie

traces	< 10 %
un peu	10 - 20 %
adjectif ("...eux")	20 - 35 %
et	35 - 50 %

Classification

Silt et argile	< 0,08 mm
Sable	0,08 - 5 mm
Gravier	5 - 80 mm
Cailloux	80 - 300 mm
Blocs	> 300 mm

Compacité

Très lâche	0 - 4
Lâche	4 - 10
Compact	10 - 30
Dense	30 - 50
Très dense	>50

Indice 'N'

Type d'échantillon

Analyses

CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:
CF Cuillère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	RMD Lixiviation (mat. dangereuses)
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	SED. Analyse sédimentologique
TS Tube Shelby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50	
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)	
		IPP Identification des produits pétroliers	
		Mercure Mercure	

Profondeur Élévation (m)	Matrice de sols	Stratigraphie	Échantillon		Indices de contamination				Analyses	Duplicata
			N° échantillon	COV (ppm)	Faible	Moyenne	Fort	Disseminé		
0										
0,05		Végétation herbacée.								
14,43		Remblai : Silt argileux brun avec 20% de matières résiduelles (poudre rougeâtre, blocs de béton, débris métalliques et barils en métal), lâche et humide.	(0.0-0.4)			X				A.C.
0,40		Matières résiduelles beige, brun et/ou noir : Résidus de mortier, cendres, mâchefers, scories, de granulométrie grossière à 200 mm, lâche, humide.	(0.4-0.65)					X		A.C.
14,08		Matières résiduelles gris foncées : charbon / cendres en poudre et débris de tissus en traces, compact, saturées en eau huileuse.	(0.65-1.1)				X	X		
0,65		Venue d'eau à 1,1 m : eau grisâtre, présence d'irisation, huileuse, odeurs fortes d'hydrocarbures pétroliers					X	X		
13,33		Matières résiduelles : Silt argileux gris-noir et gravier (s'apparentant à de l'enrobé bitumineux), compactes à lâches, saturées. Présence d'irisation, forte odeurs de bitume.	(0.0-1.8)							
1,10		Argile grise avec silt en traces, ferme à molle, saturée. Présence de fissures noires.					X	X		A.C.
13,38		Devenant fissurée et molle à 2,8 m.	(1.8-2.8)							
1,80										
12,68			(2.8-3.5)							
3,50		Fin de la tranchée à 3,5 m.								
10,98										

Client: TPSGC

Projet n°: M02681J

Nom du projet: Ancien dépôt Pagé

Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur

Coordonnées / Élévations:

X: 328349.92

Projection : MTM8

Y: 5080421.54

Météo:

T°: 10°C

Z: 19.875 m

Compagnie: Excavation LFG

Équipement:

Type de forage: Pelle Mécanique

Équip. d'échantillonnage: Excavation

Terminologie

traces	< 10 %
un peu	10 - 20 %
adjectif ("...eux")	20 - 35 %
et	35 - 50 %

Classification

Silt et argile	< 0,08 mm
Sable	0,08 - 5 mm
Gravier	5 - 80 mm
Cailloux	80 - 300 mm
Blocs	> 300 mm

Compacité

Très lâche	0 - 4
Lâche	4 - 10
Compact	10 - 30
Dense	30 - 50
Très dense	>50

Indice 'N'

Type d'échantillon

Analyses

CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:
CF Cuillère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc,
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	RMD Lixiviation (mat. dangereuses)
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	SED. Analyse sédimentologique
TS Tube Sherby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50	
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)	
		IPP Identification des produits pétroliers	
		Mercure Mercure	

Profondeur Élévation (m)	Matrice de sols	Stratigraphie	Échantillon		Indices de contamination				Analyses	Duplicata
			N° échantillon	COV (ppm)	Faible	Moyenne	Fort	Disseminé		
0										
0.10 19,78		Végétation herbacée								
1		Matières résiduelles brunes : 60% de débris de démolition (dalle de béton, morceaux de béton bitumineux, briques et débris de métal,) dans une matrice de sable moyen graveleux, lâche, humide.	(0.1-1.3)					X		
1.30 18,58		Matières résiduelles hétérogènes brunes foncées noires ; débris de démolition, fluff automobile (matériaux de rembourrage déchiquetés, tissus, pneus, pellicules de plastique, débris de métal, de béton, de caoutchouc, de bois, de plastique et de vinyle), ordures ménagères (sacs de plastique, emballage alimentaire en plastique, en métal, en carton, canette), styromousse, lâche, humide. Odeurs modérées d'hydrocarbures pétroliers.			X			X		
2										
3		Venue d'eau à 2,9 m : eau grisâtre à noire, présence d'irisation, huileuse. Faibles odeurs d'hydrocarbures pétroliers.	(1.3-5.0)							
4										
5	5,00 14,88	Fin de la tranchée à 5,0 m. Limite de l'excavatrice.								

Client: TPSGC	Coordonnées / Élévations:	
Projet n°: M02681J	X: 328351.07	Projection : MTM8
Nom du projet: Ancien dépôt Pagé	Y: 5080470.82	Météo: T°: 0°C
Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur	Z: 17.96 m	

Compagnie: Excavation LFG	Terminologie	Classification	Compacité	Indice 'N'
Équipement:	traces < 10 %	Silt et argile < 0,08 mm	Très lâche	0 - 4
Type de forage: Pelle Mécanique	un peu 10 - 20 %	Sable 0,08 - 5 mm	Lâche	4 - 10
Équip. d'échantillonnage: Excavation	adjectif ("...eux") 20 - 35 %	Gravier 5 - 80 mm	Compact	10 - 30
	et 35 - 50 %	Cailloux 80 - 300 mm	Dense	30 - 50
		Blocs > 300 mm	Très dense	>50

Type d'échantillon	Analyses		
CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:
CF Cuillère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	RMD Lixiviation (mat. dangereuses)
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	SED. Analyse sédimentologique
TS Tube Sherby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50	
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)	
		IPP Identification des produits pétroliers	
		Mercuré Mercure	

Profondeur Élévation (m)	Matrice de sols	Stratigraphie	Échantillon N° échantillon	Indices de contamination				Analyses	Duplicata	
				COV (ppm)	Odeur					Visuel
		Faible	Moyenne		Fort	Disséminé	Saturé			
0										
0,05 17,91 0,20 17,76		Végétation herbacée.	(0.0-0.2)							A.C.
1		Remblai : Silt argileux gris-brun avec gravier et radicules en traces, lâche, humide. Matières résiduelles brunes : 40% de débris de démolition (béton, brique, mortier), emballage de plastique, pièces de voiture métallique et pneus de grande dimension, lâche, humide.	(0.2-1.1)							
1,10 16,86		Matières résiduelles noires : fluff automobile et 50% de pneus de grande dimension (environ 40), compact à lâche, humide. Faibles odeurs d'hydrocarbures pétroliers.	(1.1-3.7)							
2										
3										
3,70 14,26		Venue d'eau à 3,7 m								
4		Remblai : Silt argileux gris avec un peu de matières résiduelles, lâche, humide. Strié de noir.	(3.7-4.7)							A.C.
4,70 13,26		Argile grise avec silt en traces, ferme à molle, saturée. Présence d'oxydation.	(4.7-5.7)							
5										
5,70 12,26		Fin de la tranchée à 5,7 m.								

Client: TPSGC	Coordonnées / Élévations:
Projet n°: M02681J	X: 328375.96 Projection : MTM8
Nom du projet: Ancien dépôt Pagé	Y: 5080345.81 Météo: T°: 1°C
Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur	Z: 20.417 m

Compagnie: Excavation LFG	Terminologie	Classification	Compacité	Indice 'N'
Équipement:	traces < 10 %	Silt et argile < 0,08 mm	Très lâche	0 - 4
Type de forage: Pelle Mécanique	un peu 10 - 20 %	Sable 0,08 - 5 mm	Lâche	4 - 10
Équip. d'échantillonnage: Excavation	adjectif ("...eux") 20 - 35 %	Gravier 5 - 80 mm	Compact	10 - 30
	et 35 - 50 %	Cailloux 80 - 300 mm	Dense	30 - 50
		Blocs > 300 mm	Très dense	>50

Type d'échantillon	Analyses
CD Carottier à diamants	BPC Biphényles polychlorés
CF Cullère fendue	BTEX Benzène, toluène, éthylbenzène, xylène
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)
TR Truelle	C.Phénol Composés phénoliques
TS Tube Sherby	COV Hydrocarbures HAM et HAC
TT Tube transparent	Diox. & Fur. Dioxines et furanes
	GR Analyse granulométrique
	HAM Hydrocarbures aromatiques monocycliques
	HAP Hydrocarbures aromatiques polycycliques
	C10 Hydrocarbures pétroliers C10- C50
	F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)
	IPP Identification des produits pétroliers
	Mercure Mercure
	MX Métaux applicables parmi: Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.
	RMD Lixiviation (mat. dangereuses)
	SED. Analyse sédimentologique

Profondeur Élévation (m)	Matrice de sols	Stratigraphie	Échantillon N° échantillon	Indices de contamination				Analyses	Duplicata	
				COV (ppm)	Odeur	Visuel				
				Faible	Moyenne	Fort	Disséminé	Saturé		
0		Végétation herbacée								
0.10 20,32		Remblai : Silt argileux gris avec matières résiduelles en traces (débris de plastique, de métal), lâche et humide.	(0.1-0.5)				X			A.C.
0.50 19,92		Matières résiduelles brunes : Résidus de déchetage (Fluff automobile) : matériaux de rembourrage déchetés, pellicules de plastique, débris de métal, de caoutchouc, résidus blanc s'apparentant à de la chaux, lâche, humide.						X		
1										
2			(0.5-3.6)							
3										
3.60 16,82		Remblai hétérogène noirâtre : Résidus de végétaux et souches d'arbres dans une matrice d'argile silteuse, matière résiduelle en traces (débris de métal), compact, humide.	(3.6-4.1)				X	X		
4		Odeurs modérées d'hydrocarbures pétroliers/solvants. Venue d'eau à 3,6 m : eau noirâtre, présence d'irisation, huileuse. Odeurs modérées à fortes d'hydrocarbures pétroliers.	(4.1-4.6)				X	X		A.C.
4.10 16,32		Matières résiduelles grises foncées : cendres et débris de tissus en traces, compact, saturées en eau huileuse.								
4.60 15,82		Sable fin silteux, gris pâle à brun, compact, humide. Odeurs modérées d'hydrocarbures pétroliers.	(4.6-5.6)				X			A.C.
5										
5.80		Devenant avec interlits de sable fin gris et argile en traces, à 5,6 m.	(5.6-5.8)							
14,62		Fin de la tranchée à 5,8 m.								

Client: TPSGC

Projet n°: M02681J

Nom du projet: Ancien dépôt Pagé

Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur

Coordonnées / Élévations:

X: 328387.11

Projection : MTM8

Y: 5080421.83

Météo:

T°: 1°C

Z: 19.093 m

Compagnie: Excavation LFG

Équipement:

Type de forage: Pelle Mécanique

Équip. d'échantillonnage: Excavation

Terminologie

traces	< 10 %
un peu	10 - 20 %
adjectif ("...eux")	20 - 35 %
et	35 - 50 %

Classification

Silt et argile	< 0,08 mm
Sable	0,08 - 5 mm
Gravier	5 - 80 mm
Cailloux	80 - 300 mm
Blocs	> 300 mm

Compacité

Très lâche	0 - 4
Lâche	4 - 10
Compact	10 - 30
Dense	30 - 50
Très dense	>50

Indice 'N'

Type d'échantillon

Analyses

CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:
CF Cuillère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	RMD Lixiviation (mat. dangereuses)
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	SED. Analyse sédimentologique
TS Tube Shelby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50	
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)	
		IPP Identification des produits pétroliers	
		Mercure Mercure	

Profondeur Élévation (m)	Matrice de sols	Stratigraphie	Échantillon		Indices de contamination				Analyses	Duplicata
			N° échantillon	COV (ppm)	Faible	Moyenne	Fort	Visuel		
0										
0,05 19,04		Végétation herbacée.								
0,80 18,29		Remblai : Silt argileux brun avec un peu de matières résiduelles (bloc de béton, mortier) et radicelles, lâche et humide.	(0.0-0.8)		X			X		
1		Matières résiduelles brunes : Résidus de déchetage (Fluff automobile) : matériaux de rembourrage déchetés, pneus, débris de métal, de béton, de vinyle, de plastique, compact, humide. Devenant noires à rouge à 1,0 m, avec pellicules de plastique, garnitures de portières, ceinture de sécurité, débris de bois (1B) ainsi qu'avec une boue rougeâtre contenue dans quelques barils percés (1A). Odeurs modérées d'hydrocarbures pétroliers et de produits chimiques.	(0.8-1.0)					X		
1,90 17,19		Matières résiduelles noires : ordures ménagères (sacs de plastique, emballage alimentaire en plastique, en métal, en carton, canette), débris de plomberie, de bois, compact, humide.	(1.0-1.9A) (1.0-1.9B)			X		X		A.C.
2										
3										
3,80 15,29		Devenant saturées à 3,5 m Venue d'eau grisâtre, présence d'une couche mousseuse rouge en surface et d'irisation, huileuse. Sable silteux gris, compact, saturé.	(1.9-3.8)			X		X		
4										
4,80 14,29		Argile silteuse grise, molle, saturée.	(3.8-4.8)			X				A.C.
5										
5,40 13,69		Fin de la tranchée à 5,4 m.	(4.8-5.4)							A.C.

Client: TPSGC	Coordonnées / Élévations:		
Projet n°: M02681J	X: 328427.86	Projection : MTM8	
Nom du projet: Ancien dépôt Pagé	Y: 5080372.28	Météo:	T°: 9°C
Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur	Z: 21.068 m		

Compagnie: Excavation LFG	Terminologie	Classification	Compacité	Indice 'N'
Équipement:	traces < 10 %	Silt et argile < 0,08 mm	Très lâche	0 - 4
Type de forage: Pelle Mécanique	un peu 10 - 20 %	Sable 0,08 - 5 mm	Lâche	4 - 10
Équip. d'échantillonnage: Excavation	adjectif ("...eux") 20 - 35 %	Gravier 5 - 80 mm	Compact	10 - 30
	et 35 - 50 %	Cailloux 80 - 300 mm	Dense	30 - 50
		Blocs > 300 mm	Très dense	>50

Type d'échantillon	Analyses			
CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:	
CF Cuillère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.	
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	RMD Lixiviation (mat. dangereuses)	
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	SED. Analyse sédimentologique	
TS Tube Sherby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50		
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)		
		IPP Identification des produits pétroliers		
		Mercurc Mercure		

Profondeur Élévation (m)	Matrice de sols	Stratigraphie	Échantillon		Indices de contamination				Analyses	Duplicata
			N° échantillon	COV (ppm)	Faible	Moyenne	Fort	Visuel		
0		Végétation herbacée.								
0.10 20,97		Remblai : Silt argileux gris et sable moyen, avec un peu de matières résiduelles (blocs de béton, mortier) et racielles, lâche et humide.	(0.1-0.5)					X		
0.50 20,57		Matières résiduelles brunes : Résidus de déchetage (Fluff automobile) : matériaux de rembourrage déchetés, pneus, débris de métal, de béton, de vinyle, de plastique, compact, humide.	(0.5-1.3)						X	
1		Devenant noires à 1,3 m, avec pellicules de plastique, garnitures de portières, ceinture de sécurité, débris de bois. Faibles odeurs d'hydrocarbures pétroliers. Devenant avec 50% d'ordures ménagères (sacs de plastique, emballage alimentaire en plastique, en métal, en carton, canette) à 1,6 m.							X	
2										
3			(1.3-4.5)							
4		Devenant avec un peu de boue rougeâtre et présence de barils à 3,8 m. Devenant saturé à 4,0 m. Venue d'eau grise à rouge, présence de mousse rouge en surface et irisation, huileuse, odeur modérée de produits chimiques.								
4.50 16,57		Sable silteux gris, fissuré, compact, saturé en eau huileuse.								
5		Argile silteuse grise, molle, saturée.	(4.5-5.0)							A.C.
16,07 5,00		Fin de la tranchée à 5,0 m.								

Client: TPSGC **Coordonnées / Élévations:**
Projet n°: M02681J X: 328395.56 Projection : MTM8
Nom du projet: Ancien dépôt Pagé Y: 5080306.37 Météo: T°: 9°C
Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur Z: 20.538 m

Compagnie:	Terminologie	Classification	Compacité	Indice 'N'
Excavation LFG	traces < 10 %	Silt et argile < 0,08 mm	Très lâche	0 - 4
Équipement:	un peu 10 - 20 %	Sable 0,08 - 5 mm	Lâche	4 - 10
Type de forage: Pelle Mécanique	adjectif ("...eux") 20 - 35 %	Gravier 5 - 80 mm	Compact	10 - 30
Équip. d'échantillonnage: Excavation	et 35 - 50 %	Cailloux 80 - 300 mm	Dense	30 - 50
		Blocs > 300 mm	Très dense	>50

Type d'échantillon	Analyses			
CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:	
CF Cullère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.	
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	RMD Lixiviation (mat. dangereuses)	
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	SED. Analyse sédimentologique	
TS Tube Sherby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50		
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)		
		IPP Identification des produits pétroliers		
		Mercure Mercure		

Profondeur Élévation (m)	Matrice de sols	Stratigraphie	Échantillon		Indices de contamination				Analyses	Duplicata
			N° échantillon	COV (ppm)	Faible	Moyenne	Fort	Visuel		
0										
0,10 20,44		Végétation herbacée.								
1		Remblai : Silt argileux gris avec matières résiduelles en traces (briques, béton bitumineux, débris métalliques), lâche, humide.	(0.1-1.1)				X		A.C.	
1,10 19,44		Remblai : Sable silteux gris avec matières résiduelles en traces (débris de plastique, de métal, de briques), lâche à compact, humide. Présence d'oxydation.	(1.1-2.1)				X		A.C.	
2		Devenant avec 10-15% de matières résiduelles et radicelles en traces à 2,1 m, lâche et saturé.	(2.1-3.1)				X		A.C.	
3		Venue d'eau à 2,7 m.								
4		Fissuré à 3,1 m.	(3.1-4.1)							
4,10 16,44		Sable silteux gris, compact, saturé.	(4.1-5.1)							
5			(5.1-5.8)							
5,80 14,74		Fin de la tranchée à 5,8 m.								

Client: TPSGC **Coordonnées / Élévations:**
Projet n°: M02681J X: 328450.4 Projection : MTM8
Nom du projet: Ancien dépôt Pagé Y: 5080348.64 Météo: T°: -5°C
Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur Z: 21.32 m

Compagnie:	Terminologie	Classification	Compacité	Indice 'N'
Excavation LFG	traces < 10 %	Silt et argile < 0,08 mm	Très lâche	0 - 4
Équipement:	un peu 10 - 20 %	Sable 0,08 - 5 mm	Lâche	4 - 10
Type de forage: Pelle Mécanique	adjectif ("...eux") 20 - 35 %	Gravier 5 - 80 mm	Compact	10 - 30
Équip. d'échantillonnage: Excavation	et 35 - 50 %	Cailloux 80 - 300 mm	Dense	30 - 50
		Blocs > 300 mm	Très dense	>50

Type d'échantillon	Analyses			
CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:	
CF Cuillère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.	
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	RMD Lixiviation (mat. dangereuses)	
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	SED. Analyse sédimentologique	
TS Tube Sherby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50		
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)		
		IPP Identification des produits pétroliers		
		Mercure Mercure		

Profondeur Élévation (m)	Matrice de sols	Stratigraphie	Échantillon		Indices de contamination				Analyses	Duplicata
			N° échantillon	COV (ppm)	Faible	Moyenne	Fort	Visuel		
0										
0,05 21,27		Végétation herbacée								
0,40 20,92		Remblai : Silt argileux gris avec radicelles et matières résiduelles en traces (débris de plastique et de métal), lâche, humide.	(0.0-0.4)				X			
1		Matières résiduelles noires : Résidus de déchetage (Fluff automobile) et ordures ménagères (sac de plastique, résidus de tissus, de plastique, de métal, de bois) dans une matrice de sable et de silt, lâche, humide. Fortes odeurs d'hydrocarbures pétroliers et de décomposition.					X	X		
2										
3			(0.4-5.1)							
4										
5										
5,10 16,22 5,30 16,02		Venue d'eau à 5,1 m. Silt sableux gris, avec interlits d'argile, lâche, saturé. Fin de la tranchée à 5,3 m.	(5.1-5.3)						A.C.	DUP-19

Client: TPSGC **Coordonnées / Élévations:**
Projet n°: M02681J X: 328427 Projection : MTM8
Nom du projet: Ancien dépôt Pagé Y: 5080314.62 Météo: T°: -5°C
Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur Z: 20.416 m

Compagnie: Excavation LFG	Terminologie	Classification	Compacité	Indice 'N'
Équipement:	traces < 10 %	Silt et argile < 0,08 mm	Très lâche	0 - 4
Type de forage: Pelle Mécanique	un peu 10 - 20 %	Sable 0,08 - 5 mm	Lâche	4 - 10
Équip. d'échantillonnage: Excavation	adjectif ("...eux") 20 - 35 %	Gravier 5 - 80 mm	Compact	10 - 30
	et 35 - 50 %	Cailloux 80 - 300 mm	Dense	30 - 50
		Blocs > 300 mm	Très dense	>50

Type d'échantillon	Analyses			
CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:	
CF Cuillère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.	
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	RMD Lixiviation (mat. dangereuses)	
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	SED. Analyse sédimentologique	
TS Tube Sherby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50		
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)		
		IPP Identification des produits pétroliers		
		Mercure Mercure		

Profondeur Élévation (m)	Matrice de sols	Stratigraphie	Échantillon N° échantillon	Indices de contamination				Analyses	Duplicata	
				COV (ppm)	Odeur					Visuel
		Faible	Moyenne		Fort	Disséminé	Saturé			
0										
0,05 20,37		Végétation herbacée.								
0,40 20,02		Remblai : Silt argileux gris avec radicelles et matières résiduelles en traces (débris de plastique et de métal), lâche, humide.	(0.00-0.40)							A.C.
1		Matières résiduelles : Débris de construction; 50% de bois et débris de briques, de plastique, de métal, styromousse, tissus, membrane de polyéthylène, lâche, humide.								
2		Présence de résidus rougeâtres et sable brun foncé-noir avec des barils percés à 2,0 m compact, humide. Fortes odeurs d'hydrocarbures pétroliers.	(0.40-3.70)							A.C.
3		Venue d'eau à 2,7 m. Eau rougeâtre, présence d'un film mousseux rougeâtre, aucune irisation., Fortes odeurs de décomposition / produits chimiques. Devenant rougeâtres et saturées à 3,0 m.								
3,70 16,72 3,90		Silt sableux brun-gris, lâche, saturé.	(3.70-3.90)							
16,52		Fin de la tranchée à 3,9 m.								

Cliant: TPSGC **Coordonnées / Élévations:**
Projet n°: M02681J X: 328403.77 Projection : MTM8
Nom du projet: Ancien dépôt Pagé Y: 5080278.34 Météo: T°: -3°C
Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur Z: 18.756 m

Compagnie:	Terminologie	Classification	Compacité	Indice 'N'
Excavation LFG	traces < 10 %	Silt et argile < 0,08 mm	Très lâche	0 - 4
Équipement:	un peu 10 - 20 %	Sable 0,08 - 5 mm	Lâche	4 - 10
Type de forage: Pelle Mécanique	adjectif ("...eux") 20 - 35 %	Gravier 5 - 80 mm	Compact	10 - 30
Équip. d'échantillonnage: Excavation	et 35 - 50 %	Cailloux 80 - 300 mm	Dense	30 - 50
		Blocs > 300 mm	Très dense	>50

Type d'échantillon	Analyses	
CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes
CF Cuillère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques
TS Tube Sherby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)
		IPP Identification des produits pétroliers
		Mercure Mercure
		MX Métaux applicables parmi: Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.
		RMD Lixiviation (mat. dangereuses)
		SED. Analyse sédimentologique

Profondeur Élévation (m)	Matrice de sols	Stratigraphie	Échantillon N° échantillon	Indices de contamination				Analyses	Duplicata
				COV (ppm)	Odeur				
		Faible	Moyenne		Fort	Disséminé	Saturé		
0									
0,05 18,71 0,30		Végétation herbacée.							
18,46		Remblai : Silt argileux gris avec un peu de sable, compact, humide.	(0,00-0,30)						
1		Remblai : Silt argileux brun avec un peu de matières résiduelles (fluff automobile et bois noir, plastique), lâche, humide.	(0,30-1,30)		X	X		A.C.	DUP-18
1,30 17,46		Remblai : Sable brun avec un peu de silt et du gravier en traces, compact, humide.	(1,30-1,60)					A.C.	
1,60 17,16		Silt sableux gris, compact, saturé.							
2			(1,60-2,60)						
2,60		Venue d'eau à 2,2 m Eau brune, aucune irisation, aucune odeur							
16,16		Fin de la tranchée à 2,6 m.							

Cliant: TPSGC **Coordonnées / Élévations:**
Projet n°: M02681J X: 328148.77 Projection : MTM8
Nom du projet: Ancien dépôt Pagé Y: 5080554.72 Météo: T°: 3°C
Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur Z: 12.24 m

Compagnie:	Terminologie	Classification	Compacité	Indice 'N'
Excavation LFG	traces < 10 %	Silt et argile < 0,08 mm	Très lâche	0 - 4
Équipement:	un peu 10 - 20 %	Sable 0,08 - 5 mm	Lâche	4 - 10
Type de forage: Pelle Mécanique	adjectif ("...eux") 20 - 35 %	Gravier 5 - 80 mm	Compact	10 - 30
Équip. d'échantillonnage: Excavation	et 35 - 50 %	Cailloux 80 - 300 mm	Dense	30 - 50
		Blocs > 300 mm	Très dense	>50









Type d'échantillon	Analyses			
CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:	
CF Cuillère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.	
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	RMD Lixiviation (mat. dangereuses)	
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	SED. Analyse sédimentologique	
TS Tube Sherby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50		
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)		
		IPP Identification des produits pétroliers		
		Mercure Mercure		

Profondeur Élévation (m)	Matrice de sols	Stratigraphie	Échantillon		Indices de contamination				Analyses	Duplicata
			N° échantillon	COV (ppm)	Faible	Moyenne	Fort	Disseminé		
0										
0,05 12,19		Végétation herbacée.								
		Argile grise avec radicelles en traces, molle, saturée.	(0.0-1.0)						A.C.	
1			(1.0-1.3)							
1,30 10,94		Fin de la tranchée à 1,3 m								

Cliant: TPSGC	Coordonnées / Élévations:		
Projet n°: M02681J	X: 328024.93	Projection : MTM8	
Nom du projet: Ancien dépôt Pagé	Y: 5080775.68	Météo:	T°: 9°C
Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur	Z: 14.424 m		

Compagnie: Excavation LFG	Terminologie	Classification	Compacité	Indice 'N'
Équipement:	traces < 10 %	Silt et argile < 0,08 mm	Très lâche	0 - 4
Type de forage: Pelle Mécanique	un peu 10 - 20 %	Sable 0,08 - 5 mm	Lâche	4 - 10
Équip. d'échantillonnage: Excavation	adjectif ("...eux") 20 - 35 %	Gravier 5 - 80 mm	Compact	10 - 30
	et 35 - 50 %	Cailloux 80 - 300 mm	Dense	30 - 50
		Blocs > 300 mm	Très dense	>50

Type d'échantillon	Analyses			
CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:	
CF Cuillère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.	
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	RMD Lixiviation (mat. dangereuses)	
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	SED. Analyse sédimentologique	
TS Tube Shelby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50		
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)		
		IPP Identification des produits pétroliers		
		Mercure Mercure		

Profondeur Élévation (m)	Matrice de sols	Stratigraphie	Échantillon		Indices de contamination				Analyses	Duplicata
			N° échantillon	COV (ppm)	Faible	Moyenne	Fort	Disséminé		
0										
0,30 14,12		Litière végétale, dont des racines d'arbres.								
1		Remblai : Silt argileux gris avec un peu de gravier, lâche, humide.	(0.3-1.3)							
2		Devenant avec matières résiduelles en traces (5% de mortier et débris de carton) à 1,3 m.	(1.3-2.3)				x		A.C.	DUP-15
2,30 12,12		Remblai : Sable moyen brun-rouille avec un peu de matières résiduelles (5-10% de débris de métal et de plastique), compact, humide.	(2.3-3.0)				x			
3		Venue d'eau à 3,0 m.								
3,00 11,42		Argile grise avec silt en traces, fissurée, molle et humide. Odeurs modérée de solvant. Présence d'oxydation.	(3.0-3.8)			x	x			
3,80 10,62		Argile grise fissurée, ferme à molle, saturée, irisation.	(3.8-4.4)				x			
4		Fin de la tranchée à 4,4 m.								
4,40 10,02										

Client: TPSGC **Coordonnées / Élévations:**
Projet n°: M02681J X: 328359.73 Projection : MTM8
Nom du projet: Ancien dépôt Pagé Y: 5080357.13 Météo: T°: 0°C
Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur Z: 16.637 m

Compagnie:	Terminologie	Classification	Compacité	Indice 'N'
Excavation LFG	traces < 10 %	Silt et argile < 0,08 mm	Très lâche	0 - 4
Équipement:	un peu 10 - 20 %	Sable 0,08 - 5 mm	Lâche	4 - 10
Type de forage: Pelle Mécanique	adjectif ("...eux") 20 - 35 %	Gravier 5 - 80 mm	Compact	10 - 30
Équip. d'échantillonnage: Excavation	et 35 - 50 %	Cailloux 80 - 300 mm	Dense	30 - 50
		Blocs > 300 mm	Très dense	>50

Type d'échantillon	Analyses			
CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:	
CF Cuillère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.	
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	RMD Lixiviation (mat. dangereuses)	
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	SED. Analyse sédimentologique	
TS Tube Sherby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50		
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)		
		IPP Identification des produits pétroliers		
		Mercure Mercure		

Profondeur Élévation (m)	Matrice de sols	Stratigraphie	Échantillon		Indices de contamination				Analyses	Duplicata
			N° échantillon	COV (ppm)	Faible	Moyenne	Fort	Disseminé		
0										
0,05 16,59		Matière organique brun-noir, lâche, humide.	(0.00-0.40)							
0,40 16,24		Silt sableux brun avec gravier en traces, compact, humide.								
1		Silt sableux brun clair avec un peu d'argile, compact à dense, humide.	(0.40-1.40)						A.C.	
1,40 15,24		Silt argileux gris, compact, saturé.	(1.40-2.40)							
2										
2,40 14,24		Fin de la tranchée à 2,4 m.								

Cliant: TPSGC	Coordonnées / Élévations:	
Projet n°: M02681J	X: 328320.73	Projection : MTM8
Nom du projet: Ancien dépôt Pagé	Y: 5080422.59	Météo: T°: 0°C
Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur	Z: 13.308 m	

Compagnie: Excavation LFG	Terminologie	Classification	Compacité	Indice 'N'
Équipement:	traces < 10 %	Silt et argile < 0,08 mm	Très lâche	0 - 4
Type de forage: Pelle Mécanique	un peu 10 - 20 %	Sable 0,08 - 5 mm	Lâche	4 - 10
Équip. d'échantillonnage: Excavation	adjectif ("...eux") 20 - 35 %	Gravier 5 - 80 mm	Compact	10 - 30
	et 35 - 50 %	Cailloux 80 - 300 mm	Dense	30 - 50
		Blocs > 300 mm	Très dense	>50

Type d'échantillon	Analyses			
CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:	
CF Cuillère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.	
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	RMD Lixiviation (mat. dangereuses)	
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	SED. Analyse sédimentologique	
TS Tube Shelby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50		
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)		
		IPP Identification des produits pétroliers		
		Mercure Mercure		

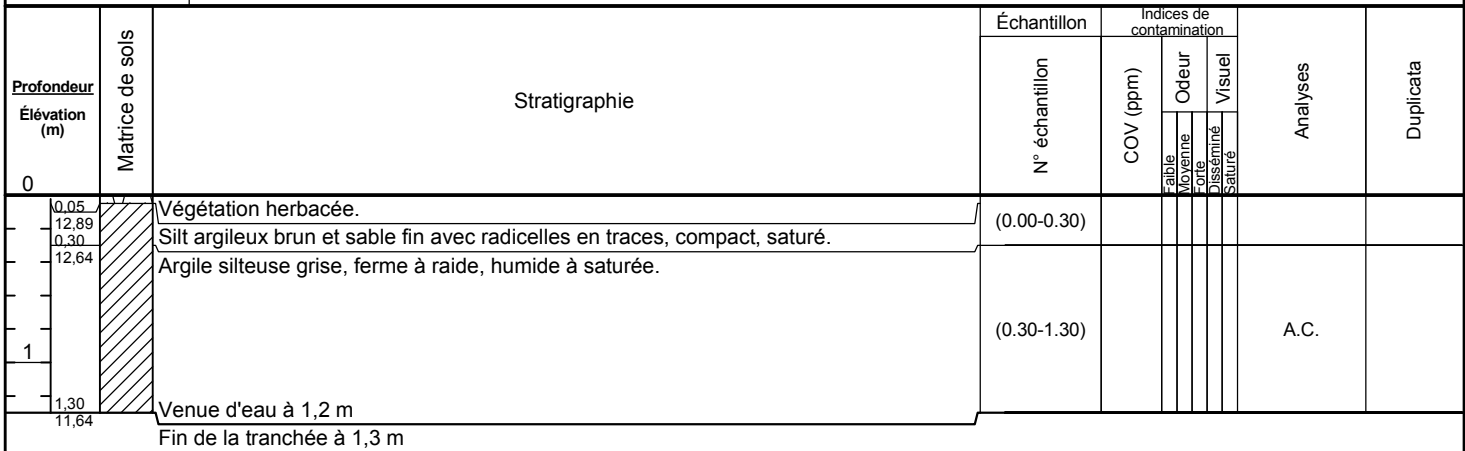
Profondeur	Élévation (m)	Matrice de sols	Stratigraphie				Indices de contamination				Analyses	Duplicata		
			N° échantillon	COV (ppm)	Odeur	Visuel	Faible	Moyenne	Fort	Disséminé			Saturé	
0														
	0,05	Végétation herbacée.												
	13,26													
	0,20													
	13,11													
	1													
	1,20													
	12,11													

Fin de la tranchée à 1,2 m.

Cliant: TPSGC **Coordonnées / Élévations:**
Projet n°: M02681J X: 328275.87 Projection : MTM8
Nom du projet: Ancien dépôt Pagé Y: 5080439.1 Météo: T°: 0°C
Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur Z: 12.937 m

Compagnie: Excavation LFG	Terminologie	Classification	Compacité	Indice 'N'
Équipement:	traces < 10 %	Silt et argile < 0,08 mm	Très lâche	0 - 4
Type de forage: Pelle Mécanique	un peu 10 - 20 %	Sable 0,08 - 5 mm	Lâche	4 - 10
Équip. d'échantillonnage: Excavation	adjectif ("...eux") 20 - 35 %	Gravier 5 - 80 mm	Compact	10 - 30
	et 35 - 50 %	Cailloux 80 - 300 mm	Dense	30 - 50
		Blocs > 300 mm	Très dense	>50

Type d'échantillon	Analyses			
CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:	
CF Cuillère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.	
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	RMD Lixiviation (mat. dangereuses)	
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	SED. Analyse sédimentologique	
TS Tube Shelby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50		
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)		
		IPP Identification des produits pétroliers		
		Mercure Mercure		



Client: TPSGC

Projet n°: M02681J

Nom du projet: Ancien dépôt Pagé

Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur

Coordonnées / Élévations:

X: 328212.3

Projection : MTM8

Y: 5080595.84

Météo: Soleil

T°: -5°C

Z: 19.261 m

Compagnie: Succ. Forage G. Downing Ltée

Équipement:

Type de forage: CME-55 Tarière évidée - Ø 200 mm

Équip. d'échantillonnage: Cuillère fendue - Ø 51 mm

Terminologie

traces	< 10 %
un peu	10 - 20 %
adjectif ("...eux")	20 - 35 %
et	35 - 50 %

Classification

Silt et argile	< 0,08 mm
Sable	0,08 - 5 mm
Gravier	5 - 80 mm
Cailloux	80 - 300 mm
Blocs	> 300 mm

Compacité

Très lâche	0 - 4
Lâche	4 - 10
Compact	10 - 30
Dense	30 - 50
Très dense	>50

Indice 'N'

Type d'échantillon

Analyses

CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:
CF Cuillère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt,
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	chrome, cuivre, étain, manganèse, molybdène,
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	nickel, plomb, sélénium, zinc,
TS Tube Sherby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50	RMD Lixiviation (mat. dangereuses)
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)	SED. Analyse sédimentologique
		IPP Identification des produits pétroliers	
		Mercurc Mercure	

Profondeur Élévation (m)	Stratigraphie	Description	Échantillon				Indices de contamination				Analyses	Duplicata	Remarques		
			Type d'échantillon	Nombre de coups/15cm	Récupération (%)	N° échantillon	COV (ppm)	Odeur						Visuel	
								Faible	Moyenne	Forte					
0		Végétation herbacée.	SS	2	42										
0.05 19,21 0,40 18,86		Remblai : Silt sableux gris avec débris en traces (Fluff automobile), lâche, sec.	SS	1 2	33	(0,00-0,40)									
		Matières résiduelles brunes à noires : Résidus de déchetage (Fluff automobile) : matériaux de rembourrage déchetés, pellicules de plastique, débris de métal, de caoutchouc, compactes, humides. Fortes odeurs d'hydrocarbures pétroliers.		3 2 3 4											
2				4 3 4	25										
			SS	5 5	33	(0,40-6,80)			X	X					
4				5 8 9	33										
			SS		100										
6 6,80 12,46		Silt argileux gris, lâche, humide. Devenant argileux avec un peu de silt à 7,0 m.				(6,80-7,80)									
7 7,80 11,46		Fin du forage à 7,80 m.													

Client: TPSGC

Projet n°: M02681J

Nom du projet: Ancien dépôt Pagé

Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur

Coordonnées / Élévations:

X: 328288.88

Projection : MTM8

Y: 5080512.68

Météo: Soleil

T°: -5°C

Z: 17.567 m

Compagnie: Succ. Forage G. Downing Ltée

Équipement:

Type de forage: CME-55 Tarière évidée - Ø 200 mm

Équip. d'échantillonnage: Cuillère fendue - Ø 51 mm

Terminologie

traces	< 10 %
un peu	10 - 20 %
adjectif ("...eux")	20 - 35 %
et	35 - 50 %

Classification

Silt et argile	< 0,08 mm
Sable	0,08 - 5 mm
Gravier	5 - 80 mm
Cailloux	80 - 300 mm
Blocs	> 300 mm

Compacité

Très lâche	0 - 4
Lâche	4 - 10
Compact	10 - 30
Dense	30 - 50
Très dense	>50

Indice 'N'

Type d'échantillon

Analyses

CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:
CF Cuillère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc,
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	RMD Lixiviation (mat. dangereuses)
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	SED. Analyse sédimentologique
TS Tube Sherby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50	
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)	
		IPP Identification des produits pétroliers	
		Mercurc Mercure	

Profondeur Élévation (m)	Stratigraphie	Description	Échantillon				Indices de contamination				Analyses	Duplicata	Remarques			
			Type d'échantillon	Nombre de coups/15cm	Récupération (%)	N° échantillon	COV (ppm)	Odeur						Visuel		
								Faible	Moyenne	Fort						
0		Végétation herbacée.	SS	3	66	(0,00-0,30)										
0.05 17,52		Remblai : Silt sableux brun avec matière organique en traces, compact, humide.	SS	5	7	50	(0,30-0,50)									
0.30 17,27		Remblai : Sable gris-beige avec débris de démolition (mortier) en traces, lâche, humide.	SS	2	4	6	2									
0.50 17,07		Matières résiduelles brunes-noires : Résidus de déchetage (Fluff automobile) : matériaux de rembourrage déchetés, pellicules de plastique, débris de métal, de caoutchouc, lâche à compacte, humide. Faibles odeurs d'hydrocarbures pétroliers.	SS	2	3	4	3	25								
2			SS	6	5	8	4	25	(0,50-6,00)							
4			SS	2	4	3	4	0								
6			SS	1	1	1	1	100								
6.00 11,57		Argile silteuse grise avec sable fin en traces, molle, saturée.							(6,00-7,00)							
7.00 10,57		Fin du forage à 7,00 m														

Client: TPSGC

Projet n°: M02681J

Nom du projet: Ancien dépôt Pagé

Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur

Coordonnées / Élévations:

X: 328252.92

Projection : MTM8

Y: 5080519.52

Météo: Soleil

T°: -5°C

Z: 17.535 m

Compagnie: Succ. Forage G. Downing Ltée

Équipement:

Type de forage: CME-55 Tarière évidée - Ø 200 mm

Équip. d'échantillonnage: Cuillère fendue - Ø 51 mm

Terminologie

traces	< 10 %
un peu	10 - 20 %
adjectif ("...eux")	20 - 35 %
et	35 - 50 %

Classification

Silt et argile	< 0,08 mm
Sable	0,08 - 5 mm
Gravier	5 - 80 mm
Cailloux	80 - 300 mm
Blocs	> 300 mm

Compacité

Très lâche	0 - 4
Lâche	4 - 10
Compact	10 - 30
Dense	30 - 50
Très dense	>50

Indice 'N'

Type d'échantillon

Analyses

CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:
CF Cuillère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc,
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	RMD Lixiviation (mat. dangereuses)
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	SED. Analyse sédimentologique
TS Tube Sherby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50	
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)	
		IPP Identification des produits pétroliers	
		Mercurc Mercure	

Profondeur Élévation (m)	Stratigraphie	Description	Échantillon		N° échantillon	COV (ppm)	Indices de contamination				Analyses	Duplicata	Remarques			
			Type d'échantillon	Nombre de coups/15cm			Récupération (%)	Odeur	Visuel	Faible				Moyenne	Forte	Disséminé
0		Végétation herbacée.	SS	4	33											
0.10 17.44		Matières résiduelles brunes à noires : Résidus de déchetage (Fluff automobile) : matériaux de rembourrage déchetés, pellicules de plastique, débris de métal, de caoutchouc, de verre, lâche, humide. Fortes odeurs d'hydrocarbures pétroliers.	SS	5	33											
1																
2																
2																
3																
3																
4																
4.20 13.34		Silt sableux gris avec argile en traces, compact, humide.	SS	2	75											
4.80 12.74		Argile grise, molle, très humide.	SS	2	83											
5																
5.40 12.14		Fin du forage à 5,40 m														

Client: TPSGC

Projet n°: M02681J

Nom du projet: Ancien dépôt Pagé

Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur

Coordonnées / Élévations:

X: 328377.92

Projection : MTM8

Y: 5080390.06

Météo: Soleil

T°: -5°C

Z: 20.533 m

Compagnie: Succ. Forage G. Downing Ltée

Équipement:

Type de forage: CME-55 Tarière évidée - Ø 200 mm

Équip. d'échantillonnage: Cuillère fendue - Ø 51 mm

Terminologie

traces	< 10 %
un peu	10 - 20 %
adjectif ("...eux")	20 - 35 %
et	35 - 50 %

Classification

Silt et argile	< 0,08 mm
Sable	0,08 - 5 mm
Gravier	5 - 80 mm
Cailloux	80 - 300 mm
Blocs	> 300 mm

Compacité

Très lâche	0 - 4
Lâche	4 - 10
Compact	10 - 30
Dense	30 - 50
Très dense	>50

Indice 'N'

Type d'échantillon

Analyses

CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:
CF Cuillère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc,
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	RMD Lixiviation (mat. dangereuses)
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	SED. Analyse sédimentologique
TS Tube Sherby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50	
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)	
		IPP Identification des produits pétroliers	
		Mercurc Mercure	

Profondeur Élévation (m)	Stratigraphie	Description	Échantillon				Indices de contamination				Analyses	Duplicata	Remarques		
			Type d'échantillon	Nombre de coups/15cm	Récupération (%)	N° échantillon	COV (ppm)	Odeur						Visuel	
								Faible	Moyenne	Forte					
0		Végétation herbacée.	SS	2	66										
0,05 20,48		Remblai : Silt sableux gris avec débris en traces (béton bitumineux, charbon), lâche, sec.	SS	2 2 5	75										
0,60 19,93		Matières résiduelles brunes à noires : Résidus de déchetage (Fluff automobile) : matériaux de rembourrage déchetés, pellicules de plastique, débris de métal, de caoutchouc, compactes, humides. Fortes odeurs d'hydrocarbures pétroliers.	SS	2 4 3 5	16										
1															
2															
3															
4															
4,20 16,33		Remblai : Sable graveleux gris-rosé, compact, humide.	SS	5 5 5	50					x	x				
4,60 15,93		Silt gris avec argile et sable en traces, compact, saturé.	SS	5 5	100										
5															
6															
6,00 14,53		Fin du forage 6,00 m.													

Client: TPSGC **Coordonnées / Élévations:**
Projet n°: M02681J X: 328153.67 Projection :
Nom du projet: Ancien dépôtoir Y: 5080647.73 Météo: Soleil T°: 0.7°C
Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur Z: 20.488 m

Compagnie:	Terminologie	Classification	Compacité	Indice 'N'
Succ. Forage G. Downing Ltée	traces < 10 %	Silt et argile < 0,08 mm	Très lâche 0 - 4	0 - 4
Équipement:	un peu 10 - 20 %	Sable 0,08 - 5 mm	Lâche 4 - 10	4 - 10
Type de forage: CME-55 Tarière évidée - Ø 200 mm	adjectif ("...eux") 20 - 35 %	Gravier 5 - 80 mm	Compact 10 - 30	10 - 30
Équip. d'échantillonnage: Cuillère fendue - Ø 51 mm	et 35 - 50 %	Cailloux 80 - 300 mm	Dense 30 - 50	30 - 50
		Blocs > 300 mm	Très dense >50	>50

Type d'échantillon	Analyses			
CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:	
CF Cuillère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc,	
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	RMD Lixiviation (mat. dangereuses)	
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	SED. Analyse sédimentologique	
TS Tube Sherby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50		
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)		
		IPP Identification des produits pétroliers		
		Mercure Mercure		

Profondeur Élévation (m)	Stratigraphie	Description	Échantillon		N° échantillon	COV (ppm)	Indices de contamination			Analyses	Duplicata	Construction du puits
			Type d'échantillon	Nombre de coups/15cm			Récupération (%)	Faible	Moyenne			
0												
0,05		Végétation herbacée.	SS	3	30							
20,44		Remblai : Silt sableux gris-brun, compact, humide.	SS	3	30	(0,00-0,40)						Bouchon de bentonite
20,09		Matières résiduelles brunes-noires : Résidus de déchetage (Fluff automobile) : matériaux de rembourrage déchetés, pellicules de plastique, débris de métal, de caoutchouc, de bois, morceaux de béton bitumineux et présence de poudre rougeâtre, compact, humide.	SS	3	8							
2			SS	3	16							Sable
4			SS	3	33	(0,40-7,00)	X	X				
6			SS	2	16							Bouchon de bentonite
7,00		Silt argileux gris verdâtre, lâche, saturé. Présence d'oxydation.	SS	1	100	(7,00-7,94)				A.C.		Sable et crépine
13,49												
8,50		Fin du forage à 8,5 m										
11,99												

Client: TPSGC **Coordonnées / Élévations:**
Projet n°: M02681J **X:** 328340.47 **Projection :**
Nom du projet: Ancien dépôt **Y:** 5080445.86 **Météo:** Soleil **T°:** -5°C
Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur **Z:** 21.044 m

Compagnie:	Terminologie	Classification	Compacité	Indice 'N'
Succ. Forage G. Downing Ltée	traces < 10 %	Silt et argile < 0,08 mm	Très lâche 0 - 4	0 - 4
Équipement:	un peu 10 - 20 %	Sable 0,08 - 5 mm	Lâche 4 - 10	4 - 10
Type de forage: CME-55 Tarière évidée - Ø 200 mm	adjectif ("...eux") 20 - 35 %	Gravier 5 - 80 mm	Compact 10 - 30	10 - 30
Équip. d'échantillonnage: Cuillère fendue - Ø 51 mm	et 35 - 50 %	Cailloux 80 - 300 mm	Dense 30 - 50	30 - 50
		Blocs > 300 mm	Très dense >50	>50

Type d'échantillon	Analyses			
CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:	
CF Cuillère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc,	
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	RMD Lixiviation (mat. dangereuses)	
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	SED. Analyse sédimentologique	
TS Tube Sherby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50		
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)		
		IPP Identification des produits pétroliers		
		Mercurc Mercure		

Profondeur Élévation (m)	Stratigraphie	Description	Échantillon				Indices de contamination			Analyses	Duplicata	Construction du puits	
			Type d'échantillon	Nombre de coups/15cm	Récupération (%)	N° échantillon	COV (ppm)	Odeur					
								Faible	Moyenne				Fort
0													
0.05 20,99		Végétation herbacée.	SS	5	67								
1.00 20,04		Remblai hétérogène brun-noir ; silt sableux, sable graveleux avec matières résiduelles en traces (charbon et béton bitumineux), lâche, humide.	SS	3	54	(0,00-1,00)	X		X			Bouchon bentonite	
2		Matières résiduelles brunes : Résidus de déchetage (Fluff automobile) : matériaux de rembourrage déchiquetés, pellicules de plastique, débris de métal, de caoutchouc, de bois, morceaux de béton bitumineux et présence de poudre rougeâtre, compactes, humides.	SS	5	50	(1,00-3,00)		X	X			Sable	
3.00 18,04		Matières résiduelles grises noires : sable de fonderie et cendres, lâches, humides. Fortes odeurs d'hydrocarbures pétroliers.	SS	3	60	(3,00-4,20)			X	X		Bouchon bentonite	
4		Matières résiduelles noires : Résidus de déchetage (Fluff automobile), compactes, humide		3	33								
6			SS	5	70	(6,30-7,20)	X		X			Sable et crépine	
6.30 14,74		Matières résiduelles grises blanches : chaux, mortier / ciment en poudre, avec goudron et plastique en traces, lâches, très humides.	SS	5	100	(7,20-7,80)							
7.20 13,84		Silt argileux gris verdâtre, lâche, saturé. Présence d'oxydation.									A.C.		
7.80 13,24		Fin du forage à 7,8 m											

Client: TPSGC **Coordonnées / Élévations:**
Projet n°: M02681J X: 328422.25 Projection :
Nom du projet: Ancien dépôtoir Y: 5080339.13 Météo: Soleil T°: -5°C
Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur Z: 21.328 m

Compagnie:	Terminologie	Classification	Compacité	Indice 'N'
Succ. Forage G. Downing Ltée	traces < 10 %	Silt et argile < 0,08 mm	Très lâche	0 - 4
Équipement:	un peu 10 - 20 %	Sable 0,08 - 5 mm	Lâche	4 - 10
Type de forage: CME-55 Tarière évidée - Ø 200 mm	adjectif ("...eux") 20 - 35 %	Gravier 5 - 80 mm	Compact	10 - 30
Équip. d'échantillonnage: Cuillère fendue - Ø 51 mm	et 35 - 50 %	Cailloux 80 - 300 mm	Dense	30 - 50
		Blocs > 300 mm	Très dense	>50

Type d'échantillon	Analyses			
CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:	
CF Cuillère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc,	
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	RMD Lixiviation (mat. dangereuses)	
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	SED. Analyse sédimentologique	
TS Tube Sherby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50		
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)		
		IPP Identification des produits pétroliers		
		Mercurc Mercure		

Profondeur Élévation (m)	Stratigraphie	Description	Échantillon		Indices de contamination			Analyses	Duplicata	Construction du puits
			Type d'échantillon	Nombre de coups/15cm	Récupération (%)	N° échantillon	COV (ppm)			
0		Végétation herbacée.	SS	2	67					
0.05 21,28		Remblai : Silt sableux gris-brun, lâche, sec.	SS	2	75					
0.60 20,73		Matières résiduelles brunes : Résidus de déchetage (Fluff automobile) : matériaux de rembourrage déchetés, pellicules de plastique, débris de métal, de caoutchouc, compactes, humides.	SS	6	66					Bouchon de bentonite
2		Remblai : Silt sableux gris-noir, lâche, humide. Fortes odeurs d'hydrocarbures pétroliers.	SS	3	67					
2.44 18,89		Aucune récupération, mais présence de matières résiduelles (débris métallique, fils électrique, câble de métal) à l'extrémité de l'échantillonneur.	SS	3	20					
3.05 18,28		Matières résiduelles brunes noires : Résidus de déchetage (Fluff automobile) : matériaux de rembourrage déchetés, pellicules de plastique, débris de métal, de caoutchouc, compactes, humides. Fortes odeurs d'hydrocarbures pétroliers.	SS	5	60					Sable et crépine
3.66 17,67		Sable silteux gris, saturé, lâche.	SS	4	60				A.C.	
4			SS	5	60					
4.50 16,83			SS	4	60					
6			SS	5	60					
6.10 15,23		Fin du forage à 6,10 m								

Client: TPSGC **Coordonnées / Élévations:**
Projet n°: M02681J X: 327975.26 Projection :
Nom du projet: Ancien dépôtoir Y: 5080763.71 Météo: Soleil T°: -5°C
Adresse: Lot 4 812 972 du cadastre du Québec, Contrecoeur Z: 11.956 m

Compagnie:	Terminologie	Classification	Compacité	Indice 'N'
Succ. Forage G. Downing Ltée	traces < 10 %	Silt et argile < 0,08 mm	Très lâche 0 - 4	0 - 4
Équipement:	un peu 10 - 20 %	Sable 0,08 - 5 mm	Lâche 4 - 10	4 - 10
Type de forage: CME-55 Tarière évidée - Ø 200 mm	adjectif ("...eux") 20 - 35 %	Gravier 5 - 80 mm	Compact 10 - 30	10 - 30
Équip. d'échantillonnage: Cuillère fendue - Ø 51 mm	et 35 - 50 %	Cailloux 80 - 300 mm	Dense 30 - 50	30 - 50
		Blocs > 300 mm	Très dense >50	>50

Type d'échantillon	Analyses			
CD Carottier à diamants	BPC Biphényles polychlorés	Diox. & Fur. Dioxines et furanes	MX Métaux applicables parmi:	
CF Cuillère fendue	BTEX Benzène, toluène, éthylbenzène, xylène	GR Analyse granulométrique	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc,	
TM Tarière manuelle	C.Inorg. Autres composés inorganiques (cyanures, fluorure, bromure, soufre total)	HAM Hydrocarbures aromatiques monocycliques	RMD Lixiviation (mat. dangereuses)	
TR Truelle	C.Phénol Composés phénoliques	HAP Hydrocarbures aromatiques polycycliques	SED. Analyse sédimentologique	
TS Tube Sherby	COV Hydrocarbures HAM et HAC	C10 Hydrocarbures pétroliers C10- C50		
TT Tube transparent		F1-F4 Hydrocarb. pétrol. F1 - F4 (C10 - C50)		
		IPP Identification des produits pétroliers		
		Mercurc Mercure		

Profondeur Élévation (m)	Stratigraphie	Description	Échantillon				Indices de contamination			Analyses	Duplicata	Construction du puits	
			Type d'échantillon	Nombre de coups/15cm	Récupération (%)	N° échantillon	COV (ppm)	Odeur					
								Faible	Moyenne				Fort
0		Végétation herbacée.											
0,05		Remblai : Silt argileux gris foncé avec gravier et radicelles en traces, lâche et humide.											
11,91		Argile grise avec gravier et silt en traces, ferme à molle, humide.	SS		100								
0,50		Devenant fissurée et très humide à 1,5 m.											
11,46		Devenant saturée à 2,4 m.											
2						(2,40-3,00)							
4			SS		100	(4,20-4,80)							
6			SS		100	(5,40-6,00)							
8			SS		100	(6,60-7,20)							
10			SS		100	(7,80-8,40)							
12			SS		100	(9,60-10,20)							
14			SS		100	(11,0-11,6)							
15,24			SS		100	(12,2-12,8)							
-3,28			SS		100	(14,0-14,6)							
		Fin du forage à 15,24 m											

Coulis de ciment bentonite entre 0,60 et 11,23 m.

Sable et crépine

APPENDIX 1-4

**SUMMARY TABLE OF ATTENUATION
MEASURES ARISING FROM THE ASSESSMENT
OF THE ENVIRONMENTAL EFFECTS
(ENGLOBE, 2019)**

Table-1 Summary of residual environmental effects and mitigation measures based on key project activities

Affected environment	Component of the environment affected by the activity	Description of the effect	Mitigation measures	Environmental effect assessment parameter	Importance of the residual environmental effect
Deforestation and clearing					
Physical environment	Air Quality	Exposure of large areas of soil can promote the emission of dust in the air, while making the soil vulnerable to wind erosion. Gas emissions from chainsaws will temporarily affect air quality.	<ul style="list-style-type: none"> Use equipment in good working order for deforestation. No burning of woody residues allowed on site. 	Strength : Low Duration : Short Scope : Local	Non-significant
	Ambient noise	The use of chainsaws during deforestation and clearing is likely to disturb the ambient noise level.	<ul style="list-style-type: none"> Carry out deforestation between 7 am and 7 pm when possible. Provide hearing protection devices to workers responsible for deforestation. 	Strength : Low Duration : Short Scope : Local	Non-significant
	Surface drainage	Sedimentary particles are likely to leach to drainage ditches during precipitation or spring melt (surface erosion).	<ul style="list-style-type: none"> Provide drainage ditches to prevent puddling and keep traffic lanes in good condition. Contractor must clean streams and riparian strips of cutting residues. Ensure that drainage capabilities of the ditches that surround the site are not impeded and remove any woody debris that may fall into the ditches. Avoid creating rutting on the site. The contractor must fill the ruts as work progresses. 	Strength : Low Duration : Long Scope : Limited to the site	Non-significant
	Surface water quality	The use of chainsaws may represent a risk of petroleum (gas and oil) leakage on the site. Deforestation and clearing may have the potential to slightly change the groundwater level because of the interruption of vegetation water removal.	<ul style="list-style-type: none"> Provide an emergency oil spill kit at all times to the storage and refueling areas of the machinery. Establish a warning structure in case of oil spill and display it clearly on the site. The Contractor must install sediment barriers along watercourses and ditches before clearing begins. Watercourses and ditches are shown on the map in Appendix A. These sediment barriers will need to remain in place after deforestation and until restoration activities are completed. Regular maintenance of the sediment barrier will be required to ensure its effectiveness. 	Strength : Low Duration : Short Scope : Local	Non-significant
	Soil quality	Accumulation of woody debris from deforestation and ash buildup from burning will affect the soil quality.	<ul style="list-style-type: none"> No landfilling of wood residues is allowed on the site. No burning of woody residues allowed on site. No shredding of wood residues is allowed on the site. Wood residues must be transported to a site authorized by the Ministry of Environment and Climate Change to be disposed of in accordance with existing regulations. 	Strength : Low Duration : Short Scope : Local	Non-significant

Affected environment	Component of the environment affected by the activity	Description of the effect	Mitigation measures	Environmental effect assessment parameter	Importance of the residual environmental effect
Biological environment	Flora and flora habitat	Deforestation and clearing involve the loss or disturbance of approximately 8 ha of woodland or fallow land.	<ul style="list-style-type: none"> Where possible, minimize deforestation and clearing at work site. Accurately identify the deforestation area by marking and tagging prior to the beginning of the deforestation operations. Near the edge of deforestation, trees to be cut should be clearly identified. Plan and identify access roads prior to deforestation to avoid unnecessary traffic on site and avoid contact with invasive alien species, including the Common Reed. No trees located outside the property (lot 4 812 972) should be cut or affected by deforestation. Ensure that tree falls are directed toward the clearing area. Avoid any storage of woody debris outside the working perimeter defined prior to the deforestation. The cutted trees should be stored neatly on the site until they are recovered. When recovering trees cut, no machinery shall be operated in or near a wetland (tree swamp), a pond or in the watercourses of the construction site. It is forbidden to cross a ditch with construction vehicles; use crossover structures designed for this purpose. 	Strength : Medium Duration : Medium Scope : Limited to the site	Non-significant
	Fauna and wildlife habitat	Deforestation and clearing involve the loss or disturbance of approximately 8 ha of woodland or fallow land that could potentially be used by wildlife.	<ul style="list-style-type: none"> In accordance with the Migratory Birds Act, deforestation must be made outside the nesting season for most migratory birds, which runs from April 30 to August 15 included. Verify the presence of active nests before undertaking deforestation and clearing activities. 	Strength : Medium Duration : Medium Scope : Limited to the site	Non-significant
	Species at risk	Deforestation and clearing could destroy or disrupt the habitat of species at risk most likely to be present on the site (Butterfly Monark, Eastern Wood Pewee, Canada Warbler).	<ul style="list-style-type: none"> Where possible, minimize deforestation and clearing at work site. Accurately identify the deforestation area by marking and tagging prior to the beginning of the deforestation operations. Near the edge of deforestation, trees to be cut should be clearly identified Plan and identify access roads prior to deforestation to avoid unnecessary traffic on site and avoid contact with invasive alien species, including the Common Reed. No trees located outside the property (lot 4 812 972) should be cut or affected by deforestation. Ensure that tree falls are directed toward the clearing site. If possible, avoid working inside the milkweed colonies to protect the monarch butterfly. Respect the breeding bird protection period (April 30 to August 15). 	Strength : Medium Duration : Medium Scope : Limited to the site	Non-significant
	Invasive alien species	The use of machinery for the clearing of the areas contaminated by the phragmite could represent a vector of contamination of this species on surrounding lands. The presence of ash-tree presupposes the presence of the emerald ash borer, an undesirable species	<ul style="list-style-type: none"> Do not unnecessarily move through or within Common Reed colonies; they should be avoided at all time. Identify ash-trees that must be cutted separately. If necessary, refer to a specialist. Be sure to manage ash-tree logging residues (logs, branches and saw branches) distinctly from other wood species to prevent the spread of emerald ash borer. Provide a clean-up location and ensure proper cleaning of equipment before leaving the site to limit the spread of the Common Reed. The cleaning of the machinery must be validated by the supervisor. 	Strength : Medium Duration : Medium Scope : Limited to the site	Non-significant

Affected environment	Component of the environment affected by the activity	Description of the effect	Mitigation measures	Environmental effect assessment parameter	Importance of the residual environmental effect
			<ul style="list-style-type: none"> Solid residues resulting from the cleaning of the machinery must be managed as Common Reed residues and disposed as such. Provide method allowing off-site disposition of Common Reed prior to deforestation and cleaning. In the case where Common Reeds should be stored temporarily on site prior to be transport off-site, the plants should be putted in opaque bag; provide a location for storing the bags. If it is decided to bury on-site the soil containing fragments (stems, rhizomes) of Common Reed, plan and develop a precise location for burial at <u>2 m depth</u>. If no landfill is identified by the supervisor, the plants and soil shall be removed from the site and sent to an engineered landfill. 		
Human environment	Health and security	Deforestation of the site may pose a health risk to workers who may be hit by branches or trees during logging.	<ul style="list-style-type: none"> Employees responsible for deforestation must wear appropriate helmets and personal protective equipment. 	Strength : Medium Duration : Short Scope : Limited to the site	Non-significant
Site layout and access					
Physical environment	Air Quality	The handling and profiling of soil during the arrangement of the construction site is likely to emit dust in the air.	<ul style="list-style-type: none"> Use a water-based dust suppressant on the access roads to limit the emission of dust particles during the passage of construction vehicles. 	Strength : Medium Duration : Short Scope : Local	Non-significant
	Surface drainage	The construction of a crossover structure of the RN-1 ditch that runs along the Rang du Ruisseau (culvert, wooden bridge or other crossover structure) allowing access to the work site by machinery could disrupt or block the flow of water of this watercourse. Changes in the soil profile can alter surface drainage. In addition, soil compaction for access road development may result in reduced soil permeability.	<ul style="list-style-type: none"> Provide drainage ditches to keep traffic lanes in good condition. Limit the movement of machinery within the boundaries of the site and access roads, which should be clearly indicated. If possible, install the crossover structure of the RN-1 ditch during low water conditions or when the Ménard ditch is dry. Apply suggested bridge and culvert management principles in the MELCC Fish Habitat Protection Data Sheet. Respect the standards required in the "Regulation 172 regulating matters relating to the flow of water from rivers and shorelines and its amendments" of the MRC Marguerite-D'Youville. 	Strength : Low Duration : Longue Scope : Limited to the site	Non-significant
	Surface water quality	The handling of granular materials and the temporary disturbance of sediments in the stream bed and its banks, particularly during the construction of the crossover structure of the RN-1 ditch, may promote substrate displacement and local shoreline erosion, leading at the same time to an increase in sedimentary particles in water. These potentially contaminated suspended particles in water will decrease surface water quality. Once the work-site has been set, improper storage of petroleum products and other hazardous materials can lead, in the event of an accidental leak, to contamination of surface water. Runoff water may potentially be contaminated by the domestic or construction wastes present on-site and then be exported off-site through the surface drainage system.	<ul style="list-style-type: none"> Provide at all time an oil spill emergency kit at machinery storage and refuelling areas. Establish an oil spill warning structure and clearly display it clearly on the construction site. Protect containers containing petroleum products or other hazardous products with guardrails if installed in a place where they are not protected from vehicle damage. Whenever possible, avoid storing machinery and petroleum products within 30 m of Ménard Creek and drainage ditches. Cover soil with geomembrane in areas intended for storage of materials and petroleum products. Place cans and containers containing petroleum products or other hazardous products in a bin or between berms that can collect 110% of the volume of storage. 	Strength : Low Duration : Short Scope : Local	Non-significant
	Soil quality	Once the construction site is set, a bad storage of petroleum products and hazardous materials can lead to soil contamination in the event of a leak.	<ul style="list-style-type: none"> Provide at all time an oil spill emergency kit at machinery storage and refuelling areas. Establish an oil spill warning structure and display it clearly on the construction site. 	Strength : Low Duration : Short Scope : Local	Non-significant

Affected environment	Component of the environment affected by the activity	Description of the effect	Mitigation measures	Environmental effect assessment parameter	Importance of the residual environmental effect
			<ul style="list-style-type: none"> Protect containers containing petroleum products or other hazardous products with guardrails if installed in a place where they are not protected from vehicle collision. Cover soil with geomembrane in areas intended for storage of materials and petroleum products. Place cans and containers containing petroleum products or other hazardous products in a bin or between berms that can collect 110% of the volume of storage. 		
Biological environment	Fauna and wildlife habitat	<p>Aquatic and riparian habitat could be disrupted by the construction of a new RN-1 ditch crossover (culvert, bridge or other temporary structure).</p> <p>The installation of the crossover structure and embankment materials could result in 50 m² of loss of aquatic and riparian habitat or disturbance of a low quality aquatic habitat, considering a watercourse of 4 m wide (including the shoreline) and a culvert length of 10 m (considering an imprecision factor).</p> <p>The presence of the crossover structure may be an obstacle to the movement of fish.</p>	<ul style="list-style-type: none"> Whenever possible, install the culvert during low water periods to limit the intensity of effects on fish habitat. Minimize encroachment on fish habitat (flow bed, shoreline and riparian buffer). Fit the culvert perpendicular to the flow of the stream. Install sediment curtains to trap suspended particles when granular materials are put in place. Ensure free movement of fish upstream and downstream of the new structure, avoid the presence of a fall downstream of the culvert and respect the natural upstream-downstream longitudinal slope of the stream bed. Maintain sufficient water depth inside the culvert to maintain fish circulation. Do not shrink the natural flow area of the watercourse by more than 20%. Ensure shoreline stability around culvert or other structure. Regularly monitor the development and make corrections if necessary. 	<p>Strength : Medium Duration : Medium Scope : Limited to the site</p>	Non-significant
Human environment	Local economy	Positive effects are expected on the local economy. In addition to hiring local contractors, all construction activities will require the purchase of local construction materials from local businesses.	<ul style="list-style-type: none"> Whenever possible, use local contractors and businesses. 	Not applicable	Positive
	Infrastructures	The passage of machinery and construction vehicles could lead to a deterioration of the condition of the actual bridge, see its collapse in the Ménard ditch.	<ul style="list-style-type: none"> Avoid using the current bridge; rather give priority to access to the site through the construction of a new crossover structure (culvert) north of the current bridge. 	<p>Strength : Medium to low Duration : Short Scope : Limited to the site</p>	Non-significant
Excavation, management of cuttings and embankments					
Physical environment	Air Quality	Transportation of cuttings and embankments can release dust particles from dump trucks.	<ul style="list-style-type: none"> Carry cuttings and embankments with canvas-covered dump truck in order to . 	<p>Strength : Low Duration : Short Scope : Local</p>	Non-significant
	Surface drainage	Changes in the ground surface profile can alter surface drainage. Also, the permeability of the new soil consisting of backfill may be different of the original soil, which may change the drainage of the site.	<ul style="list-style-type: none"> Provide drainage ditches and pumps to pump water out of excavation holes. 	<p>Strength : Low Duration : Long Scope : Limited to the site</p>	Non-significant
	Surface water quality	The presence of potentially contaminated soils in cuttings and embankments may pose a risk of contamination of surface water.	<ul style="list-style-type: none"> Cover potentially contaminated piles and soils to be stripped with a watertight membrane; When possible, dispose of excavated material immediately, avoid unnecessary delay between excavation and disposal of excavated material. Control the export of sedimentary particles carried by runoff by installing sediment membranes at the bottom of slopes, before reaching drainage channels and ditches. Follow up of suspended particles concentrations in the water downstream of the construction site to ensure compliance with standards for the quality of surface water for protection of aquatic life. 	<p>Strength : Low Duration : Short Scope : Local</p>	Non-significant

Affected environment	Component of the environment affected by the activity	Description of the effect	Mitigation measures	Environmental effect assessment parameter	Importance of the residual environmental effect
	Soil quality	Mismanagement of excavated contaminated soil may spread the contamination off-site to the non-contaminated existing soil.	<ul style="list-style-type: none"> If sediments and contaminated soils are disposed off-site, apply cuttings management according to their degree of contamination (if applicable) according to the Intervention Guide for Soil Protection and Contaminated Sites Rehabilitation (Beaulieu, 2016). In the event that the excavated materials are disposed on a federal site, their management will be carried out according to CCME criteria. 	Strength : Low Duration : Short Scope : Local	Non-significant
Soil leveling and landscaping of slopes					
Physical environment	Surface drainage	Changes in the soil leveling can affect the quality of surface drainage in the area.	<ul style="list-style-type: none"> Once reprofiled, peripheral drainage ditches will have the capacity to handle runoff on the graded surface.. Ensure that the hydrological engineer's recommendations are taken into account so that new ditches have the capacity to handle high flows in the spring and during heavy rainfall. 	Strength : Low Duration : Long Scope : Limited to the site	Non-significant
Biological environment	Invasive alien species	The area devoid of vegetation will be vulnerable to colonization by invasive alien species, such as Common Reed, from colonies located at the lower edge of the embankment.	<ul style="list-style-type: none"> Limit soil exposure time as much as possible by seeding bare surfaces as quickly as possible with fast-growing, large-scale native plant species adapted to field conditions to limit the colonization of bare areas by the Common Reed. Install anchor trenches on slopes around the site and ensure that the waterproof membrane covers the vertical surfaces of the trench. This separation will isolate the soil beneath the membrane from the rhizomes located outside and on the periphery of the containment zone. If possible, manually apply a chemical herbicide at the edge of the waterproof membrane boundary to limit lateral development inward of the Common Reed from the rhizomes. Implement shrubs in high densities on stream banks, ditches and channels, except in situations where the insulating membrane extends to the edge of the creek, ditch or canal. Do not consider Common Reed as a method of phytoremediation. Ensure regular monitoring of developments of Common Reed for several years after restoration. Carry out systematic cutting or manual extraction of Common Reed appearing on the site. 	Strength : Low Duration : Medium Scope : Limited to the site	Non-significant
Installation of waterproof membranes (a geocomposite membrane and a polyethylene membrane)					
Physical environment	Air Quality	The installation of the waterproof membrane will create a significant increase in the concentration of biogas, which will be confined under the membrane rather than being evacuated to the atmosphere.	<ul style="list-style-type: none"> Ensure the installation of a biogas collection system with drains and passive escape routes under the overlay geomembrane as described in the restoration scenario. Provide workers with filter masks. Monitor the air quality from the installation of the membrane until the end of the work. 	Strength : Medium Duration : Long Scope : Limited to the site	Non-significant
Biological environment	Invasive alien species (Common Reedgrass)	Recolonization of the new exposed ground by the Common Reedgrass.	<ul style="list-style-type: none"> Limit soil exposure time as much as possible by seeding bare surfaces as quickly as possible with a mixture of grass plants containing a cover species, fast-growing, and an annual species that quickly covers the soil without affecting the development of perennial species 	Strength : Medium Duration : Medium Scope : Limited to the site	Non-significant
Human environment	Infrastructure	Destabilization of impermeable membranes by Common Reed sprouts from root fragments in the soil.	<ul style="list-style-type: none"> Install anchor trenches on slopes around the site and ensure that the waterproof membrane covers the vertical surfaces of the trench. This separation will isolate the soil beneath the membrane from the rhizomes located outside and on the periphery of the containment zone. 	Strength : Low Duration : Medium Scope : Limited to the site	Non-significant

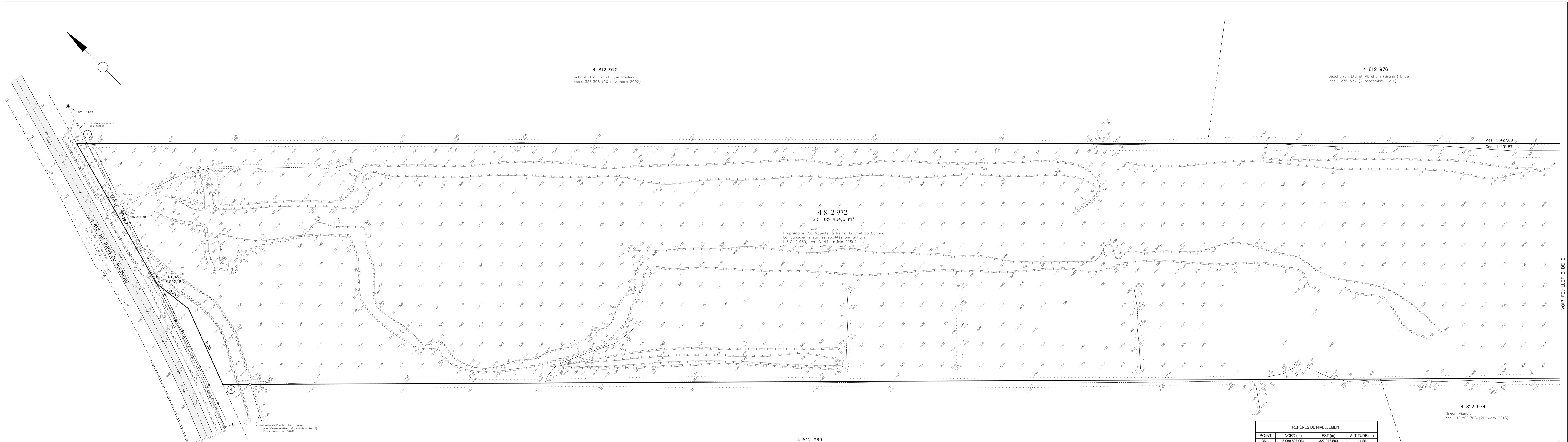
Affected environment	Component of the environment affected by the activity	Description of the effect	Mitigation measures	Environmental effect assessment parameter	Importance of the residual environmental effect
			<ul style="list-style-type: none"> If possible, apply manually a chemical herbicide at the edge of the membrane or waterproofing boundary to limit lateral development inward of the Common Reed from the rhizomes. Ensure regular monitoring of restoration site for several years. If necessary, proceed to systematic cutting or manual extraction of the plants appearing on the site. 		
	Health and security	The potential accumulation of biogas under impervious layers poses a potential risk to the health and safety of workers.	<ul style="list-style-type: none"> Monitor the air quality from the installation of the membrane until the end of the work. 	Strength : Medium Duration : Medium Scope : Limited to the site	Non-significant
Vegetalisation and final earthworks					
Biological environment	Flora and flora habitat	Increased biodiversity and floristic habitats of the site as a result of hydraulic seeding of herbaceous seed on areas devoid of vegetation.	<ul style="list-style-type: none"> Make sure to use a mixture of seeds of native species. 	Not applicable	Positive
	Fauna and wildlife habitat	Increase of wildlife and wildlife biodiversity at the site.	<ul style="list-style-type: none"> Make sure to use a mixture of seeds of native species. 	Not applicable	Positive
	Invasive alien species	The new bare surface at the end of the project will be vulnerable to colonization by the Common Reed after the installation of the new soil and surrounding surface water catchment ditches.	<ul style="list-style-type: none"> Collect all Common Reed cutting residues and dispose these residues according to the disposal methods recommended. Seed bare areas as quickly as possible with native, fast-growing, large-sized plant species to limit the colonization of bare areas by the reed. Choose plants adapted to field conditions. If natural soil is backfilled, be sure to use clean, uncontaminated material. 	Strength : Medium Duration : Long Scope : Limited to the site	Non-significant
Operation and traffic of machinery and construction vehicles					
Physical environment	Air Quality	Ensure the installation of a biogas collection system with drains and passive escape routes under the geomembrane as described in the waterproofing scenario.	<ul style="list-style-type: none"> Do not allow construction vehicles to idle unnecessarily. Use a water-based dust suppressant on the access roads to limit the emission of dust particles during the passage of construction vehicles. 	Strength : Low Duration : Short Scope : Local	Non-significant
	Ambient noise	Construction vehicle traffic on the Rang du Ruisseau and lot 4 812 972 will result in sporadic and temporary changes to the day-time ambient noise level in the vicinity of the construction site. In addition, the operation of heavy-duty machinery during all activities may cause an increase in the sound level on and around lot 4 812 972.	<ul style="list-style-type: none"> Ensure that construction vehicles are in good working order to limit noise emissions. Do not allow construction vehicles to idle unnecessarily. Ensure that all vehicles and machinery are equipped with noise silencers and mufflers and that they are in good working order. Carry out activities between 7h00 and 19h00. 	Strength : Low Duration : Short Scope : Local	Non-significant
	Surface drainage	Rutting caused by machinery can disrupt surface drainage in the area. In addition, the circulation of heavy-duty machinery can compact the soil and thus reducing its permeability.	<ul style="list-style-type: none"> Limit the displacement and the operation of machinery within the boundaries of the site and access roads, which should be clearly indicated. 	Strength : Low Duration : Long Scope : Limited to the site	Non-significant
	Surface water quality	Mechanical failures and improper handling of petroleum products can cause accidental spills that can contaminate surface water. In addition, the movement of machinery on-site can result in a release of sedimentary particles when vehicles cross or move around drainage ditches.	<ul style="list-style-type: none"> Provide an oil spill emergency kit at all times to the storage and refuelling areas of the machinery. Establish an oil spill warning structure and display it clearly on the construction site. The refuelling area should be as far as possible from drainage channels and ditches. Ensure that construction vehicles are in good working order to limit oil spills and leaking. 	Strength : Low Duration : Short Scope : Local	Non-significant
	Soil quality	Accidental oil or gas spill could affect soil quality.	<ul style="list-style-type: none"> Provide an oil spill emergency kit at all times to the storage and refuelling areas of the machinery. Establish an oil spill warning structure and display it clearly on the construction site. 	Strength : Low Duration : Short Scope : Local	Non-significant

Affected environment	Component of the environment affected by the activity	Description of the effect	Mitigation measures	Environmental effect assessment parameter	Importance of the residual environmental effect
			<ul style="list-style-type: none"> The refuelling area should be as far as possible from drainage channels and ditches. Ensure that construction vehicles are in good working order to limit oil spills and leaking. 		
Biological environment	Invasive alien species	Movement of machinery through Common Reed colonies may present a risk of spreading this invasive species to the site or to surrounding lands.	<ul style="list-style-type: none"> Identify Common Reed colonies using forest ribbons before work begins. Do not intervene inside colonies of invasive alien species (Common Reeds, purple loosestrife). Use access roads built prior to the work. All components of the machinery must be free of mud and Common Reed fragments before undertaking other on-site or off-site activities, especially if they moved through the existing colonies. The cleaning of the machinery must be validated by the supervisor. Cleaning should be done with water, high pressure air or other tools such as brushes, brooms, shovels or vacuum cleaners. This operation must be carried out in a washing area which makes it possible to confine all the solid residues. The location of the wash area must be approved by the supervisor. Solid residues resulting from the cleaning of the machinery must be managed as Common Reed residues and managed as contaminated materials. If Common Reed (including seeds) and soil are transported off site, dump trucks must be covered in such a way that there is no release into the environment. Plan the movements of machinery and construction vehicles within the site to prevent the spread of seed outside the property boundaries. Specify the exact location of the waiting area for dump trucks and loading areas to limit movement within the site and to limit the spread of seed outside the lot boundaries when moving to the disposal site. Wood residues and rhizome-contaminated soils should be putted directly in a canvas-covered dump truck to prevent the risk of leakage when transported to the technical landfill. The contractor must provide a copy of the transportation manifest to the supervisor. Be sure to clean equipment before leaving the site to limit the spread of Common Reed. 	Strength : Low Duration : Medium Scope : Local	Non-significant
Human environment	Health and security	Heavy-duty machinery operation represents a health risk for workers working in the vicinity of these equipments. The increase of the local truck traffic may also represent an increased risk of accident for the local population.	<ul style="list-style-type: none"> Install adequate road signs to inform motorists of the presence of the construction site. Respect speed limits on municipal roads. Ensure proper operation of back-up audible traffic warning devices on machinery to reduce risk of accident. Properly identify access and pathways to the site. Maintain in good condition the roadways used by construction vehicles 	Strength : Medium Duration : Short Scope : Local	Non-significant
	Resident's quality of life	The quality of life of the local residents will be disrupted by the presence of the building site, increased traffic caused by the movement of machinery, trucking and construction vehicles, as well as dust emissions and noise emissions.	<ul style="list-style-type: none"> Notify residents of the construction period and display adequate road signs on the rang du Ruisseau to inform motorists of the proximity of the site. Restoration activities must be carried out during working days, between 7:00 am and 7:00 pm. 		

Affected environment	Component of the environment affected by the activity	Description of the effect	Mitigation measures	Environmental effect assessment parameter	Importance of the residual environmental effect
	Local traffic on the Rang du Ruisseau	Local heavy-duty truck traffic can be a nuisance to local traffic. Damage to roadway and road drainage ditches may occur.	<ul style="list-style-type: none"> Properly identify access and pathways to the site. Install adequate road signs to inform motorists of the presence of the construction site. Maintain clean and in good condition roadways used by construction vehicles. 	Strength : Low Duration : Medium Scope : Limited to the site	Non-significant
Residual material management					
Physical environment	Surface water quality	Poor residual material management (dry materials, domestic waste) may result in surface water contamination by runoff. These contaminants can be exported off site by the surface drainage network.	<ul style="list-style-type: none"> Make sure to put waste and dry materials inside containers with lids. Ensure that containers are present in sufficient numbers for the volume of waste produced and install them in appropriate places. Ensure that garbage containers and chemical toilets are collected at an appropriate frequency to avoid overflow. 	Strength : Low Duration : Short Scope : Local	Non-significant
	Soil quality	Poor waste management (dry materials, domestic waste) may result in contamination of nearby land due to wind carrying debris.	<ul style="list-style-type: none"> Make sure to put waste and dry materials inside containers with lids. Ensure that containers are present in sufficient numbers for the volume of waste produced and install them in appropriate places. Ensure that garbage containers and chemical toilets are collected at an appropriate frequency to avoid overflow. 	Strength : Low Duration : Short Scope : Local	Non-significant

APPENDIX 1-5

**TOPOGRAPHIC MAP AND PLACEMENT
OF TWO LEVELING BENCHMARKS, CONTRECOEUR
LANDFILL (PWGSC, 2016)**



4 812 970
Richard Grouard et Lyse Rouleau
Insc.: 336 308 (20 novembre 2002)

4 812 976
Debbachron Ltd et Abraham (Brahm) Ender
Insc.: 276 577 (7 septembre 1994)

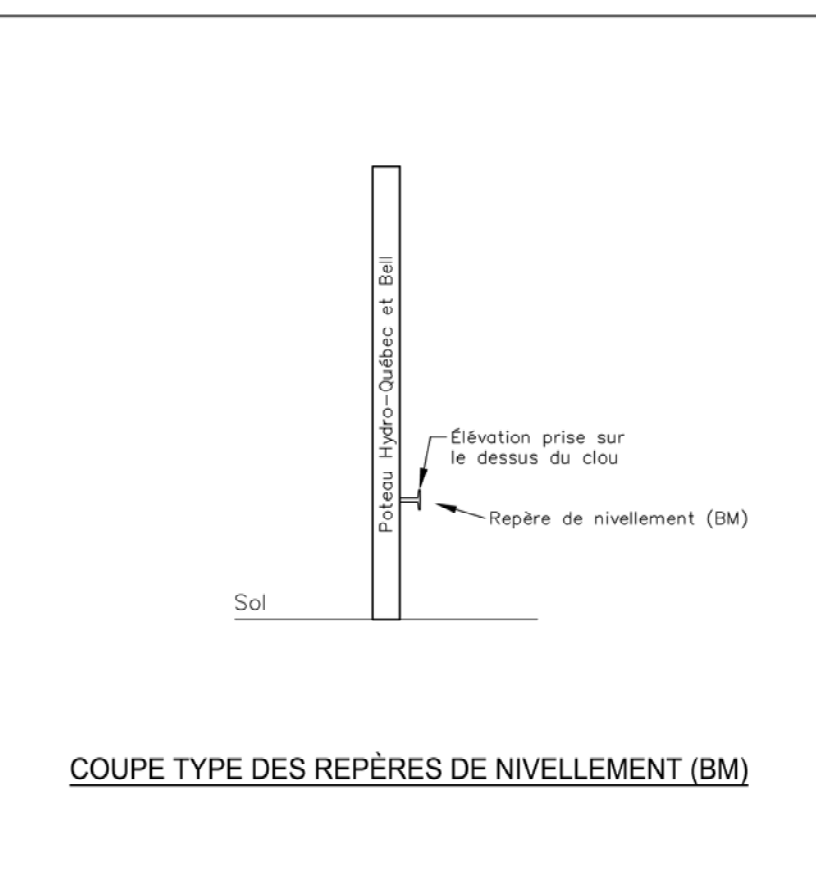
4 812 972
S: 165 434,6 m²
Propriétaire: Sa Majesté la Reine du Chef du Canada
Loi canadienne sur les sociétés par actions
L.R.C. (1985), ch. C-44, article 228(1)

4 812 974
Réjean Vignola
Insc.: 19 809 768 (21 mars 2013)

4 812 969
Richard Grouard et Lyse Rouleau
Insc.: 336 308 (20 novembre 2002)

Mes: 1 427,00
Cod: 1 431,87

- LÉGENDE:**
- ⊙ Repère d'arpentage poss.
 - ⊙ Repère de nivellement (BM)
 - Limite de propriété
 - Limite selon le cadastre du Québec
 - Bord de fossé
 - Bord de talus
 - Bord de fossé
 - Centre de fossé
 - Type de drainage
 - Centre de garage
 - Clôture
 - Périence
 - Clôture d'acier
 - Câble électrique/communications aérien
 - Réseau hydro-Québec et dist.
 - Hauban
 - Arbre protégé
 - Election



Notes:

- Levé des lieux: 11, 12, 16, 17, 18, 24, 25 et 26 novembre 2015.
- Date du piquetage: 19 juillet 2016
- Les mesures indiquées sur ce plan sont en mètres (S.I.).
- Les gisements et les coordonnées apparaissant sur ce document sont en référence au système de coordonnées planes du Québec (SCDPQ), fuseau R, NAD83.
- Facteur-échelle combiné: 0,999909
- Ce plan ainsi que le rapport qui l'accompagne font parties intégrantes du présent certificat de localisation. Préparé pour des fins de vente et de mise à jour de l'inventaire immobilier, ils ne doivent pas être utilisés à d'autres fins sans l'autorisation du sousigné.
- Les repères posés au cours du présent arpentage ainsi que les coordonnées indiquées sur ce plan correspondent à l'expression de mon opinion sur la position des limites de propriété établies pour Travaux publics et Services gouvernementaux Canada (TPSGC). Cette affirmation a été effectuée pour le seul bénéfice du requérant. Ce travail pourrait être confirmé dans le cadre d'une opération de bornage à l'initiative du judiciaire.
- Les limites montrées sur ce plan ont été modifiées pour des besoins internes.

REPÈRES DE NIVELLEMENT

POINT	NORD (m)	EST (m)	ALTITUDE (m)
BM 1	5 080 897,964	327 976,503	11,86
BM 2	5 080 840,912	327 956,958	11,65

POINTS GÉODÉSQUES

POINT	NORD (m)	EST (m)	ALTITUDE (m)
69K3723	5 081 071,775	328 107,067	11,50
M01KSV08	5 084 623,302	330 176,784	11,00

TABLEAU DE COORDONNÉES DU LOT 4 812 972

POINT	NORD (m)	EST (m)
1	5 080 878,270	327 969,590
2	5 079 856,670	328 965,723
3	5 079 746,867	329 914,574
4	5 080 736,062	327 940,727
5	5 080 756,929	327 952,142
6	5 080 773,389	327 959,104
7	5 080 795,178	327 962,058
8	5 080 810,436	327 956,459
9	5 080 827,994	327 953,698

APPROUVÉ PAR / APPROVED BY
MONTREAL - GENÈVE / QUEBEC LAND SURVEYOR
MONTREAL, LE _____ 20__

Travaux publics et Services gouvernementaux Canada / **Public Works and Government Services Canada**

PROJET / ANCIEN DÉPÔTIER DE CONTRECOEUR

SUJET / CERTIFICAT DE LOCALISATION, CERTIFICAT DE PIQUETAGE

SUBJECT / ET LEVES TOPOGRAPHIQUES

PROPRIÉTÉ DE / PROPERTY OF: SA MAJESTÉ LA REINE DU CHEF DU CANADA

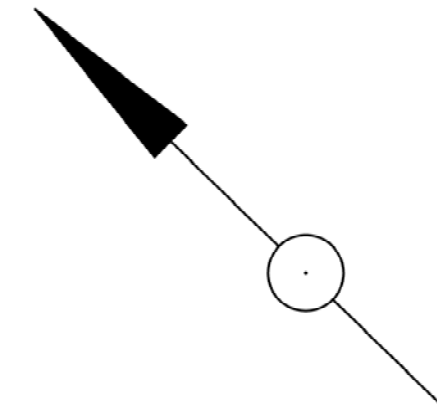
LOT (S): 4 812 972

CADASTRE OFFICIEL / OFFICIAL CADASTRE DU QUÉBEC

CIRCOSCRPTION FONCIÈRE/REGISTRATION DIVISION QUÉBEC

ÉCHELLE / SCALE: 1:500

NO PLAN PLAN NO: M2016-10243/2



4 812 976
 Debcharon Ltd et Abraham (Brahm) Ender
 Insc.: 276 577 (7 septembre 1994)

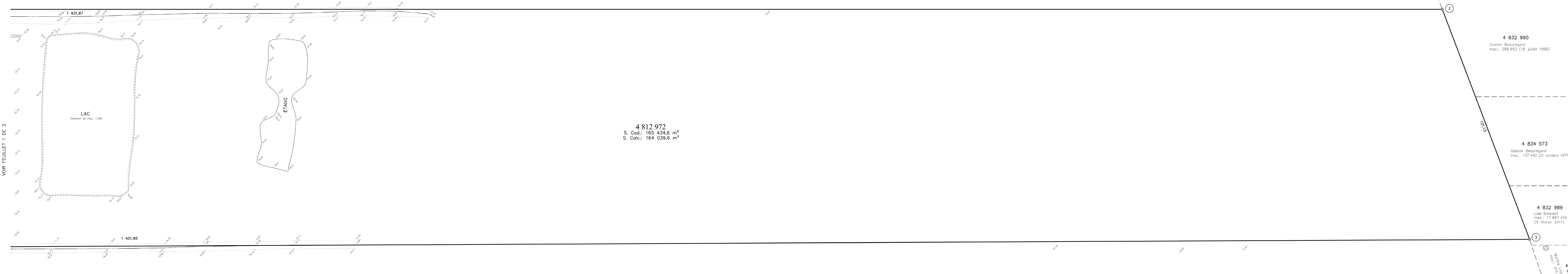
4 832 990
 Gaston Beaugrand
 Insc.: 289 952 (18 juillet 1996)

4 834 573
 Gaston Beaugrand
 Insc.: 137 440 (21 octobre 1977)

4 832 989
 Lise Boisvert
 Insc.: 17 897 319
 (9 février 2011)

4 812 972
 S. Calc.: 165 434,6 m²
 S. Calc.: 164 039,6 m²

4 812 974
 Réjean Vignola
 Insc.: 19 809 768 (21 mars 2013)



VOIR FEUILLET 1 DE 2

- légende:
- Repère d'arpenteur assés
 - Repère de nivellement (BN)
 - Limite de propriété
 - Limite selon le cadastre du Québec
 - Haut de l'eau
 - Bas de l'eau
 - Bord de fossé
 - Centre de fossé
 - Type de drainage
 - Centre de drainage
 - Clôture
 - Fossés
 - Câbles électriques/communications aérien
 - Passes hydrauliques et bass
 - Maison
 - Arbre planté
 - Elevation

FORMULE PLAN TPC "M" (1600mm x 594mm)

REPÈRES DE NIVELLEMENT			
POINT	NORD (m)	EST (m)	ALTITUDE (m)
BM 1	5 080 897,964	327 976,503	11,86
BM 2	5 080 840,812	327 856,958	11,65

POINTS GÉODÉSQUES			
POINT	NORD (m)	EST (m)	ALTITUDE (m)
BNR3723	5 081 071,775	328 107,067	11,90
M01K5V06	5 084 823,302	330 178,784	11,00

TABLEAU DE COORDONNÉES DU LOT 4 812 972		
POINT	NORD (m)	EST (m)
1	5 080 878,270	327 969,590
2	5 079 856,070	328 983,723
3	5 079 746,887	328 914,574
4	5 080 736,062	327 940,727
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6	5 080 776,389	327 955,104
7	5 080 795,178	327 962,058
8	5 080 810,436	327 956,459
9	5 080 827,994	327 953,698

- Notes:
- Levé des lieux: 11, 12, 16, 17, 18, 24, 25 et 26 novembre 2015.
 - Date du piquetage: 19 juillet 2016.
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 - Facteur-échelle combiné: 0,999909
 - Ce plan ainsi que le rapport qui l'accompagne font parties intégrantes du présent certificat de localisation. Préparés pour des fins de vente et de mise à jour de l'inventaire immobilier, ils ne devront pas être utilisés à d'autres fins sans l'autorisation du sousigné.
 - Les repères posés au cours du présent arpentage ainsi que les coordonnées indiquées sur ce plan correspondent à l'expression de mon opinion sur la position des limites de propriété établies pour travaux publics et Services gouvernementaux Canada (TPSC). Cette délimitation a été effectuée pour le seul bénéfice du requérant. Ce travail pourrait être confirmé dans le cadre d'une ordonnance de bornage à l'initiative du judiciaire.
 - Les limites montrées sur ce plan ont été modifiées pour des besoins internes.

APPROUVE PAR / APPROVED BY
 ARPELIER-GÉOMÈTRE / QUÉBEC LAND SURVEYOR
 MONTRÉAL, LE _____ 20__

	Travaux publics et Services gouvernementaux Canada	Public Works and Government Services Canada	
PROJET ANCIEN DÉPÔTIER DE CONTRECOEUR			
SUJET CERTIFICAT DE LOCALISATION, CERTIFICAT DE PIQUETAGE ET LEVÉS TOPOGRAPHIQUES		PRÉPARÉ PAR / PREPARED BY <u>arpe</u>	
PROPRIÉTÉ DE / PROPERTY OF SA MAJESTÉ LA REINE DU CHEF DU CANADA		SOREL-TRACY, LE _____ 20__	
LOT (S) 4 812 972		SOREL-TRACY, LE _____ 20__	
CADASTRE OFFICIEL / OFFICIAL CADASTRE DU QUÉBEC		COPIE CONFORME À L'ORIGINAL / TRUE COPY	
CIRCOSCRIPTION FONDÈRE/REGISTRATION DIVISION VERCHÈRES		SOREL-TRACY, LE _____ 20__	
ÉCHELLE / SCALE 1:500		SOREL-TRACY, LE _____ 20__	
NO PLAN PLAN NO		M2016-1024312	

APPENDIX 1-6

**LIST OF EXISTING MONITORING WELLS
TO BE KEPT**

**IMPLEMENTATION OF ENVIRONMENTAL MITIGATION MEASURES AT THE FORMER
CONTRECOEUR LANDFILL**

APPENDIX 1.6 - Existing Observation Wells to be Kept

Name	X Coord. (MTM)	Y Coord. (MTM)	Soil surf. elev.	Top tubing elev.
	(m)	(m)	(m)	(m)
PO-15-01	328153.672	5080647.749	19.541	20.471
PO-15-02	328340.487	5080445.820	20.073	20.953
PO-15-03	328422.233	5080339.157	21.298	22.305
PO-15-04	327975.075	5080763.522	11.890	12.765
PO-15-05	327970.912	5080763.053	11.952	12.852
PO-16-06	327975.261	5080756.570	11.915	12.866
PO-16-07	328045.785	5080728.190	16.369	17.260
PO-16-08	328102.493	5080706.085	17.270	18.212
PO-16-09	328083.034	5080685.599	17.456	18.257
PO-16-10	328061.312	5080660.144	16.804	17.595
PO-16-11	328106.854	5080655.183	17.631	18.505
PO-16-12	328254.975	5080549.558	18.486	19.508
PO-16-13	328245.689	5080540.709	17.671	18.689
PO-16-14	328238.097	5080535.350	17.606	18.659
PO-16-15	328209.417	5080511.974	12.220	13.140
PO-16-16	328301.361	5080419.324	12.966	13.861
PO-16-17	328398.462	5080369.216	20.737	21.807