Hydrogeological profile of the selected site for the new solid waste disposal project near the community of Waswanipi

Final Report

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Sign-off Sheet

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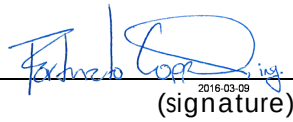
Prepared by 

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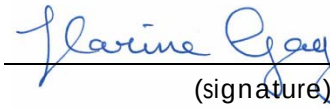
Reviewed by 
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Executive Summary

Today, the community of Waswanipi currently sends all of their domestic waste to a local landfill, which reached its maximum lifespan capacity in 2014. This site is located on Category IA lands of the CFNW and has been in continuous operation since 1997. Since its opening, the existing site has been operated as an in-trench disposal site and due to its location on Category IA lands, did not require a certificate of authorization, nor was it subject to the RRLIRM. Due to the geographic setting of the existing site, amongst active granular material pits and its close proximity to Regional Highway 113, there are no feasible options for expansion of the existing site. Furthermore, due to the important distance between Waswanipi and the nearest municipalities, the CFNW has no opportunity to send its waste to another existing landfill. Thus, the only feasible option is to open a new landfill site close to the community.

The selected site regarding the new solid waste disposal project was determined after taking into account the conclusions of several analytical studies, site visit observations, topographical data and all other relevant documents available at the time and comparing all this information against the clauses of the RRLIRM with regards to trench disposal sites and the specific needs of the community.

Stantec was mandated by the CFNW to conduct an assessment and review of the environmental and social impacts regarding the new solid waste disposal project on the selected site situated on Category II lands of the James Bay Cree Nation. The impact assessment was prepared on their behalf with the full cooperation and participation of CFNW representatives and in consultation with its community members and was designed to meet the requirements set out in the Directive issued by the COMEV and is structured accordingly. Details of the ESIA can be found in the document entitled *Opening of a new solid waste disposal site on Category II lands: Regulation respecting the environmental and social impact assessment and review procedure applicable to the territory of James Bay and Northern Quebec under Chapter II of the EQA* (Stantec Reference: 027-P-0006524-100-01-EN-R-0001-00).

While assessing the potential impacts of such a new landfill site, an understanding of the project itself, the environment and the technical, environmental, human, social and traditional requirements of the community of Waswanipi is necessary in order to achieve a balance between them in relation to government regulations. Thus, the site selection process, the methodological approach used to obtain all relevant information during the field investigation work, the site planning and management elements and the current description of the biophysical, hydrous, wildlife, plants, environmental, human and social elements detailed in the ESIA document recapitulates the prerequisite information required to evaluate each potential risk and impact. Consequently, in order to reduce the negative effects of each potential risk and impact, mitigation measures, monitoring programs and/or follow-up actions were proposed in

accordance with community needs and concerns as well as government regulations applicable to the selected site.

However, at the time of the assessment and review of the environmental and social impacts of the selected site, the hydrogeological profile was not clearly acknowledged. The present document addresses the hydrogeological elements of the selected site in more detail.

Abbreviations

CFNW	Cree First Nation of Waswanipi
CNG	Cree Nation Government
COMEV	Evaluation Committee
COMEX	Review Committee
CRD	Construction, Renovation and Demolition
ESIA	Environmental and Social Impact Assessment
EQA	Environment Quality Act
ICI	Industrial, Commercial and Institutional
MDDELCC	Minister of Sustainable Development, Environment and the Fight against Climate Change of Quebec
MERN	Minister of Energy and Natural Resources of Quebec
MFFP	Ministry of Forests, Wildlife and Parks of Quebec
MTQ	Ministry of Transport of Quebec
QNHDC	Quebec Natural Heritage Data Centre
RRLIRM	Regulation Respecting the Landfilling and Incineration of Residual Materials
USDA	United States Department of Agriculture

1.0 CONTEXT AND GENERAL INFORMATION

1.1 MANDATE SCOPE OF WORK

At the time of the assessment and review of the environmental and social impacts of the selected site, the hydrogeological profile was not clearly acknowledged due to the absence of on-site monitoring wells. However, the depth of the water table was somewhat known due to the test pits conducted by Poly-Géo in 2012 which indicated a water table situated more than 4.3 meters below the ground surface. This depth is well above the requirement as per Section 88 of the RRLIRM which states that the bottom of the trenches must be at least 1 meter above the rock and the groundwater level since any lowering of the groundwater level by pumping, draining or otherwise is prohibited. Furthermore, it was assumed that the water table may lie at a depth of more than 6 meters and possibly more than 10 meters due to the following elements:

- Presence of permeable surficial deposits consisting primarily of sand with possible beds of sand and gravel and till up to 10 meters in thickness;
- Presence of site-specific topographical features as it is located at the top of a broad ridge that rises some 20 to 30 meters above the surrounding land and nearest waterbody.

Furthermore, since precise groundwater data is required for the final design plans and specifications of the new landfill site (to better define waste burial depths and landfill lifespan estimations), the drilling of boreholes and the installation of monitoring wells is required in strategic areas across the selected site. Therefore, in order to address the lack of detailed hydrogeological elements of the selected site at the time of ESIA, Stantec's scope of work comprised of following a site-specific methodological approach for the purpose of collecting pertinent groundwater data.

1.2 SITE-SPECIFIC METHODOLOGICAL APPROACH

The basis of the present document revolves around the interpretation of analytical data and technical information obtained through the execution of the following investigative activities and procedures:

- Drilling of two (2) boreholes in the center of the selected site to adequately identify the most vulnerable hydrogeological unit as well as obtain the stratigraphic soil context (in order to understand the subsurface geology above the bedrock within the projected limits of the new landfill site);
- Drilling and installation of four (4) monitoring wells located one (1) upstream and three (3) downstream of the selected site to obtain actual groundwater depths, flow direction and water quality as well as obtain the stratigraphic soil context (in order to

understand the subsurface geology above the bedrock adjacent to the projected limits of the new landfill site);

- Permeability analyses for each monitoring well to obtain the variations in hydraulic conductivity of the subsurface soils (or values taken from common literature);
- Soil sampling and granulometric analysis of each observed stratigraphic unit;
- Water sampling that will establish the local background level of groundwater quality and its spatial variability (all parameters naturally present in the groundwater and whose content is likely be amended during the operation phase of the new landfill site);
- Inventory of working wells situated downstream of the selected site;
- Groundwater classification;
- Analyse of potential groundwater contamination.

The field works (drilling, monitoring well installation and test data compilation) were carried out from September 28 to October 6, 2015 and October 19 to October 22, 2015. Soil samples were later sent to LVM, a division of Englobe Corporation, a laboratory specializing in granulometric analyses. On-site permeability test were carried out from October 19 to October 21, 2015 while groundwater depths and samples were taken on October 29, 2015. Water samples were later sent to Maxxam Analytics, an accredited laboratory according to the MDDELCC specializing in water quality analyses.

1.3 SITE SELECTION PROCESS

The following sections have been extrapolated (and summarized) from the ESIA document in order to comprehend the reasoning behind the decision of the selected site for the new solid waste disposal project. It is important to note that all cited reference documents have already been included as part of the ESIA document and therefore not appended to the present document.

1.3.1 Site identification and evaluation (Poly-Géo)

In December 2011, the CFNW retained the services of Poly-Géo to identify potentially feasible sites for the in-trench disposal of community waste. The study was carried out in two (2) phases, as described in the subsequent paragraphs.

1.3.2 Phase 1 study – Inventory of potential sites (Poly-Géo)

Air photo interpretation was the initial step of the project and focused on an approximate 400 km^2 study area surrounding the community. More specifically, the study area covered an 8 to 10 kilometer wide corridor centered on Regional Highway 113, extending approximately 30 kilometers northeast and 15 kilometers southwest of Waswanipi, excluding all land located

within a 5 kilometer radius of the community. The following activities were carried out in this preliminary study:

- Review of base information;
- Air photo interpretation and identification of potential sites meeting the following criteria:
  - Minimum distance of 10 kilometers from the community;
  - Minimum surface area of 4 hectares;
  - Optimal soil composition (sand, slightly silty sand, gravely sand or dry till);
  - Suitable topography and surface drainage;
  - Minimum water table depth between 3 and 4 meters and the possibility of having a minimum distance of 1 meter between the landfilled waste and the groundwater level;
  - Minimum distance of 150 meters from the network of lakes, streams and any other waterbody (as per Section 88 of the RRLIRM);
  - Minimum distance of 500 meters from any water intake facility for human consumption (as per Section 88 of the RRLIRM);
  - Not visible within a 1 kilometer radius of a public area or residence;
- Potential site selection and characterization as well as recommendations on the most suitable sites.

As a result, the community itself suggested three (3) potential sites (Wa-1, Wa-2 and Wa-3) while Poly-Géo identified an additional six (6) potential sites (Site 1, Site 2, Site 3, Site 4, Site 5 and Site 6b) for a total of nine (9) potential sites as of February 2012. A preliminary characterization summary as well as a recommendation of each potential site is presented in Table 1. The approximate locations, with respect to the community and Regional Highway 113, are illustrated in Figure 1.

Table 1 Characterization and recommendation of each potential site following the Phase 1 study (Poly-Géo)

Site	Characterization
Wa-1	The site crosses a relatively narrow ridge of till (less than 200 meters wide) that rises barely a few meters above the surrounding peatlands. The till is therefore poorly drained, and the water table is expected to be at a shallow depth (probably below 2 meters).
	Recommendation for field investigation work: Yes ☐ No ☒
Wa-2	The site occupies the northwestern end of a rocky knoll covered by a thin layer of till. The thickness of the material is insufficient for landfill work.
	Recommendation for field investigation work: Yes ☐ No ☒
Wa-3	The site corresponds to the bottom of a gravel pit that and according to the photographs taken in 1992, it was mined up to the edge of the adjacent peatlands. This site is not suitable for landfill development as the water table lies very near surface.
	Recommendation for field investigation work: Yes ☐ No ☒

HYDROGEOLOGICAL PROFILE OF THE SELECTED SITE FOR THE NEW SOLID WASTE DISPOSAL PROJECT NEAR THE COMMUNITY OF WASWANIPI

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Site	Characterization
Site 1	The site covers a surface area of just over 15 hectares and is located approximately 500 meters north of Regional Highway 113 and approximately 26 kilometers northeast of Waswanipi. The southwestern edge of the site is located 150 meters from the dry bed of a small stream that occasionally drains snow meltwater. When the surficial material is not frozen, water drains through the sandy-gravelly material. The site occupies the upper part of a glaciofluvial deposit whose extension was partially mined near Regional Highway 113. The ground surface is slightly uneven. There are several knolls roughly 5 meters high, but the site is large enough to avoid these. The surface sits an average of 5 to 10 meters above the surrounding lowlands. Surficial materials are composed of sand and gravelly sand. In the northern half of the site (roughly 8 to 10 hectares), the surficial material is more than 15 meters thick and the water table lies at a depth of more than 8-10 meters. Drainage conditions would therefore appear to be excellent. In the southern part, the ground is lower and the water table may lie at depths of 6 to 8 meters.
	Recommendation for field investigation work: Yes ☒ No ☐
Site 2	The site covers a surface area of just over 40 hectares and is located approximately 1.3 kilometers south of Regional Highway 113 and approximately 25 kilometers northeast of Waswanipi. The surface area leaves considerable flexibility in the choice of an optimal site for the landfill. The site is located at the top of a broad ridge that rises some 20 to 30 meters above the surrounding land. The ground surface is flat or slightly undulating and could easily be developed as a landfill. The site lies more than 150 meters from any lakes or streams. The surficial deposits would consist primarily of sand, likely with beds of sand and gravel and till. They are likely up to 10 meters thick over most of the outlined area. The material seems somewhat less permeable than other sites composed of sand and gravel, which would slow groundwater flow. Surface drainage appears to be excellent and the water table should lie at a depth of more than 6 meters and possibly more than 10 meters.
	Recommendation for field investigation work: Yes ☒ No ☐
Site 3	The site crosses a ridge whose rugged crest rises slightly more than 10 meters above the surrounding lowlands. This WNW-ESE oriented ridge has a steep northern slope (greater than 15%) and a gentle slope (2%) on its south side. A surface area of nearly 8 hectares is available, but its irregular, gently-sloping surface would require grading to facilitate the development as a landfill. The surficial materials at the site are over 10 meters thick and consist of sand and gravel that might be interbedded with till. Surface drainage appears good and the water table should lie at a depth of over 5 to 8 meters, except at the southwestern edge, where it would be at 2 to 3 meters. The site boundaries are 150 meters or more from the surrounding peatland and are not close to any streams or rivers. The site is located approximately 18 kilometers northeast of Waswanipi via Regional Highway 113 (16 kilometers) and a logging road (2 kilometers) that appears in good condition based on the photographs taken in 1992. Only a very short road (less than 100 meters) would be needed to access the site from the existing road network. Although the site is close to the community, it overlooks a major logging road and the wind could blow residential waste onto the road. The site offers a maximum surface area of 8 hectares, but the piles of material from clearing and stripping would encroach on this amount. There is no potential for expansion. The water table may lie at a shallow depth at the southwestern edge and the site would require grading prior to development.
	Recommendation for field investigation work: Yes ☐ No ☒

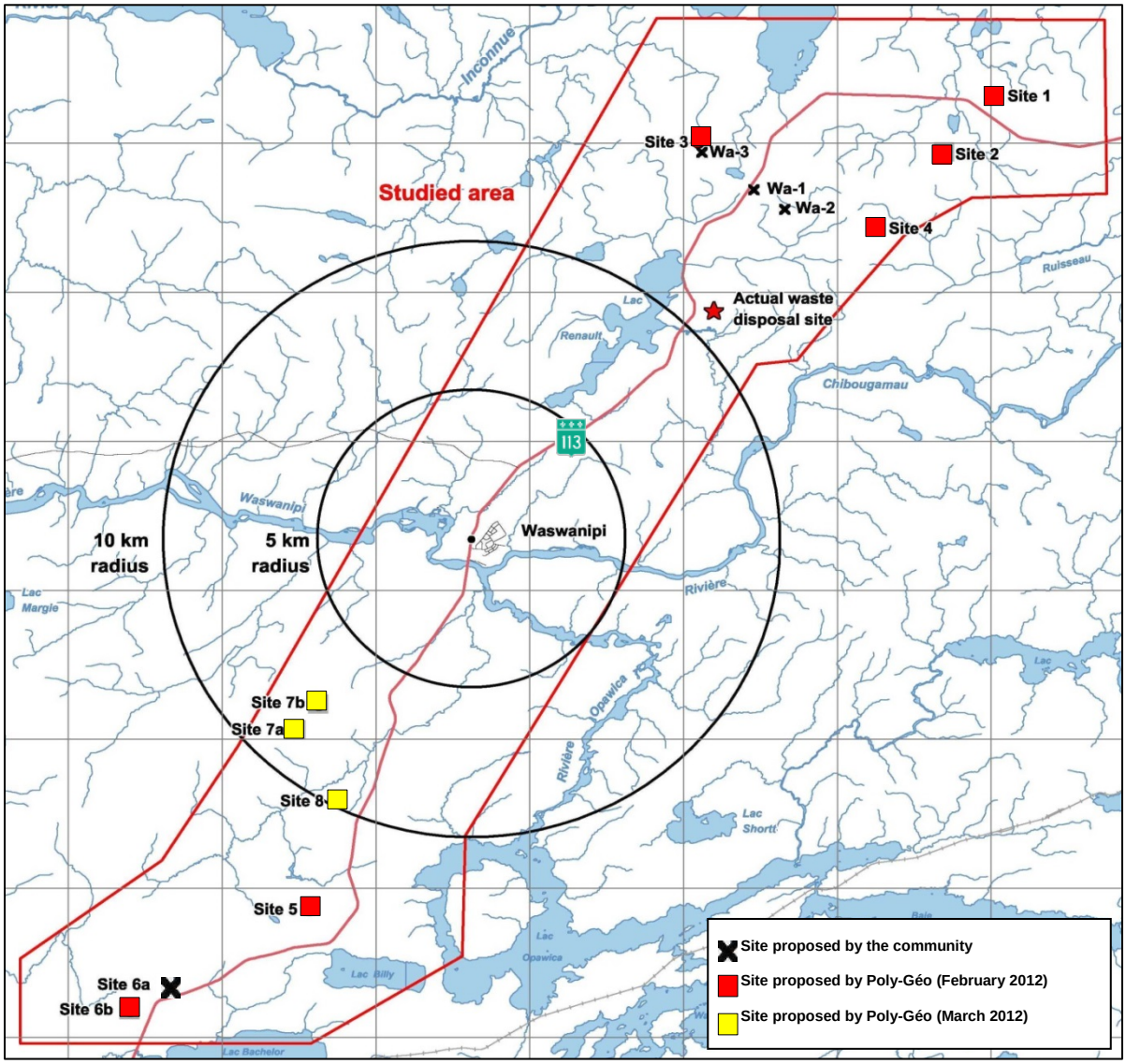
HYDROGEOLOGICAL PROFILE OF THE SELECTED SITE FOR THE NEW SOLID WASTE DISPOSAL PROJECT NEAR THE COMMUNITY OF WASWANIPI

Context and general information
January 22, 2016

Site	Characterization
Site 4	The site covers a surface area of slightly more than 20 hectares and is located approximately 3 kilometers south of Regional Highway 113 and approximately 20 kilometers northeast of Waswanipi. The site occupies a surface area that is generally flat with some local irregularities and sits some 20 meters above the surrounding ground. Surficial materials are locally composed of sand, sand and gravel and till. The water table is at a depth of 3 to 4 meters but would lie at more than 5 to 6 meters near the slopes at the periphery of the site. The site has interesting geological conditions for a residential waste landfill. It would be easy to develop and would meet environmental standards. However, the 5 kilometer stretch of logging road that would have to be maintained and plowed during the winter season is a distinct disadvantage.
	Recommendation for field investigation work: Yes ☐ No ☒
Site 5	The site is easily accessible via an existing road that runs within 200 meters and is located approximately 1 kilometer north of Regional Highway 113 and approximately 14 kilometers southwest of Waswanipi. The available surface area covers roughly 38 hectares and it occupies the edge of an esker ridge. The slopes tend to be gentle, except where there are gravelly knolls 5 to 10 meters high. It is more than 150 meters from any lakes or streams. The surface area rises 10 to 30 meters above the surrounding ground. Surficial deposits probably consist of a layer of sand 15 to 20 meters thick. The sandy material is probably interbedded with thin layers of gravelly sand. The handful of knolls present would be primarily composed of gravel. The water table is at a depth of more than 8 meters. The site would be fairly easy to develop. The gently-sloping surfaces easily cover more than the required 4 hectares and the site has ample expansion potential.
	Recommendation for field investigation work: Yes ☒ No ☐
Site 6b	The site is very large with a surface area covering roughly 50 hectares and is located approximately 100 meters north of Regional Highway 113 and approximately 21 kilometers southwest of Waswanipi. The site is crossed by a logging road that appears to be in fairly good condition both on the air photographs taken in 1989 and in recent satellite images. No new access road would have to be built and access for exploration by hydraulic shovel would be easy. The site straddles a broad ridge consisting of sandy-gravelly glaciofluvial materials possibly interbedded with till. Operating gravel pits less than 1 kilometer farther north indicate material thicknesses of more than 10 to 20 meters. The soil is well drained and the water table should lie at a depth of more than 8 meters. The ground surface is fairly regular and slightly mounded, so any grading would be minor. The southern edge of the site is 150 meters or more from any streams or rivers, and its northern edge is 100 meters on average from extensive peatlands. The site offers good conditions for development. It is approximately 8 kilometers from Desmaraisville, a relatively short distance that constitutes as an advantage in terms of site selection.
	Recommendation for field investigation work: Yes ☐ No ☒

According to the preliminary site characterization analysis by Poly-Géo, three (3) potential sites (Site 1, Site 2 and Site 5) were identified and recommended for a field investigation by hydraulic shovel.

Figure 1 Potential sites inventory identified by the community and Poly-Géo



1.3.3 Phase 2 study – Field investigation results (Poly-Géo)

In March 2012, four (4) additional sites were further proposed by the community itself (Site 6a) and Poly-Géo (Site 7a, Site 7b and Site 8) bringing the total to 13 potential sites. Based on the results of the initial study and in conjunction with CFNW comments and discussions, field investigation works were finally executed in May 2012 on five (5) potential sites (Site 2, Site 6a, Site 6b, Site 7a and Site 7b) as the other sites were not considered due to important technical and/or environmental issues. The purpose of this secondary study was to obtain a more detailed characterization of each proposed site leading to the selection of the optimal sites to be further assessed by a waste management planning study.

The field investigation works was comprised of 19 test pits excavated by hydraulic shovel to an average depth of 4 meters that inevitably facilitated the description of the overall context of the five (5) potential sites according to topography, drainage, access, surficial materials, water table depth and expansion possibilities.

A more detailed characterization summary as well as a recommendation of each potential site is presented in Table 2. The approximate locations, with respect to the community and Regional Highway 113, are illustrated in Figure 1.

Table 2 Characterization and recommendation of each potential site following the Phase 2 study (Poly-Géo)

Site	Characterization
Site 2	A total of five (5) test pits were excavated in the northwestern area, which seemed more promising from aerial photo-interpretation. The covered area includes hummocks (maximum material thickness) and hollows (water table depth) to retrieve a maximum of data. The surficial deposits consist primarily of sand (fine to medium grain size) with traces of silt (less than 10%), but pebbles and boulders were observed locally (northeastern area) below 3 meters of depth, suggesting the proximity of silt. Although the test pits confirmed the thickness of sand reaches equal or greater than 4.3 meters, there is likely up to 6 meters of materials. The latter seems somewhat less permeable than other sites composed of sand and gravel, which would slow groundwater flow. With a gentle slope going down towards the northwest, surface drainage appears to be excellent. Despite the fact that the water table was not reached, some important water inflows were observed in one test pit The latter was excavated in the lowest part of the northwest area and had the particularity of having 2.4 meters of silty sand overlaying fine to medium size sand. No water inflows where noted in the other test pits, suggesting the water table depth is greater than 4.3 meters. The optimal area proposed excludes these poorly drained areas. There are two (2) possible access routes (roads to be built). The western route goes through well-drained but slightly irregular ground composed of tilt and locally outcropping bedrock. It is 1.6 kilometers long. The eastern route is shorter (1.3 kilometers), but runs over thin peat (less than 2 meters) for a stretch of 175 meters. The rest of the route is underlain by till. However, of the two (2) options, the eastern route would appear to be the optimal choice.
	Recommendation for field investigation work: Yes ☒ No ☐
Site 6a	The site is located approximately 300 meters west of Regional Highway 113 and approximately 20 kilometers southwest of Waswanipi. No access road would need to be built as the existing one is in very good condition. The site intersects a narrow ridge, aligned in an ENE-WSW axis, in which two (2) sand pits have been exploited in the past. Surrounding slopes of the pits reach a height of 10 to 30 meters and show well drained fine to medium sand, with sporadic presence of gravel. Within the mined area, the water table does not surface. However, verification in the bottom of one of the pits suggests that the water table should be roughly 2.8 to 3 meters beneath the surface. Outside the borrow areas, the surface of the terrain is slightly irregular and forms a gentle slope towards the adjacent lowlands, generally providing a good surficial drainage. Trees are quite sparse. A total of four (4) test pits were excavated, with depths varying from 3.1 to 4.1 meters were excavated near the top of the ridge to properly identify surficial materials and estimate depth of water table. The materials observed are essentially very well drained, fine to medium sand. The latter are locally covered by a thin layer (less than 2.5 meters) of silty sand. The water table has not been reached. However, in very local depressions, compact silty materials have been identified with some important water inflows between the depths of 0.9 and 3.5 meters. These poorly drained terrains have been excluded from the optimal subareas proposed. Considering these results, the site can be divided into two (2) optimal subareas

Site	Characterization
	extending on each side of the access road. Subarea 1 (roughly 3.5 hectares) is located on the eastern side and includes a 10 to 15 meter deep borrow pit. Subarea 2 (roughly 5.8 hectares) is located in the western side and comprises a 30 meter deep sand pit which seems to still be operated. The bottom of the borrow pits could be used for waste disposal. However, some backfilling would be required given that the water table is near the surface at the bottom of the excavations. Apart from the borrow pits, the available surface area is close to 7 hectares.
	Recommendation for field investigation work: Yes ☐ No ☒
Site 6b	The site is very large with a surface area covering roughly 50 hectares and is located approximately 100 meters north of Regional Highway 113 and approximately 21 kilometers southwest of Waswanipi. It is crossed by a logging road that is in fairly good condition. No new access road would have to be built. The site straddles a broad ridge consisting of sandy glaciofluvial materials possibly overlying tilt. Gentle to moderate slopes generally provides excellent drainage on both flanks of the ridge. Vegetation density changes from very dense to very sparse. A total of five (5) test pits were excavated in the eastern portion of the site. The excavations depth reached 3.9 to 4.5 meters. The observed materials are mostly fine to medium sand and the water table was not reached. The undulating surface relief comprises of low and poorly drained areas. In these particular areas, test pits have shown that the materials are mostly clayey silt with some water inflows between depths of 1.9 and 2.4 meters. Three (3) subareas within the site have been identified for good conditions for the development of a landfill and from east to west, these cover respectively 9.2, 9.3 and 4.7 hectares. The ground surface is fairly regular and slightly mounded, so any grading would be minor. The southern edge of the site is roughly 200 meters from any streams or rivers while its northern edge is 100 meters on average from extensive peatlands.
	Recommendation for field investigation work: Yes ☒ No ☐
Site 7a	The site is located approximately 5 kilometers northwest of Regional Highway 113 and approximately 11 kilometers southwest of Waswanipi. It is located right beside a large glaciofluvial deposit and covers a slightly undulating surface. Its dimensions largely overtake project needs with roughly 59 hectares. More than 50% of the site is covered by a young jack pine plantation while rest is covered by a mature black spruce forest, where the tree density is slightly higher. Two (2) tests pits were excavated in the southern area and one (1) test pit was excavated in the northwestern area. All of the test pits showed a thin layer less than 2 meters of silt with less than 10% of sand, overlying well drained fine sand with less than 10% of silt. The transition between these types of sediments is very sharp, suggesting a rapid change in the post-glacial environment. Even though this site is close to the center of an esker, the material seems composed of finer sediments than expected. Just outside the northwest corner, a sand and gravel pit, excavated in the core of the esker, indicates that materials get coarser as you get closer to the esker. This should be characteristic of materials found in the northern part of site or on the south flank of the esker. For most of the surface area, the fine silt sediments covering the surface are slowing down water penetration considerably. However, a general slope which is gentle to moderate provides a good surficial drainage towards the south. The water table was not reached in the three (3) test pits that were excavated to depths varying from 4 to 4.3 meters. The site is accessible by logging roads that are in relatively good condition. The construction of a 300 meters long access may reduce the distance on the logging roads to roughly 3 kilometers, thus minimizing snow plowing during the winter season. The terrain, which is lightly rugged, would need some leveling. Furthermore, in order to remove the top layer of silty materials less than 2 meters, some relatively important scouring work would need to be planned. The northern portion of the site seems more appropriate but offers a smaller area.
	Recommendation for field investigation work: Yes ☐ No ☒

Site	Characterization
Site 7b	The site is located approximately 4 kilometers northwest of Regional Highway 113 and approximately 10 kilometers southwest of Waswanipi. It is part of the same large glaciofluvial deposit located approximately 8 kilometers southwest of Waswanipi. With a surface area of roughly 18 hectares, it is a much smaller than the nearby potential site (Site 7a), but still overtakes project needs. More than 50% of the site is an old deforestation site (strip cutting) which possibly affected the natural surficial drainage. Due to the difficulty of accessing the site, only two (2) test pits were excavated in the eastern area of the site. The test pits reached a maximum depth of 4.3 meters and showed that the materials are characterized by alternating beds equal or less than 1 meter thickness of clayey silt, sandy silt and silty sand overlying fine to medium sand. The clayey sediments are wet and characterized by the presence of rhythmites, suggesting a slow deposition in the bottom of the proglacial lake (Ojibway). Although the plain is gently sloping towards the east, surficial drainage is poor. The slope is hardly noticeable in the eastern area of the site. Water flows on the surface of the silty materials, underneath the organic layer. In the test pit located in the southeastern part of the site, the water table was measured at a depth of 2.7 meters. Water inflows were observed at a depth of 2.4 meters in the test pit located in the northeastern part of the site. Materials of sand and gravel, reaching a thickness of 10 to 15 meters have been observed in an operating pit located in the core of the esker, located north-northwestern of the site. The latter indicates what type of material could be found in the western part of the site, which is a flank of the same esker. The water table does not surface anywhere in the bottom of the pit. The surface is more regular than the nearby potential site (Site 7a) and rises roughly 4 meters above the surroundings. This site is also accessible by logging roads that are in considerably good condition. The construction of a 300 meters long access may reduce the distance on the logging roads to roughly 3 kilometers, thus minimizing snow plowing during the winter season.
	Recommendation for field investigation work: Yes ☐ No ☒

According to the more detailed site characterization analysis by Poly-Géo, two (2) potential sites (Site 2 and Site 6b) were identified and recommended as an optimal site selection to be further assessed by a waste management planning study. Each site has its own advantages.

Site 2 has the best technical and environmental conditions. Its surface is relatively even, the water table is low, the surficial materials are not too permeable and its expansion potential is almost limitless, with a surface area of roughly 23 hectares and expansion possibilities up to roughly 45 hectares. However, it is approximately 25 kilometers from Waswanipi and would require the construction of a 1.3 kilometer access road (if the eastern route is taken) or a 1.6 kilometer access road (if the western route is taken).

The technical and environmental conditions of Site 6b are similar to those of Site 2. However, the ground surface is more irregular and would possibly require grading locally. The main advantage is that it is closer to Regional Highway 113 than Site 2 and requires no new access road. Another advantage to be considered is its proximity from Waswanipi (approximately 21 kilometers), but also from Desmaraisville (approximately 8 kilometers) and Bachelor Lake project (10 kilometers) who could be interested to use the site. However, due to its reduced dimensions, that likelihood may not be possible.

Regarding the rejected Site 6a, although it presents some advantages, it was deemed unfavorable due to its smaller size (roughly 7 to 9 hectares) and the presence of borrow pits and/or slopes that would require groundwork. As for Site 7a and Site 7b, which are located closer to Waswanipi as any other potential site (approximately 10 to 11 kilometers), these sites are deemed unfavorable due to the presence of a surficial layer of silty clay that should be removed as well as very poor drainage in some areas. Furthermore, the access to these sites would imply snow plowing of logging roads approximately 3 to 5 kilometers in length.

1.3.4 Comparative analysis (Groupe Alphard)

Following both Poly-Géo studies, two (2) potential sites (Site 2 and Site 6b) were identified and recommended as an optimal site selection to be further assessed by a waste management planning study. Consequently, in November 2012, the CFNW retained the services of Groupe Alphard to perform such a waste management planning study, with an ultimate goal of selecting the next landfill site. The study was based on waste site selection on more than the technical and environmental aspects identified in the previous Poly-Géo studies. More specifically, the Groupe Alphard study completed the necessary planning information required to make an informed decision based on current and future community needs according to solid waste generation rates, recuperation and diversion opportunities, economic feasibility and cost estimations and comparative evaluations.

1.3.5 Economic feasibility (Groupe Alphard)

Regarding the cost estimation evaluation of each potential site, the Groupe Alphard study considered an estimated acreage required for an annual trench landfill with a 25 year lifespan for the community of approximately 60,000 m^2 (6 hectares) assuming an excavation depth of 3 meters. This total does not include any waste diversion. Assuming waste diversion at peak amounts estimated throughout the entire 25 year lifespan, the acreage required would be approximately 37,000 m^2 (3.7 hectares). However, for the purposes of the economic feasibility of each site and to ensure that the selected landfill location does have sufficient land available to last the community 25 years, the “worst case” scenario of zero waste diversion was considered.

The economic feasibility of each potential site was measured according to the following cost components:

- Detailed topographical survey;
- Geotechnical investigation and monitoring well installation;
- Environmental studies;
- Detailed engineering and certificate of authorization demand;
- Trench excavation;
- Landscaping;

- Fencing, gates, culverts and signage;
- Access road upgrades and construction;
- Construction supervision.

1.3.6 Comparative evaluation (Groupe Alphard)

Regarding the comparative evaluation of each potential site, the Groupe Alphard study aimed to assist the community with the optimal selection of a new landfill site (following the conclusions of both Poly-Géo studies) based on community waste production and planning needs for at least the next 25 years. In order to simplify the choice between Site 2 and Site 6b, a comparative evaluation (weighted score system) was done based on several criteria (13 in total) grouped into the following four (4) key aspects:

- Environmental impact;
- Technical;
- Social;
- Economical.

Basically, each criterion is given a weight based on their importance (the total of which equals 100) and a score between 1 (least favorable) and 3 (most favourable). The multiplication of these values generates a weighted score for each criterion and the sum of these individual weighted scores produces an overall weighted score for each site. Consequently, the site with the highest overall weight score is the preferred option.

The following 13 criteria (with weights in parentheses) were considered for the comparative evaluation:

Environmental impact (35)

- Potential for groundwater contamination (10);
- Potential for surface water contamination (10);
- Risk to wildlife habitats (10);
- Geomorphology (5);

Technical (25)

- Ease of initial development (10);
- Ease of development during projected lifespan (25 years) (10);
- Ease of development past projected lifespan (>25 years) (5);

Social (15)

- Humanistic (10);
- Access (5);

Economical (25)

- Initial investment (10);
- Cost during projected lifespan (25 years) (5);
- Cost past projected lifespan (>25 years) (5);
- Potential for monetary offset (5).

According to the comparative evaluation, Site 2 had a higher overall weighted score than Site 6b (235 versus 190). The most important difference in scoring was the weighted scores attributed to the environmental impact aspects due to the risks of environmental impact being a continuous concern, from the moment of initial development, throughout the 25 year lifespan, to the eventual definitive closure of the site and well beyond.

1.3.7 Justification of final selection (Groupe Alphard)

After taking into account the conclusions of both Poly-Géo studies, the site visit observations, the topographical data and all other relevant documents available at this time, and comparing all this information against the clauses of the RRLIRM with regards to trench disposal sites, the Groupe Alphard study concluded that both Site 2 and Site 6B would satisfy the requirements of the provincial regulations and have enough storage capacity for the solid waste expected to be produced by the community for the next 25 years.

However, even after taking into account the slightly higher start-up construction costs, the simpler site layout, the environmental aspects and especially the expansion possibilities after the 25 year projections at Site 2 lead Groupe Alphard to conclude that this site is better suited to the future needs of the community. It is clear that the community would like to open a new landfill site that has a better possibility for future expansion should the need arise, and would prefer to open one site that the community could continue to safely use far beyond the 25 year lifespan that the current study is based on.

It is important to note that prior to the undertaking of the ESIA of Site 2, Stantec Consulting Ltd. obtained and interpreted all past studies prepared by Poly-Géo and Groupe Alphard and it was observed that all evaluations of potential sites were based on the “annual” trench method rather than the “continuous” trench method. A smaller land area is required for “continuous” trenches because a bigger volume can be buried in a smaller area and although variable topographic lows are undesirable for “annual” trenches, these are very interesting for “continuous” trenches. This means that areas, such as old gravel/sand pits and natural depressions, can be considered as optimal locations for the site development under the

"continuous" trench method because these areas are already excavated, thus reducing site development investment as well as the disturbed ecological footprint. Keeping in mind these facts and reanalyzing all previous studies prepared by Poly-Géo and Groupe Alphard, Stantec Consulting Ltd. had determined that Site 6a (subarea 6a1 and subarea 6a2) was now rendered as a potential site that required further evaluation. However, following a further assessment in July and August 2014, this option was eventually rejected since one (1) subarea cannot be exploited due to reserved mineral rights by a third-party participant (according to the MERN database) and the affected tallyman was against the idea because this would have been the second landfill site within his trapline boundaries.

1.3.8 Location of the selected site in its local context

Figure 2 illustrates the location of the selected site in its local context including basic topographic, hydrologic and geographic information relative to the ESIA in order to comprehend the general portrait of the situation.

Figure 3 illustrates the existing conditions at the selected site following the ESIA including air photo background and topographic contours as well as hydrological, environmental, floral, faunal and additional geographic information relative to the ESIA.

Figure 2 General location of the selected site in its local context

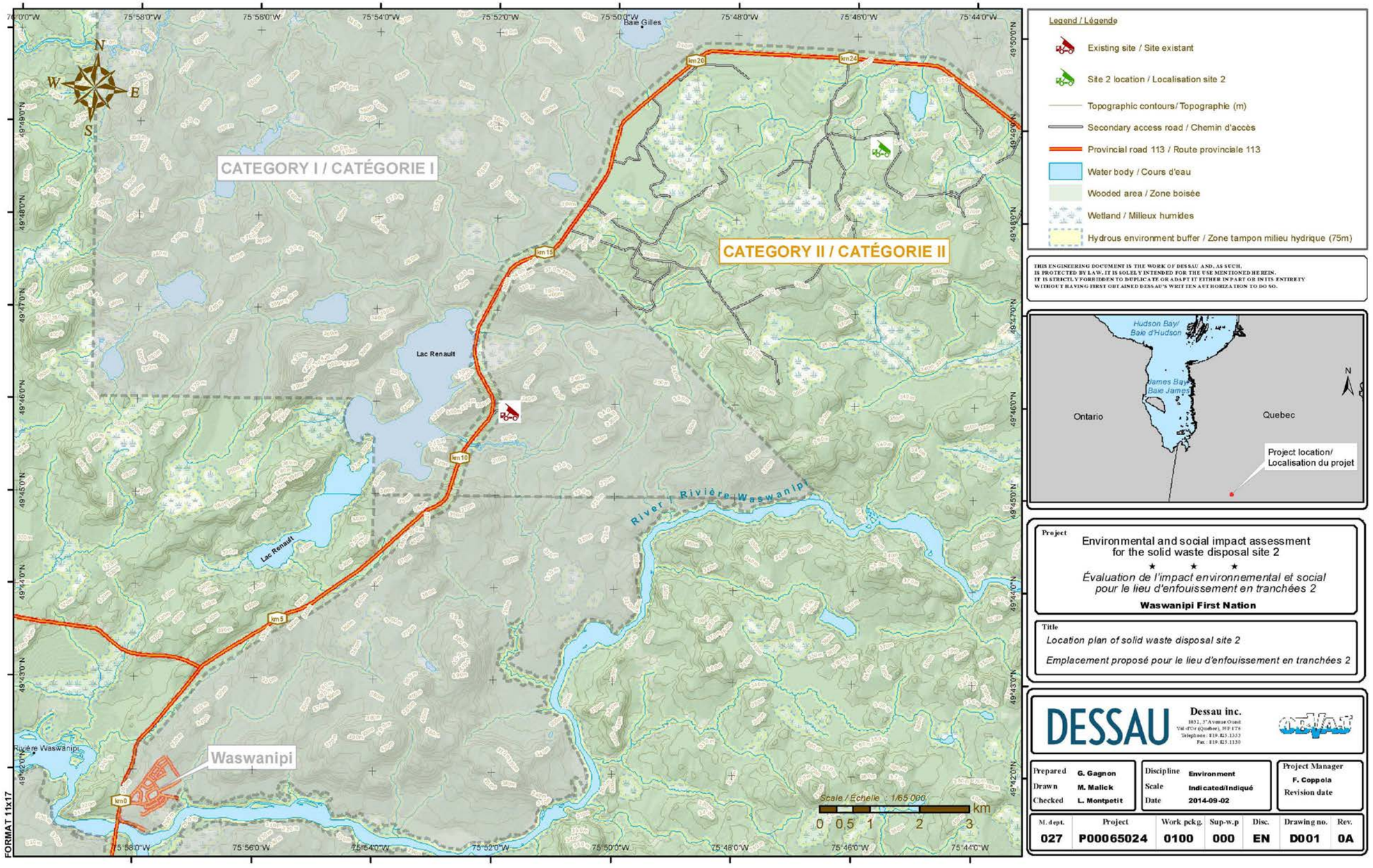
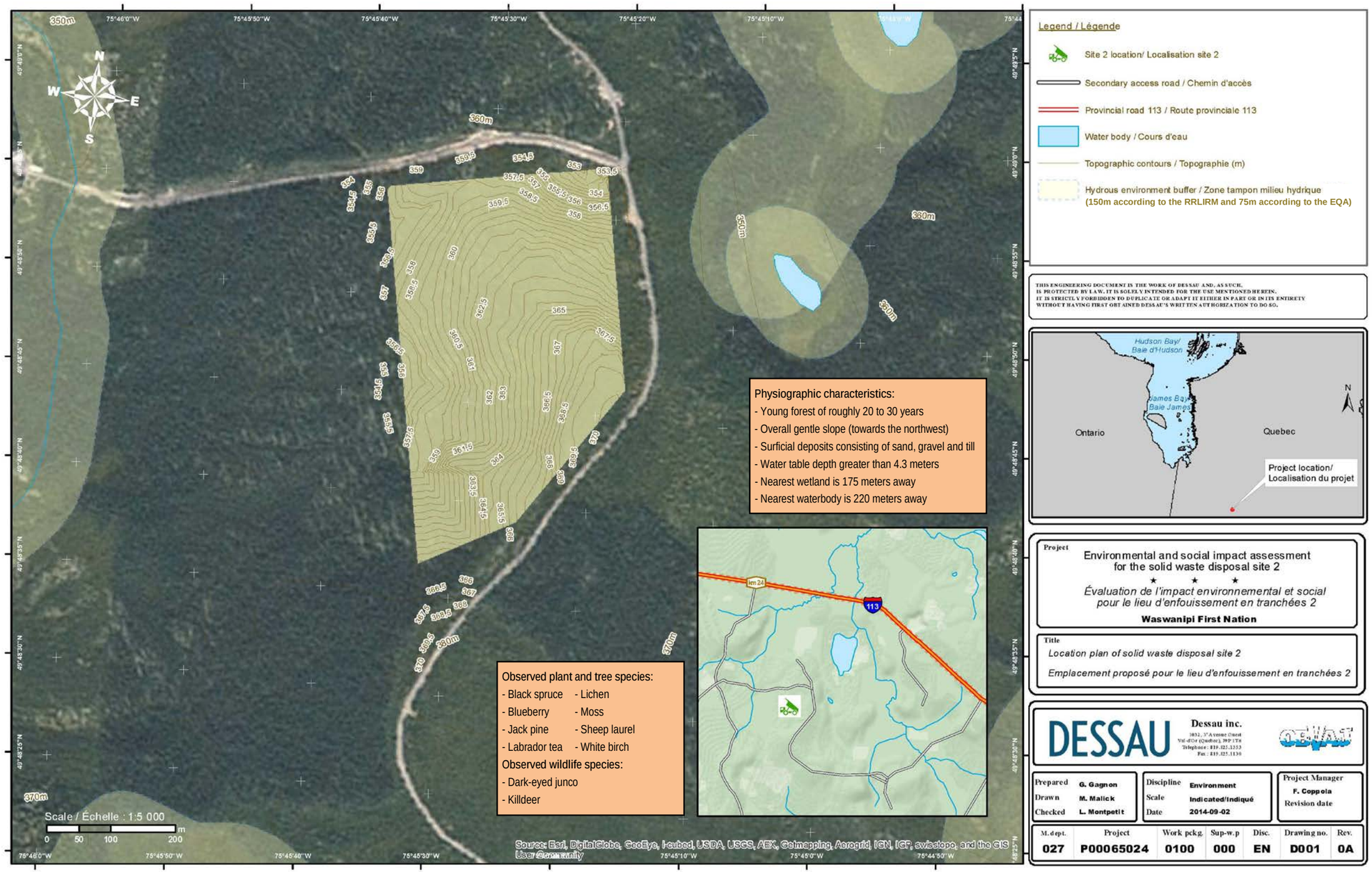


Figure 3 Existing conditions at the selected site following the ESIA



2.0 PHYSICAL ENVIRONMENT

2.1 PHYSIOGRAPHY

The site covers a surface area of just over 40 hectares and is located approximately 1.3 kilometers south of Regional Highway 113, approximately 25 kilometers northeast of Waswanipi and is within the James Bay clay belt. The land is relatively flat, with elevations ranging between 310 and 350 meters. The surface area leaves considerable flexibility in the choice of an optimal site for the landfill. The site is located at the top of a broad ridge that rises some 20 to 30 meters above the surrounding land. The ground surface is flat or slightly undulating and could easily be developed as a landfill. The site lies more than 150 meters from any lakes or streams. The surficial deposits would consist primarily of sand, likely with beds of sand and gravel and till. They are likely up to 10 meters thick over most of the outlined area. The material seems somewhat less permeable than other sites composed of sand and gravel, which would slow groundwater flow. The higher ground offers excellent surface drainage while the lowlands consist of clayey deposits and peat which are often poorly drained.

2.2 REGIONAL SURFICIAL DEPOSITS

The surficial deposits that embrace Quebec today began 1.65 million years ago during the Quaternary Period which was dominated by major climatic disturbances that promoted the growth of massive ice sheets across the entire province. Dating back some 18 000 years, the geological provinces lay under a 2 kilometer thick ice sheet. Today, these glaciers have disappeared and left an impressive array of surficial deposits of variable composition and thickness overlaying the bedrock. According to common literature, the main regional surficial deposits found in the surrounding areas of Waswanipi are as follows:

- Moraine (till) glacial deposits which are ubiquitous in the territory and take different forms depending on whether they have been implemented during the progression of the glacier, the glacier front or at the gradual melting of the ice sheets. Till is generally a heterogeneous material whose elements are comprised of all sizes (blocks clays) with no spatial organization, but in some instances, it can be mostly sand and exhibit some form of stratification;
- Fluvial deposits that line the valleys of most rivers and alluvium deposits that lay over the floodplains during the spring freshet or heavy rainfall events. These deposits are commonly found to be sandy on the Canadian Shield;
- Organic deposits that are characteristic of peatlands and generally, this term refers to any land comprising of organic matter having a minimum thickness of 40 cm. Although peatlands can be found everywhere in Quebec, their importance decreases towards the north starting at the 55th parallel.

2.3 GEOLOGICAL CONTEXT

2.3.1 Regional

From a geological perspective, the community of Waswanipi is part of the Superior Province which is the heart of the Canadian Shield. It lies in the western part of Quebec over an area of 630,000 km^2. According to common literature, the bedrock in this region is composed primarily of diorite, gabbro, basalt amphibolite, granotoide and tonalite.

2.3.2 Local

In reference to the local geology of the selected site, the bedrock consists mainly of intrusive rocks like granite, granodiorite, tonalite, syenite and diorite as well as mafic volcanic rocks. The bedrock is very seldom exposed as it is mostly hidden under a layer of unconsolidated material that can attain a thickness of over 6 meters in certain areas.

It is important to note that the presence of one or more of these types of rocks were observed during the field works carried out in July 2014 (required for the ESIA) as well as in September/October 2015 (required for hydrogeological profile).

2.4 HYDROGRAPHICAL CONTEXT

2.4.1 Regional

The configuration and density of Quebec's hydrographic network (lakes and rivers) are heavily dependent on the land's topography. According to Quebec's hydrographic network, the community of Waswanipi is located in the James Bay and Hudson Bay watershed. More specifically, the selected site is located within the Nottaway River watershed, which drains a surface area of approximately 65,800 km^2 and is characterized by important tributaries, such as the Bell and Waswanipi Rivers.

2.4.2 Local

The Waswanipi River and its main affluent, the Opawaca River, flow through the Waswanipi region and the catchments are generally drained by small meandering creeks. Regarding the Waswanipi River, which is located south of the community as well as the selected site, two (2) hydrometric stations were installed in the 1960s to measure its stream flow. The upstream station was installed at the confluence of the Waswanipi and Opawica Rivers (1962-1982) and the downstream station was installed at Chute-Rouge (1966-2001). The stations showed respective annual mean stream flows of 373 and 590 m^3/s. It was perceived that spring flood began in the first half of April while the peak stream flow was reached between mid-May and the end of May with mean stream flows of 900 and 1,400 m^3/s respectively at the upstream and downstream stations. The peak stream flows had reached maximums of 2,000 and 2,750 m^3/s

respectively at the upstream and downstream stations during the recording periods. The minimum stream flow during the summer low water period was reached at the end of July upstream and at the beginning of September downstream. At that time, the mean stream flows were between 400 and 500 m^3/s. Finally, the stream flows during the winter low water period were at their minimum in the first half of March, with values of 100 and 200 m^3/s respectively at the upstream and downstream stations. The data show that there are very few mild spells that caused the stream flows of the Waswanipi River to vary during the winter.

According to the field works carried out in July 2014 (required for the ESIA) as well as in September/October 2015 (required for hydrogeological profile), the selected site itself is free of wetlands and is located approximately 175 meters southwest of the nearest wetland, approximately 220 meters southwest of the nearest waterbody, approximately 7 kilometers north of Waswanipi River and approximately 6 kilometers southeast of Lac Inconnu.

3.0 SUBSOIL CONDITIONS

3.1 INVESTIGATIVE MEANS

Table 3 presents the different investigative means implemented between 2012 and 2015 at the selected site for the purpose of obtaining factual subsoil conditions while Figure 4 illustrates the approximate locations of these different investigative means with respect to the projected landfill limits.

Table 3 Different investigative means implemented to obtain factual subsoil conditions

Investigative Means	Name	Coordinates[1] x	y	Measured Depth[2]	Observed Subsurface Materials
Work was done by Stantec[3]					
Monitoring well	PO-01-15	445667	5518027	18.50	Sand and bedrock
Monitoring well	PO-02-15	445682	5518367	23.05	Sand and bedrock
Monitoring well	PO-03-15	445426	5518466	5.38	Sand and bedrock
Monitoring well	PO-04-15	445307	5518217	7.01	Sand and bedrock
Borehole	F-05-15	445491	5518334	5.18	Sand and bedrock
Borehole	F-06-15	445624	5518122	25.30	Sand and bedrock
Work was done by Poly-Géo[4]					
Test pit	Not given	445376	5518359	4.3	Sand
Test pit	Not given	445483	5518243	4.3	Sand
Test pit	Not given	445534	5518149	4.3	Sand
Test pit	Not given	445655	5518180	4.3	Sand
Test pit	Not given	445559	5518415	4.3	Sand

[1] Approximate locations based on the Cartesian coordinate system UTM (zone 18).

[2] Measured from the surface (meters).

[3] Work was done between September 28 and October 22, 2015.

[4] Work was done between May 22 and May 29, 2012.

Figure 4 Approximate locations of the different investigative means with respect to the projected landfill limits

3.2 STRATIGRAPHIC UNITS

3.2.1 Monitoring wells and boreholes (Stantec)

A detailed description of the various observed stratigraphic units (nature and composition of geological material and lateral extension) within the projected limits of the new landfill site is required in order to understand and remediate possible groundwater risks once operations will have started. A total of six (6) boreholes were drilled to this effect, in which four (4) of them were immediately converted into monitoring wells. The entrepreneur responsible for the borehole drilling in addition to the monitoring well installation was Forage Giroux while supervisory duties were assumed by an experienced Stantec field technician. Figure 5 illustrates the specialized drilling equipment used by the entrepreneur (Diedrich D-50, Sedidrill s410 and Mooroka MST 1500).

Figure 5 Specialized drilling equipment used by the entrepreneur

Various stratigraphic units were observed during the drilling work, as summarized below and detailed in Table 4, by means of a systematic core sampling approach.

Natural topsoil

Natural topsoil was nearly absent (maximum depth of 0.10 meters from the surface) at each site.

Granular lacustrine deposit

From a general perspective, a granular lacustrine deposit was identified within each borehole with an observed granulometry consisting of fine sand with some traces of silt near the surface and medium sand at depth. Some pebbles were also observed near the surface in one (1) borehole (F-06-15) and medium to coarse sand with some traces of gravel were observed in two (2) boreholes (PO-01-15 and PO-02-15).

The in-situ standard penetration test (whose key purpose is to provide an indication of the relative density of granular deposits from which it is virtually impossible to obtain undisturbed samples) generally indicated very loose to compact sand within boreholes PO-01-15, PO-02-15, PO-03-15, PO-04-15 and F-05-15 and compact to dense sand within borehole F-06-15, as presented in Table 5.

The thickness of the granular lacustrine deposit varies between 3.86 and 25.20 meters.

Subsoil conditions
January 22, 2016

Bedrock

The bedrock, that was either attained or surpassed within each borehole, varies between 3.96 and 25.30 meters below the surface. Local quartzic veins were observed in the sampled portions and although the rock quality designation (whose key purpose is to provide a rough measure of the degree of jointing or fracture in a rock mass) was not recorded within each borehole, field observations had suggested a rock quality varying between fair and good.

Table 4 Detailed description of the various stratigraphic units observed during the drilling work

Soil Profile	Measured Depth[1]					
	PO-01-15	PO-02-15	PO-03-15	PO-04-15	F-05-15	F-06-15
Natural topsoil	0.00 – 0.10	0.00 – 0.10	0.00 – 0.10	0.00 – 0.10	0.00 – 0.10	0.00 – 0.10
Fine sand	9.14 – 12.19		0.10 – 0.61	0.10 – 0.61	0.10 – 2.44	
Fine sand with some pebbles						0.61 – 1.22
Fine sand with traces of medium sand			1.82 – 3.96			
Fine sand with traces of medium sand and silt			0.61 – 1.82			1.22 – 2.44
Fine sand with traces of silt				0.61 – 1.82		
Medium sand	0.10 – 7.62	3.05 – 9.14		1.82 – 5.18		6.10 – 12.19 16.76 – 25.30
Medium sand with traces of gravel		16.76 – 19.66				
Medium to fine sand		0.10 – 3.05			2.44 – 5.18	0.10 – 0.61 2.44 – 4.57 12.19 – 16.76
Medium to fine sand with traces of very fine sand						4.57 – 6.10
Medium to coarse sand	7.62 – 9.14 12.19 – 16.76	9.14 – 16.76				
Coarse sand with gravel and traces of fine sand and clay	16.76 – 17.53					
Bedrock	17.53 – 18.50	19.66 – 23.05	3.96 – 5.38	5.18 – 7.01	5.18	25.30

[1] Measured from the surface (meters).

Table 5 In-situ standard penetration test field results

Borehole	Range of Results[1]	Very loose (< 4)	Loose (4 – 10)	Compact (10 – 30)	Dense (30 – 50)	Very dense (> 50)
PO-01-15	3 – 20	■	■	■		
Note: Most of the field results were recorded in the compact category.						
PO-02-15	5 – 32		■	■	■	
Note: Most of the field results were recorded in the loose and compact categories.						
PO-03-15	13 – 34			■	■	
Note: Most of the field results were recorded in the compact category.						
PO-04-15	2 – 34	■	■	■	■	
Note: Most of the field results were recorded in the loose and compact categories.						
F-05-15	2 – 25	■	■	■		
Note: Most of the field results were recorded in the compact category.						
F-06-15	2 – 53	■	■	■	■	
Note: Most of the field results were recorded in the compact and dense categories.						

[1] The in-situ standard penetration test employs a thick-walled sample tube, with an outside diameter of 50.8 mm, an inside diameter of 35 mm and a length of 650 mm. The sample tube is driven into the ground at the bottom of a borehole by blows from a slide hammer (drill) at a specific mass falling through a distance of 760 mm. The sample tube is driven 150 mm into the ground and then the number of blows needed for the tube to penetrate each 150 mm up to a depth of 450 mm is recorded. The sum of the number of blows required for the second and third 150 mm of penetration is termed the "standard penetration resistance" or the "N-value". In cases where 50 blows are insufficient to advance it through a 150 mm interval, the penetration after 50 blows is then recorded.

In addition to the field observations, core samples representing the main stratigraphic units within each borehole were sent to the laboratory and subjected to granulometric and sedimentometric tests. The laboratory results, as summarized in Table 6, consequently affirm the overwhelming presence of sand within each borehole.

All supporting documentation (daily production reports, drill hole logs, photographic album and laboratory results pertaining to the granulometric and sedimentometric tests) is included in Appendices A, B, C and D, respectively.

Table 6 Granulometric and sedimentometric results based on representative core samples

Core Sample[1]	Pebbles	Gravel	Sand	Silt	Clay
Borehole PO-01-15					
CF7 (6.10 – 6.71 meters)	0.0	0.2	91.8	6.5	1.5
CF10 (10.67 – 11.28 meters)	0.0	0.1	88.4	9.1	2.4
CF12 (13.72 – 14.33 meters)	0.0	0.2	96.7	1.2	1.9
Borehole PO-02-15					
CF4 (1.83 – 2.44 meters)	0.0	0.1	89.4	8.1	2.4
CF7 (6.10 – 6.71 meters)	0.0	0.3	95.4	1.9	2.4
CF9 (10.67 – 11.28 meters)	0.0	1.4	96.6	0.2	1.8
Borehole PO-03-15					
CF4 (1.83 – 2.44 meters)	0.0	0.0	68.2	29.9	1.9
Borehole PO-04-15					
CF4 (1.83 – 2.44 meters)	0.0	3.8	75.5	18.8	1.9
Borehole F-05-15					
CF5 (2.44 – 3.05 meters)	0.0	0.1	91.4	6.7	1.8
Borehole F-06-15					
CF3 (1.22 – 1.83 meters)	0.0	0.1	64.2	33.4	2.3
CF10 (10.67 – 11.28 meters)	0.0	0.5	93.4	4.7	1.4

[1] Proportion measured as a percentage.

3.2.2 Test pits (Poly-Géo)

As mentioned previously, a total of five (5) test pits were excavated by hydraulic shovel to an average depth of 4.3 meters within the projected limits of the new landfill site during the site selection process. A local operator was responsible for the burrowing while supervisory duties were assumed by an experienced Poly-Géo field technician.

From a general perspective, the surficial deposits within each test pit consisted primarily of fine to medium sand with traces of silt (less than 10 %), which is very similar to the findings of the adjacent boreholes. Nonetheless, some pebbles and boulders were observed locally (northeastern area) below the 3 meter level.

Figure 6 illustrates the hydraulic shovel used for the burrowing and a typical stratigraphic cross-section of a test pit.

Figure 6 Hydraulic shovel used for the burrowing and a typical stratigraphic cross-section of a test pit

All supporting documentation regarding the test pits has already been included as part of the ESIA document and therefore not appended to the present document.

3.3 PERMEABILITY

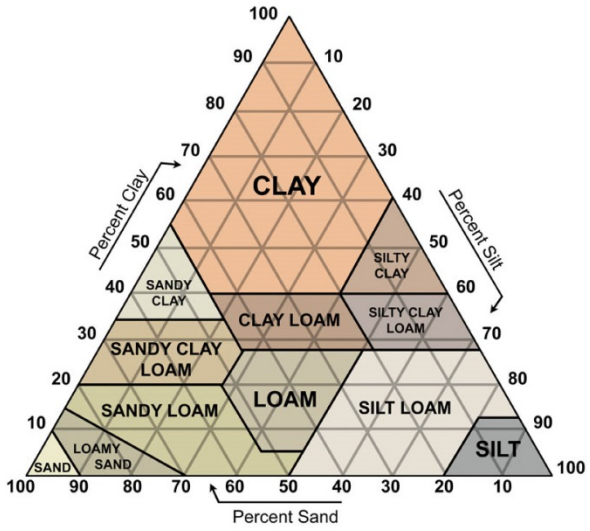
3.3.1 Soil texture

Soil texture analysis is a qualitative classification tool used in both the field and laboratory to determine different types of soils that are distinguishable in the field by the "textural feel" and further verified in the laboratory by separating the relative proportions of sand, silt and clay. This separation technique is known as the particle size distribution analysis.

Soil classifications are typically named for the primary constituent particle size (sand, silt and clay) or a combination of the most abundant particles sizes. For example, soils can be classified as "sandy clay" or as "silty clay". In addition to the primary constituent particle sizes, a fourth term (loam) is also used to describe a roughly equal concentration of sand, silt, and clay. Therefore, soils can be classified as "clay loam" or as "silt loam".

Determining soil textures is often supported by means of a soil texture triangular system and according to common literature, there are several systems used today for soil classification purposes. However, the qualitative differences amongst each system are not deemed as important and all systems are mutually compatible. The most common system used by professionals in North America has been developed by the USDA in which soils are divided into 12 major soil texture classifications, as illustrated in Figure 7.

Figure 7 Triangular system developed by the USDA depicting 12 major soil texture classifications



Regarding the six (6) boreholes, a total of 11 representative samples were used for the soil texture analysis based on the USDA soil texture triangular system and according to the results presented in Table 7, the following three soil texture classifications are present within the

projected limits of the new landfill site, with sand acting as the primary constituent particle size in each given sample:

- Sand (6 samples);
- Loamy Sand (3 samples);
- Sandy Loam (2 samples).

Table 7 Soil texture classifications present within the projected limits of the new landfill site according to the 11 representative samples

Core Sample	Soil Texture Classification	Comments
Borehole PO-01-15		
CF7 (6.10 – 6.71 meters)	Sand	
CF10 (10.67 – 11.28 meters)	Loamy Sand	Close to the Sand classification
CF12 (13.72 – 14.33 meters)	Sand	
Borehole PO-02-15		
CF4 (1.83 – 2.44 meters)	Loamy Sand	Close to the Sand classification
CF7 (6.10 – 6.71 meters)	Sand	
CF9 (10.67 – 11.28 meters)	Sand	
Borehole PO-03-15		
CF4 (1.83 – 2.44 meters)	Sandy Loam	Close to the Loamy Sand classification
Borehole PO-04-15		
CF4 (1.83 – 2.44 meters)	Loamy Sand	Close to the Sandy Loam classification
Borehole F-05-15		
CF5 (2.44 – 3.05 meters)	Sand	
Borehole F-06-15		
CF3 (1.22 – 1.83 meters)	Sandy Loam	Close to the Loamy Sand classification
CF10 (10.67 – 11.28 meters)	Sand	

Therefore, the findings of the particle size distribution and soil texture analyses consequently affirm the various stratigraphic units observed during the drilling work.

All supporting documentation (particle size distribution and soil texture analyses) is included in Appendices D and E, respectively.

3.3.2 Theoretical hydraulic conductivity

Once the different soil textures classifications are known, theoretical hydraulic conductivity values may be determined. Hydraulic conductivity, defined as the ease with which a fluid can move through pore spaces or fractures, depends on the intrinsic permeability of the material and the degree of saturation as well as the density and viscosity of the fluid. Saturated hydraulic conductivity describes water movement through saturated media. Permeability is defined as the ability of a porous material to allow fluids to pass through it.

Figure 8 presents, according to common literature, ranges of theoretical hydraulic conductivity (K, cm/s) and intrinsic permeability (K, millidarcy) values for subsurface materials found in nature in reference to typical fresh groundwater conditions (using standard values of viscosity and specific gravity for water at 20°C and 1 atm). According to Figure 8, the theoretical hydraulic conductivity values relevant to the different soils present within the projected limits of the new landfill site may vary between 1 x 10^{-5} and 1 x 10^{-2} cm/s. Consequently, the soils are considered to be in the “semi-pervious” range of values.

Figure 8 Ranges of hydraulic conductivity values for subsurface materials found in nature in reference to typical fresh groundwater conditions

K (cm/s)	10^{2}	10^{1}	1	10^{-1}	10^{-2}	10^{-3}	10^{-4}	10^{-5}	10^{-6}	10^{-7}	10^{-8}	10^{-9}	10^{-10}
K (millidarcy)	10^{8}	10^{7}	10^{6}	10^{5}	10^{4}	10^{3}	10^{2}	10^{1}	1	10^{-1}	10^{-2}	10^{-3}	10^{-4}
K (feet/day)	10^{5}	10^{4}	10^{3}	10^{2}	10^{1}	1	10^{-1}	10^{-2}	10^{-3}	10^{-4}	10^{-5}	10^{-6}	10^{-7}
Relative Permeability	Pervious				Semi-Pervious				Impervious				
Aquifer	Good				Poor				None				
Unconsolidated Sand & Gravel	Well Sorted Gravel		Well Sorted Sand or Sand & Gravel		Very Fine Sand, Silt, Loess, Loam								
Unconsolidated Clay & Organic					Peat		Layered Clay		Unweathered Clay				
Consolidated Rocks	Highly Fractured Rocks				Oil Reservoir Rocks			Fresh Sandstone	Fresh Limestone, Dolomite			Fresh Granite	

Source: modified from Bear, 1972.

3.3.3 Field hydraulic conductivity

Table 8 presents the field hydraulic conductivity values relevant to the different soils present within the projected limits of the new landfill site based on the permeability tests performed on-site. According to Table 8, the field hydraulic conductivity values assessed within the four (4) monitoring wells varies between 2.32 x 10^{-5} and 2.17 x 10^{-3} cm/s, which corroborate the theoretical hydraulic conductivity values as well as the nature of observed soils (sand to sandy loam) that comprises the hydrostratigraphic unit in which the permeability tests were performed.

Table 8 Permeability field test results

Monitoring well	PO-01-15	PO-02-15	PO-03-15	PO-04-15
Conductivity (cm/s)	2.17 x 10^{-3}	2.32 x 10^{-5}	4.20 x 10^{-4}	6.87x10^{-4}

All supporting documentation (on-site permeability tests) is included in Appendix F.

4.0 GROUNDWATER DATA

4.1 WATER TABLE DEPTH AND CONDITIONS

The water table depth is commonly considered as being the boundary between the unsaturated zone of subsurface materials (near the surface) and the saturated zone of subsurface materials (at depth). However, a saturated capillary fringe may exist above the water table. Groundwater may be the result from infiltrating precipitation and/or from groundwater flowing into the aquifer. In areas with consistent precipitation, water infiltrates through pore spaces in the soil, passing through the unsaturated zone. In increasing depths, water then fills in more of the pore spaces in the soils, until the zone of saturation is attained. In permeable or porous materials, such as sands and well fractured bedrock, the water table forms a relatively horizontal plane. Below the water table, in the phreatic zone, permeable units that yield groundwater are called aquifers. The ability of the aquifer to store groundwater is dependent on the porosity and permeability of the bedrock or subsurface materials. In less permeable soils, such as tight bedrock formations and historic lakebed deposits, the water table may be more difficult to define.

As mentioned previously, a total of six (6) boreholes were drilled, in which four (4) of them were immediately converted into monitoring wells, to identify the most vulnerable hydrogeological unit as well as to obtain actual groundwater depths, flow direction and water quality. The reasoning behind the decision to install the monitoring wells at this time is that the landfill site operator will eventually have to comply with Sections 63 to 71 (monitoring and supervision measures) of the RRLIRM. Regarding the location of these monitoring wells, as per Section 65 of the RRLIRM, one (1) is positioned upstream and three (3) are positioned downstream.

The monitoring wells were installed according to industry standards (strainer with silica sand, 50 mm nominal diameter PVC casing and a bentonite plug) and were constructed in a manner to remove the fine particles introduced during the drilling works and to restore its natural aquifer hydraulic conductivity. Each monitoring well was equipped with 12 mm diameter tubing fitted with a mechanically operated "WaterraMC" type check valve and sampled in accordance to MDDELLCC guidelines.

Table 9 presents the observed and measured water table depths according to the different investigative means. Regarding the six (6) boreholes, the water table levels were found to lie, for the most part, immediately above or below the bedrock. As for the test pits, the water table was not observed. It is important to note that groundwater measurements (depths and samples) were taken in late October, several months after the spring snowmelt. The selection of this period of the year does not allow for the measurement of water table depths at or near their maximum levels (high-groundwater level or phreatic high) since water tables are known to fluctuate in response to climatic conditions.

All supporting documentation (daily production reports, drill hole logs, photographic album and laboratory results pertaining to the granulometric and sedimentometric tests) is included in Appendices A, B, C and D, respectively.

4.2 INVENTORY OF WORKING WELLS

To our knowledge, there are no known working water wells situated downstream of the selected site.

Table 9 Observed and measured water table depths according to the different investigative means

Investigative Means	Name	Coordinates[1] x	y	Measured depth[2] Excavation	Bedrock	Water table
Work was done by Stantec[3]						
Monitoring well	PO-01-15	445667	5518027	18.50	17.53	17.73
Monitoring well	PO-02-15	445682	5518367	23.05	19.66	21.23
Monitoring well	PO-03-15	445426	5518466	5.38	3.96	3.70
Monitoring well	PO-04-15	445307	5518217	7.01	5.18	2.41
Borehole	F-05-15	445491	5518334	5.18	4.88	Not observed
Borehole	F-06-15	445624	5518122	25.30	25.30	Not observed
Work was done by Poly-Géo[4]						
Test pit	Not given	445376	5518359	4.3	Not observed	> 4.3 m
Test pit	Not given	445483	5518243	4.3	Not observed	> 4.3 m
Test pit	Not given	445534	5518149	4.3	Not observed	> 4.3 m
Test pit	Not given	445655	5518180	4.3	Not observed	> 4.3 m
Test pit	Not given	445559	5518415	4.3	Not observed	> 4.3 m

1 Approximate locations based on the Cartesian coordinate system UTM (zone 18).

2 Measured from the surface (meters).

3 Work was done between September 28 and October 22, 2015.

4 Work was done between May 22 and May 29, 2012.

4.3 FLOW DIRECTION AND HYDRAULIC GRADIENT

The water table within an aquifer is rarely horizontal and it somewhat reflects the surface relief due to the capillary effect in soils, sediments and other porous media. Groundwater within an aquifer flows from points of higher pressure to points of lower pressure and the direction of this flow typically has both a horizontal and a vertical component. The slope of the water table is known as the hydraulic gradient, which depends on the rate at which water is added to and removed from the aquifer and the permeability of the material. It is important to note that water tables do not always mimic surface topography due to the variations within subsurface geological structures (such as fold, faults and fractured bedrock).

Figure 9 presents the piezometric map (including groundwater contour lines and flow direction) within the projected limits of the new landfill site after taking into account the observed and measured water table depths presented in Table 9. Consequently, groundwater is presumed to flow from north-west towards south-east and the hydraulic gradient was determined to be approximately 0.023 m/m (measured between wells).

4.4 GROUNDWATER VELOCITY

Assuming that no preferential pathway affects the groundwater flow, the groundwater velocity within the surficial sand unit may be calculated according to Darcy's Law (Freeze and Cherry, 1979) using the following relation:

$$v = Q / S = K * ne(H_1 - H_2)L$$

V = Groundwater velocity

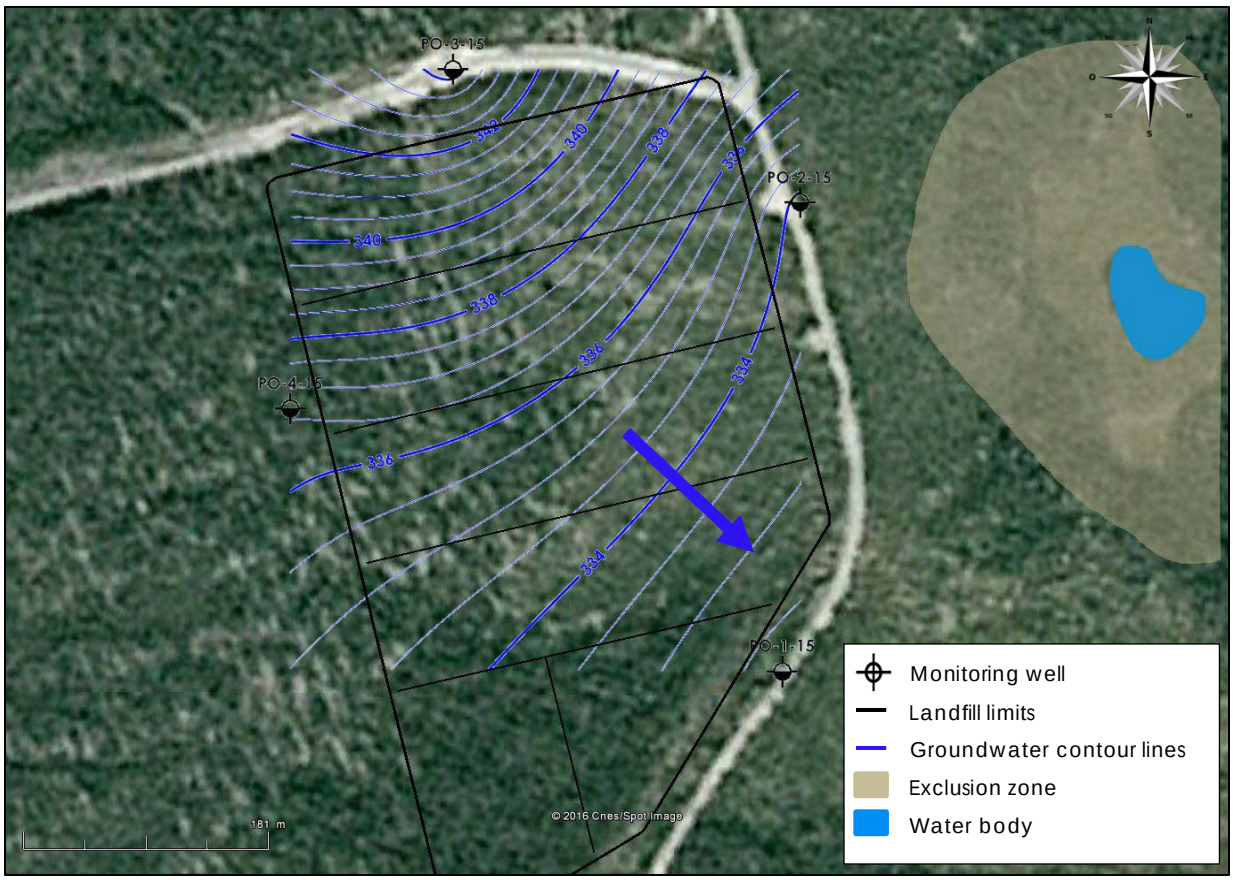
K = Average hydraulic conductivity (1.3×10^{-5} m/s)

$(H_1 - H_2) / L$ = Average horizontal hydraulic gradient (0.023 m/m)

n_e = Effective porosity (0.3)

The groundwater present on the property (surficial hydrostratigraphic unit) is estimated to flow at a velocity of 9.64 meters per year within the investigated area.

Figure 9 Piezometric map including groundwater contour lines and flow direction



4.5 WATER QUALITY

Following the installation of the four (4) monitoring wells, an initial water sampling program was followed to establish the local background level of groundwater quality and its spatial variability (all parameters naturally present in the groundwater and whose content is likely be amended during the operation phase of the new landfill site). According to Section 57 of the RRLIRM, groundwater migrating into the soil where disposal areas or a leachate or water treatment system are sited must comply with a prescribed criteria listing of 21 limit values (at each monitoring well). It is important to note that only the Environmental Minister may determine the parameters to be measured or substances to be analyzed on the basis of the composition of the residual materials received for disposal, and set the limit values to be complied with for those parameters or substances. The limit values may be in addition to or in substitution for the limit values set out in Section 57 of the RRLIRM.

Table 10 presents the results of the chemical analyses performed at each monitoring well with a comparison to the limit values stated in Section 57 of the RRLIRM, when applicable.

It is important to note that each monitoring well was purged with an electrical hydrolift pump (by retrieving three (3) times the volume of water in the monitoring well or when groundwater conditions allowed) prior to sampling the groundwater. This procedure helps to free the monitoring well of fine particles and allows the standing groundwater to be replaced by fresh and more representative groundwater from the hydrogeological formation. In addition, all sampling, transportation and preservation procedures were accomplished following the characterization guidelines published by MDDELCC and groundwater was sampled with bottles previously sent by the accredited laboratory, given the established parameters. Samples to be used for metal analysis were filtered on-site with a single-use filter.

Table 10 Monitoring well water quality

Parameter / Substance	Unit	Limit Value[1]	PO-01-15	PO-02-15	PO-03-15	PO-04-15
Microbiologic						
Fecal Coliforms	CFU/ 100 ml	0	0	< 10	0	0
Conventional						
Ammonia Nitrogen (NH_3-N)	mg/L	1.5	0.05	1.4	< 0.02	< 0.02
Chlorides (Cl^-)	mg/L	250	5.4	6.5	0.79	1.4
Conductivity	mS/cm	--	0.15	0.14	0.10	0.13
5-day biochemical oxygen demand (BOD5)	mg/L	--	26	< 4	6	7

Groundwater data
January 22, 2016

Parameter / Substance	Unit	Limit Value[1]	PO-01-15	PO-02-15	PO-03-15	PO-04-15
Chemical oxygen demand (COD)	mg/L	--	87	1,300	130	110
Nitrates + nitrites (N)	mg/L	10	< 0.02	0.07	0.03	< 0.02
Nitrates (NO_3^-N)	mg/L	--	< 0.02	0.07	0.03	< 0.02
Nitrites (NO_2^-N)	mg/L	--	< 0.02	< 0.02	< 0.02	< 0.02
Phenolic Compound-4AAP	mg/L	--	0.004	< 0.002	0.002	0.003
Total Cyanides (CN^-)	mg/L	0.2	< 0.003	< 0.003	< 0.003	< 0.003
Total Sulphates (SO_4^{-2})	mg/L	500	13	18	4.2	14
Total Sulphides (S^{-2})	mg/L	0.05	< 0.02	< 0.02	< 0.02	0.05
Metals						
Boron (B)	mg/L	5	< 0.05	< 0.05	< 0.05	< 0.05
Cadmium (Cd)	mg/L	0.005	< 0.001	< 0.001	< 0.001	< 0.001
Chromium (Cr)	mg/L	0.05	< 0.005	< 0.005	< 0.005	< 0.005
Iron (Fe)	mg/L	0.3	**1.1**	**0.7**	0.2	0.2
Lead (Pb)	mg/L	0.01	< 0.001	0.002	< 0.001	< 0.001
Manganese (Mn)	mg/L	0.05	**0.43**	**0.25**	**0.37**	**0.14**
Mercury (Hg)	mg/L	0.001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel (Ni)	mg/L	0.02	0.02	**0.03**	< 0.01	< 0.01
Sodium (Na)	mg/L	200	5.7	56	2.3	12
Zinc (Zn)	mg/L	5	0.079	0.59	0.007	< 0.005
Volatile Compounds						
Benzene	mg/L	0.005	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	mg/L	0.0024	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	mg/L	0.024	0.003	< 0.001	< 0.001	< 0.001
Xylene (o, m, p)	mg/L	0.3	< 0.001	< 0.001	< 0.001	< 0.001

[1] The limit values correspond to the limit values that apply to water intended for human consumption.

-- No applicable limit value.

Result exceeding the applicable limit value.

According to the results of Table 10, the following observations should be noted with respect to each category of selected parameters and substances:

Microbiologic

- None of the groundwater samples contained detectable traces of fecal coliforms;

Conventional

- Although some concentrations were detected, none exceeded the prescribed limit values;
- Some concentrations were found to be lower than the analytical detection limits;
- Conductivity measurements are relativity equal;
- The 5-day biochemical oxygen demand (BOD5) as well as the chemical oxygen demand (COD) present significant variations throughout the selected site;

Metals

- Three concentrations (iron, manganese and nickel) exceeded the prescribed limit values;
- Some concentrations were found to be lower than the analytical detection limits;

Volatile Compounds

- Although one concentration (toluene) was detected, it did not exceed the prescribed limit value;
- All, except one concentration, were found to be lower than the analytical detection limits.

It is important to note that another water sampling program will be planned in 2016 for comparison and quality control purposes in order to address any important variances (or to affirm similar results). Following this second water sampling program, the reasoning behind the exceedance of three metal concentrations (iron, manganese and nickel) will also be addressed (naturally found and/or present due to human intervention). Nonetheless, according to Section 58 of the RRLIRM, the limit values listed in Section 57 of the RRLIRM do not apply if the groundwater analysis shows that there is no compliance with those limit values before the groundwater migrates into the soil where the disposal areas or the leachate or water treatment system are situated. In this case, the quality of the groundwater must not, in relation to the parameters or substances listed in section 57 of the RRLIRM, be deteriorated in any manner as a result of its migration into the soil. Lastly, temperature and pH measurements will be recorded during the second water sampling program.

It is important to note that excess iron and manganese are the most common natural contaminants found in soils according to common literature.

All supporting documentation (laboratory results pertaining to the initial water sampling program) is included in Appendix G.

5.0 GROUNDWATER CONSIDERATIONS

5.1 HYDROGEOLOGICAL FORMATION

Once the subsurface materials and groundwater conditions are known, the hydrogeological formation can be identified as an aquifer, aquitard or aquiclude. An aquifer is defined as a saturated layer of water-bearing permeable rock, rock fractures or unconsolidated materials (gravel, sand or silt) from which groundwater can store and transmit significant quantities of groundwater under ordinary hydraulic gradients and/or can yield economic quantities of water to wells. An aquitard is defined as a bed of low permeability along an aquifer capable of transmitting geologically significant amounts of water, but not economic quantities of water to wells. An aquiclude is defined as a solid impermeable area underlying or overlying an aquifer that cannot transmit geologically significant amounts of water to wells.

Taking into account the different field observations, stratigraphic units, analytical results, soils textures and hydraulic conductivity values, the subsurface materials found within the projected limits of the new landfill site can be classified as either aquifers or aquitards due to the following arguments:

- The relative permeability is neither “pervious”, nor “impervious” as the field hydraulic conductivity values relevant to the different soils (based on the permeability tests performed on-site) varies between 2.32×10^{-5} and 2.17×10^{-3} cm/s;
- Although there is an overwhelming presence of sand as the primary constituent particle size of each apparent soil texture (sand, loamy sand and sandy loam), the minimal presence of well sorted sand and gravel combined with a strong presence of fine sand makes it difficult to exclusively classify the hydrogeological formation as an aquifer;
- The presence of fractured and/or intact bedrock (by means of visual observations) at different depths.

It is important to note that the possible presence of aquicludes within the projected limits of the new landfill site is very unlikely due to the lack of subsurface impermeable materials and/or non-porous materials with low hydraulic conductivity values.

5.2 AQUIFER TYPE

Regarding the end members in the spectrum of aquifer types, an aquifer can be either “confined” or “unconfined” (with “semi-confined” being in between).

An “unconfined” aquifer is defined as water that is allowed to seep from the ground surface through permeable layers directly above the aquifer. Hence, the water table level is free to fluctuate according to seasonal precipitations. An “unconfined” aquifer is sometimes referred to

as a water table or a phreatic aquifer due to the upper boundary being the water table or phreatic surface. Typically (but not always) the shallowest aquifer at a given location is "unconfined", meaning it does not have a confining layer (an aquitard or aquiclude) between itself and the ground surface. The term "perched" refers to ground water accumulating above a low-permeability unit or strata (such as a clay layer), which is clearly not the case here. This term is generally used to refer to a small local area of ground water that occurs at an elevation higher than a regionally extensive aquifer. The difference between "perched" and "unconfined" aquifers is that the former term refers to smaller quantities.

A "confined" aquifer is defined as water that is prevented from seeping from the ground surface due to the presence of impermeable layers directly above the aquifer. Instead, water seeps into a "confined" aquifer from farther away where impermeable layers do not exist. Additionally, the confining layer might offer some protection from surface contamination.

Taking into account the different field observations, stratigraphic units, analytical results, soils textures and "semi-pervious" relative permeability, the aquifer type is probably between "unconfined" and "semi-confined" with a quality situated somewhere between "good" and "poor" (as illustrated in Figure 8).

It is important to note that the possible presence of a "confined" aquifer within the projected limits of the new landfill site is very unlikely due to the lack of subsurface impermeable materials and/or non-porous materials with low hydraulic conductivity values.

5.3 POTENTIAL CONTAMINATION RISKS

Sources of groundwater contamination can be categorized as either "point sources" (from clearly defined sources) or "non-point sources" (from one or more non-specific sources due to the cumulative effects of any number of factors or activities). Regarding the operation of landfill sites, sources of groundwater contamination are considered to be "point sources" since the known potential contamination risk derives from waste liquids (or leachates formed from the passage of rainwater and snowmelt through the waste) that can infiltrate across the unsaturated zone and transport contaminated water to the water table. Once solid waste has been landfilled, water passing through the stored material leaches chemicals from the waste that can subsequently move from the landfill into surface and/or ground water. The chemical constituents in the leachate reflect the kinds of materials landfilled as well as the age of the landfill and every conceivable inorganic and organic material may be found in the composition of the leachates.

Landfills constructed in the past constitute significant "point sources" of contaminants since little attempt was made in earlier years to control the types of materials landfilled or the generation and movement of leachate. Today, with better environmental guidelines and waste management practices combined with recycling and recuperation activities, the chemical quality of leachates can be better controlled today. Nonetheless, the same potential

contamination risks still exist today as in the past due to the inevitable occurrence of leachates. In reference to the projected limits of the new landfill site, the natural environment may be at risk if leachates are not controlled. However, this site was preferred due to the affirmation of the following site-selection criteria:

- Minimum water table depth between 3 and 4 meters and the possibility of having a minimum distance of 1 meter between the landfilled waste and the groundwater level;
- Minimum distance of 150 meters from the network of lakes, streams and any other waterbody (as per Section 88 of the RRLIRM);
- Minimum distance of 500 meters from any water intake facility for human consumption (as per Section 88 of the RRLIRM);
- Not visible within a 1 kilometer radius of a public area or residence.

Lastly, the drinking water of Waswanipi is not considered at risk since the projected limits of the new landfill site are situated approximately 25 kilometers northeast of the community and to our knowledge, there are no other known working water wells situated downstream of the site. Nevertheless, compliance to general siting, operational and containment protection conditions as well as monitoring, supervision and frequency procedures (according to the RRLIRM) is essential to assure an efficient means of leachate and groundwater control during the lifespan and post-closure activities.

5.4 POTENTIAL RESURGENCE

There is potential groundwater resurgence in the following areas according to the observed and measured water table depths (data presented in Table 9 and illustrated in Figure 10):

- Furthermost western portion of trench #2 near borehole PO-04-15. Since the water table is relatively near the surface (measured at 2.41 meters), groundwater resurgence is likely to occur in local depressions or at the base of sharp slopes, after heavy precipitation or snowmelt;
- Trenches #5 and #6 due to the lack of available groundwater data. It is important to note that access to the southern portion of the projected limits of the new landfill site was deemed too difficult and unsecure (due to the forest and topographical limits) at the time of the borehole drilling works (between September 28 and October 22, 2015).

Since the final design plans and specifications of the new landfill will be provided with the certificate of authorization demand (following the ministerial acceptance of the impact assessment), the western portion of trench #2 should not be included within the projected limits of the new landfill site in order to eliminate possible groundwater exposure and/or contamination. It is important to note that the exclusion of the western portion of trench #2 will not affect the 25 year lifespan (6 hectares) envisioned by the community since the projected

limits of the new landfill site represents a surface area of roughly 23 hectares, assuming a proposed trench depth of 3 meters.

Regarding trenches #5 and #6, groundwater data can be made available once safe access is granted (by means of deforestation and surface grading). Since trenches #1 to #4 will be landfilled prior to trenches #5 and #6, the required works can be executed at a later time. Furthermore, once the final design plans and specifications of the new landfill will be prepared for the certificate of authorization demand, the available volume and lifespan per trench will be known and the need for trenches #5 and #6 will be re-evaluated at this time. It is important to note the nearest measured water table depths to these two (2) trenches are greater than the proposed trench depth of 3 meters (17.73 meters at borehole PO-01-15 and > 25.30 meters at borehole F-06-15).

Figure 10 Observed and measured water table depths according to the different investigative means

Appendix A DAILY PRODUCTION REPORTS

RAPPORT JOURNALIER C.E.S.

Projet : installation de puits **N° d'OTP :** 1670 20019

Endroit : Waswanipi, Futur LEE+ **Date :** 15-9-28

Personnes rencontrées : ☐ N/A

☒ Entrepreneur : Forage Giroux

☐ Sous-traitants :

☐ Client :

☐ Autres :

Conditions atmosphériques:

☐ Pluie ☐ Averses ☐ Ensoleillé ☒ Nuageux ☐ Neige ☐ Autres:

Description des activités : 7h30 → Début preparation du matériel à l'entrepôt

8h00 → Location pick-up

8h30 → Bureau ⇒ impression programme travaille + preparation materiel Final

9h30 → Départ pour waswanipi

13h00 → Arrivé a waswanipi ⇒ Mobilisation vers le site car Foreurs pas arrivé

13h00 à 14h00 → positionnement du 1er puits + Retour waswanipi car foreur arrivé

14h00 à 17h30 → Mobilisation vers site avec Foreuse et camion tanker + positionnement sur PO-03-15 ⇒ positionnement des autres Forages

17h30 à 18h30 → Route vers chapais + chambre hotel

11h00

Documents joints :

☐ Rapport de forage ☐ Développement d'un puits ☐ Rapport de tranchée d'exploration

☐ Relevé des COV ☐ Purge à faible débit, faible rabattement ☐ Relevé d'arpentage

☐ Relevé des niveaux d'eau ☐ Échantillonnage d'eau ☐ Plan ou croquis

☐ Demande d'analyse ☐ Essai de perméabilité ☐ Autre :

Technicien : M Frigon **Date :** 15-9-28

Vérifié par : **Date :**

FORAGE GIROUX
Géotechnique - Environnemental - Exploration

Rapport quotidien de Forage

172 A, Rte 386
Senneterre, (Qc) J0Y 2M0
stevegiroux77@yahoo.ca

Tél.: 819 737-2043
Fax: 819 737-3343
Cell: 819 856-9389

Client : Stantec

Lun **Date :** 28 Sept 2015 **Date :**

Localisation : Km 271 Rte Chapais **Localisation :**

Mobilisation : Senneterre Km 271

Démobilisation :

Mob. / démob. Personnel : 1.0

Camion de service	✓
Chauffage d 'outils	
Chauffage d'eau	
Réservoir d'eau	
Pension journalière	
Déjeuner	
Dîner	
Souper	
Coucher	
Obturateur	
Argo	
VTT / motoneige	

Nilcon	
Piston	

Outils diamantés	Nb. Pieds
BW	
BQ	
HW	
HQ	
NW	
NQ	
PW	
PQ	

Foreuse	Utilisée	Heures
Sedidrill s410 et Mooroka MST 1500		
Diedrich D-50 sur chenillard		
Diedrich D-50 sur camion		
Attente		

Détails des heures : de 7:00 h à 10:30 Garage et chargement
de 10:30 à 2:30 Transport
2:30 à 5:00 Opération

Matériel divers :

Foreur: Emery Victor Technicien: Michael A.

RAPPORT JOURNALIER C.E.S.

Projet : Installation de puits **N° d'OTP :** 1670 20019

Endroit : Waswanipi, Futur LEET **Date :** 15-9-21

Description des activités : 6h00-D Départ pour site

7h00-D Remplissage Réservoir d'eau dans étang à castor

8h00-D Début Forage PO-03-15

10h00-D 0-13' de Foré, Atteinte du Roc à 13'

Confirmation du Roc 5'

11h00-D Roc confirmé de 13' à 18' installation du Puits

12h30-D PO-03-15 installé, Mobilisation vers PO-02-15

13h00-D Début Forage PO-02-15

15h30-D Forage 0' à 25' => CF-7 20-22' est saturé

on va installé à 25'

17h00-D Puits Terminé

=> Vérification des Niveau d'eau dans PO-3 et PO-2

!!? -> PO-02-15 est à Sec !! :(

On devra le Refaire => incompréhensible car tout indiquais qu'on était dans l'eau

17h00 à 18h00 -D Retour à chapais

12h00

Technicien : M Ricard **Date :**

Vérifié par : **Date :**

FORAGE GIROUX
Géotechnique - Environnemental - Exploration

Rapport quotidien de Forage

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stevegiroux77@yahoo.ca

Tél.: 819 737-2043
Fax: 819 737-3343
Cell: 819 856-9389

Client : Stentic

Date : 29 Sept 2015 **Date :**

Localisation : Wasamigan **Localisation :** 11670 20019

Mobilisation :

Démobilisation :

Mob. / démob. Personnel : 2 hrs

Camion de service	✓
Chauffage d 'outils	
Chauffage d'eau	
Réservoir d'eau	✓
Pension journalière	
Déjeuner	
Dîner	
Souper	
Coucher	
Obturateur	
Argo	
VTT / motoneige	

Nilcon	
Piston	

Outils diamantés		Nb. Pieds
BW		
BQ		
HW		
HQ		
NW	✓	38
NQ	✓	5'
PW		
PQ		

Foreuse	Utilisée	Heures
Sedidrill s410 et Mooroka MST 1500		
Diedrich D-50 sur chenillard	✓	12 hrs
Diedrich D-50 sur camion		
Attente		

Détails des heures :

Matériel divers : Debut 6:00 Total 12 hrs
Fin 6:00

Foreur: Technicien:

PubMC14-01

RAPPORT JOURNALIER C.E.S.

Projet : Installation de puits **N° d'OTP :** 16702019

Endroit : Washawipi + Future LEET **Date :** 15-9-30

Personnes rencontrées : ☐ N/A

- ☑ Entrepreneur : Forages Gilbert
- ☐ Sous-traitants :
- ☐ Client :
- ☑ Autres : Fortunato

Conditions atmosphériques:

☐ Pluie ☐ Averses ☐ Ensoleillé ☐ Nuageux ☐ Neige ☐ Autres:

Description des activités :

6h00 → Départ chapais
6h45 → Remplissage Réservoirs + Vérification PO-02-15 → Puits Vraiment à sec. Sera Refait
7h30 → Nettoyage puits existant + Forage 0-30' en destructif
8h30 à 10h00 → Attente flaggage trail pour Forage + Développement PO-03-15
10h00 → Echantillonnage PO-02-15 30' à 40' + Validation Position Puits restant avec Fortunato
11h30 → PO-02-15 est à 40' attente + Vérification ▽ + Divers
12h00 → Pompage de l'eau dans cassing pour validation ▽
12h30 → ▽ à 38' → Forage supplémentaire jusqu'à 45'
13h15 → Installation PO-02-15
15h00 → Mob vers PO-01-15 → Vérification du niveau d'eau
↳ Après Vérification il y a presque pas d'eau dans le puits !!!!!!!!!! Incompréhensible !!!
16h00 → CE-1 et CE-2 pour PO-01-15
17h00 → Retour chapais
18h00 → FIN
(13h00)

Documents joints :

☐ Rapport de forage	☐ Développement d'un puits	☐ Rapport de tranchée d'exploration
☐ Relevé des COV	☐ Purge à faible débit, faible rabattement	☐ Relevé d'arpentage
☐ Relevé des niveaux d'eau	☐ Échantillonnage d'eau	☐ Plan ou croquis
☐ Demande d'analyse	☐ Essai de perméabilité	☐ Autre :

Technicien : M Roy **Date :** 15-9-30

Vérifié par : **Date :**

FORAGE GIROUX
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Rapport quotidien de Forage

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Cell: 819 856-9389

Client : Stantec

Date : 30 Sept 2015 **Date :** 1/10/2019

Localisation : Wasswanipi **Localisation :**

Mobilisation :

Démobilisation :

Mob. / démob. Personnel : 2h

Camion de service	✓
Chauffage d 'outils	
Chauffage d'eau	
Réservoir d'eau	✓
Pension journalière	
Déjeuner	
Dîner	
Souper	
Coucher	
Obturateur	
Argo	
VTT / motoneige	

Nilcon	
Piston	

Outils diamantés	Nb. Pieds
BW	
BQ	
HW	45
HQ	
NW	45
NQ	
PW	
PQ	

Foreuse	Utilisée	Heures
Sedidrill s410 et Mooroka MST 1500		
Diedrich D-50 sur chenillard	✓	11.5
Diedrich D-50 sur camion		
Attente		

Détails des heures : debut 6.00 hr
fin 5.30 hr total 11.30

Matériel divers : 1 Coupe 10' 2"
4 PVC 2"
1 Bouchon fond + 1 Bouchon orange

Foreur: Emery Vachon Technicien:

PubMC14-01

RAPPORT JOURNALIER C.E.S.

Projet : Installation de puits **N° d'OTP :** 1670202019

Endroit : Waswanipi, Futur LEET **Date :** 15-10-01

Description des activités : 6h00 → Départ vers site.

6h45 à 7h30 → Remplissage Réservoir

7h30 à 12h30 → Forage PO-CY-15 0' à 480'

12h30 → Remplissage Réservoir

13h00 → Reprise 0' à 57'

16h00 → Roc atteint ≈ 57' carottage du Roc sur 5' pour confirmation

17h30 → Forage terminé à ≈ 61'

Retour vers chapais

18h30 → Programmation du Datalogger

19h00 → FIN

(13h00)

Technicien : M. Rigan **Date :** 15-10-01

Vérifié par : **Date :**

FORAGE GIROUX
Géotechnique - Environnemental - Exploration

Rapport quotidien de Forage

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Tél.: 819 737-2043
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Cell: 819 856-9389

Client : Stantec

Jeu **Date :** 01 OCT 2015 **Date :** 1670 20019

Localisation : Wasamigi **Localisation :**

Mobilisation :

Démobilisation :

Mob. / démob. Personnel :

Camion de service	✓
Chauffage d 'outils	
Chauffage d'eau	
Réservoir d'eau	✓
Pension journalière	
Déjeuner	
Dîner	
Souper	
Coucher	
Obturateur	
Argo	
VTT / motoneige	

Nilcon	
Piston	

Outils diamantés	Nb. Pieds
BW	
BQ	
HW	
HQ	
~~NW~~ HW ✓	57
~~NQ~~ HQ ✓	5
PW	
PQ	

Foreuse	Utilisée	Heures
Sedidrill s410 et Mooroka MST 1500		
Diedrich D-50 sur chenillard	✓	11.5
Diedrich D-50 sur camion		
Attente		

Détails des heures : début 600 fin 630 total 11.5

Matériel divers :

Foreur: Enrry Victor Technicien:

PubMC14-01

RAPPORT JOURNALIER C.E.S.

Projet : Installation de puits **N° d'OTP :** 167020019

Endroit : Waswanipi, Future LEET **Date :** 15-10-02

Personnes rencontrées : ☐ N/A

☐ Entrepreneur : Forage Giroux

☐ Sous-traitants :

☐ Client :

☐ Autres :

Conditions atmosphériques:

☐ Pluie ☐ Averses ☐ Ensoleillé ☐ Nuageux ☐ Neige ☐ Autres:

Description des activités : 6h00 → Départ pour site

6h45 → Remplissage Réservoir

7h30 → Installation du puits PO-01-15 à ≈61 pieds

9h30 → Cassing a cassé en Arrachant @ 30' tentative de Récupéré infructueuse.

11h00 → Arrivé de Steve Giroux, Evaluation de la situation mais le cassing sera laissé en place car impossible d'aller le chercher sans briser le puits

11h30 → Finition du puits + Dinner

12h30 → Mobilisation sur PO-02-15 (Encore)

13h00 → Arrachage du puits déjà en place et Reforage jusqu'à 55' en destructif

13h30 → Développement du Puits PO-01-15 pendant le Forage en destructif de PO-02-15 (c)

14h00 → Développement PO-01-15

14h30 → Essai perméabilité PO-03-15

16h30 → Fin Forage 0' à 50' wow! + Ramassage

17h00 → Départ pour chapais

18h00 → Fin (12h00)

Documents joints :

☐ Rapport de forage ☐ Développement d'un puits ☐ Rapport de tranchée d'exploration

☐ Relevé des COV ☐ Purge à faible débit, faible rabattement ☐ Relevé d'arpentage

☐ Relevé des niveaux d'eau ☐ Échantillonnage d'eau ☐ Plan ou croquis

☐ Demande d'analyse ☐ Essai de perméabilité ☐ Autre :

Technicien : M Trian **Date :** 15-10-02

Vérifié par : **Date :**

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Rapport quotidien de Forage

Client : Stantec

len **Date :** 2 octobre 2015 **Date :** 16 70 20 19

Localisation : Waswanipi **Localisation :**

Mobilisation :

Démobilisation :

Mob. / démob. Personnel :

Camion de service	✓
Chauffage d 'outils	
Chauffage d'eau	
Réservoir d'eau	✓
Pension journalière	
Déjeuner	
Dîner	
Souper	
Coucher	
Obturateur	
Argo	
VTT / motoneige	

Nilcon	
Piston	

Outils diamantés	Nb. Pieds
BW	
BQ	
HW	
HQ	
~~NW~~ HW ✓	50'
NQ	
PW	
PQ	

Foreuse	Utilisée	Heures
Sedidrill s410 et Mooroka MST 1500		
Diedrich D-50 sur chenillard	✓	12 hr
Diedrich D-50 sur camion		
Attente		

Détails des heures : debut 6 00 hr total 12 hr
fin 6 00 hr

Matériel divers :

Foreur: Emey Victor Technicien: [signature]

PubMC14-01

RAPPORT JOURNALIER C.E.S.

Projet : Installation de puits **N° d'OTP :** 1670200019

Endroit : Waswanipi, Futur LEG **Date :** 15-10-03

Personnes rencontrées : ☐ N/A

- ☒ Entrepreneur : Forage Giroux
- ☐ Sous-traitants :
- ☐ Client :
- ☐ Autres :

Conditions atmosphériques:

☐ Pluie ☐ Averses ☒ Ensoleillé ☐ Nuageux ☐ Neige ☐ Autres: -5°C

Description des activités :

6h00 → Départ vers site 1
6h45 → Remplissage Réservoir
7h30 → Suite Forage PO-05-15 (c) de #50' à 64'6"
9h00 → carottage du Roc sur 5' de 64'6" à ≈70'
9h15 → essai perméabilité PO-01-15
10h15 → Roc est très fracturé en surface, il sera carotté sur 10' pour faire suite d'item sur le Roc
12h00 → Après emballage des tiges le cassing "H" est coincé dans le trou et ne veut pas bouger
13h30 → Après plusieurs essais infructueux on va appeler Steve pour voir les solutions. Steve ne répond pas on va remplir le réservoir il allera faire les forages sans l'installation de puits
13h00 → Mobilisation vers F-05-15
15h00 → Début Forage F-05-15
17h00 → Roc atteint @ 16' Fin du Forage
Drainage des hoses et Finition
17h45 → Retour à chapais
18h30 → Fin de journée (12h30)

Documents joints :

☐ Rapport de forage	☐ Développement d'un puits	☐ Rapport de tranchée d'exploration
☐ Relevé des COV	☐ Purge à faible débit, faible rabattement	☐ Relevé d'arpentage
☐ Relevé des niveaux d'eau	☐ Échantillonnage d'eau	☐ Plan ou croquis
☐ Demande d'analyse	☐ Essai de perméabilité	☐ Autre :

Technicien : M Fréjon **Date :** 15-10-03

Vérifié par : **Date :**

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Rapport quotidien de Forage

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Cell: 819 856-9389

Client : Stantec

Date : 3 oct 2015 **Date :** ~~Start~~

Localisation : Wasamigan **Localisation :**

Mobilisation :

Démobilisation :

Mob. / démob. Personnel :

Camion de service	✓
Chauffage d 'outils	
Chauffage d'eau	
Réservoir d'eau	✓
Pension journalière	
Déjeuner	
Dîner	
Souper	
Coucher	
Obturateur	
Argo	
VTT / motoneige	

Nilcon	
Piston	

Outils diamantés		Nb. Pieds
BW		
BQ		
HW	✓	15
HQ	✓	10
NW	✓	15
NQ		
PW		
PQ		

Foreuse	Utilisée	Heures
Sedidrill s410 et Mooroka MST 1500		
Diedrich D-50 sur chenillard	✓	13hrs
Diedrich D-50 sur camion		
Attente		

Détails des heures : debut 5.30 total 13hrs
fin 6.30

Matériel divers :

Foreur: Emery Victor Technicien: ML

PubMC14-01

RAPPORT JOURNALIER C.E.S.

Projet : Installation de puits **N° d'OTP :** 167020019

Endroit : Waswanipi, Futur LEE+ **Date :** 15-10-04

Personnes rencontrées : ☐ N/A

☒ Entrepreneur : Forage Gireux

☐ Sous-traitants :

☐ Client :

☐ Autres :

Conditions atmosphériques:

☐ Pluie ☐ Averses ☐ Ensoleillé ☒ Nuageux ☐ Neige ☐ Autres:

Description des activités : 6h00 → Départ Pour site

6h45 → De Mobilisation du F-05-15 et Mobilisation sur F-06-15

8h15 → Debut CE F06-15

9h00 → Remplissage Réservoir

9h45 → Reprise F-06-15

13h00 → Arrêt du forage @ 30' car plus de "Mod" les foreurs vont retourner @ Senneterre pour aller chercher de la mod et le gros marteau pour Deprendre le casing du PO 02-15

13h00 à 14h00 → Drainage et Ramasse du Matériel pour prochain Forage. Strappage et preparation pour retour du camion à Senneterre.

14h00 → Retour Chapais

15h00 - 15h30 → Verification accessibilité pour puits a ouje P.12 = ok

9h30

Documents joints :

☐ Rapport de forage ☐ Développement d'un puits ☐ Rapport de tranchée d'exploration

☐ Relevé des COV ☐ Purge à faible débit, faible rabattement ☐ Relevé d'arpentage

☐ Relevé des niveaux d'eau ☐ Échantillonnage d'eau ☐ Plan ou croquis

☐ Demande d'analyse ☐ Essai de perméabilité ☐ Autre :

Technicien : M Fergen **Date :** 15-10-04

Vérifié par : **Date :**

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Rapport quotidien de Forage

Client : Stantec

Dim **Date :** 4 octobre 2015 **Date :** ~~[illegible]~~

Localisation : [illegible] **Localisation :**

Mobilisation :

Démobilisation : ~~[illegible]~~

Mob. / démob. Personnel : 2hr

Camion de service	✓
Chauffage d 'outils	
Chauffage d'eau	
Réservoir d'eau	✓
Pension journalière	
Déjeuner	
Dîner	
Souper	
Coucher	
Obturateur	
Argo	
VTT / motoneige	

Nilcon	
Piston	

Outils diamantés		Nb. Pieds
BW		
BQ		
HW	✓	15
HQ	✓	5
NW	✓	3/05
NQ		
PW		
PQ		

Foreuse	Utilisée	Heures
Sedidrill s410 et Mooroka MST 1500		
Diedrich D-50 sur chenillard	✓	8hrs
Diedrich D-50 sur camion		
Attente		

Détails des heures : début 16-05.30 total 7h 3hrs
fin 2.00 hs

Matériel divers :

Foreur: Emery Victor Technicien: [signature]

PubMC14-01

RAPPORT JOURNALIER C.E.S.

Projet : Installation de puits **N° d'OTP :** 1670 20019

Endroit : Waswanipi, Futur LEET **Date :** 15-10-05

Personnes rencontrées : ☐ N/A

☑ Entrepreneur : Forage Giroux

☐ Sous-traitants :

☐ Client :

☐ Autres :

Conditions atmosphériques:

☐ Pluie ☐ Averses ☐ Ensoleillé ☐ Nuageux ☐ Neige ☐ Autres:

Description des activités : 6h00 → Départ pour site

6h45 → Remplissage des Réservoirs

7h15 → Suite F-06-15 30' à 40'

9h00 → Remplissage des Réservoirs

9h30 → Suite F-06-15 40' à 55'

11h00 → Rentest de 37' @ 83'

11h45 à 13h00 → Mobilisation sur PO-02-15 pour Dépendre le cassing et Finir le puits

13h00 à 16h00 ⇒ marteau a corde pendant tout l'après midi on a réussi a sortir 10' de cassing on reprendra Demain.

16h00 à 16h30 → Ramassage et Départ pour chapais.

17h15 → Finition papier et Discussion pour prochain jour Appel Steve Giroux et Fortunato

18h00 → Fin

18h00

Documents joints :

☐ Rapport de forage ☐ Développement d'un puits ☐ Rapport de tranchée d'exploration

☐ Relevé des COV ☐ Purge à faible débit, faible rabattement ☐ Relevé d'arpentage

☐ Relevé des niveaux d'eau ☐ Échantillonnage d'eau ☐ Plan ou croquis

☐ Demande d'analyse ☐ Essai de perméabilité ☐ Autre :

Technicien : Michael Frigon **Date :** 15-10-05

Vérifié par : **Date :**

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Cell: 819 856-9389

Rapport quotidien de Forage

Client : Stantec

~~mar~~ **Date :** ~~6-10-2015~~ 5-10-2015

Date :

Localisation : Warwanize

Localisation :

Mobilisation :

Démobilisation :

Mob. / démob. Personnel :

Camion de service	✓
Chauffage d 'outils	
Chauffage d'eau	
Réservoir d'eau	✓
Pension journalière	
Déjeuner	
Dîner	
Souper	
Coucher	
Obturateur	
Argo	
VTT / motoneige	

Nilcon	
Piston	

Outils diamantés	Nb. Pieds
BW	
BQ	
HW	
HQ	
NW ✓	25
NQ	
PW	
PQ	

Foreuse	Utilisée	Heures
Sedidrill s410 et Mooroka MST 1500		
Diedrich D-50 sur chenillard	✓	11hrs
Diedrich D-50 sur camion		
Attente		

Détails des heures : debut 6:30h total 11hrs
fin 5.30

Matériel divers :

Foreur: Emery Vieto

Technicien: [signature]

PubMC14-01

RAPPORT JOURNALIER C.E.S.

Projet : Installation de puits **N° d'OTP :** 167020019

Endroit : Wiswanipi, LEET **Date :** 15-10-06

Description des activités : 5h45 → Départ vers S.6

16h30 → Début reprise arrachage du cassing PO-02-15 "C"

6h30 à 8h00 → Corde brisé 2x et tiring mole cassé 2x !!

8h00 → Victor, l'aide foreur a tombé en raccrochant la corde alors qu'il était sur le devant du Muskai et est tombé sur un bloc de bois qui était par terre. Il s'est fait mal au côtés du dos

Victor va se reposer voir si tout est ok

8h00 à 10h00 → Suite arrachage cassing

10h00 → cassing arraché et finition du puits

∇ = 19.87 sol (eau plein de Mod encore)

Fond = 22.19 sol

10h30 → Ramassage et communication avec les chargées de projet pour savoir si on continue avec une autre drill ou si on reporte le reste du projet plus tard

11h00 @ 11h45 → Attente pour décision

11h45 → Victor ne va pas bien, on part au CLSC à Chapais

12h30 → Arrivé au CLSC

12h30 @ 13h00 → Paiment hotel

13h15 @ 14h30 → Attente au CLSC

14h30 → Retour au site

15h20 → Arrivé au site → Développement puits PO-02-15

↳ Les foreurs sont partis

16h00 → impossible de développer le puits maintenant car tubulure trop mole. Il faut aussi disoudre la "Mod" car l'eau est trop moder. ma sonde ne marche pas bien en présence de Mod. Sera développé et l'essai de perméabilité sera reprise dans 2 semaines.

16h30 → Retour Val d'or 7h45 Arrivé (14h00)

Technicien : M Frigen **Date :**

Vérifié par : **Date :**

FORAGE GIROUX
Géotechnique - Environnemental - Exploration

Rapport quotidien de Forage

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Cell: 819 856-9389

Client : Stantec

Date : 6 OCTobre 2015 **Date :** 16/09/2015

Localisation : Waswanipi **Localisation :**

Mobilisation :

Démobilisation :

Mob. / démob. Personnel :

Camion de service	✓
Chauffage d 'outils	
Chauffage d'eau	
Réservoir d'eau	
Pension journalière	
Déjeuner	
Dîner	
Souper	
Coucher	
Obturateur	
Argo	
VTT / motoneige	

Nilcon	
Piston	

Outils diamantés	Nb. Pieds
BW	
BQ	
HW	
HQ	
NW	
NQ	
PW	
PQ	

Foreuse	Utilisée	Heures
Sedidrill s410 et Mooroka MST 1500		
Diedrich D-50 sur chenillard	✓	7.5
Diedrich D-50 sur camion		
Attente		

Détails des heures : Debut 6.00 h total 9h. - 1½ attente
fin 3:00 hr. total 7.5 Operation

Matériel divers :

arrêt en attente de 10.30 à 12.00
arracher casing pris dans le trou.

Foreur: Emery Victor Technicien: Michel

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Rapport quotidien de Forage

Client : Stantec

Mar **Date :** 6 OCT 2015 **Date :** 167020019

Localisation : Waswanipi **Localisation :**

Mobilisation :

Démobilisation : Waswanipi → Senneterre

Mob. / démob. Personnel : Waswanipi → Senneterre + 1h chapais

Camion de service	
Chauffage d 'outils	
Chauffage d'eau	
Réservoir d'eau	
Pension journalière	
Déjeuner	
Dîner	
Souper	
Coucher	
Obturateur	
Argo	
VTT / motoneige	

Nilcon	
Piston	

Outils diamantés	Nb. Pieds
BW	
BQ	
HW	
HQ	
NW	
NQ	
PW	
PQ	

Foreuse	Utilisée	Heures
Sedidrill s410 et Mooroka MST 1500		
Diedrich D-50 sur chenillard		
Diedrich D-50 sur camion		
Attente		

Détails des heures :

Matériel divers :

Foreur: Ernest Vectors Technicien: [signature]

PubMC14-01

RAPPORT JOURNALIER C.E.S.

Projet : Installation puits **N° d'OTP :** 16702009

Endroit : Waswanipi Future LEEF **Date :** 15-10-19

Personnes rencontrées : ☐ N/A

- ☐ Entrepreneur :
- ☐ Sous-traitants :
- ☐ Client :
- ☐ Autres :

Conditions atmosphériques:

☐ Pluie ☐ Averses ☐ Ensoleillé ☐ Nuageux ☐ Neige ☐ Autres:

Description des activités : 8h00 → Bureau Preparation Datalogger + Feuille terrain
8h30 → Camion Location + materiel
9h30 → Depart pour site
13h00 → Arrivé → Developpement du puits PO-02-15 + Attente
Forcer T = 21.81 } PVC eau un peu de
Fond = 23.01 } "Mod" + Pento au fond ??
⇒ Pas d'eau Qui sort, Revenu d'eau probablement trop lent
du Javex devra être mis dans le puits pour dissoudre la
Mod car eau encore epaisse
14h15 → Essai Perméabilité PO-03-15
15h15 → Essai Perméabilité PO-01-15
16h00 → Arrivé des Forcers
16h00 à 17h30 → Preparation pour Mobilisé au PO-04-15
17h30 à 18h30 → Route pour chapais

16h30

Documents joints :

- ☐ Rapport de forage
- ☐ Relevé des COV
- ☐ Relevé des niveaux d'eau
- ☐ Demande d'analyse
- ☐ Développement d'un puits
- ☐ Purge à faible débit, faible rabattement
- ☐ Échantillonnage d'eau
- ☐ Essai de perméabilité
- ☐ Rapport de tranchée d'exploration
- ☐ Relevé d'arpentage
- ☐ Plan ou croquis
- ☐ Autre :

Technicien : M. Frizon **Date :** 15-10-19

Vérifié par : **Date :**

FORAGE GIROUX
Géotechnique - Environnemental - Exploration

Rapport quotidien de Forage

172 A, Rte 386
Senneterre, (Qc) J0Y 2M0
stevegiroux77@yahoo.ca

Tél.: 819 737-2043
Fax: 819 737-3343
Cell: 819 856-9389

Client : Stantec

Date : 19 oct 2015 **Date :**

Localisation : Waswanipi **Localisation :**

Mobilisation : Senneterre → Waswanipi 250 KM

Démobilisation :

Mob. / démob. Personnel : chantier à chapois 70 KM

Camion de service	✓
Chauffage d 'outils	
Chauffage d'eau	
Réservoir d'eau	
Pension journalière	
Déjeuner	✓
Dîner	✓
Souper	✓
Coucher	✓
Obturateur	
Argo	
VTT / motoneige	

Nilcon	
Piston	

Outils diamantés	Nb. Pieds
BW	
BQ	
HW	
HQ	
NW	
NQ	
PW	
PQ	

Foreuse	Utilisée	Heures
Sedidrill s410 et Mooroka MST 1500	✓	2 h 30
Diedrich D-50 sur chenillard		
Diedrich D-50 sur camion		
Attente		

Détails des heures : 15 h 30 à 18 h 00 → 2 h 30

Matériel divers :

Foreur: Steve L.
Steve L.

Technicien:

PubMC14-01

RAPPORT JOURNALIER C.E.S.

Projet : installation de puits **N° d'OTP :** 167020019

Endroit : Waswanipi, Futur LEGI **Date :** 15-10-20

Personnes rencontrées : ☐ N/A

☒ Entrepreneur : Forage Giroux

☐ Sous-traitants :

☐ Client :

☐ Autres :

Conditions atmosphériques:

☐ Pluie ☐ Averses ☐ Ensoleillé ☒ Nuageux ☐ Neige ☐ Autres: Venteux

Description des activités : 6h00 → Départ pour site

6h45 → Remplissage Reservoir

7h00 → Mesure ∇ PO-02-15 = 22.04 m PVC + purge avec Dater

8h00 → Mobilisation sur PO-04-15 avec hose et Muskai

9h30 à 11h30 → Forage de 0' à 17' ⇒ Roc atteind à 17'

carrotage du Roc sur 5'

11h30 → Remplissage du Reservoir d'eau

12h15 à 15h00 → Finition carrotage + installation du Puits à 23' total

15h00 à 17h00 → Démobilisation et preparation pour DeMain + Journal

17h15 - à 18h00 → Route vers Chapais

18h00

Documents joints :

☐ Rapport de forage ☐ Développement d'un puits ☐ Rapport de tranchée d'exploration

☐ Relevé des COV ☐ Purge à faible débit, faible rabattement ☐ Relevé d'arpentage

☐ Relevé des niveaux d'eau ☐ Échantillonnage d'eau ☐ Plan ou croquis

☐ Demande d'analyse ☐ Essai de perméabilité ☐ Autre :

Technicien : M. Frizon **Date :**

Vérifié par : **Date :**

FORAGE GIROUX
Géotechnique - Environnemental - Exploration

Rapport quotidien de Forage

172 A, Rte 386
Senneterre, (Qc) J0Y 2M0
stevegiroux77@yahoo.ca

Tél.: 819 737-2043
Fax: 819 737-3343
Cell: 819 856-9389

Client : Stantec

Date : 20 Oct. 2015 **Date :** _____

Localisation : Wemindji **Localisation :** _____

Mobilisation : _____

Démobilisation : _____

Mob. / démob. Personnel : 140 KM

Camion de service	✓
Chauffage d 'outils	
Chauffage d'eau	
Réservoir d'eau	✓
Pension journalière	✓
Déjeuner	
Dîner	
Souper	
Coucher	
Obturateur	
Argo	
VTT / motoneige	

Nilcon	
Piston	

Outils diamantés	Nb. Pieds
BW	
BQ	
HW	23 P.
HQ	
NW	
NQ	
PW	
PQ	

Foreuse	Utilisée	Heures
Sedidrill s410 et Mooroka MST 1500	✓	11 h 15
Diedrich D-50 sur chenillard		
Diedrich D-50 sur camion		
Attente		

Détails des heures : 6h30 à 17h45 → 11h15

Matériel divers :

Foreur: Steve G. Steve G.

Technicien: _____

PubMC14-01

RAPPORT JOURNALIER C.E.S.

Projet : Installation de puits **N° d'OTP :** 1670 20019

Endroit : Waswanipi // Ouje **Date :** 15-10-21

Personnes rencontrées : ☐ N/A

☒ Entrepreneur : Forage Girouk

☐ Sous-traitants :

☐ Client :

☐ Autres :

Conditions atmosphériques:

☐ Pluie ☐ Averses ☒ Ensoleillé ☒ Nuageux ☐ Neige ☐ Autres:

Description des activités : 6h00 → Route vers site Waswanipi et mesure Niveau Nieau PO-04-15 + finition preparation pour Route vers Ouje.

8h00 → Depart pour Ouje

9h00 → preparation au Forage

9h30 → Remplissage Reservoir

10h30 → Debut Forage P-12

11h00 → Depart pour site Waswanipi pour Developement du Puits et essai permeabilité

12h30 → Développement du puits PO-04-15

13h00 → essai permeabilité PO-02-15

14h00 → essai Permeabilité PO-04-15

14h45 → Retour au site Ouje ⇒ les forages ont Foré jusqu'a 90' comme prévu

16h00 ⇒ installation du puits

17h30 → Puits installé, preparation pour Depart

18h00 → Signature papier + Fin Journée

12h00

Documents joints :

☐ Rapport de forage ☐ Développement d'un puits ☐ Rapport de tranchée d'exploration

☐ Relevé des COV ☐ Purge à faible débit, faible rabattement ☐ Relevé d'arpentage

☐ Relevé des niveaux d'eau ☐ Échantillonnage d'eau ☐ Plan ou croquis

☐ Demande d'analyse ☐ Essai de perméabilité ☐ Autre :

Technicien : M. Frigon **Date :**

Vérifié par : **Date :**

FORAGE GIROUX
Géotechnique - Environnemental - Exploration

Rapport quotidien de Forage

172 A, Rte 386
Senneterre, (Qc) J0Y 2M0
stevegiroux77@yahoo.ca
Tél.: 819 737-2043
Fax: 819 737-3343
Cell: 819 856-9389

Mer **Client :** Stantec

Date : 21 Oct 2015 **Date :**

Localisation : **Localisation :**

Mobilisation : Oudjé Semetune 320 KM

Démobilisation : Waswanipi Oudjé 90 KM

Mob. / démob. Personnel :

Camion de service	✓
Chauffage d 'outils	
Chauffage d'eau	
Réservoir d'eau	✓
Pension journalière	✓
Déjeuner	
Dîner	
Souper	
Coucher	
Obturateur	
Argo	
VTT / motoneige	

Nilcon	
Piston	

Outils diamantés	Nb. Pieds
BW	
BQ	
HW	90 P
HQ	
NW	
NQ	
PW	
PQ	

Foreuse	Utilisée	Heures
Sedidrill s410 et Mooroka MST 1500	✓	11 h 30
Diedrich D-50 sur chenillard		
Diedrich D-50 sur camion		
Attente		

Détails des heures : 6 h 30 à 18 h 00 → 11 h 30

Matériel divers :

Foreur: Steve Z Steve Z Technicien:

PubMC14-01

RAPPORT JOURNALIER C.E.S.

Projet : Installation puits **N° d'OTP :** 1870 20019

Endroit : ouJé LEEF + waswanipi **Date :** 15.10.22

Personnes rencontrées : ☒ N/A

- ☐ Entrepreneur :
- ☐ Sous-traitants :
- ☐ Client :
- ☐ Autres :

Conditions atmosphériques:

☐ Pluie ☐ Averses ☐ Ensoleillé ☐ Nuageux ☐ Neige ☐ Autres:

Description des activités : 7h30 → Départ pour site ouJé

Schoop → ∇ D'eau P.12 = 23.40 PVC

Fond = 28.49 PVC

→ Développement et purge du puits

Après purge ∇ = 23.45 en remonté = Revenu d'eau Rapide

8h45 → Route vers site waswanipi pour

9h45 → 2e essai perméabilité sur PO-02-15

10h30 → Départ pour VD

14h00 → Remise papier et Matériel + FDT + préparation semaine prochaine

Documents joints :

- ☐ Rapport de forage
- ☐ Relevé des COV
- ☐ Relevé des niveaux d'eau
- ☐ Demande d'analyse
- ☐ Développement d'un puits
- ☐ Purge à faible débit, faible rabattement
- ☐ Échantillonnage d'eau
- ☐ Essai de perméabilité
- ☐ Rapport de tranchée d'exploration
- ☐ Relevé d'arpentage
- ☐ Plan ou croquis
- ☐ Autre :

Technicien : M. Frigon **Date :**

Vérifié par : **Date :**

RAPPORT JOURNALIER C.E.S.

Projet : Echantillonnage d'eau ++ **N° d'OTP :** 1670200028 / 2019

Endroit : LEET ouest + Waswanipi **Date :** 15-10-29

Personnes rencontrées : ☐ N/A

- ☐ Entrepreneur : _____
- ☐ Sous-traitants : _____
- ☐ Client : _____
- ☒ Autres : Kenny, Employé de Jonathan Mistissini

Conditions atmosphériques:

☒ Pluie ☐ Averses ☐ Ensoleillé ☐ Nuageux ☐ Neige ☐ Autres: _____

Description des activités :

7h00 - Départ pour Mistissini
8h00 - Chargage et photos excavation Charlie's gaz bar
9h00 - Préparation et Rencontre avec Kenny L'employé de Jonathan
9h00 à 10h00 - Rencontre et Formation avec Kenny et 2 autres employés par Hwaste
10h00 - 11h45 - Route vers LEET ouest
11h45 à 2h00 - Échantillonnage ouest
2h00 à 3h00 - Route vers LEET Waswanipi
3h00 à 5h00 - Échantillonnage Waswanipi
5h00 à 8h00 - Route vers U-D
8h00 à 9h00 - Envoies échantillons

14h00

Documents joints :

☐ Rapport de forage	☐ Développement d'un puits	☐ Rapport de tranchée d'exploration
☐ Relevé des COV	☐ Purge à faible débit, faible rabattement	☐ Relevé d'arpentage
☐ Relevé des niveaux d'eau	☒ Échantillonnage d'eau	☐ Plan ou croquis
☐ Demande d'analyse	☐ Essai de perméabilité	☐ Autre : _____

Technicien : M. Trigo **Date :** 15-10-29

Vérifié par : _____ **Date :** _____

Appendix B DRILL HOLE LOGS

Stantec

SOUNDING LOG

NO. **PO-01-15**

PROJECT: **Future Landfill Site - Monitoring Well installation** FILE NO: **167020019** DATE: **2015-09-30**

LOCATION: **Waswanipi** CLIENT: **Cree First Nation of Waswanipi**

Sounding Type:

	From	To
Casing HQ Drilling	0,00	17,53
Rock Drilling	17,53	18,50

Sample Type

SS Split Spoon: 51 mm O.D.
ST Shelby Tube:
TS Piston Tube:
CR Core sample, Caliper:
PW Core sample Fondatec
GS Grab Sample
AU Manual Auger
WS Wash Sample
TU PVC Tubing (Geoprobe)

State of Sample

Disturbed Intact Lost Core

Tests and Measurement in Field

N: Standard Penetration Test
RQD: Rock Quality Designation
R: Refusal
GA: Grain Size Analysis
Kt: Triaxial Permeability Test
VOC: Volatils organic compounds

Analytics Parameters and Tests in Laboratory

MET: Metals
PAH: Polycyclic aromatic hydrocarbon
MAH: Monocyclics aromatic hydrocarbon
THH: Total halogeneted hydrocarbon
BTEX: Benzene, toluene, ethylbenzene, xylenes (totals)
PH: Petroleum hydrocarbon C10-C50
LEA: Leachate test

Coordinates: UTM (zone 18)
X: 5.518.027,000
Y: 445.667,000
Bench Mark:

Groundwater Level

Elevation	Date
m	15-10-29

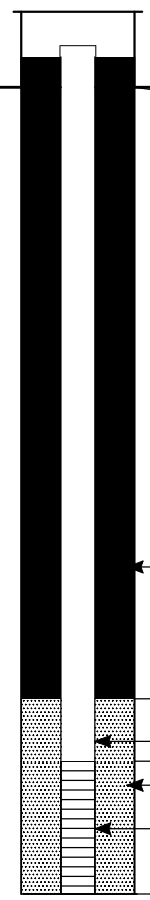
Free Phase Level

Elevation	Date

Depth (m)	Elevation (m)	Groundwater	Free Phase	Soil Profile	Depth (m)
0				Natural soil: Medium grey sand, loose and dry.	0
2				Medium grey sand, slightly moist with dense compaction.	2,44m
4					
6					
8				Medium to coarse grey sand, moist with very dense compaction.	7,62m
10				Fine white and grey sand, firm and moist.	9,14m
12				Medium to coarse grey sand, moist with dense compaction.	12,19m
14					
16					
18		▽ 17.73		Coarse grey sand with gravel, traces of fine sand and clay, soft, saturated.	16,76m
				Rock	17,53m
20				Part of the casing was lost in the hole between 8,23 to 17,37 meters.	18,50m
22					
24					

Well Construction

Diagram



Description

Depth (m)	Sample Type and Number	State	Recovery (%)	N / RQD	Others	VOC (ppm)	Depth (ft)
0	SS-1	X	71	3-9			0
0,61m	SS-2	X	75	11-13			
1,22m	SS-3	X	63	12-20			
1,82m	SS-4	X	58	12-14			
2,44m	SS-5	X	63	15-18			10
3,05m							
5,18m	SS-6	X	54	16-20			
6,71m	SS-7	X	50	15-17	Soil Analysis		20
8,23m	SS-8	X	50	11-13			
9,75m	SS-9	X	50	10-12			30
11,28m	SS-10	X	46	11-13	Soil Analysis		
12,80m	SS-11	X	46	12-13			40
14,33m	SS-12	X	25	13-15	Soil Analysis		50
17,37m	SS-13	X	38	10-7			
							60
							70
							80

FIELD TECHNICIAN: **Michael Frigon. tech.** APPROVED BY: **Patrick L-Distefano, ing.**

Stantec

RAPPORT DE FORAGE

Projet : Installation de puits	**Forage n° :** PO-01-15
Endroit : Wemindji, futur LGET	
N° OTP : 167020019	**Date :** 13-9-30 / 10-01

Compagnie de Forage : Forage Giboulo **Type de foreuse :** ☒ Diedrich D-50 ☐

État	Types	Indices olfactifs	Méthode	Calibre ou diamètre ext.	Profondeur
☒ remanié	MA : Manuel				
▨ intact	CF : Carottier	ND : aucun	Cassing	HW	de 0 à 57'
■ perdu	CR : Tube carottier	L : léger	Carottage	HQ	de 57 à 62'
◧ C.R.	TM : Tube mince	M : moyen			de ___ à ___
	TU : Tube (Géoprobe)	F : fort			de ___ à ___

Profondeur Pi	Échantillons: État	Type et n°	Pénét. (N) ou RQD	Récupération	Indices olfactifs	Description des échantillons	Coupe géologique	Profondeur M
0	☒	CF-1	2-3 4-9	17/24	–	TN: Sable Moyen. Jaune Devenant plus pâle. Lâche. Sec Odeur		
2	☒	CF-2	10-11 13-17	18/24	–	Sable Moyen. GRIS, Sec et Lâche Odeur Traces de sable Grossier		
4	☒	CF-3	10-12 20-22	15/24	–	Sable fin. à Moyen. GRIS. Lâche. un peu humide Odeur		
6	☒	CF-4	10-12 14-21	14/24	–	Idem Précédent		
8	☒	CF-5	8-5 18-22	15/24	–	~~Idem~~: Sable Moyen, GRIS. Ferme, un peu humide		
10								
14								
15								
16	☒	CF-6	12-16 20-25	13/24	–	Sable Moyen. GRIS. compact. Devenant sable fin. GRIS-Blanc @ 2", compact, très humide		
18								
20	☒	CF-7	11-15 17-20	8/24	–	Sable Moyen GRIS. très compact. très humide		
22								
24								
25	☒	CF-8	8-11 13-14	12/24	–	Sable Moyen à Grossier. GRIS très humide à la fin		
27								

Remarques :

Quantité d'eau utilisée lors des travaux de forage : _____ L

Schéma de puits d'observation au verso : ☐ oui ☐ non

Date	Niveau d'eau (tubage)

Technicien M Frigon Vérifié par : _____ Date : _____

Stantec

RAPPORT DE FORAGE

Projet : Installation de puits	**Forage n° :** PO-01-15 (suite)
Endroit : Waswanipi, Futur LEET	
N° OTP : 167020019	**Date :** 15-10-01

Compagnie de Forage : Forage Giroux **Type de foreuse :** ☐ ☐

État	Types	Indices olfactifs	Méthode	Calibre ou diamètre ext.	Profondeur
☒ remanié	MA : Manuel	ND : aucun			de ____ à ____
▨ intact	CF : Carottier	L : léger			de ____ à ____
■ perdu	CR : Tube carottier	M : moyen			de ____ à ____
◧ C.R.	TM : Tube mince	F : fort			de ____ à ____
	TU : Tube (Géoprobe)				

Profondeur Pi	Échantillons: État	Type et n°	Pénét. (N) ou RQD	Récupération	Indices olfactifs	Description des échantillons	Coupe géologique	Profondeur M
30–32	X	CF-9	8-10 12-14	12/24	–	sable très fin, gris-blanc, ferme, très humide.		
34–35								
35–37	X	CF-10	9-11 13-17	11/24	–	sable fin à très fin, gris-blanc, compact, très humide à saturé		
38–40								
40–42	X	CF-11	9-12 13-14	11/24	–	Sable grossier, gris, compact, saturé		
45–47	X	CF-12	11-13 15-16	6/24	–	Sable moyen à grossier, compact, saturé, traces de gravier, gris.		
						↳ plus beaucoup de récupération on va échantillonner au 10'		
50								
55	X	CF-13	11-10 7-14	9/24	–	Sable grossier et gravier, gris foncé, avec présence de sable fin un peu argileux (plus) saturé, ferme		
	→ Roc atteint à ≈ 52'6" ⇒ Carotage 5' pour confirmation + installation							

Remarques :

Quantité d'eau utilisée lors des travaux de forage : 2 réservoirs L

Schéma de puits d'observation au verso : ☐ oui ☐ non

Date	Niveau d'eau (tubage)

Technicien M Trigan Vérifié par : _____ Date : _____

RAPPORT DE FORAGE

FORAGE N° : PO-01-15

N° OTP : 1670200L9

DATE : 15-10-02

Schéma de puits d'observation

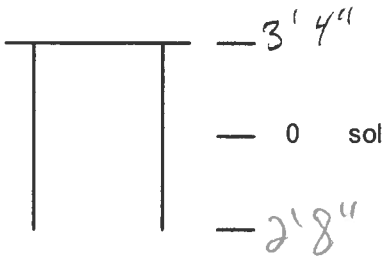
Tubage protecteur

A	✓

ou

Boîte de service

B	



Avant installation : D = 16.70 sol
Fond = 18.50 sol

Après installation : D = 17.68 (PVC)
16.77 (sol)
Fond = 19.40 PVC
18.50 sol

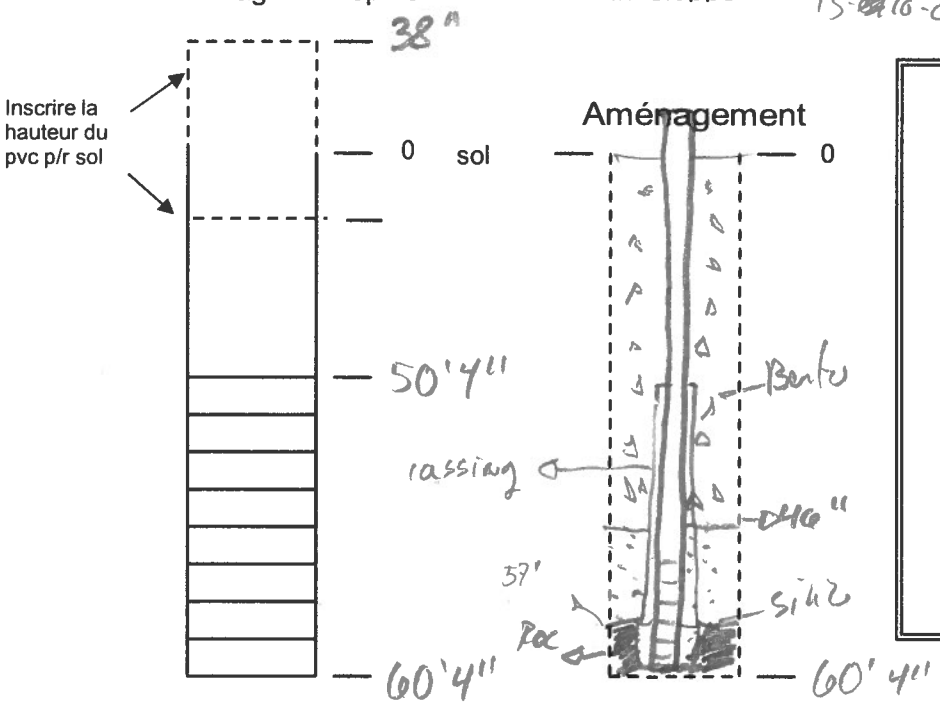
Après Développement : 18.30 PVC

Après Purge : D = 1915 (PVC) (15-10-02)

15-10-03 : D = 18.80 PVC
17.90 Sol

Tubage et crépine

Enveloppe



Légende à utiliser pour l'aménagement du puits

1. Asphalte
2. Ciment
3. Coulis ciment-bentonite
4. Bentonite : hole plug dia : ____ ou peltonite dia : ____
5. Massif filtrant silice grade : ___
6. Autre : _____

Type de crépine :

- ☑ PVC
- ☐ Pointe filtrante
- ☐ Acier Inoxidable
- ☐ _____

Diamètre intérieur de la crépine

- ☐ 38.10 mm
- ☑ 50.8 mm
- ☐ _____

Matériel et quantité utilisés

Tubage	x 5'	6	x10'
Crépine	x 5'	1	x10'
Bouchon	2		
Sac de Silice	2		
Sac Bentonite	6		
Sac de ciment			
Sac de bento poudre	1/2 (chez Dieu)		
Sac d'asphalte froide			

* cassing laissé en place car coincé de 38" à 57' (30' cassing)

Nombre de baril 45 gal utilisé pour disposer les déblais de forage :
(pour éviter les blessures remplir le ou les barils au 3/4 seulement) _____

Tri- 16'4" = 16.3'8" tubage total

Stantec

SOUNDING LOG

NO. **PO-02-15**

PROJECT: **Future Landfill Site - Monitoring Well installation** FILE NO: **167020019** DATE: **2015-10-06**

LOCATION: **Waswanipi** CLIENT: **Cree First Nation of Waswanipi**

Sounding Type:

	From	To
Casing HQ Drilling	0,00	19,66
Rock Drilling	19,66	23,05

Sample Type

SS Split Spoon: 51 mm O.D.
ST Shelby Tube:
TS Piston Tube:
CR Core sample, Caliper:
PW Core sample Fondatec
GS Grab Sample
AU Manual Auger
WS Wash Sample
TU PVC Tubing (Geoprobe)

State of Sample

Disturbed, Intact, Lost, Core

Tests and Measurement in Field

N: Standard Penetration Test
RQD: Rock Quality Designation
R: Refusal
GA: Grain Size Analysis
Kt: Triaxial Permeability Test
VOC: Volatils organic compounds

Analytics Parameters and Tests in Laboratory

MET: Metals
PAH: Polycyclic aromatic hydrocarbon
MAH: Monocyclics aromatic hydrocarbon
THH: Total halogeneted hydrocarbon
BTEX: Benzene, toluene, ethylbenzene, xylenes (totals)
PH: Petroleum hydrocarbon C10-C50
LEA: Leachate test

Coordinates: UTM (zone 18)
X: 5.518.367,000
Y: 445.682,000

Bench Mark:

Groundwater Level

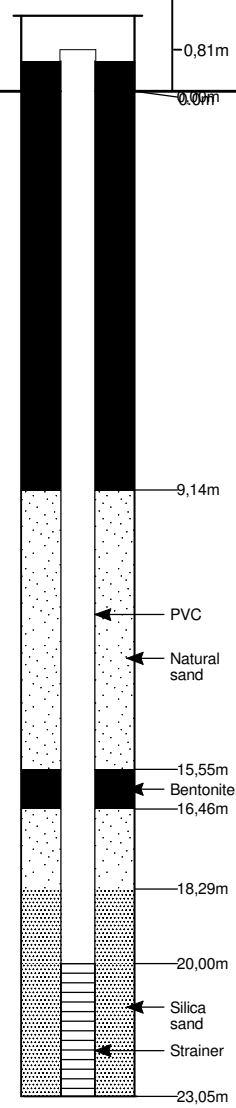
Elevation	Date
m	15-10-29

Free Phase Level

Elevation	Date

Well Construction

Diagram



Depth (m)	Elevation (m)	Groundwater	Free Phase	Soil Profile	Depth (ft)
0				Natural soil: Medium to fine grey sand, loose, dry and yellow at surface becoming moist and pale grey.	0
2					
3,05				Medium grey sand, firm and moist.	10
4					
6					20
8					
9,14				Medium to coarse grey sand, firm and moist.	30
10					
10,67				Medium to coarse grey sand, loose and moist.	
12					40
14					
16					50
16,76				Medium grey sand, moist with dense compaction, traces of gravel.	
18					60
19,66				Rock	
20					
21.23		▽			70
22					
23,05					
24					80

Sample Type and Number	State	Recovery (%)	N / RQD	Others	VOC (ppm)
SS-1		75	5-12		
SS-2		71	14-20		
SS-3		63	19-22		
SS-4		67	21-32	Soil Analysis	
SS-5		63	17-20		
SS-6		58	11-13		
SS-7		46	9-11	Soil Analysis	
SS-8		42	9-11		
SS-9		4	6-8	Soil Analysis	
SS-10		46	18-20		

Depth (m): 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24
Depth (ft): 0, 10, 20, 30, 40, 50, 60, 70, 80

LOG DESSAU-ANG Z:\GINT À TRANSFÈRER\167020019.GPJ DES_SOP.GDT 15-11-12

FIELD TECHNICIAN: **Michael Frigon, tech.** APPROVED BY: **Patrick L-Distefano, ing.**

Stantec

RAPPORT DE FORAGE

Projet : Installation de puits	**Forage n° :** PO-02-15 "A"
Endroit : Uashaunipi, Future LEET	
N° OTP : 1670 2019	**Date :** 15-9-29

Compagnie de Forage : Forage Giroux **Type de foreuse :** ☐ Diedrich D-50 ☐

État	Types	Indices olfactifs	Méthode	Calibre ou diamètre ext.	Profondeur
☒ remanié	MA : Manuel				
▨ intact	CF : Carottier	ND : aucun			de ____ à ____
■ perdu	CR : Tube carottier	L : léger			de ____ à ____
◧ C.R.	TM : Tube mince	M : moyen			de ____ à ____
	TU : Tube (Géoprobe)	F : fort			de ____ à ____

Profondeur Pi	Échantillons: État	Type et n°	Pénét. (N) ou RQD	Récupération	Indices olfactifs	Description des échantillons	Coupe géologique	Profondeur M
0	X	CF-1	2-5 8-12	18/24	–	Sable fin à Moyen. Jaune devenant GRIS. Lâche. sec. Ø odeur		
2	X	CF-2	8-14 20-21	17/24	–	Idem: Sable fin à Moyen. GRIS-Blanc, sec Lâche. Ø odeur		
4	X	CF-3	M-19 22-31	15/24	–	Idem; humide.		
6	X	CF-4	10-21 30-39	16/24	–	Idem: Sable fin à Moyen. GRIS-blanc. Un peu humide. Lâche. Ø odeur		
8	X	CF-5	11-12 20-21	15/24	–	Idem. très humide.		
10								
14								
15								
16	X	CF-6	7-11 13-15	14/24	–	Sable Moyen, GRIS. FERME. très humide à Saturé.		
17								
18								
20	X	CF-7	7-9 11-12	11/24	–	Idem. Sable Moyen. GRIS. FERME. Saturé Ø odeur		
22						LD FORAGE JUSQU'À 23' et installation du puits * puit REFait à 4' au sud CAR Ø d'eau à 25'		
24								
25								

Remarques :	Date	Niveau d'eau (tubage)
Quantité d'eau utilisée lors des travaux de forage : _____ L Schéma de puits d'observation au verso : ☐ oui ☐ non		

Technicien MM Frigon Vérifié par : _____ Date : _____

Stantec

RAPPORT DE FORAGE

Projet : Installation de puits	**Forage n° :** PO-02-15 (B)
Endroit : Waswanipi. Future LEEF	
N° OTP : 167U20019	**Date :** 15-9-30

Compagnie de Forage : Giroux **Type de foreuse :** ☐ Diedrich D-50 ☐

État	Types	Indices olfactifs	Méthode	Calibre ou diamètre ext.	Profondeur
☒ remanié	MA : Manuel	ND : aucun	Cassing	HW	de 0 à 40'
▨ intact	CF : Carottier	L : léger			de ___ à ___
■ perdu	CR : Tube carottier	M : moyen			de ___ à ___
◧ C.R.	TM : Tube mince	F : fort			de ___ à ___
	TU : Tube (Géoprobe)				

Profondeur Pi	Échantillons: État	Type et n°	Pénét. (N) ou RQD	Récupération	Indices olfactifs	Description des échantillons	Coupe géologique	Profondeur M
30	X	CF-8	7-9 11-13	10/24	-	Sable moyen à grossier, gris. Ferme. saturé. Ø odeur		
32								
34								
35	X	CF-9	4-6 8-10	1/24		Sable moyen à grossier. gris. Lâche saturé ⇒ Le sable a sortie de la CF, ce qui indique qu'on est surement dans l'eau ~~⇒ Forage jusqu'à 40' et installation~~		
37								
40						↳ Des test ont été fait dans le cassing, l'eau d'injection a été pompé avec ma petite pompe et finalement. l'eau remonte jusqu'à 38' et semble stable. on va forer jusqu'à 45' et on va installé		
55								

Remarques :

Quantité d'eau utilisée lors des travaux de forage : _____ L

Schéma de puits d'observation au verso : ☐ oui ☐ non

Date	Niveau d'eau (tubage)

Technicien M. Frigen Vérifié par : _____ Date : _____

Stantec

RAPPORT DE FORAGE

Projet : installation de puits	**Forage n° :** PO-02-15 (C)
Endroit : Wasuanipi, Future LEGI	
N° OTP : 16-70 2009	**Date :** 15-10-03

Compagnie de Forage : Forage Cabour **Type de foreuse :** ☐ ☐

État	Types	Indices olfactifs	Méthode	Calibre ou diamètre ext.	Profondeur
☒ remanié	MA : Manuel	ND : aucun			de ____ à ____
▨ intact	CF : Carottier	L : léger			de ____ à ____
■ perdu	CR : Tube carottier	M : moyen			de ____ à ____
◧ C.R.	TM : Tube mince	F : fort			de ____ à ____
	TU : Tube (Géoprobe)				

Profondeur Pi	Échantillons: État	Type et n°	Pénét. (N) ou RQD	Récupération	Indices olfactifs	Description des échantillons	Coupe géologique	Profondeur M
55	X	CF-10	12-18 20-23	11/24	-	Sable Moyen, gris, compact, semble saturé, couleur traces de gravier		
60								
64						↳ Roc atteint à 6" carotage du Roc du 5' ⇒ Roc très fracturé en surface sera carotté S R 10' pour être sur		
75						→ Fin du Forage * cassin coincé @ 65 ∅ = 20 m (sol 15-10-04 9h00 Fond = 22.25 m (sol)		

Remarques :

Quantité d'eau utilisée lors des travaux de forage : _____ L

Schéma de puits d'observation au verso : ☐ oui ☐ non

Date	Niveau d'eau (tubage)

Technicien M Briga Vérifié par : _____ Date : _____

RAPPORT DE FORAGE

Démantelé

FORAGE N° : PO-02-15 (1er)

N° OTP : 167020019

DATE : 15-9-29

Schéma de puits d'observation

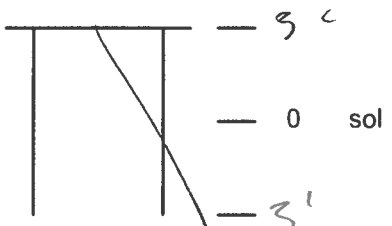
Tubage protecteur

A	✓

ou

Boîte de service

B	

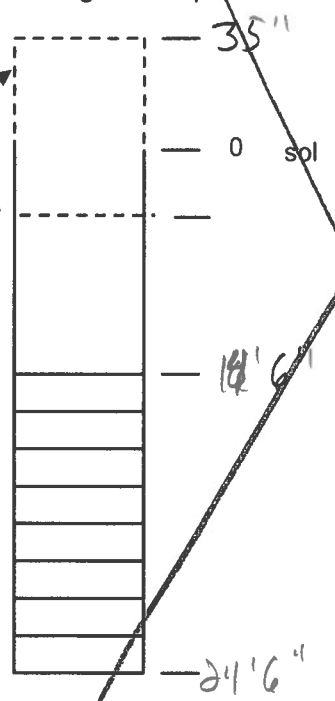


▽ : 8.37 ?!!
↳ pas d'eau dans le puits.
⇒ le puits sera refait !!

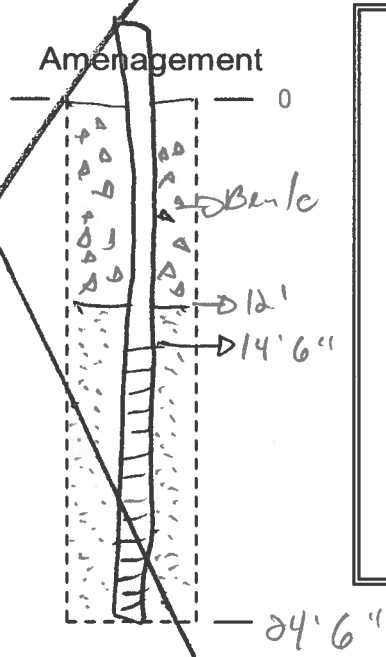
Tubage et crépine

Enveloppe

Inscrire la hauteur du pvc p/r sol



Aménagement



Légende à utiliser pour l'aménagement du puits

1. Asphalte
2. Ciment
3. Coulis ciment-bentonite
4. Bentonite : hole plug dia : ____ ou peltonite dia : ____
5. Massif filtrant silice grade : ____
6. Autre : _____

Type de crépine :

- ☐ PVC
- ☐ Pointe filtrante
- ☐ Acier Inoxidable
- ☐ _____

Diamètre intérieur de la crépine

- ☐ 38.10 mm
- ☐ 50.8 mm
- ☐ _____

Matériel et quantité utilisés

Tubage	x 5' 2 x10'
Crépine	x 5' 1 x10'
Bouchon	2
Sac de Silice	2
Sac Bentonite	3
Sac de ciment	
Sac de bento poudre	
Sac d'asphalte froide	

Nombre de baril 45 gal utilisé pour disposer les déblais de forage :
(pour éviter les blessures remplir le ou les barils au 3/4 seulement) _____

RAPPORT DE FORAGE

Démantelé

FORAGE N° : PO-02-15 ("B") 2e

N° OTP : 1670200019

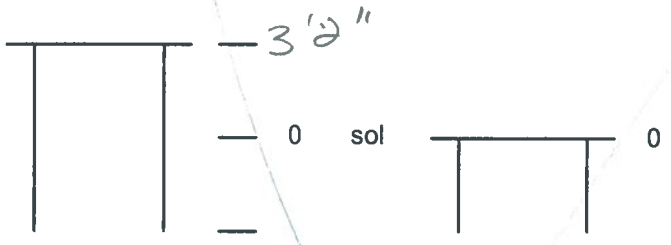
DATE : 15-9-30

Schéma de puits d'observation

Tubage protecteur

A ☑ ou B ☐

Boîte de service



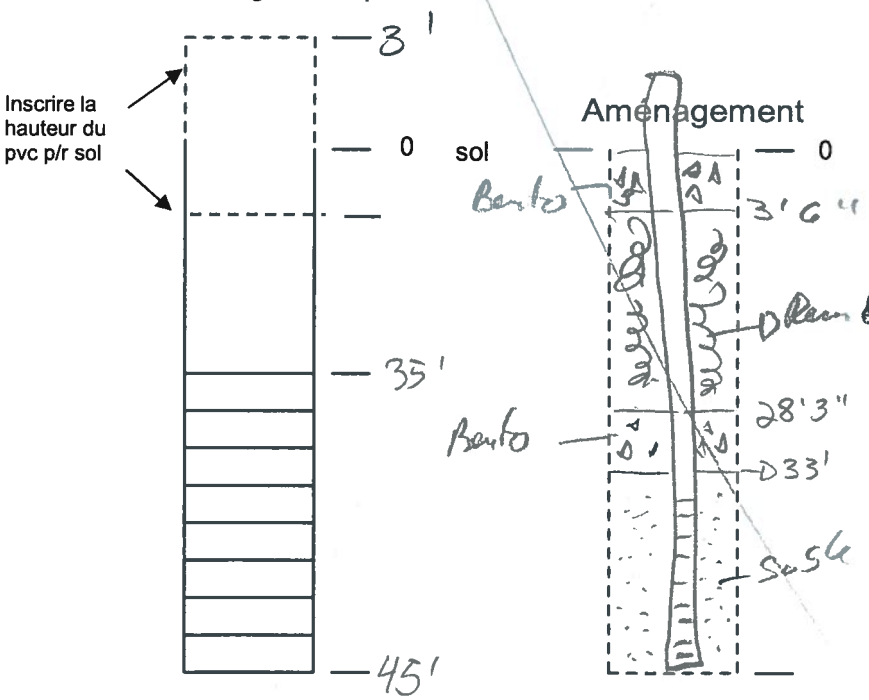
TP = 14.41 (PVC - 15-10-01 // 7h30)
13.54 (sol)

Fond = 14.45 (PVC)
13.60 (Fond)

!!

Tubage et crépine

Enveloppe



Légende à utiliser pour l'aménagement du puits

1. Asphalte
2. Ciment
3. Coulis ciment-bentonite
4. Bentonite : hole plug dia : ____ ou peltonite dia : ____
5. Massif filtrant silice grade : ___
6. Autre : _____

Type de crépine :

- ☑ PVC
- ☐ Pointe filtrante
- ☐ Acier Inoxidable
- ☐ _____

Diamètre intérieur de la crépine

- ☐ 38.10 mm
- ☑ 50.8 mm
- ☐ _____

Matériel et quantité utilisés

Tubage	x 5' 4	x10'
Crépine	x 5'	x10' 1
Bouchon	2	
Sac de Silice	3	
Sac Bentonite	1	
Sac de ciment		
Sac de bento ~~poudre~~ pellet	1/2 Maurice	
Sac d'asphalte froide		

Nombre de baril 45 gal utilisé pour disposer les déblais de forage :
(pour éviter les blessures remplir le ou les barils au 3/4 seulement) _____

RAPPORT DE FORAGE

FORAGE N° : PO-02-15 (c")

N° OTP : 16702001G

DATE : 15-10-06

(15-10-06 15h45)

D = 20.72 (PVC)

Fond : 23.05 (PVC)

Schéma de puits d'observation

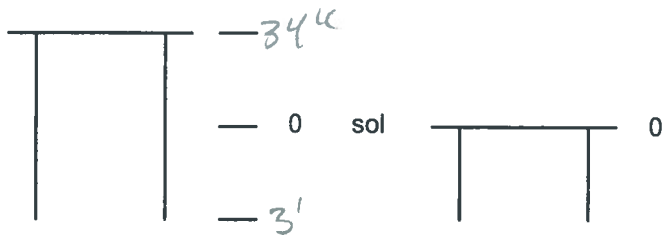
Tubage protecteur

A | ✓

ou

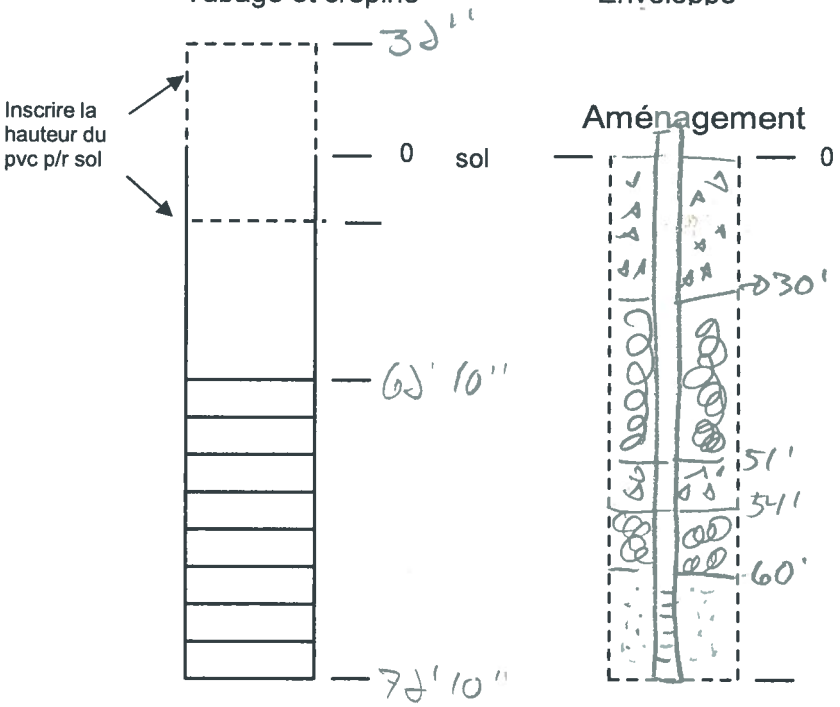
Boîte de service

B |



Tubage et crépine

Enveloppe



Légende à utiliser pour l'aménagement du puits

1. Asphalte
2. Ciment
3. Coulis ciment-bentonite
4. Bentonite : hole plug dia : ____ ou peltonite dia : ____
5. Massif filtrant silice grade : ___
6. Autre : _____

Type de crépine :

- ☑ PVC
- ☐ Pointe filtrante
- ☐ Acier Inoxidable
- ☐ _____

Diamètre intérieur de la crépine

- ☐ 38.10 mm
- ☑ 50.8 mm
- ☐ _____

Matériel et quantité utilisés

Tubage	x 5' 7	x10'
Crépine	x 5' 1	x10'
Bouchon	2	
Sac de Silice	2	
Sac Bentonite	7	
Sac de ciment		
Sac de bento poudre		
Sac d'asphalte froide		

Nombre de baril 45 gal utilisé pour disposer les déblais de forage :
(pour éviter les blessures remplir le ou les barils au 3/4 seulement) _____

Stantec

SOUNDING LOG

NO. **PO-03-15**

PROJECT: **Future Landfill Site - Monitoring Well installation** FILE NO: **167020019** DATE: **2015-09-29**

LOCATION: **Waswanipi** CLIENT: **Cree First Nation of Waswanipi**

Sounding Type:	From	To
Casing HQ Drilling	0,00	3,96
Rock Drilling	3,96	5,38

Sample Type

SS Split Spoon: 51 mm O.D.
ST Shelby Tube:
TS Piston Tube:
CR Core sample, Caliper:
PW Core sample Fondatec
GS Grab Sample
AU Manual Auger
WS Wash Sample
TU PVC Tubing (Geoprobe)

State of Sample

Disturbed Intact Lost Core

Tests and Measurement in Field

N: Standard Penetration Test
RQD: Rock Quality Designation
R: Refusal
GA: Grain Size Analysis
Kt: Triaxial Permeability Test
VOC: Volatils organic compounds

Analytics Parameters and Tests in Laboratory

MET: Metals
PAH: Polycyclic aromatic hydrocarbon
MAH: Monocyclics aromatic hydrocarbon
THH: Total halogeneted hydrocarbon
BTEX: Benzene, toluene, ethylbenzene, xylenes (totals)
PH: Petroleum hydrocarbon C10-C50
LEA: Leachate test

Coordinates: UTM (zone 18)
X: 5.518.466,000
Y: 445.426,000
Bench Mark:

Groundwater Level

Elevation	Date
m	15-10-29

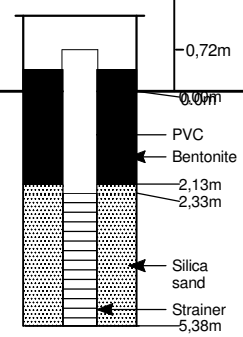
Free Phase Level

Elevation	Date

Depth (m)	Elevation (m)	Groundwater	Free Phase	Soil Profile	Depth (m)
0				Natural soil: fine sand, yellow becoming grey at 0.25m, moist and firm.	0,61m
				Fine pale grey sand, with traces of silt and medium sand, moist and firm.	1,82m
2				Fine grey sand, very moist with dense compaction, traces of medium and loose sand at 2,10m.	3,96m
4		▽ 3.7		Rock	5,38m
6					
8					
10					
12					
14					
16					
18					
20					
22					
24					

Well Construction

Diagram



Description

Depth (m)	Sample Type and Number	State	Recovery (%)	N / RQD	Others	VOC (ppm)
0,61m	SS-1		83	13-16		
1,22m	SS-2		92	32-34		
1,82m	SS-3		67	20-30		
2,44m	SS-4		75	20-23	Soil Analysis	
3,05m	SS-5		54	25-30		

Depth (ft): 0, 10, 20, 30, 40, 50, 60, 70, 80

LOG DESSAU-ANG Z:\GINT À TRANSFÈRER\167020019.GPJ DES_SOP.GDT 15-11-12

FIELD TECHNICIAN: **Michael Frigon, tech.** APPROVED BY: **Patrick L-Distefano, ing.**

Stantec

RAPPORT DE FORAGE

Projet : Installation de puits	**Forage n° :** PO-03-15
Endroit : Waswanipi, ~~Futur~~ LEET	
N° OTP : 167020019-210	**Date :** 15-9-29

Compagnie de Forage : Forage Giroux **Type de foreuse :** ☐ Diedrich D-50 ☐

État	Types	Indices olfactifs	Méthode	Calibre ou diamètre ext.	Profondeur
☒ remanié	MA : Manuel	ND : aucun	Cassing	HW	de 0 à 13'
▨ intact	CF : Carottier	L : léger	carrotage	HQ	de 13' à 18'
■ perdu	CR : Tube carottier	M : moyen			de ___ à ___
◧ C.R.	TM : Tube mince	F : fort			de ___ à ___
	TU : Tube (Géoprobe)				

Profondeur Pi	Échantillons: État	Type et n°	Pénét. (N) ou RQD	Récupération	Indices olfactifs	Description des échantillons	Coupe géologique	Profondeur M
0	X	CF-1	8 13 16 17	20/24	—	TN: sable fin. Jaune devenant Gris @ 10" un peu humide, Ferme. Ø odeur		
2	X	CF-2	25 [illegible]	22/24	—	sable fin. Gris-blanc, Ferme. trace de silt par endroit, un peu humide avec sable Moyen - Gris-blanc @ 20" + Lâche	Ø odeur	
4	X	CF-3	8-20 30-39	16/24	—	sable fin. Gris-blanc, ~~[illegible]~~ un peu humide Ø odeur compact.		
6	X	CF-4	10-20 23-32	18/24	—	sable fin. Gris, compact et très humide devenant sable Moyen @ 13", Gris - très humide ~~[illegible]~~ plus Lâche	Ø odeur	
8	X	CF-5	15-25 30-30	13/24	—	sable fin. Gris. compact. très humide Ø odeur		
10								
13						→ Roc probablement atteind à ≈ 13' confirmation du Roc à 13'		
14								
15						⇒ carottage du Roc de 13' à 18' Roc confirmé. Installation du puits avec 10' crépine de 8' à 18'.		
16								
18								
20								

Remarques :

Quantité d'eau utilisée lors des travaux de forage : _____ L

Schéma de puits d'observation au verso : ☐ oui ☐ non

Date	Niveau d'eau (tubage)

Technicien M Frigen Vérifié par : _____ Date : _____

RAPPORT DE FORAGE

FORAGE N° : PO-03-15

N° OTP : 1670 20019

DATE : 15-9-21

16h30

V = PVC = 4.25
Fond = 6.10

Sol = 3.47
Fond = 5.25

Après développement (15-10-01)

V = PVC = 4.31 (PVC)
Fond = 6.10

V : 3.60 (Fond)
Fond : 5.38

Schéma de puits d'observation

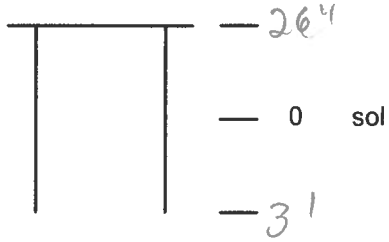
Tubage protecteur

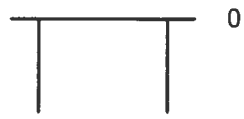
A	✓

ou

Boîte de service

B	

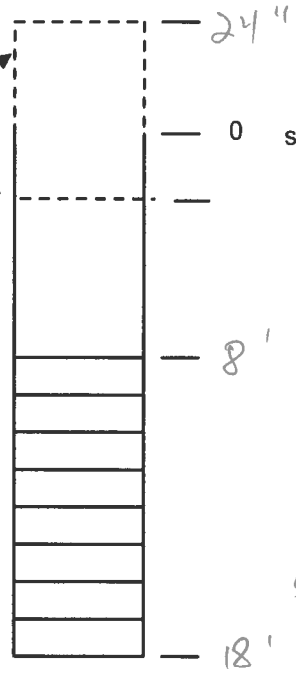




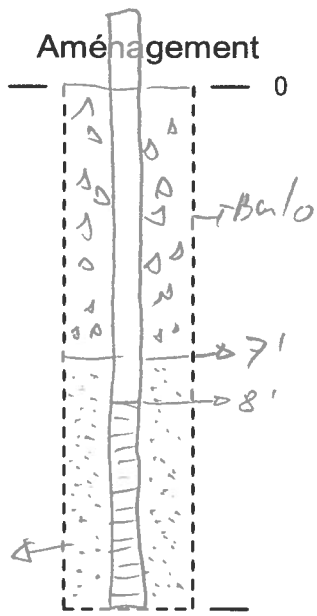
Tubage et crépine

Enveloppe

Inscrire la hauteur du pvc p/r sol



Aménagement



Légende à utiliser pour l'aménagement du puits

1. Asphalte
2. Ciment
3. Coulis ciment-bentonite
4. Bentonite : hole plug dia : 3/8
   ou peltonite dia : ____
5. Massif filtrant silice grade : 1
6. Autre : ____

Type de crépine :

- ☑ PVC
- ☐ Pointe filtrante
- ☐ Acier Inoxidable
- ☐ ____

Diamètre intérieur de la crépine

- ☐ 38.10 mm
- ☑ 50.8 mm
- ☐ ____

Matériel et quantité utilisés

Tubage	x 5' 1 x10'
Crépine	x 5' 1 x10'
Bouchon	2
Sac de Silice	2
Sac Bentonite	1
Sac de ciment	–
Sac de bento poudre	–
Sac d'asphalte froide	–

Nombre de baril 45 gal utilisé pour disposer les déblais de forage :
(pour éviter les blessures remplir le ou les barils au 3/4 seulement) ____

SOUNDING LOG

NO. **PO-04-15**

PROJECT: **Future Landfill Site - Monitoring Well installation** FILE NO: **167020019** DATE: **2015-10-20**

LOCATION: **Waswanipi** CLIENT: **Cree First Nation of Waswanipi**

Sounding Type:

	From	To
Casing HQ Drilling	0,00	5,18
Rock Drilling	5,18	7,07

Sample Type

SS Split Spoon: 51 mm O.D.
ST Shelby Tube:
TS Piston Tube:
CR Core sample, Caliper:
PW Core sample Fondatec
GS Grab Sample
AU Manual Auger
WS Wash Sample
TU PVC Tubing (Geoprobe)

State of Sample

Disturbed Intact Lost Core

Tests and Measurement in Field

N: Standard Penetration Test
RQD: Rock Quality Designation
R: Refusal
GA: Grain Size Analysis
Kt: Triaxial Permeability Test
VOC: Volatils organic compounds

Analytics Parameters and Tests in Laboratory

MET: Metals
PAH: Polycyclic aromatic hydrocarbon
MAH: Monocyclics aromatic hydrocarbon
THH: Total halogeneted hydrocarbon
BTEX: Benzene, toluene, ethylbenzene, xylenes (totals)
PH: Petroleum hydrocarbon C10-C50
LEA: Leachate test

Coordinates: UTM (zone 18)
X: 5.518.217,000
Y: 445.307,000
Bench Mark:

Groundwater Level

Elevation	Date
m	15-10-29

Free Phase Level

Elevation	Date

Depth (m)	Elevation (m)	Groundwater	Free Phase	Soil Profile	Well Construction: Diagram / Description	Sample Type and Number	State	Recovery (%)	N / RQD	Others	VOC (ppm)	Depth (ft)
0				Natural soil: Fine sand, yellow on top becoming grey at 0.15m, firm and dry. Presence of organic matérial.	0,76m	SS-1		54	2-4			0
0,61m						SS-2		79	24-30			
1,22m						SS-3		58	28-34			
1,82m				Fine grey sand, firm and moist, with traces of silt between 1,22 and 1,82m.		SS-4		71	24-23	Soil Analysis		
2,44m				Medium grey sand, firm to loose, moist.		SS-5		-	8-12			
3,05m												
4,57m						SS-6		-	-			
2		2.41										10
4												
6				Rock								20
					5,18m							
8												30
					7,01m							
10												40
12												
14												50
16												
18												60
20												
22												70
24												
												80

Bentonite
2,44m
PVC
3,96m
Silica sand
Strainer
7,01m

LOG DESSAU-ANG Z:\GINT À TRANSFÈRER\167020019.GPJ DES_SOP.GDT 15-11-12

FIELD TECHNICIAN: **Michael Frigon, tech.** APPROVED BY: **Patrick L-Distefano, ing.**

Stantec

RAPPORT DE FORAGE

Projet : Installation puits	**Forage n° :** PO-04-15
Endroit : Waswanipi, Futur LGGR	
N° OTP : 167020019	**Date :** 15-10-20
Compagnie de Forage : Forage Giroux	**Type de foreuse :** ☐ SeDiDrill ☐

État	Types	Indices olfactifs	Méthode	Calibre ou diamètre ext.	Profondeur
☒ remanié	MA : Manuel				
▨ intact	CF : Carottier	ND : aucun	Casstag	HW	de 0 à
■ perdu	CR : Tube carottier	L : léger			de à
◧ C.R.	TM : Tube mince	M : moyen			de à
	TU : Tube (Géoprobe)	F : fort			de à

Profondeur Pi	Échantillons: État	Type et n°	Pénét. (N) ou RQD	Récupération	Indices olfactifs	Description des échantillons	Coupe géologique	Profondeur M
0	X	CF-1	0-2 / 4-7	13/24	-	Sable fin à moyen. Jaune. Beaucoup GRIS @ 6" sec Couleur, tend vers humide en surface		
2								
4	X	CF-2	14-24 / 30-36	19/24	-	Sable fin à moy. gris. Forme. Un peu humide Couleur		
6	X	CF-3	18-28 / 31-36	14/24		Sable fin à moy. gris avec présence de silt Compact Couleur humide		
8	X	CF-4	22-24 / 33-33	17/24	-	Sable moyen gris. Ferme à très humide Couleur		
10	X	CF-5	7-8 / 16-16	/24	-			
12								
13								
14	X	CF-6		/24	-			
15								
16								
17						→ Roc atteint à ≈ 17'		
18						carottage du Roc sur 5'		
19						→ Fin Forage @ 22'		
20								
21								
22								
23								
24								

Remarques :

Quantité d'eau utilisée lors des travaux de forage : _____ L

Schéma de puits d'observation au verso : ☐ oui ☐ non

Date	Niveau d'eau (tubage)

Technicien M. Feign Vérifié par : _____ Date : _____

RAPPORT DE FORAGE

FORAGE N° : PO-04-15

N° OTP : 1670 20019

DATE : 15-10-20

Schéma de puits d'observation

Tubage protecteur

A	✓

ou

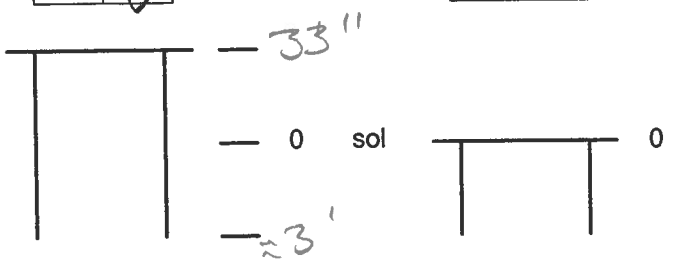
Boîte de service

B	

15-10-21 7400

Ø = 3.23 PVC

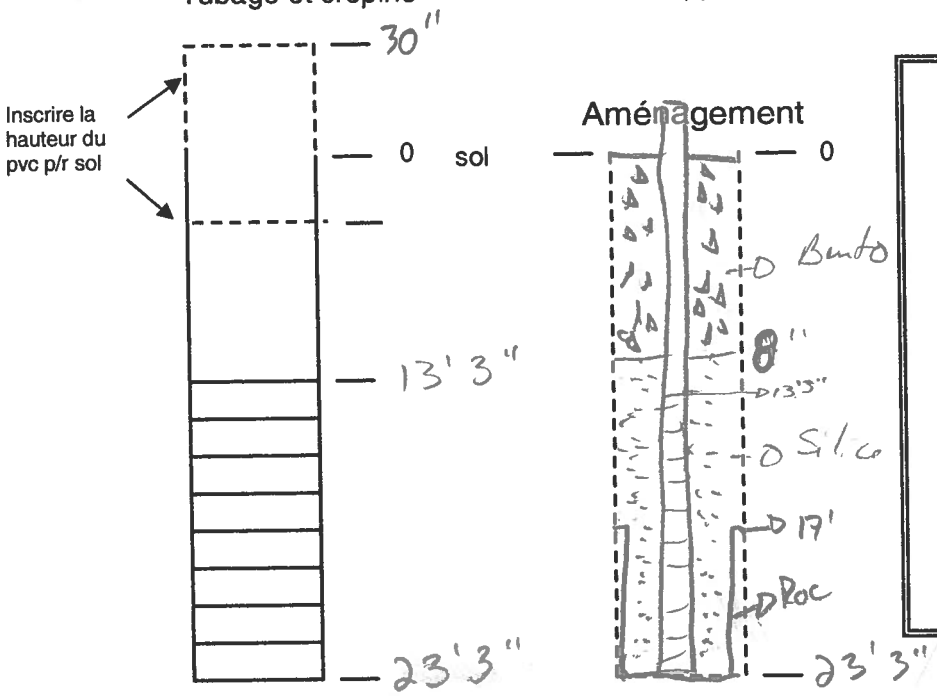
Fond = 7.77 PVC



Tubage et crépine

Enveloppe

Inscrire la hauteur du pvc p/r sol



Légende à utiliser pour l'aménagement du puits

❶ Asphalte

❷ Ciment

❸ Coulis ciment-bentonite

❹ Bentonite : hole plug dia : 3/8
ou peltonite dia : ____

❺ Massif filtrant silice grade : 1

❻ Autre : ____

Type de crépine :

- ☒ PVC
- ☐ Pointe filtrante
- ☐ Acier Inoxidable
- ☐ ____

Diamètre intérieur de la crépine

- ☐ 38.10 mm
- ☒ 50.8 mm
- ☐ ____

Matériel et quantité utilisés

Tubage	x 5' 2	x10'
Crépine	x 5' 1	x10'
Bouchon	2	
Sac de Silice	3	
Sac Bentonite	3	
Sac de ciment		
Sac de bento poudre		
Sac d'asphalte froide		

Nombre de baril 45 gal utilisé pour disposer les déblais de forage :
(pour éviter les blessures remplir le ou les barils au 3/4 seulement) ____

30'-[redacted]"

SOUNDING LOG

NO. **F-05-15**

PROJECT: **Future Landfill Site - Monitoring Well installation** FILE NO: **167020019** DATE: **2015-10-03**

LOCATION: **Waswanipi** CLIENT: **Cree First Nation of Waswanipi**

Sounding Type: | **From** | **To**

Casing NQ Drilling | 0,00 | 4,88

Sample Type

SS Split Spoon: 51 mm O.D.
ST Shelby Tube:
TS Piston Tube:
CR Core sample, Caliper:
PW Core sample Fondatec
GS Grab Sample
AU Manual Auger
WS Wash Sample
TU PVC Tubing (Geoprobe)

State of Sample

Disturbed | Intact | Lost | Core

Tests and Measurement in Field

N: Standard Penetration Test
RQD: Rock Quality Designation
R: Refusal
GA: Grain Size Analysis
Kt: Triaxial Permeability Test
VOC: Volatils organic compounds

Analytics Parameters and Tests in Laboratory

MET: Metals
PAH: Polycyclic aromatic hydrocarbon
MAH: Monocyclics aromatic hydrocarbon
THH: Total halogeneted hydrocarbon
BTEX: Benzene, toluene, ethylbenzene, xylenes (totals)
PH: Petroleum hydrocarbon C10-C50
LEA: Leachate test

Coordinates: UTM (zone 18)
X: 5.518.334,000
Y: 445.491,000
Bench Mark:
Groundwater Level ▽
Elevation | Date
Free Phase Level ▼
Elevation | Date

Depth (m)	Elevation (m)	Groundwater	Free Phase	Soil Profile	Well Construction: Diagram	Well Construction: Description	Sample Type and Number	State	Recovery (%)	N / RQD	Others	VOC (ppm)	Depth (ft)
0				Natural soil: Find sand, yellow becoming grey, loose and moist.			CF-1	X	88	2-7			0
0,61m							CF-2	X	79	15-17			
1,22m				Fine pale grey sand with dense compaction, moist.			CF-3	X	63	15-25			
1,82m							CF-4	X	63	21-16			
2,44m				Medium to fine grey sand, with very dense compaction, moist becoming saturated at 4,57m.			CF-5	X	58	21-25	Soil Analysis		10
3,05m													
4													
							CF-6	X	54	18-R			
5,18m				Rock									
6													20
8													30
10													40
12													
14													50
16													
18													60
20													
22													70
24													
													80

4,88m

LOG DESSAU-ANG Z:\GINT À TRANSFÈRER\167020019.GPJ DES_SOP.GDT 15-11-12

FIELD TECHNICIAN: **Michael Frigon, tech.** APPROVED BY: **Patrick L-Distefano, ing.**

RAPPORT DE FORAGE

Projet : Installation de puits	**Forage n° :** F05-15
Endroit : Waswanipi. Future LEE!	
N° OTP : 167020019	**Date :** 15-10-03

Compagnie de Forage : GiPaux **Type de foreuse :** ☐ ☐

État	Types	Indices olfactifs	Méthode	Calibre ou diamètre ext.	Profondeur
☒ remanié	MA : Manuel	ND : aucun			de ____ à ____
▨ intact	CF : Carottier	L : léger			de ____ à ____
■ perdu	CR : Tube carottier	M : moyen			de ____ à ____
◧ C.R.	TM : Tube mince	F : fort			de ____ à ____
	TU : Tube (Géoprobe)				

Profondeur Pi	Échantillons: État	Type et n°	Pénét. (N) ou RQD	Récupération	Indices olfactifs	Description des échantillons	Coupe géologique	Profondeur M
0	X	CF1	1:2 7:6	21/24	–	Sable fin. Jaune Devenant GRIS. Lache un peu humide Gadeurs		
2	X	CF-2	14-15 17-19	19/24	–	Idem Sable fin. gris-beige un peu humide Lache Gadeurs		
4	X	CF-3	15/24	13-15 25-31	–	Sable fin. gris-blanc. compact un peu humide		
6	X	CF-4	11-21 16-21	15/24	–	Idem		
8	X	CF-5	14-21 23-29	14/24		Sable fin à Moyen. GRIS. très compact. un peu humide		
10								
15	X	CF-6	12-18 R.	13/24	–	Sable fin, GRIS. très compact, Sature-Roc atteind @ 16'		
						↳ Fin du Forage à 16' car Roc atteind		

Remarques :	Date	Niveau d'eau (tubage)
Quantité d'eau utilisée lors des travaux de forage : _____ L Schéma de puits d'observation au verso : ☐ oui ☐ non		

Technicien M Trigan Vérifié par : _____ Date : _____

SOUNDING LOG

NO. **F-06-15**

PROJECT: **Future Landfill Site - Monitoring Well installation** FILE NO: **167020019** DATE: **2015-10-04**

LOCATION: **Waswanipi** CLIENT: **Cree First Nation of Waswanipi**

Sounding Type:

	From	To
Casing NQ Drilling	0,00	16,76
Pentest	16,76	25,30

Sample Type

SS Split Spoon: 51 mm O.D.
ST Shelby Tube:
TS Piston Tube:
CR Core sample, Caliper:
PW Core sample Fondatec
GS Grab Sample
AU Manual Auger
WS Wash Sample
TU PVC Tubing (Geoprobe)

State of Sample

Disturbed Intact Lost Core

Tests and Measurement in Field

N: Standard Penetration Test
RQD: Rock Quality Designation
R: Refusal
GA: Grain Size Analysis
Kt: Triaxial Permeability Test
VOC: Volatils organic compounds

Analytics Parameters and Tests in Laboratory

MET: Metals
PAH: Polycyclic aromatic hydrocarbon
MAH: Monocyclics aromatic hydrocarbon
THH: Total halogeneted hydrocarbon
BTEX: Benzene, toluene, ethylbenzene, xylenes (totals)
PH: Petroleum hydrocarbon C10-C50
LEA: Leachate test

Coordinates: UTM (zone 18)
X: 5.518.122,000
Y: 445.624,000
Bench Mark:
Groundwater Level Elevation Date
Free Phase Level Elevation Date

Depth (m)	Soil Profile	Well Construction Diagram	Well Construction Description	Sample Type and Number	State	Recovery (%)	N / RQD	Others	VOC (ppm)	Depth (ft)
0	Natural soil: Medium to fine sand, yellow becoming grey, dry and loose. 0,61m			CF-1	X	58	2-3			0
0,61m				CF-2	X	75	33-39			
1,22m				CF-3	X	75	38-50			
1,82m				CF-4	X	54	53-R			
2,44m				CF-5	X	66	31-37			
3,05m										10
5,18m				CF-6	X	66	26-31			
6,71m				CF-7	X	66	21-25			20
8,23m				CF-8	X	54	14-19			
9,75m				CF-9	X	50	14-18			30
11,28m				CF-10	X	50	15-19			
12,80m				CF-11	X	50	14-17			40
14,33m				CF-12	X	54	15-21			
17,37m				CF-13	X	46	13-13			50
17,98m							27-33			
18,59m							30-25			60
19,20m							26-33			
19,81m							30-29			
20,42m							33-33			
21,03m							32-35			70
21,64m							38-43			
22,25m							50-31			
22,86m							25-24			
23,47m							31-29			
24,08m							31-29			
24,69m							22-32			80
25,30m	Rock 25,30m						35-R			

Natural soil: Medium to fine sand, yellow becoming grey, dry and loose. 0,61m
Fine grey sand, dry with very dense compaction, with traces of pebbles. 1,22m
Fine grey sand, with traces of silt, moist with dense compaction. 2,44m
Medium to fine grey sand, moist with dense compaction.
Medium grey-white sand, dry with dense compaction, presence of fine sand with traces of very fine sand. 4,57m
Medium grey sand, moist with dense compaction. 6,10m
Medium grey sand, moist with dense compaction, becoming finer at 12,50m. 12,19m
Medium grey sand, moist and with dense compaction, becoming loose between 17,07m and 17,37m. 16,76m
Rock 25,30m

LOG DESSAU-ANG Z:\GINT À TRANSFÈRER\167020019.GPJ DES_SOP.GDT 15-11-12

FIELD TECHNICIAN: **Michael Frigon, tech.** APPROVED BY: **Patrick L-Distefano, ing.**

Stantec

RAPPORT DE FORAGE

Projet : Installation de puits	**Forage n° :** F06-15
Endroit : Waswanipi Future LEET	
N° OTP : 1670 20049	**Date :** 15-10-04

Compagnie de Forage : Gilbert **Type de foreuse :** ☐ Diedrich D-50 ☐

État	Types	Indices olfactifs	Méthode	Calibre ou diamètre ext.	Profondeur
☒ remanié	MA : Manuel				
▨ intact	CF : Carottier	ND : aucun	"N"		de 0 à
■ perdu	CR : Tube carottier	L : léger			de à
◧ C.R.	TM : Tube mince	M : moyen			de à
	TU : Tube (Géoprobe)	F : fort			de à

Profondeur Pi	Échantillons: État	Type et n°	Pénét. (N) ou RQD	Récupération	Indices olfactifs	Description des échantillons	Coupe géologique	Profondeur M
0	☒	CF-1	2-2 3-12	14/24	–	TN: Sable fin à moyen. Jaune Devenant Beige. Sec. Lâche. Terre organique en surface (6")		
4	☒	CF-2	20-33 39-R	18/24	–	Sable fin. GRIS-beige, sec, très compact. Cailloux au bout de la CF-2 (4" SUR DERNIER "N")		
6	☒	CF-3	20-38 50-R	18/24	–	Sable fin. Gris, un peu silteux. compact et humide devenant sable fin. GRIS @ 12"		
8	☒	CF-4	36-53 R	13/24	<	Sable fin. GRIS-blanc avec horizon de silt GRIS sec et très compact.		
10	☒	CF-5	18-31 37-45	14/24	–	Sable fin à moyen. GRIS très compact. très humide.		
15	☒	CF-6	16-26 31-32	16/24	–	Sable Moyen. Gris-blanc sec et très compact avec présence de sable fin et sable très fin.		
20	☒	CF-7	13-21 25-27	16/24	–	Sable Moyen. GRIS. très compact un peu humide		
25	☒	CF-8	10-14 19-22	18/24	–	± Dense semble saturé		
27								

Remarques :

Quantité d'eau utilisée lors des travaux de forage : _____ L

Schéma de puits d'observation au verso : ☐ oui ☐ non

Date	Niveau d'eau (tubage)

Technicien M. Fetgan Vérifié par : _____ Date : _____

Stantec

RAPPORT DE FORAGE

Projet : Installation de puits	**Forage n° :** F-0615 (suite)
Endroit : Wascana Ip: Futur LEET	
N° OTP : 1670 30019	**Date :** 13.10.03
Compagnie de Forage : Forage G. Roux	**Type de foreuse :** ☐ ☐

État	Types	Indices olfactifs	Méthode	Calibre ou diamètre ext.	Profondeur
☒ remanié	MA : Manuel				
▨ intact	CF : Carottier	ND : aucun			de ____ à ____
■ perdu	CR : Tube carottier	L : léger			de ____ à ____
◧ C.R.	TM : Tube mince	M : moyen			de ____ à ____
	TU : Tube (Géoprobe)	F : fort			de ____ à ____

Profondeur Pi	Échantillons: État	Type et n°	Pénét. (N) ou RQD	Récupération	Indices olfactifs	Description des échantillons	Coupe géologique	Profondeur M
30	X	CF-9	11-14 / 18-20	12/24	-	Sable Moyen, gris, très compact. Semble saturé - odeur		
35	X	CF-10	10-15 / 19-20	12/24	-	Idem		
40	X	CF-11	10-14 / 17-20	12/24	-	Sable moyen, gris, compact. Devenant plus fin @ 8" humide.		
45	X	CF-12	11-15 / 21-27	13/24	-	Sable moyen, gris, compact. Semble saturé -		
55	X	CF-13	15-13 / 13-17	11/24	-	Sable moyen, GRIS, semble saturé - compact devenant plus mou @ 5"		
57		=>	Arrêt Forage au cassing CAR très difficile à Foreer, un Renforcement sera					

Remarques : Gaine Jusqu'au Roc => Voir Croquis

Quantité d'eau utilisée lors des travaux de forage : _____ L

Schéma de puits d'observation au verso : ☐ oui ☐ non

Date	Niveau d'eau (tubage)

Technicien M Tricon Vérifié par : _____ Date : _____

Pentest F-06-15 à partir de 57'

	"N"
57'	27
58	33
60	30
62	25
64	26
66	33
68	30
70	29
72	33
74	33
76	32
78	35
80	38
82	43
83	50
	31
	25
	24
	31
	29
	31
	29
	22
	32
	35

Refo = Roc @ 83'

Appendix C PHOTOGRAPHIC ALBUM

Photograph 1: Preparation for drilling borehole PO-01-15 (at the side of the access road).

Photograph 2: Soil sample from borehole PO-01-15 (between 4.57 and 5.18 meters). Two different types of sand can be observed throughout the core sample.

Photograph 3: Rock core sample from borehole PO-01-15 (between 17.53 and 18.50 meters).

Photograph 4: Development of monitoring well PO-01-15 (after installation).

Photographs 5: Positioning of the drill for the installation of monitoring well PO-02-15.

Photograph 6: Soil sample from borehole PO-02-15 (at a depth of 16.76 meters). Sand can be observed throughout the core sample.

Photograph 7: Rock core sample from borehole PO-02-15.

Photograph 8: Installation of monitoring well PO-02-15 (at a depth of 23.05 meters).

Photograph 9: Soil sample from borehole PO-03-15(between 1.22 and 1.82 meters). Sand can be observed throughout the core sample.

Photograph 10: Bedrock drilling of borehole PO-03-15.

Photograph 11: Mobilization towards borehole F-05-15.

Photograph 12: Soil sample from borehole F-05-15 (between the surface and 0.61 meters). Sand can be observed throughout the core sample.

Photograph 13: Mobilization towards borehole PO-04-15.

Photograph 14: Drilling of borehole PO-04-15 (at a depth of 6.71 meters).

Photograph 15: Rock core sample from borehole PO-04-15 (between 5.18 and 6.71 meters)

Photograph 16: Development of monitoring well PO-04-15 (after installation).

Appendix D GRANULOMETRIC AND SEDIMENTOMETRIC TESTS (PARTICLE SIZE DISTRIBUTION ANALYSIS)

Englobe

129, avenue Marcel-Baril
Rouyn-Noranda, J9X 7B9
Téléphone: (819) 762-5119

Essais sur sols, granulats et autres matériaux

Client : **Stantec**
Projet : **Essais labo & contr. matériaux; Essais en laboratoire - Projet 167020019**
Endroit : **Amos**

Dossier : **P-0009163-0-20-001-01**
Réf. client

Rapport n° : **1** **Rév. 0**
Page **1 de 1**

ÉCHANTILLONNAGE

Provenance :
N° d'échantillon : 1 N° d'échantillon client :
Matériau :
Profondeur :
Localisation : PO-01-15 CF-7, 20 à 22 pi.

Échantillonné par : le client
Date d'échantillonnage :
Date de réception : 2015-10-23
Densité relative des particules < 2 mm : 2.700(estimé)

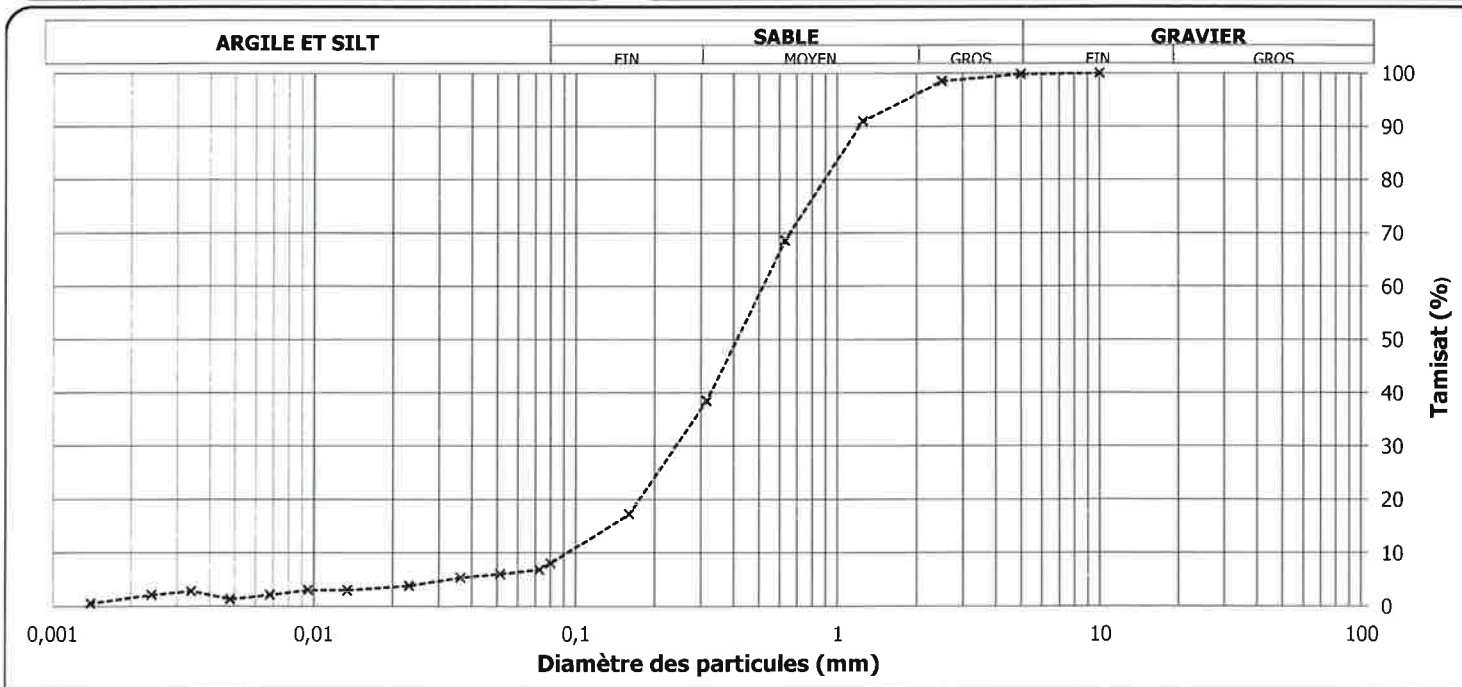
Analyse granulométrique (LC 21-040)		Analyse sédimentométrique (NQ 2501-025)	
Tamis	Tamisat (%)	Diamètre équivalent	Tamisat (%)
112 mm			
80 mm		72,4 µm	6,8
56 mm		51,3 µm	6,0
40 mm		36,3 µm	5,3
31,5 mm		23,1 µm	3,8
20 mm		13,4 µm	3,0
14 mm		9,5 µm	3,0
10 mm	100	6,8 µm	2,1
5 mm	100	4,8 µm	1,3
2,5 mm	99	3,4 µm	2,8
1,25 mm	91	2,4 µm	2,1
0,630 mm	69	1,4 µm	0,5
0,315 mm	39		
0,160 mm	17		
0,080 mm	8,0		

AUTRES ESSAIS	MESURÉ

REMARQUES

Le prélèvement et le transport de l'échantillon ont été effectués par un représentant du client.

Proportion selon analyse (%)			
Cailloux :	0,0	Sable :	91,8
Gravier :	0,2	Silt :	6,5
		Argile :	1,5



D_{10} : 0,093 D_{30} : 0,240 D_{60} : 0,517

Préparé par : **Date :**
Sofiane Bradai, ing. 2015-11-26

Approuvé par : **Date :**
Michel Cliche, ing. 2015-11-27

Englobe

129, avenue Marcel-Baril
Rouyn-Noranda, J9X 7B9
Téléphone: (819) 762-5119

Essais sur sols, granulats et autres matériaux

Client : **Stantec**
Projet : **Essais labo & contr. matériaux; Essais en laboratoire - Projet 167020019**
Endroit : **Amos**

Dossier : **P-0009163-0-20-001-01**
Réf. client

Rapport n° : **2** **Rév. 0**
Page **1 de 1**

ÉCHANTILLONNAGE

Provenance :
N° d'échantillon : 2 N° d'échantillon client :
Matériau :
Profondeur :
Localisation : PO-01-15 CF-10, de 35 à 37 pi.

Échantillonné par : le client
Date d'échantillonnage :
Date de réception : 2015-10-23
Densité relative des particules < 2 mm : 2.700(estimé)

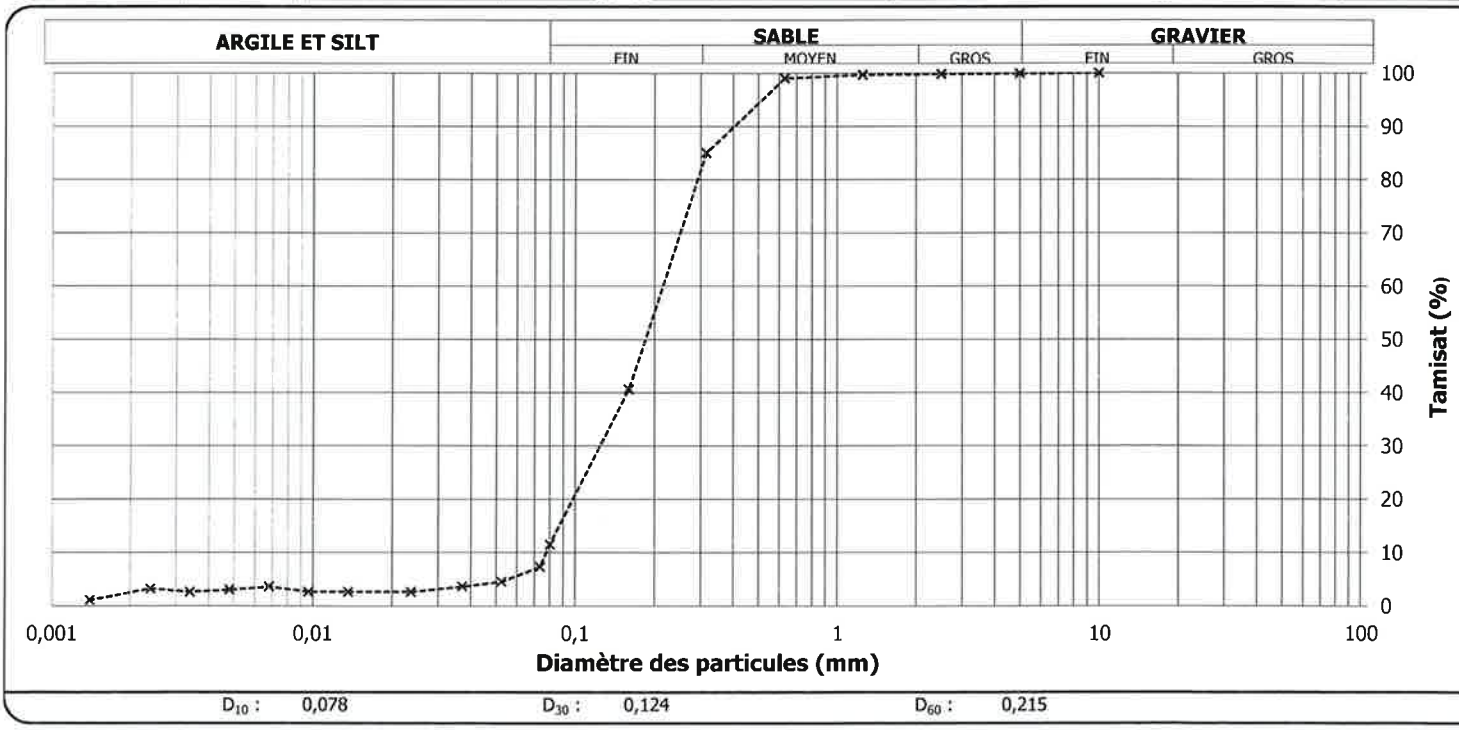
Analyse granulométrique (LC 21-040)		Analyse sédimentométrique (NQ 2501-025)	
Tamis	Tamisat (%)	Diamètre équivalent	Tamisat (%)
112 mm			
80 mm		73,4 µm	7,3
56 mm		52,3 µm	4,5
40 mm		37,1 µm	4,6
31,5 mm		23,6 µm	2,6
20 mm		13,6 µm	2,6
14 mm		9,6 µm	2,6
10 mm	100	6,8 µm	3,6
5 mm	100	4,8 µm	3,0
2,5 mm	100	3,4 µm	2,6
1,25 mm	100	2,4 µm	3,2
0,630 mm	99	1,4 µm	1,1
0,315 mm	85		
0,160 mm	41		
0,080 mm	11,5		

AUTRES ESSAIS	MESURÉ

REMARQUES

Le prélèvement et le transport de l'échantillon ont été effectués par un représentant du client.

Proportion selon analyse (%)			
Cailloux :	0,0	Sable :	88,4
Gravier :	0,1	Silt :	9,1
		Argile :	2,4



D_{10} : 0,078 D_{30} : 0,124 D_{60} : 0,215

Préparé par : **Date :**
Sofiane Bradai, ing. 2015-11-26

Approuvé par : **Date :**
Michel Cliche, ing. 2015-11-27

Englobe

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Téléphone: (819) 762-5119

Essais sur sols, granulats et autres matériaux

Client : **Stantec**
Projet : **Essais labo & contr. matériaux; Essais en laboratoire - Projet 167020019**
Endroit : **Amos**

Dossier : **P-0009163-0-20-001-01**
Réf. client

Rapport n° : **3** **Rév. 0**
Page **1 de 1**

ÉCHANTILLONNAGE

Provenance :
N° d'échantillon : 3 N° d'échantillon client :
Matériau :
Profondeur :
Localisation : PO-01-15 CF-12, de 45 à 47 pi.

Échantillonné par : le client
Date d'échantillonnage :
Date de réception : 2015-10-23
Densité relative des particules < 2 mm : 2.700(estimé)

Analyse granulométrique (LC 21-040)

Tamis	Tamisat (%)
112 mm	
80 mm	
56 mm	
40 mm	
31,5 mm	
20 mm	
14 mm	
10 mm	100
5 mm	100
2,5 mm	98
1,25 mm	90
0,630 mm	65
0,315 mm	25
0,160 mm	7
0,080 mm	3,1

Analyse sédimentométrique (NQ 2501-025)

Diamètre équivalent	Tamisat (%)
74,3 µm	2,9
52,8 µm	1,3
37,3 µm	1,3
23,6 µm	1,3
13,6 µm	1,3
9,6 µm	1,3
6,8 µm	2,1
4,8 µm	2,4
3,4 µm	2,1
2,4 µm	2,6
1,4 µm	0,9

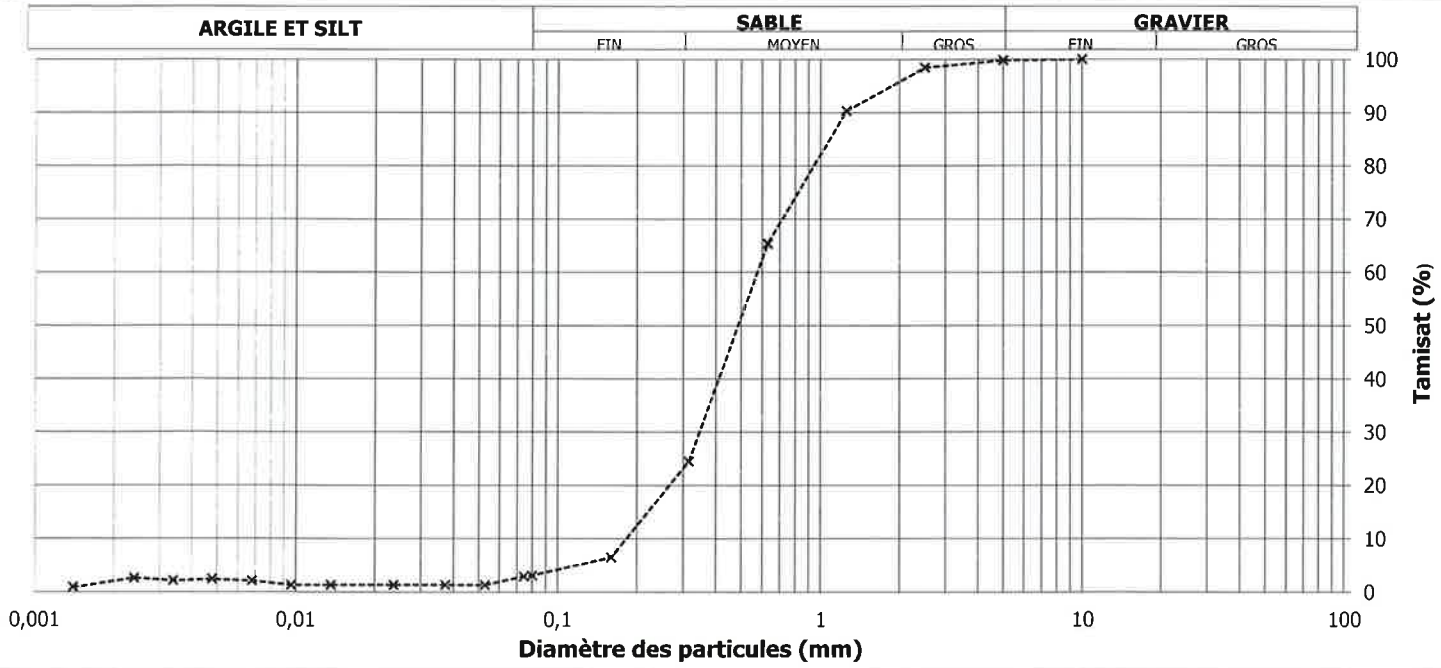
AUTRES ESSAIS	MESURÉ

REMARQUES

Le prélèvement et le transport de l'échantillon ont été effectués par un représentant du client.

Proportion selon analyse (%)

Cailloux :	0,0	Sable :	96,7
Gravier :	0,2	Silt :	1,2
		Argile :	1,9



D_{10} : 0,183 D_{30} : 0,346 D_{60} : 0,575

Préparé par : **Date :**
Sofiane Bradai, ing. 2015-11-26

Approuvé par : **Date :**
Michel Cliche, ing. 2015-11-27

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Essais sur sols, granulats et autres matériaux

Client : **Stantec**
Projet : **Essais labo & contr. matériaux; Essais en laboratoire - Projet 167020019**
Endroit : **Amos**

Dossier : **P-0009163-0-20-001-01**
Réf. client

Rapport n° : **4** **Rév. 0**
Page **1 de 1**

ÉCHANTILLONNAGE

Provenance :
N° d'échantillon : 4 N° d'échantillon client :
Matériau :
Profondeur :
Localisation : PO-02-15 CF-4, de 6 à 8 pi.

Échantillonné par : le client
Date d'échantillonnage :
Date de réception : 2015-10-23
Densité relative des particules < 2 mm : 2.700(estimé)

Analyse granulométrique (LC 21-040)

Tamis	Tamisat (%)
112 mm	
80 mm	
56 mm	
40 mm	
31,5 mm	
20 mm	
14 mm	
10 mm	100
5 mm	100
2,5 mm	100
1,25 mm	100
0,630 mm	95
0,315 mm	68
0,160 mm	27
0,080 mm	10,5

Analyse sédimentométrique (NQ 2501-025)

Diamètre équivalent	Tamisat (%)
73,5 µm	6,4
52,3 µm	4,5
37,1 µm	3,6
23,5 µm	3,6
13,6 µm	3,6
9,6 µm	2,7
6,8 µm	2,7
4,8 µm	3,0
3,4 µm	2,7
2,4 µm	3,2
1,4 µm	1,1

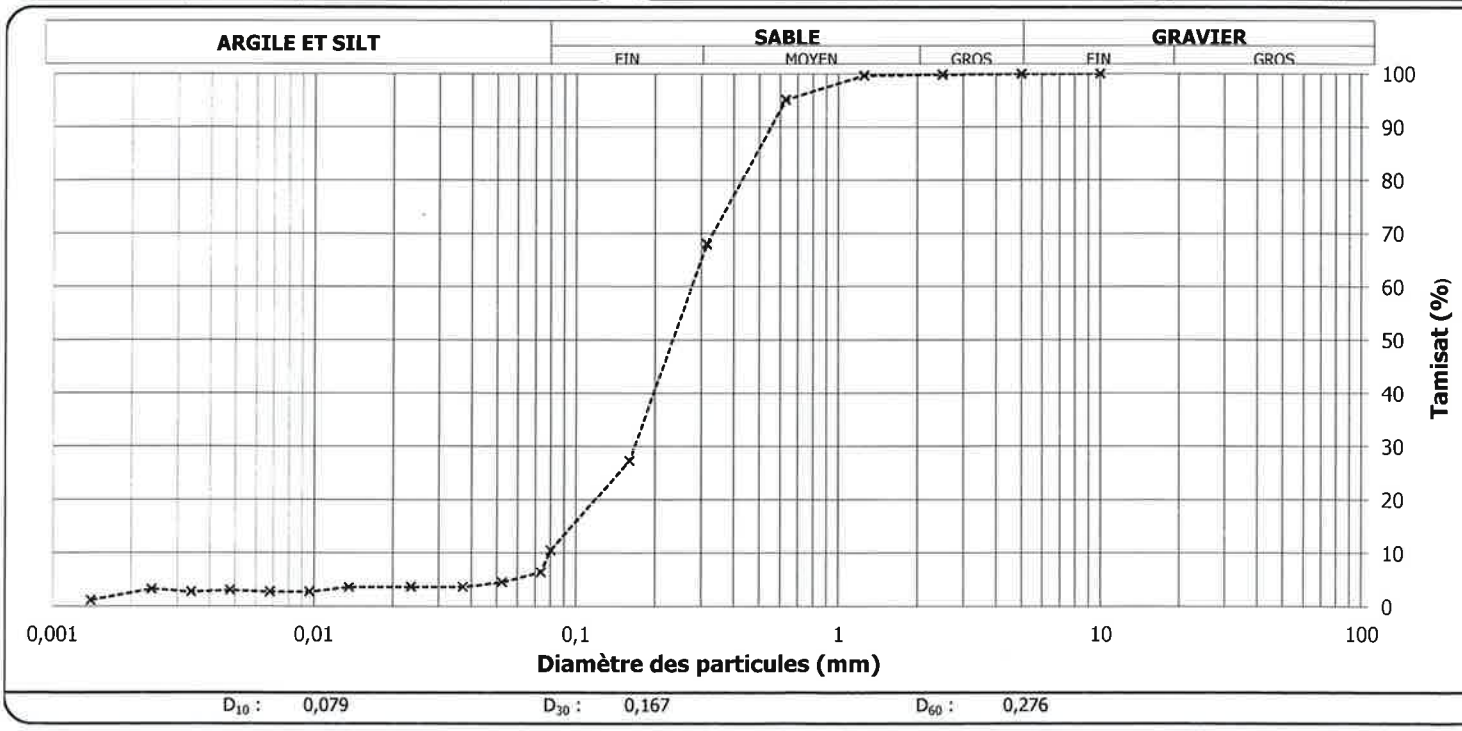
AUTRES ESSAIS	MESURÉ

REMARQUES

Le prélèvement et le transport de l'échantillon ont été effectués par un représentant du client.

Proportion selon analyse (%)

Cailloux :	0,0	Sable :	89,4
Gravier :	0,1	Silt :	8,1
		Argile :	2,4



D_{10} : 0,079 D_{30} : 0,167 D_{60} : 0,276

Préparé par : Sofiane Bradai, ing. **Date :** 2015-11-26

Approuvé par : **Michel Cliche, ing.** **Date :** 2015-11-27

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Essais sur sols, granulats et autres matériaux

Client : **Stantec**
Projet : **Essais labo & contr. matériaux; Essais en laboratoire - Projet 167020019**
Endroit : **Amos**

Dossier : **P-0009163-0-20-001-01**
Réf. client

Rapport n° : **5** **Rév. 0**
Page **1 de 1**

ÉCHANTILLONNAGE

Provenance :
N° d'échantillon : 5 N° d'échantillon client :
Matériau :
Profondeur :
Localisation : PO-02-15 CF-7, de 20 à 22 pi.

Échantillonné par : le client
Date d'échantillonnage :
Date de réception : 2015-10-23
Densité relative des particules < 2 mm : 2.700(estimé)

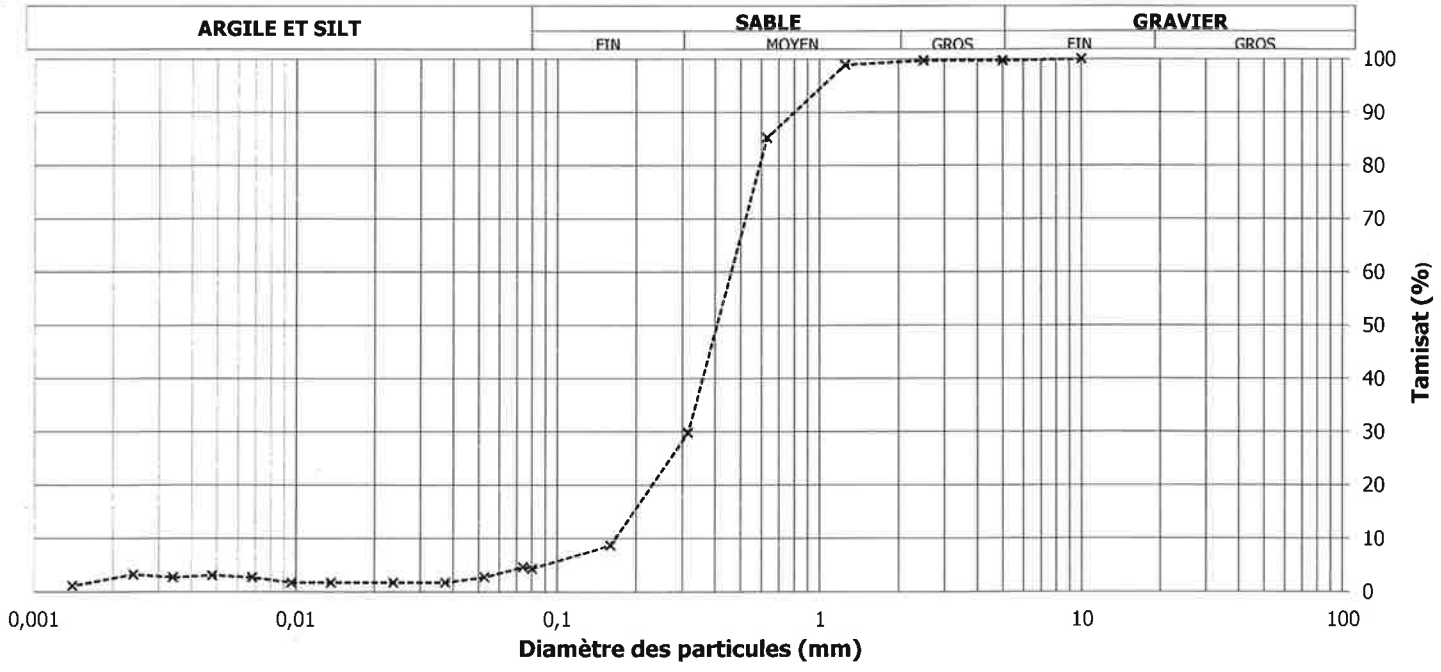
Analyse granulométrique (LC 21-040)		Analyse sédimentométrique (NQ 2501-025)	
Tamis	Tamisat (%)	Diamètre équivalent	Tamisat (%)
112 mm			
80 mm		74,0 µm	4,6
56 mm		52,7 µm	2,7
40 mm		37,3 µm	1,7
31,5 mm		23,6 µm	1,7
20 mm		13,6 µm	1,7
14 mm		9,6 µm	1,7
10 mm	100	6,8 µm	2,7
5 mm	100	4,8 µm	3,1
2,5 mm	100	3,4 µm	2,7
1,25 mm	99	2,4 µm	3,2
0,630 mm	85	1,4 µm	1,1
0,315 mm	30		
0,160 mm	9		
0,080 mm	4,3		

AUTRES ESSAIS	MESURÉ

REMARQUES

Le prélèvement et le transport de l'échantillon ont été effectués par un représentant du client.

Proportion selon analyse (%)			
Cailloux :	0,0	Sable :	95,4
Gravier :	0,3	Silt :	1,9
		Argile :	2,4



D_{10} : 0,167 D_{30} : 0,316 D_{60} : 0,460

Préparé par : **Date :**
Sofiane Bradai, ing. 2015-11-26

Approuvé par : **Date :**
Michel Cliche, ing. 2015-11-27

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Essais sur sols, granulats et autres matériaux

Client : **Stantec**
Projet : **Essais labo & contr. matériaux; Essais en laboratoire - Projet 167020019**
Endroit : **Amos**

Dossier : **P-0009163-0-20-001-01**
Réf. client

Rapport n° : **6** **Rév. 0**
Page **1 de 1**

ÉCHANTILLONNAGE

Provenance :
N° d'échantillon : 6 N° d'échantillon client :
Matériau :
Profondeur :
Localisation : PO-02-15 CF-9, de 35 à 37 pi.

Échantillonné par : le client
Date d'échantillonnage :
Date de réception : 2015-10-23
Densité relative des particules < 2 mm : 2.700(estimé)

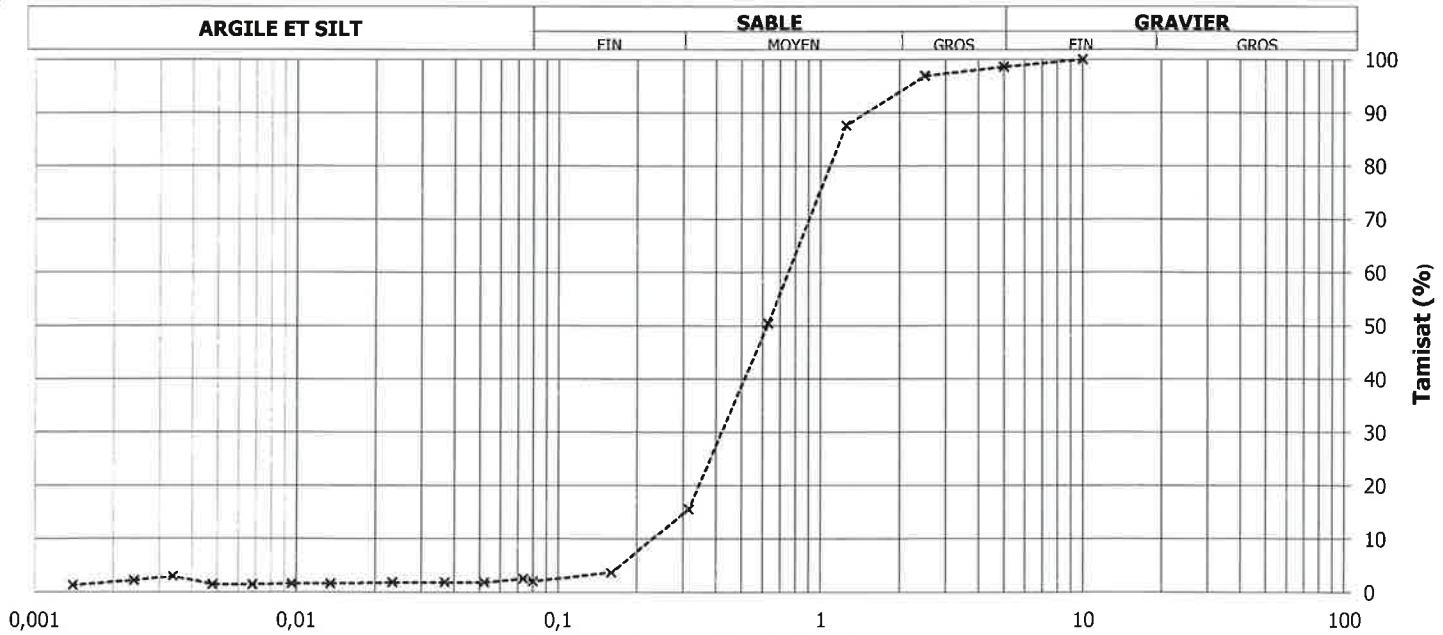
Analyse granulométrique (LC 21-040)		Analyse sédimentométrique (NQ 2501-025)	
Tamis	Tamisat (%)	Diamètre équivalent	Tamisat (%)
112 mm			
80 mm		73,6 µm	2,5
56 mm		52,1 µm	1,8
40 mm		36,9 µm	1,8
31,5 mm		23,3 µm	1,8
20 mm		13,5 µm	1,6
14 mm		9,6 µm	1,6
10 mm	100	6,8 µm	1,4
5 mm	99	4,8 µm	1,4
2,5 mm	97	3,4 µm	3,0
1,25 mm	88	2,4 µm	2,2
0,630 mm	50	1,4 µm	1,3
0,315 mm	16		
0,160 mm	4		
0,080 mm	2,0		

AUTRES ESSAIS	MESURÉ

REMARQUES

Le prélèvement et le transport de l'échantillon ont été effectués par un représentant du client.

Proportion selon analyse (%)			
Cailloux :	0,0	Sable :	96,6
Gravier :	1,4	Silt :	0,2
		Argile :	1,8



D_{10} : 0,229 D_{30} : 0,420 D_{60} : 0,752

Préparé par : **Date :**
Sofiane Bradai, ing. 2015-11-26

Approuvé par : **Date :**
Michel Cliche, ing. 2015-11-27

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Essais sur sols, granulats et autres matériaux

Client : **Stantec**
Projet : **Essais labo & contr. matériaux; Essais en laboratoire - Projet 167020019**
Endroit : **Amos**

Dossier : **P-0009163-0-20-001-01**
Réf. client
Rapport n° : **7** **Rév. 0**
Page **1 de 1**

ÉCHANTILLONNAGE

Provenance :
N° d'échantillon : 7 N° d'échantillon client :
Matériau :
Profondeur :
Localisation : PO-03-15 CF-4, de 6 à 8 pi.

Échantillonné par : le client
Date d'échantillonnage :
Date de réception : 2015-10-23
Densité relative des particules < 2 mm : 2.700(estimé)

Analyse granulométrique (LC 21-040)

Tamis	Tamisat (%)
112 mm	
80 mm	
56 mm	
40 mm	
31,5 mm	
20 mm	
14 mm	
10 mm	
5 mm	
2,5 mm	100
1,25 mm	100
0,630 mm	97
0,315 mm	87
0,160 mm	66
0,080 mm	31,8

Analyse sédimentométrique (NQ 2501-025)

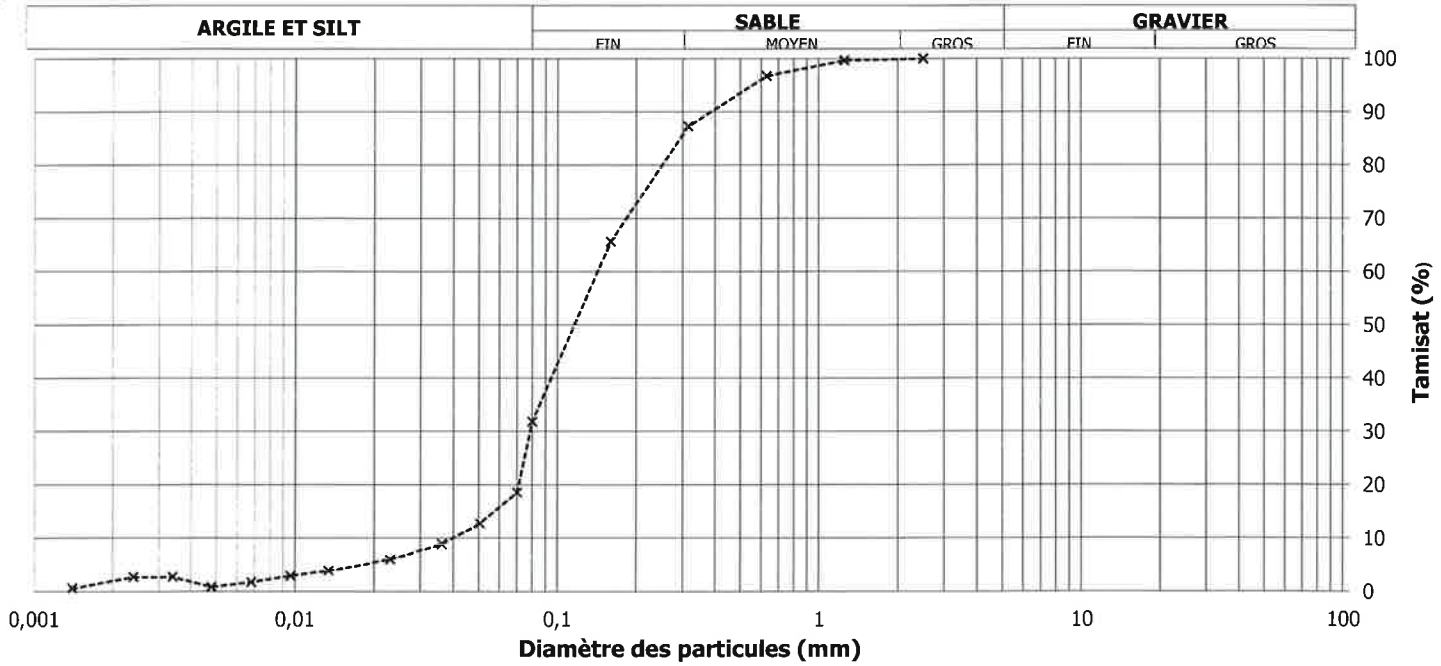
Diamètre équivalent	Tamisat (%)
70,1 µm	18,5
50,5 µm	12,7
36,2 µm	8,9
23,0 µm	6,0
13,4 µm	3,9
9,6 µm	2,9
6,8 µm	1,7
4,8 µm	0,8
3,4 µm	2,7
2,4 µm	2,7
1,4 µm	0,6

AUTRES ESSAIS	MESURÉ

REMARQUES

Le prélèvement et le transport de l'échantillon ont été effectués par un représentant du client.

Proportion selon analyse (%)			
Cailloux :	0,0	Sable :	68,2
Gravier :	0,0	Silt :	29,9
		Argile :	1,9



D_{10} : 0,040 D_{30} : 0,079 D_{60} : 0,142

Préparé par : Sofiane Bradai, ing. **Date :** 2015-11-26

Approuvé par : **Michel Cliche, ing.** **Date :** 2015-11-27

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Essais sur sols, granulats et autres matériaux

Client : **Stantec**
Projet : **Essais labo & contr. matériaux; Essais en laboratoire - Projet 167020019**
Endroit : **Amos**

Dossier : **P-0009163-0-20-001-01**
Réf. client

Rapport n° : **8** **Rév. 0**
Page **1 de 1**

ÉCHANTILLONNAGE

Provenance :
N° d'échantillon : 8 N° d'échantillon client :
Matériau :
Profondeur :
Localisation : PO-04-15 CF-4, de 6 à 8 pi.

Échantillonné par : le client
Date d'échantillonnage :
Date de réception : 2015-10-23
Densité relative des particules < 2 mm : 2.700(estimé)

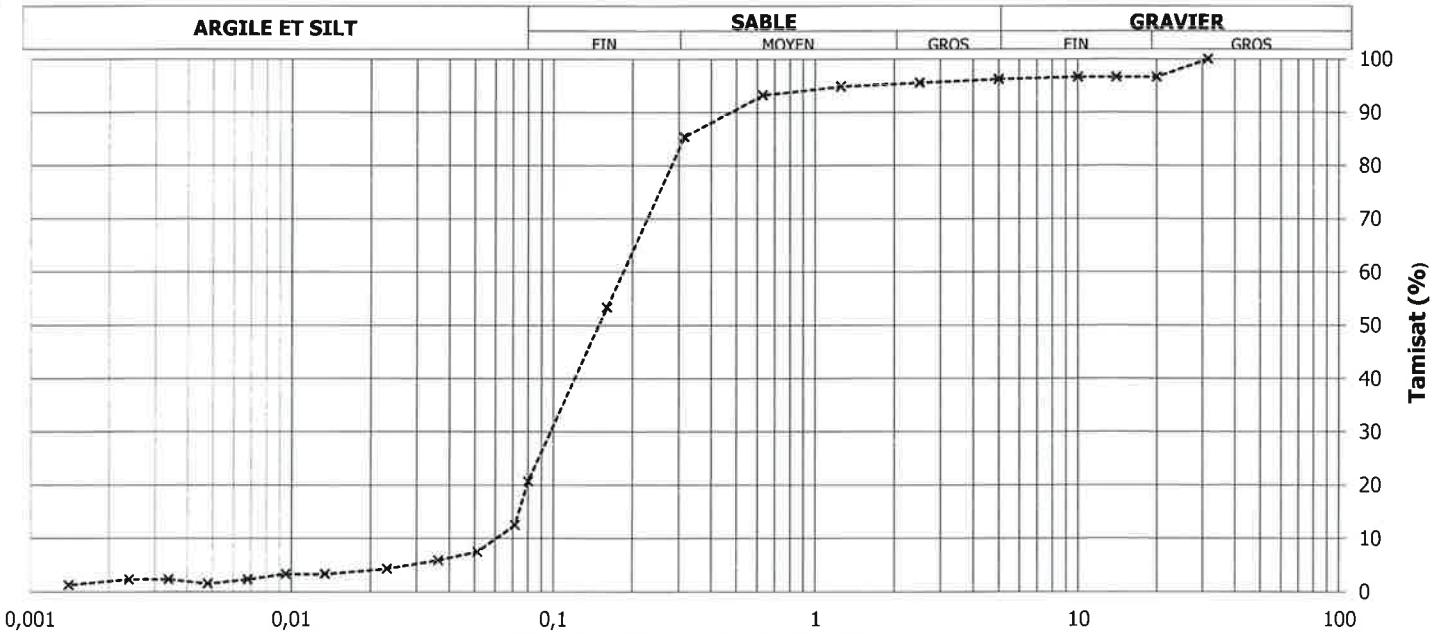
Analyse granulométrique (LC 21-040)		Analyse sédimentométrique (NQ 2501-025)	
Tamis	Tamisat (%)	Diamètre équivalent	Tamisat (%)
112 mm			
80 mm		71,2 µm	12,5
56 mm		51,2 µm	7,5
40 mm		36,3 µm	5,9
31,5 mm	100	23,1 µm	4,3
20 mm	97	13,4 µm	3,3
14 mm	97	9,5 µm	3,3
10 mm	97	6,8 µm	2,3
5 mm	96	4,8 µm	1,5
2,5 mm	96	3,4 µm	2,3
1,25 mm	95	2,4 µm	2,3
0,630 mm	93	1,4 µm	1,3
0,315 mm	85		
0,160 mm	53		
0,080 mm	20,7		

AUTRES ESSAIS	MESURÉ

REMARQUES

Le prélèvement et le transport de l'échantillon ont été effectués par un représentant du client.

Proportion selon analyse (%)			
Cailloux :	0,0	Sable :	75,5
Gravier :	3,8	Silt :	18,8
		Argile :	1,9



D_{10} : 0,060 D_{30} : 0,097 D_{60} : 0,184

Préparé par : **Date :**
Sofiane Bradai, ing. 2015-11-26

Approuvé par : **Date :**
Michel Cliche, ing. 2015-11-27

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Essais sur sols, granulats et autres matériaux

Client : **Stantec**
Projet : **Essais labo & contr. matériaux; Essais en laboratoire - Projet 167020019**
Endroit : **Amos**

Dossier : **P-0009163-0-20-001-01**
Réf. client

Rapport n° : **9** **Rév. 0**
Page **1 de 1**

ÉCHANTILLONNAGE

Provenance :
N° d'échantillon : 9 N° d'échantillon client :
Matériau :
Profondeur :
Localisation : PO-05-15 CF-5, de 8 à 10 pi.

Échantillonné par : le client
Date d'échantillonnage :
Date de réception : 2015-10-23
Densité relative des particules < 2 mm : 2.700(estimé)

Analyse granulométrique (LC 21-040)

Tamis	Tamisat (%)
112 mm	
80 mm	
56 mm	
40 mm	
31,5 mm	
20 mm	
14 mm	
10 mm	100
5 mm	100
2,5 mm	99
1,25 mm	93
0,630 mm	73
0,315 mm	41
0,160 mm	17
0,080 mm	8,5

Analyse sédimentométrique (NQ 2501-025)

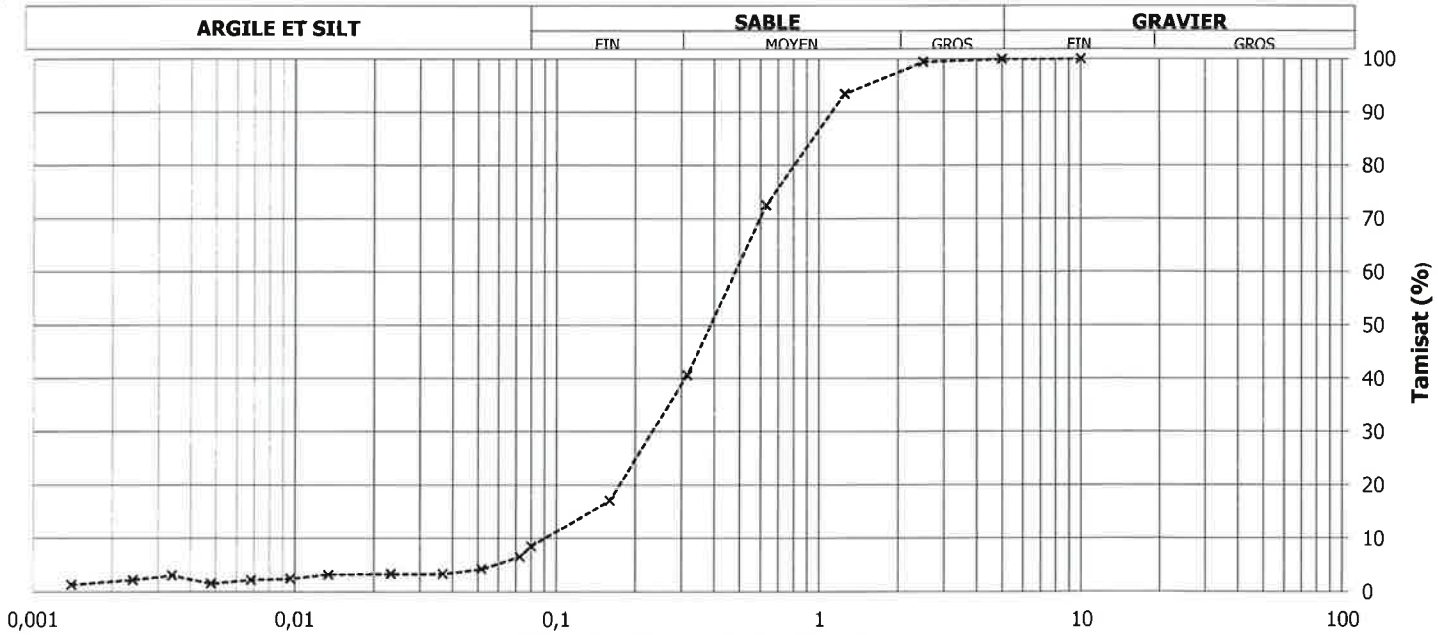
Diamètre équivalent	Tamisat (%)
72,5 µm	6,5
51,7 µm	4,2
36,7 µm	3,3
23,2 µm	3,3
13,4 µm	3,2
9,6 µm	2,4
6,8 µm	2,2
4,8 µm	1,5
3,4 µm	3,0
2,4 µm	2,2
1,4 µm	1,3

AUTRES ESSAIS	MESURÉ

REMARQUES

Le prélèvement et le transport de l'échantillon ont été effectués par un représentant du client.

Proportion selon analyse (%)			
Cailloux :	0,0	Sable :	91,4
Gravier :	0,1	Silt :	6,7
		Argile :	1,8



D_{10} : 0,090 D_{30} : 0,232 D_{60} : 0,480

Préparé par : **Date :**
Sofiane Bradai, ing. 2015-11-26

Approuvé par : **Date :**
Michel Cliche, ing. 2015-11-27

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Essais sur sols, granulats et autres matériaux

Client : **Stantec**
Projet : **Essais labo & contr. matériaux; Essais en laboratoire - Projet 167020019**
Endroit : **Amos**

Dossier : **P-0009163-0-20-001-01**
Réf. client

Rapport n° : **10** **Rév. 0**
Page **1 de 1**

ÉCHANTILLONNAGE

Provenance :
N° d'échantillon : 10 N° d'échantillon client :
Matériau :
Profondeur :
Localisation : PO-06-15 CF-3, de 4 à 6 pi.

Échantillonné par : le client
Date d'échantillonnage :
Date de réception : 2015-10-23
Densité relative des particules < 2 mm : 2.700(estimé)

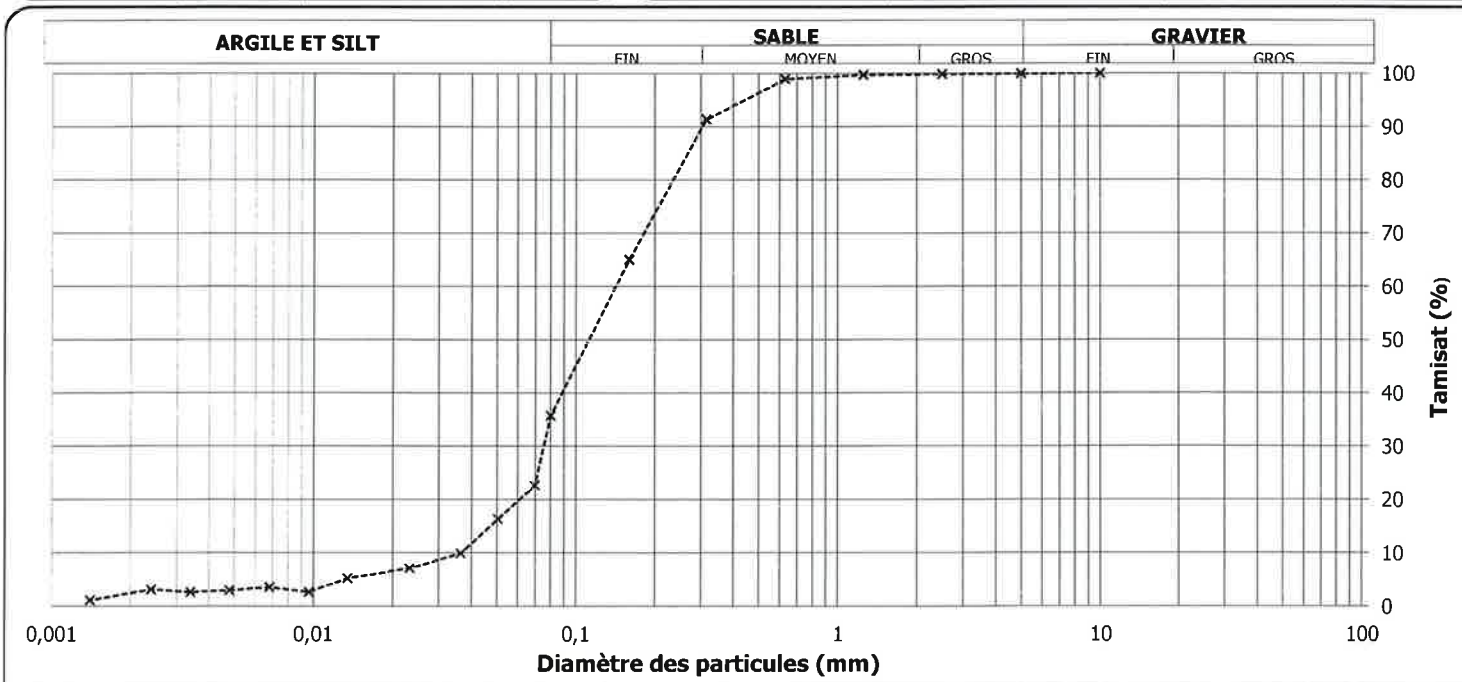
Analyse granulométrique (LC 21-040)		Analyse sédimentométrique (NQ 2501-025)	
Tamis	Tamisat (%)	Diamètre équivalent	Tamisat (%)
112 mm			
80 mm		69,7 µm	22,6
56 mm		50,4 µm	16,3
40 mm		36,4 µm	9,9
31,5 mm		23,2 µm	7,1
20 mm		13,5 µm	5,3
14 mm		9,6 µm	2,6
10 mm	100	6,8 µm	3,5
5 mm	100	4,8 µm	2,9
2,5 mm	100	3,4 µm	2,6
1,25 mm	100	2,4 µm	3,1
0,630 mm	99	1,4 µm	1,1
0,315 mm	91		
0,160 mm	65		
0,080 mm	35,7		

AUTRES ESSAIS	MESURÉ

REMARQUES

Le prélèvement et le transport de l'échantillon ont été effectués par un représentant du client.

Proportion selon analyse (%)			
Cailloux :	0,0	Sable :	64,2
Gravier :	0,1	Silt :	33,4
		Argile :	2,3



D_{10} : 0,037 D_{30} : 0,075 D_{60} : 0,142

Préparé par : **Date :**
Sofiane Bradai, ing. 2015-11-26

Approuvé par : **Date :**
Michel Cliche, ing. 2015-11-27

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Essais sur sols, granulats et autres matériaux

Client : **Stantec**
Projet : **Essais labo & contr. matériaux; Essais en laboratoire - Projet 167020019**
Endroit : **Amos**

Dossier : **P-0009163-0-20-001-01**
Réf. client
Rapport n° : **11** **Rév. 0**
Page **1 de 1**

ÉCHANTILLONNAGE

Provenance :
N° d'échantillon : 11 N° d'échantillon client :
Matériau :
Profondeur :
Localisation : PO-06-15 CF-10, de 35 à 37 pi.

Échantillonné par : le client
Date d'échantillonnage :
Date de réception : 2015-10-23
Densité relative des particules < 2 mm : 2.700(estimé)

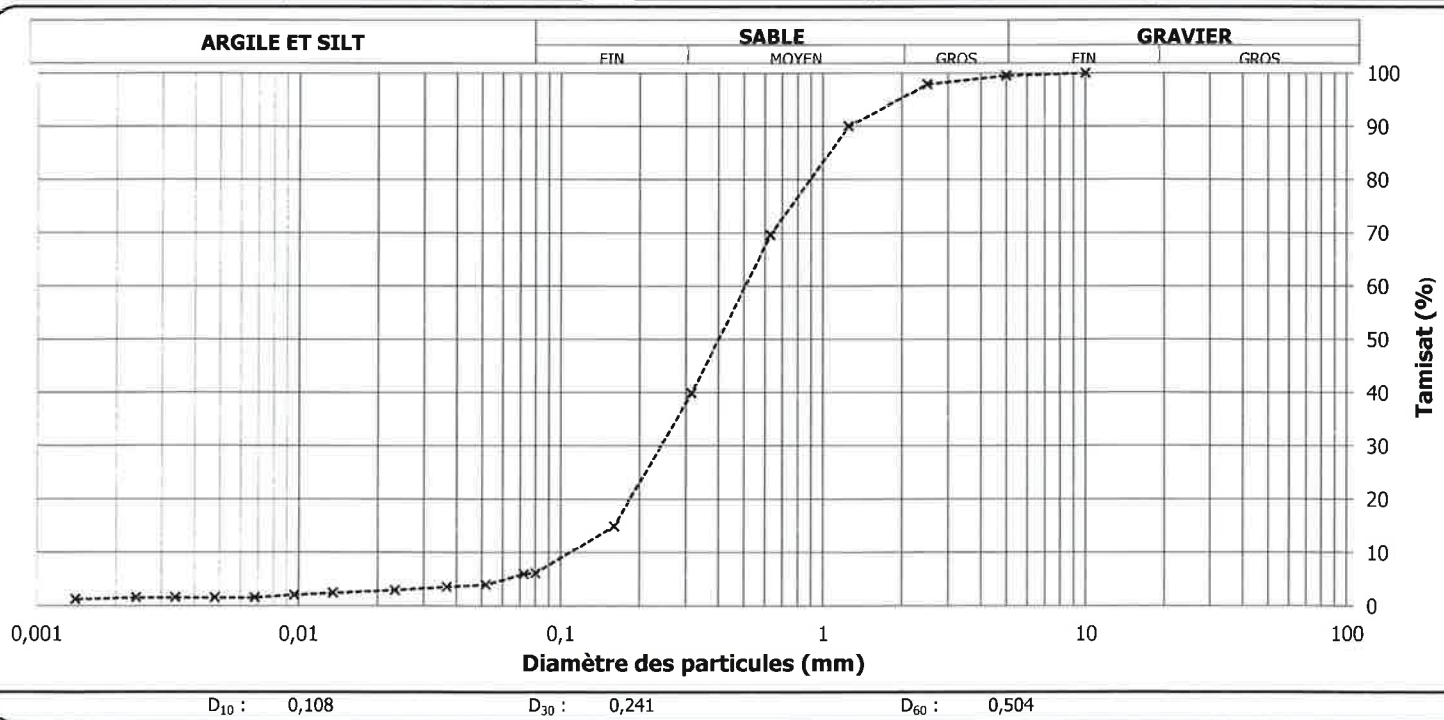
Analyse granulométrique (LC 21-040)		Analyse sédimentométrique (NQ 2501-025)	
Tamis	Tamisat (%)	Diamètre équivalent	Tamisat (%)
112 mm			
80 mm		72,3 µm	5,9
56 mm		51,8 µm	3,9
40 mm		36,7 µm	3,5
31,5 mm		23,3 µm	2,9
20 mm		13,5 µm	2,4
14 mm		9,6 µm	2,0
10 mm	100	6,8 µm	1,5
5 mm	100	4,8 µm	1,5
2,5 mm	98	3,4 µm	1,5
1,25 mm	90	2,4 µm	1,5
0,630 mm	70	1,4 µm	1,2
0,315 mm	40		
0,160 mm	15		
0,080 mm	6,1		

AUTRES ESSAIS	MESURÉ

REMARQUES

Le prélèvement et le transport de l'échantillon ont été effectués par un représentant du client.

Proportion selon analyse (%)			
Cailloux :	0,0	Sable :	93,4
Gravier :	0,5	Silt :	4,7
		Argile :	1,4



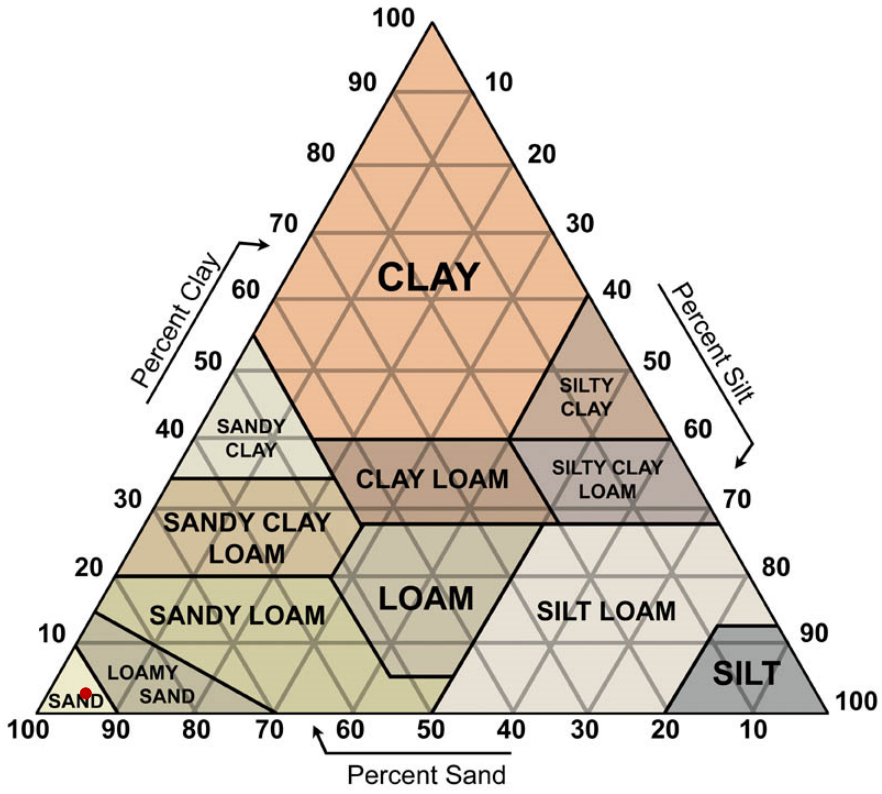
D_{10} : 0,108 D_{30} : 0,241 D_{60} : 0,504

Préparé par : **Date :**
Sofiane Bradai, ing. 2015-11-25

Approuvé par : **Date :**
Michel Cliche, ing. 2015-11-27

Appendix E SOIL TEXTURE ANALYSIS

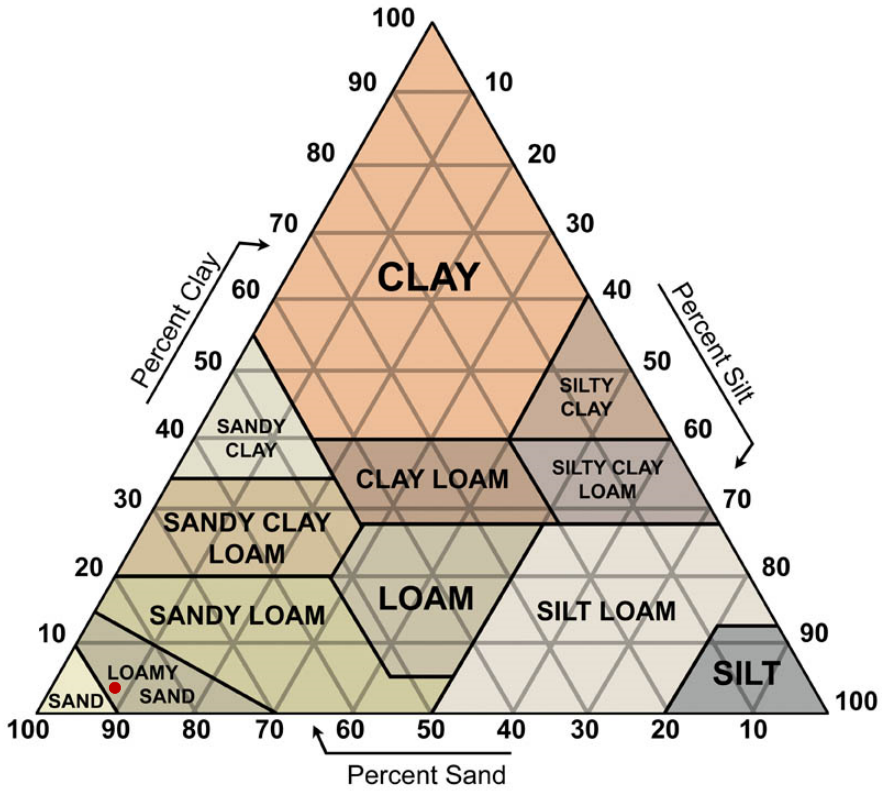
Borehole: PO-01-15
Sample: CF7 (6.10 – 6.71 meters)



Pebbles	Gravel	Sand	Silt	Clay
0.0	0.2	91.8	6.5	1.5

● = result of the soil texture analysis

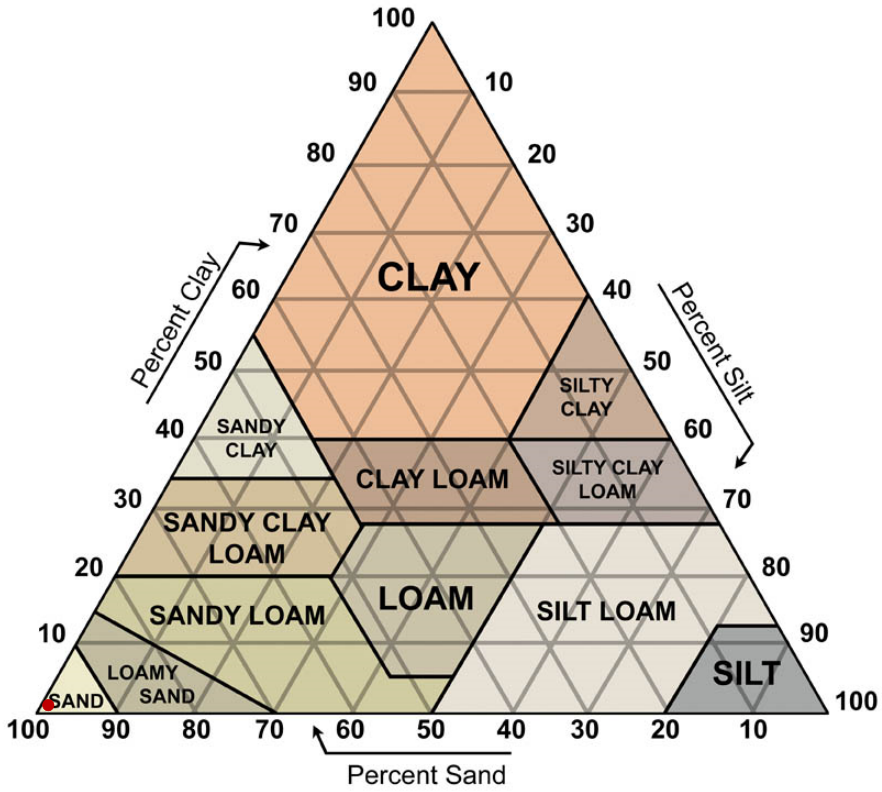
Borehole: PO-01-15
Sample: CF10 (10.67 – 11.28 meters)



Pebbles	Gravel	Sand	Silt	Clay
0.0	0.1	88.4	9.1	2.4

● = result of the soil texture analysis

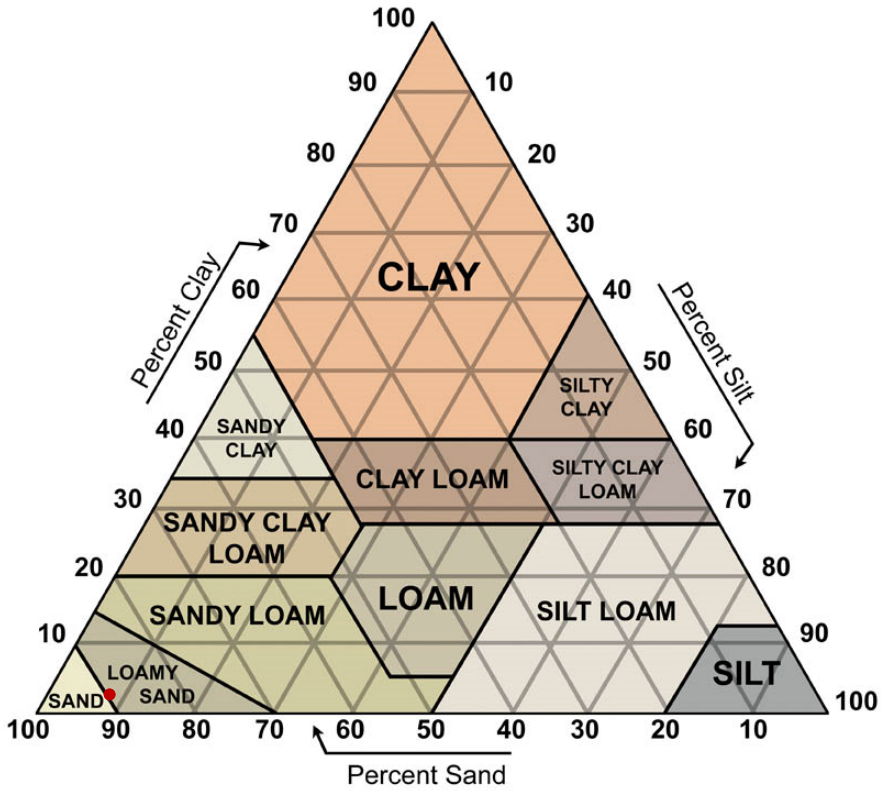
Borehole: PO-01-15
Sample: CF12 (13.72 – 14.33 meters)



Pebbles	Gravel	Sand	Silt	Clay
0.0	0.2	96.7	1.2	1.9

● = result of the soil texture analysis

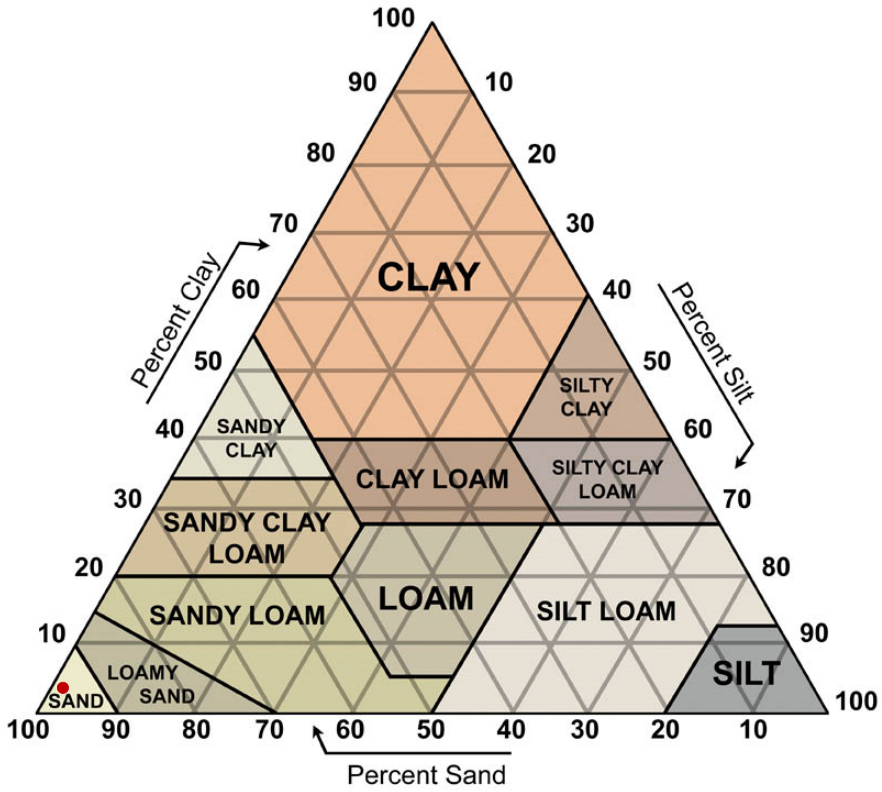
Borehole: PO-02-15
Sample: CF4 (1.83 – 2.44 meters)



Pebbles	Gravel	Sand	Silt	Clay
0.0	0.1	89.4	8.1	2.4

● = result of the soil texture analysis

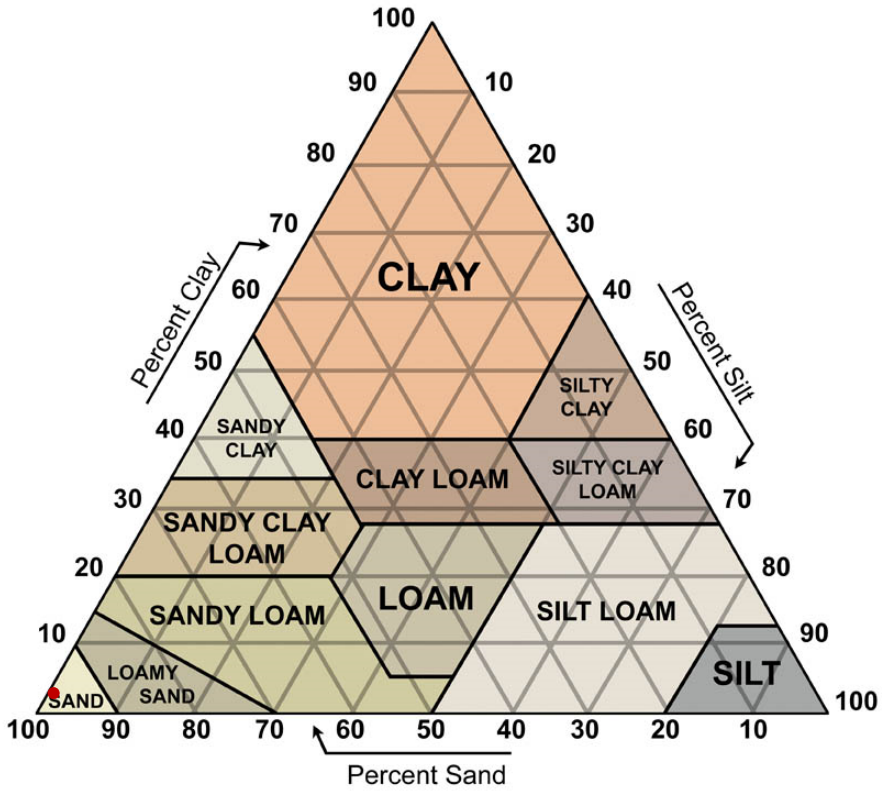
Borehole: PO-02-15
Sample: CF7 (6.10 – 6.71 meters)



Pebbles	Gravel	Sand	Silt	Clay
0.0	0.3	95.4	1.9	2.4

● = result of the soil texture analysis

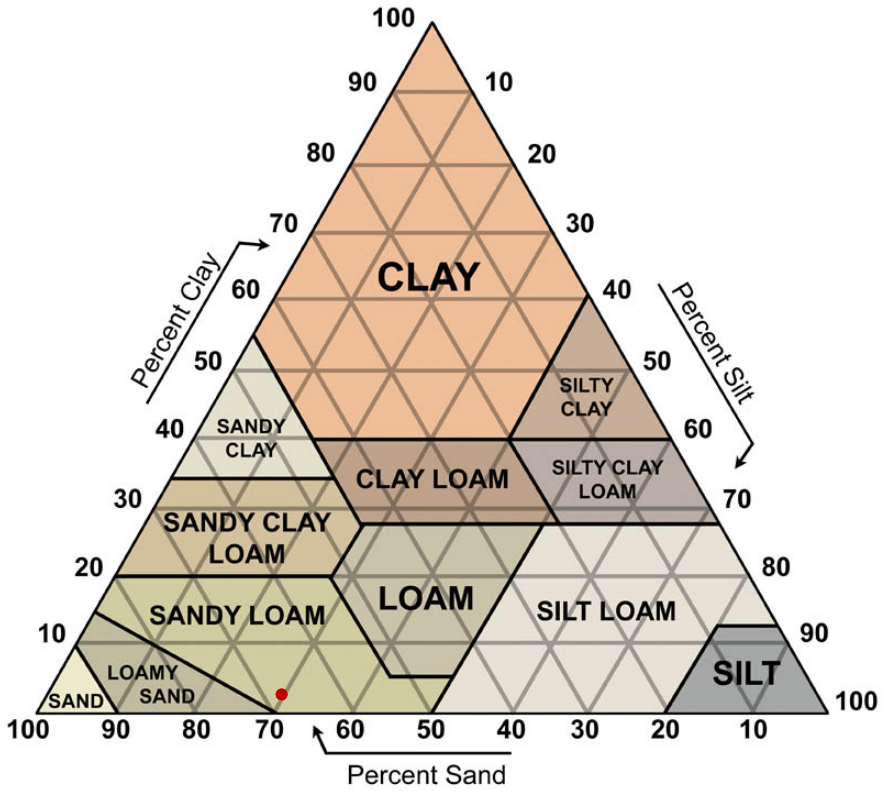
Borehole: PO-02-15
Sample: CF9 (10.67 – 11.28 meters)



Pebbles	Gravel	Sand	Silt	Clay
0.0	1.4	96.6	0.2	1.8

● = result of the soil texture analysis

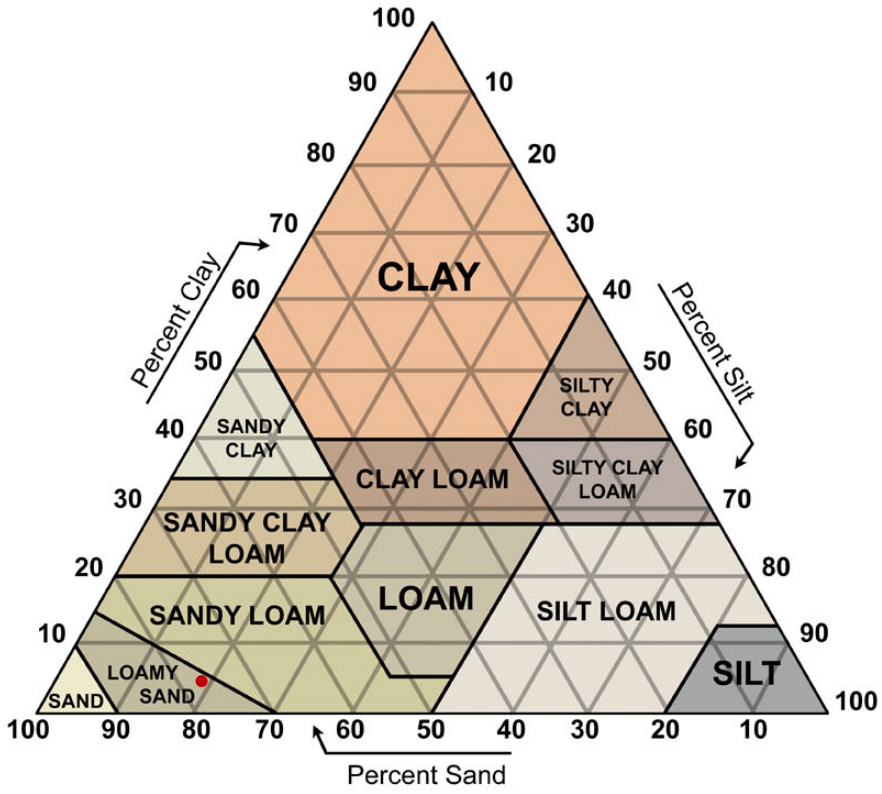
Borehole: PO-03-15
Sample: CF4 (1.83 – 2.44 meters)



Pebbles	Gravel	Sand	Silt	Clay
0.0	0.0	68.2	29.9	1.9

● = result of the soil texture analysis

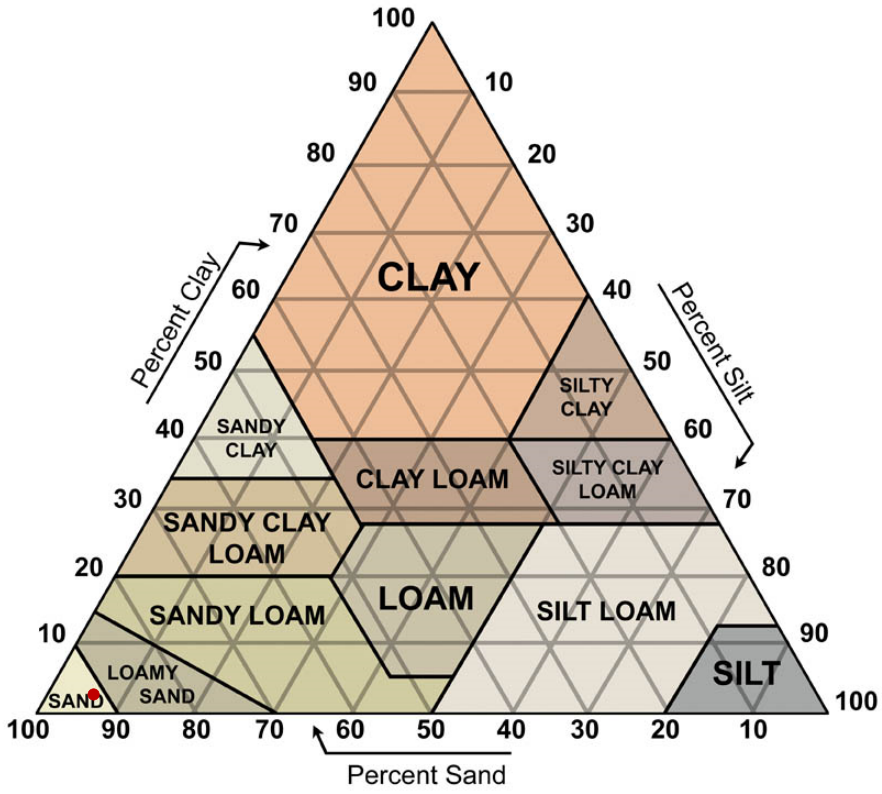
Borehole: PO-04-15
Sample: CF4 (1.83 – 2.44 meters)



Pebbles	Gravel	Sand	Silt	Clay
0.0	3.8	75.5	18.8	1.9

● = result of the soil texture analysis

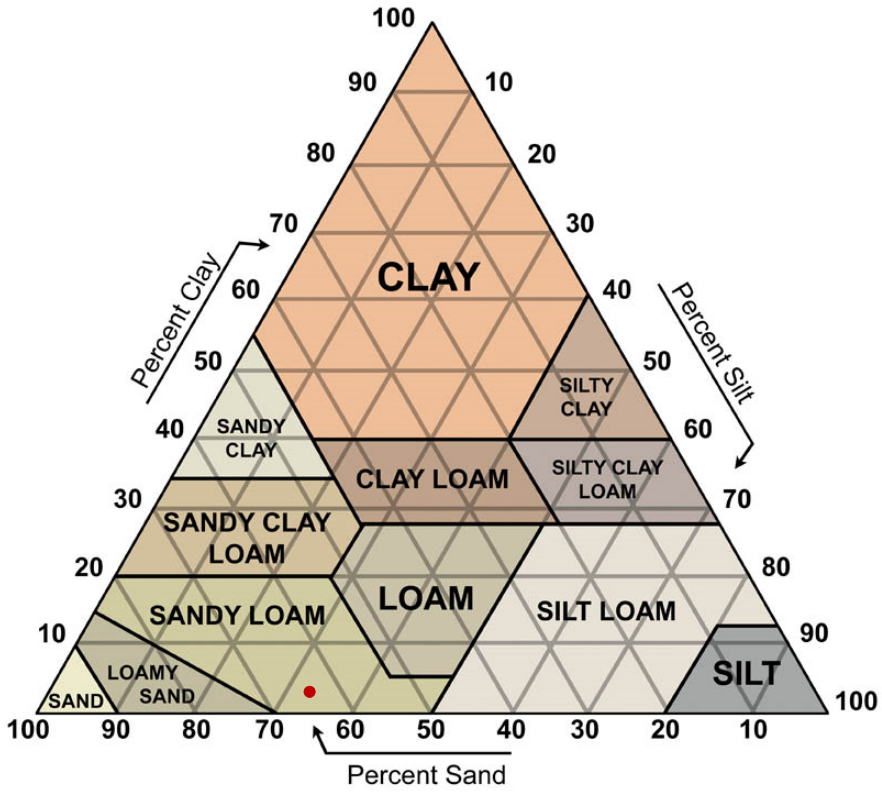
Borehole: F-05-15
Sample: CF5 (2.44 – 3.05 meters)



Pebbles	Gravel	Sand	Silt	Clay
0.0	0.1	91.4	6.7	1.8

● = result of the soil texture analysis

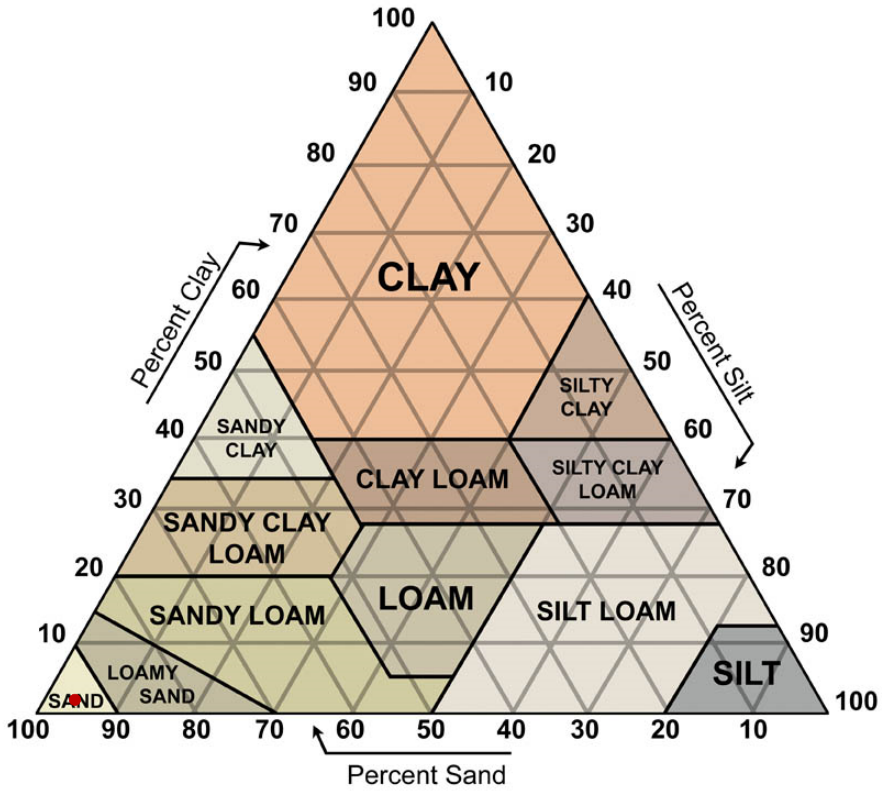
Borehole: F-06-15
Sample: CF3 (1.22 – 1.83 meters)



Pebbles	Gravel	Sand	Silt	Clay
0.0	0.1	64.2	33.4	2.3

● = result of the soil texture analysis

Borehole: F-06-15
Sample: CF10 (10.67 – 11.28 meters)



Pebbles	Gravel	Sand	Silt	Clay
0.0	0.5	93.4	4.7	1.4

● = result of the soil texture analysis

Appendix F ON-SITE PERMEABILITY TESTS

ESSAI DE PERMÉABILITÉ

Projet : Installation puits — **N° d'OTP :** 1670 20019

Endroit : Waswanipi, futur LEET — **Date :** 15-10-19

Prévoir 10 minutes entre l'insertion du data logger et le début de l'essai.

Prendre des mesures jusqu'à ce que la remontée de la nappe ait atteint 80% du rabattement

N° Puits : PO 03-15

Niveau statique : 4.42 m 14h11 h

Fond du puits : 6.10 m 14h11

PT de mesure : ☒ pvc ☐ sol

Insertion du data logger : 14h15 h

Insertion sonde à niv. d'eau : 14h26 h

Retrait du data logger : 14h46 h

Essai de type : ☒ Ascendant ☐ Descendant

Heure	Profondeur (m)
14h25	⇒ Purge 3 bailer
14h25, 30sec	—
14h26	5.20
14h26 30sec	5.09
14h27	4.98
14h28	4,81
14h30	4.60
14h32	4,51
14h35	4,45
14h40	4,43
14h45	4,42

N° Puits : PO-01-15

Niveau statique : 18.51 m 14458 h

Fond du puits : 19.35 m 14458

PT de mesure : ☒ pvc ☐ sol

Insertion du data logger : 15h06 h

Insertion sonde à niv. d'eau : 15h18 h

Retrait du data logger : 17h40 h

Essai de type : ☒ Ascendant ☐ Descendant

Heure	Profondeur (m)
15h16	⇒ purge 3 bailer
15h17	—
15h17, 30sec	—
15h18	18.86
15h18 30sec	18.855
15h19	18.852
15h20	18.85
15h22	18.845
15h25	18.84
15h30	18.835
15h40	18.83
15h50	18.825
17h39	18.815

N° Puits : PO-02-15 15-10-21

Niveau statique : 22.03 m 13h05 h

Fond du puits : 23,03 m 13h05

PT de mesure : ☒ pvc ☐ sol

Insertion du data logger : 13h16 h

Insertion sonde à niv. d'eau : 13h32 h

Retrait du data logger : 13h50 h

Essai de type : ☒ Ascendant ☐ Descendant

Heure	Profondeur (m)
13h25	purge bailer x3
13h27	—
13h28 30sec	—
13h28	—
13h28 30sec	—
13h29	—
13h30	—
13h32	22.32
13h35	22.315
13h36	22.31
13h40	22.295
13h45	22.285
13h50	22.275
14h40	22.24

problème à la sortie du bailer ne pas tenir compte des 7 premières minute Data logger a remonté

Appareils utilisés (n° ECME) :

Équipement utilisé pour créer le rabattement : Bailer X 3 ou 2 ou 1

Sonde à niveau d'eau : PU-2

Data logger : Location ERE

Remarques :

Technicien : M. Feiam — **Date :**

Vérifié par : — **Date :**

ESSAI DE PERMÉABILITÉ

Projet : Installation de puits **N° d'OTP :**

Endroit : Waswanipi, Futur LCE **Date :** 1

Prévoir 10 minutes entre l'insertion du data logger et le début de l'essai.

Prendre des mesures jusqu'à ce que la remontée de la nappe ait atteint 80% du rabattement

N° Puits : PO-04-15

Niveau statique : 3.25 m 14h17 h

Fond du puits : 7.77 m 14h07

PT de mesure : ☒ pvc ☐ sol

Insertion du data logger : 14h09 h

Insertion sonde à niv. d'eau : 14h21 h

Retrait du data logger : 14h31 h

Essai de type : ☒ Ascendant ☐ Descendant

Heure	Profondeur (m)
14h20	Bailer X3
14h21	3.83
14h21 30sec	3.52
14h22	3.40
14h22 30sec	3.32
14h23	3.29
14h24	3.26
14h25	3.255
14h27	3.25
14h30	3.25
14h35	|
14h40	↓
	Niveau Statique
	Data Logger
	Retiré

N° Puits : PO-02-15 (2e essai 15-10-21)

Niveau statique : 22.03 m 9h47 h

Fond du puits : 23.03 m 9h47

PT de mesure : ☒ pvc ☐ sol

Insertion du data logger : 9h51 h

Insertion sonde à niv. d'eau : 10h07 h

Retrait du data logger : 10h25 h

Essai de type : ☐ Ascendant ☐ Descendant

Heure	Profondeur (m)
10h00	Purge Bailer x1
10h02	=
10h02 30sec	=
10h03	=
10h03 30sec	=
10h04	=
10h05	=
10h07	22.335
10h10	22.325
10h15	22.31
10h20	22.30
10h25	22.295

N° Puits :

Niveau statique : m h

Fond du puits : m

PT de mesure : ☐ pvc ☐ sol

Insertion du data logger : h

Insertion sonde à niv. d'eau : h

Retrait du data logger : h

Essai de type : ☐ Ascendant ☐ Descendant

Heure	Profondeur (m)
	encore problème
	lors de la
	Sortie du bailer
	⇒ Ni pas tenir
	compte des données
	du Data Logger
	des 7 Premières Minutes
	car il a Remonté
	Lors de la Sortie du
	bailer

Appareils utilisés (n° ECME) :

Équipement utilisé pour créer le rabattement : Bailer X3

Sonde à niveau d'eau : WL-2

Data logger : Location ERE M30

Remarques :

Technicien : M Tremblay **Date :**

Vérifié par : **Date :**

ESSAI DE PERMÉABILITÉ

Projet : Installation de puits **N° d'OTP :** 16 7020019

Endroit : Waswanipi Futur LEET **Date :** 15 10-02

Prévoir 10 minutes entre l'insertion du data logger et le début de l'essai.

Prendre des mesures jusqu'à ce que la remontée de la nappe ait atteint 80% du rabattement

N° Puits : PO-03-15 / 15-10-02

Niveau statique : 4.32 m 14h23 h

Fond du puits : 6.10 m 14h23

PT de mesure : ☒ pvc ☐ sol

Insertion du data logger : 14h25 h

Insertion sonde à niv. d'eau : 14h36 h

Retrait du data logger : 14h50 h

Essai de type : ☒ Ascendant ☐ Descendant

Heure	Profondeur (m)
14h36	??
14h36 15 sec	4,50
14h36 30 sec	4,44
14h37	4,42
14h37 30 sec	4,40
14h38	4,38
14h39	4,36
14h40	4,35
14h42	4,34
14h45	4,32

N° Puits : PO-01-15 (15-10-3)

Niveau statique : 18.78 m 9h30 h

Fond du puits : 19.35 m 9h30

PT de mesure : ☒ pvc ☐ sol

Insertion du data logger : 9h32 h

Insertion sonde à niv. d'eau : 9h44 h

Retrait du data logger : 17h30 17h30 h

Essai de type : ☒ Ascendant ☐ Descendant

Heure	Profondeur (m)
9h42	bailer retiré
9h44	18.925
9h45	18.915
9h46	18.91
9h48	18.905
9h50	18.902
9h55	18.90
10h00	18.895
10h15	18.885
10h30	18.88
17h30	18.82
15-10-04 9h00	18.76

N° Puits : PO-02 ( )

Niveau statique : 20.77 m 2 h

Fond du puits : 23.05 m

PT de mesure : ☒ pvc ☐ sol

Insertion du data logger : h

Insertion sonde à niv. d'eau : h

Retrait du data logger : h

Essai de type : ☐ Ascendant ☐ Descendant

Heure	Profondeur (m)
Il impossible de	
développer le puits	
tubulure trop mole.	
sera repris dans	
2 semaines	

Appareils utilisés (n° ECME) :

Équipement utilisé pour créer le rabattement : Bailer

Sonde à niveau d'eau : PU-1

Data logger : Lower ERE

Remarques :

Technicien : [signature] **Date :**

Vérifié par : **Date :**

Appendix G WATER SAMPLING PROGRAM LABORATORY RESULTS

Votre # du projet: 167020019
Adresse du site: LEET WASWANIPI
Votre # Bordereau: C#129626-01-01

Attention:Patrick Leblanc-DiStefano

STANTEC CONSULTING LTD
187, avenue Murdoch
Rouyn-Noranda, QC
Canada J9X 1E3

Date du rapport: 2015/11/09
Rapport: R2071711
Version: 2 - Finale

CERTIFICAT D'ANALYSES

 # DE DOSSIER MAXXAM: B566632
Reçu: 2015/10/30, 10:00

Matrice: EAU SOUTERRAINE
Nombre d'échantillons reçus: 4

Analyses	Quantité	Date de l' extraction	Date Analysé	Méthode de laboratoire	Référence Primaire
Anions*	4	N/A	2015/10/31	STL SOP-00014	MA300-Ions 1.3 R2 m
Demande biochimique en oxygène (5 jours)*	4	2015/10/30	2015/11/04	STL SOP-00008	MA315-DBO 1.1 R3 m
Benzène, toluène, éthylbenzène, xylène*	4	N/A	2015/11/02	STL SOP-00145	MA400–COV 2.0 R3 m
Cyanures totaux*	4	2015/11/02	2015/11/03	STL SOP-00035	MA300-CN 1.2 R3 m
Demande chimique en oxygène*	3	2015/11/05	2015/11/05	STL SOP-00009	MA315-DCO 1.1 R3 m
Demande chimique en oxygène*	1	2015/11/06	2015/11/06	STL SOP-00009	MA315-DCO 1.1 R3 m
Coliformes fécaux (1)*	3	N/A	2015/10/31	STL SOP-00189	MA. 700-FEC. EC 1.0
Coliformes fécaux (1)*	1	N/A	2015/10/31	STL SOP-00189	MA. 700-FEC. EC 1.0
Conductivité*	4	N/A	2015/11/03	STL SOP-00038	SM 22 2510-B m
Métaux dissous par ICP-MS*	4	N/A	2015/11/05	STL SOP-00006	MA200-Mét 1.2 R5 m
Azote ammoniacal*	4	N/A	2015/11/04	STL SOP-00040	MA300–N 2.0 R2 m
Nitrate et/ou Nitrite*	4	N/A	2015/10/31	STL SOP-00014	MA300-Ions 1.3 R2 m
Phénols totaux par 4-AAP*	4	2015/11/05	2015/11/05	STL SOP-00033	MA404-I.Phé 2.2 R2 m
Sulfures (exprimés en S2-) (2)*	4	2015/11/05	2015/11/05	QUE SOP-00107	SM 21 4500-S2- D m

Lorsque la méthode de référence comprend le suffixe « m », cela signifie que les méthodes d'analyse contiennent les modifications validées provenant des méthodes de référence précises appliquées pour améliorer la performance.

Notez: Les données brutes sont utilisées pour le calcul du RPD (% d'écart relatif). L'arrondissement des résultats finaux peut expliquer la variation apparente.

(1) Cette analyse a été effectuée par Maxxam Microbiologie-Montréal
(2) Cette analyse a été effectuée par Maxxam - Québec

* Maxxam détient l'accréditation pour cette analyse selon le programme du MDDELCC.

clé de cryptage

Veuillez adresser toute question concernant ce certificat d'analyse à votre chargé(e) de projets
Rodrigo Caffarengo,
Courriel: RCaffarengo@maxxam.ca
Téléphone (514)448-9001 Ext:6336

==========

Maxxam a mis en place des procédures qui protègent contre l'utilisation non autorisée de la signature électronique et emploie les «signataires» requis, conformément à la section 5.10.2 de la norme ISO/CEI 17025:2005(E). Veuillez vous référer à la page des signatures de validation pour obtenir les détails des validations pour chaque division.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-4MAXXAM (462-9926)

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Dossier Maxxam: B566632
Date du rapport: 2015/11/09

STANTEC CONSULTING LTD
Votre # du projet: 167020019
Adresse du site: LEET WASWANIPI
Initiales du préleveur: MF

BTEX PAR GC/MS (EAU SOUTERRAINE)

ID Maxxam		BP0893	BP0893	BP0894	BP0895	BP0896		
Date d'échantillonnage		2015/10/29	2015/10/29	2015/10/29	2015/10/29	2015/10/29		
# Bordereau		C#129626-01-01	C#129626-01-01	C#129626-01-01	C#129626-01-01	C#129626-01-01		
	Unités	PO-01-15	PO-01-15 Dup. de Lab.	PO-02-15	PO-03-15	PO-04-15	LDR	Lot CQ
VOLATILS								
Benzène	ug/L	<1	<1	<1	<1	<1	1	1529850
Toluène	ug/L	3	3	<1	<1	<1	1	1529850
Éthylbenzène	ug/L	<1	<1	<1	<1	<1	1	1529850
Xylènes (o,m,p)	ug/L	<1	<1	<1	<1	<1	1	1529850
Récupération des Surrogates (%)								
4-Bromofluorobenzène	%	97	97	97	96	96	N/A	1529850
D4-1,2-Dichloroéthane	%	106	106	105	105	104	N/A	1529850
D8-Toluène	%	98	98	98	97	98	N/A	1529850

LDR = Limite de détection rapportée
Lot CQ = Lot contrôle qualité
N/A = Non Applicable

2015/11/09 12:44

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Dossier Maxxam: B566632
Date du rapport: 2015/11/09

STANTEC CONSULTING LTD
Votre # du projet: 167020019
Adresse du site: LEET WASWANIPI
Initiales du préleveur: MF

MÉTAUX DISSOUS (EAU SOUTERRAINE)

ID Maxxam		BP0893		BP0894		BP0895	BP0896		
Date d'échantillonnage		2015/10/29		2015/10/29		2015/10/29	2015/10/29		
# Bordereau		C#129626-01-01		C#129626-01-01		C#129626-01-01	C#129626-01-01		
	Unités	PO-01-15	Lot CQ	PO-02-15	Lot CQ	PO-03-15	PO-04-15	LDR	Lot CQ
MÉTAUX									
Bore (B)	mg/L	<0.05	1531161	<0.05	1531869	<0.05	<0.05	0.05	1531161
Cadmium (Cd)	mg/L	<0.001	1531161	<0.001	1531869	<0.001	<0.001	0.001	1531161
Chrome (Cr)	mg/L	<0.005	1531161	<0.005	1531869	<0.005	<0.005	0.005	1531161
Fer (Fe)	mg/L	1.1	1531161	0.7	1531869	0.2	0.2	0.1	1531161
Manganèse (Mn)	mg/L	0.43	1531161	0.25	1531869	0.37	0.14	0.003	1531161
Mercure (Hg)	mg/L	<0.0001	1531161	<0.0001	1531869	<0.0001	<0.0001	0.0001	1531161
Nickel (Ni)	mg/L	0.02	1531161	0.03	1531869	<0.01	<0.01	0.01	1531161
Plomb (Pb)	mg/L	<0.001	1531161	0.002	1531869	<0.001	<0.001	0.001	1531161
Sodium (Na)	mg/L	5.7	1531161	56	1531869	2.3	12	0.2	1531161
Zinc (Zn)	mg/L	0.079	1531161	0.59	1531869	0.007	<0.005	0.005	1531161

LDR = Limite de détection rapportée
Lot CQ = Lot contrôle qualité

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-4MAXXAM (462-9926)

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Dossier Maxxam: B566632
Date du rapport: 2015/11/09

STANTEC CONSULTING LTD
Votre # du projet: 167020019
Adresse du site: LEET WASWANIPI
Initiales du préleveur: MF

PARAMÈTRES CONVENTIONNELS (EAU SOUTERRAINE)

ID Maxxam		BP0893			BP0894			BP0895		
Date d'échantillonnage		2015/10/29			2015/10/29			2015/10/29		
# Bordereau		C#129626-01-01			C#129626-01-01			C#129626-01-01		
	Unités	PO-01-15	LDR	Lot CQ	PO-02-15	LDR	Lot CQ	PO-03-15	LDR	Lot CQ
CONVENTIONNELS										
Azote ammoniacal (N-NH3)	mg/L	0.05	0.02	1531239	1.4	0.02	1531239	<0.02	0.02	1531239
Conductivité	mS/cm	0.15	0.001	1529522	0.14	0.001	1529522	0.10	0.001	1529522
Cyanures Totaux	mg/L	<0.003	0.003	1530222	<0.003	0.003	1530222	<0.003	0.003	1530222
DBO5	mg/L	26	4	1529282	<4	4	1529282	6	4	1529282
DCO	mg/L	87	10	1531777	1300	20	1532466	130	10	1531777
Nitrates (N-NO3-)	mg/L	<0.02	0.02	1529529	0.07	0.02	1529529	0.03	0.02	1529529
Nitrites (N-NO2-)	mg/L	<0.02	0.02	1529529	<0.02	0.02	1529529	<0.02	0.02	1529529
Phénols-4AAP	mg/L	0.004	0.002	1531905	<0.002	0.002	1531905	0.002	0.002	1531905
Sulfures (exprimés en S2-)	mg/L	<0.02	0.02	1531962	<0.02	0.02	1531962	<0.02	0.02	1531962
Chlorures (Cl)	mg/L	5.4	0.05	1529530	6.5	0.05	1529530	0.79	0.05	1529530
Nitrate(N) et Nitrite(N)	mg/L	<0.02	0.02	1529530	0.07	0.02	1529530	0.03	0.02	1529530
Sulfates (SO4)	mg/L	13	0.5	1529530	18	0.5	1529530	4.2	0.5	1529530

LDR = Limite de détection rapportée
Lot CQ = Lot contrôle qualité

ID Maxxam		BP0896		
Date d'échantillonnage		2015/10/29		
# Bordereau		C#129626-01-01		
	Unités	PO-04-15	LDR	Lot CQ
CONVENTIONNELS				
Azote ammoniacal (N-NH3)	mg/L	<0.02	0.02	1531239
Conductivité	mS/cm	0.13	0.001	1529522
Cyanures Totaux	mg/L	<0.003	0.003	1530222
DBO5	mg/L	7	4	1529282
DCO	mg/L	110	10	1531777
Nitrates (N-NO3-)	mg/L	<0.02	0.02	1529529
Nitrites (N-NO2-)	mg/L	<0.02	0.02	1529529
Phénols-4AAP	mg/L	0.003	0.002	1531905
Sulfures (exprimés en S2-)	mg/L	0.05	0.02	1531962
Chlorures (Cl)	mg/L	1.4	0.05	1529530
Nitrate(N) et Nitrite(N)	mg/L	<0.02	0.02	1529530
Sulfates (SO4)	mg/L	14	0.5	1529530

LDR = Limite de détection rapportée
Lot CQ = Lot contrôle qualité

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Dossier Maxxam: B566632
Date du rapport: 2015/11/09

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Adresse du site: LEET WASWANIPI
Initiales du préleveur: MF

MICROBIOLOGIE (EAU SOUTERRAINE)

ID Maxxam		BP0893		BP0894			BP0895	
Date d'échantillonnage		2015/10/29		2015/10/29			2015/10/29	
# Bordereau		C#129626-01-01		C#129626-01-01			C#129626-01-01	
	Unités	PO-01-15	Lot CQ	PO-02-15	LDR	Lot CQ	PO-03-15	Lot CQ
TESTS MICROBIOLOGIQUES								
Coliformes fécaux	UFC/100ml	0	1529716	<10	10	1530188	0	1529716

LDR = Limite de détection rapportée
Lot CQ = Lot contrôle qualité

ID Maxxam		BP0896	
Date d'échantillonnage		2015/10/29	
# Bordereau		C#129626-01-01	
	Unités	PO-04-15	Lot CQ
TESTS MICROBIOLOGIQUES			
Coliformes fécaux	UFC/100ml	0	1529716

Lot CQ = Lot contrôle qualité

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REMARQUES GÉNÉRALES

État des échantillons à l'arrivée: BON

BTEX PAR GC/MS (EAU SOUTERRAINE)

Veuillez noter que les résultats n'ont été corrigés ni pour la récupération des échantillons de contrôle qualité (blanc fortifié et blanc de méthode), ni pour les surrogates.

Veuillez noter que les échantillons sont analysés par Headspace GC/MS.

MÉTAUX DISSOUS (EAU SOUTERRAINE)

Veuillez noter que les résultats n'ont pas été corrigés ni pour la récupération des échantillons de contrôle qualité, ni pour le blanc de méthode.
Les échantillons BP0893, BP0894, BP0895, BP0896 ont été filtrés en laboratoire avant l'analyse des métaux.

PARAMÈTRES CONVENTIONNELS (EAU SOUTERRAINE)

Veuillez noter que les résultats n'ont pas été corrigés ni pour la récupération des échantillons de contrôle qualité, ni pour le blanc de méthode.
Les limites de détections indiquées sont multipliées par les facteurs de dilution utilisés pour l'analyse des échantillons.

Les résultats ne se rapportent qu'aux échantillons soumis pour analyse

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RAPPORT ASSURANCE QUALITÉ

Lot AQ/CQ	Init	Type CQ	Groupe	Date Analysé	Valeur	Réc	Unités
1529282	LD2	MRC	DBO5	2015/11/04		121	%
1529282	LD2	Blanc fortifié	DBO5	2015/11/04		117 (1)	%
1529282	LD2	Blanc fortifié DUP	DBO5	2015/11/04		116 (1)	%
1529282	LD2	Blanc de méthode	DBO5	2015/11/04	<2		mg/L
1529522	MR4	Blanc fortifié	Conductivité	2015/11/03		104	%
1529522	MR4	Blanc de méthode	Conductivité	2015/11/03	<0.001		mS/cm
1529529	JEM	Blanc fortifié	Nitrates (N-NO3-)	2015/10/31		97	%
			Nitrites (N-NO2-)	2015/10/31		104	%
1529529	JEM	Blanc de méthode	Nitrates (N-NO3-)	2015/10/31	<0.02		mg/L
			Nitrites (N-NO2-)	2015/10/31	<0.02		mg/L
1529530	JEM	Blanc fortifié	Chlorures (Cl)	2015/10/31		100	%
			Nitrate(N) et Nitrite(N)	2015/10/31		101	%
			Sulfates (SO4)	2015/10/31		95	%
1529530	JEM	Blanc de méthode	Chlorures (Cl)	2015/10/31	<0.05		mg/L
			Nitrate(N) et Nitrite(N)	2015/10/31	<0.02		mg/L
			Sulfates (SO4)	2015/10/31	<0.5		mg/L
1529850	NTD	Blanc fortifié	4-Bromofluorobenzène	2015/11/02		107	%
			D4-1,2-Dichloroéthane	2015/11/02		80	%
			D8-Toluène	2015/11/02		96	%
			Benzène	2015/11/02		89	%
			Toluène	2015/11/02		88	%
			Éthylbenzène	2015/11/02		84	%
			Xylènes (o,m,p)	2015/11/02		85	%
1529850	NTD	Blanc de méthode	4-Bromofluorobenzène	2015/11/02		106	%
			D4-1,2-Dichloroéthane	2015/11/02		80	%
			D8-Toluène	2015/11/02		97	%
			Benzène	2015/11/02	<1		ug/L
			Toluène	2015/11/02	<1		ug/L
			Éthylbenzène	2015/11/02	<1		ug/L
			Xylènes (o,m,p)	2015/11/02	<1		ug/L
1530222	JL1	MRC	Cyanures Totaux	2015/11/03		89	%
1530222	JL1	Blanc fortifié	Cyanures Totaux	2015/11/03		106	%
1530222	JL1	Blanc de méthode	Cyanures Totaux	2015/11/03	<0.003		mg/L
1531161	JF1	Blanc fortifié	Bore (B)	2015/11/04		102	%
			Cadmium (Cd)	2015/11/04		99	%
			Chrome (Cr)	2015/11/04		98	%
			Fer (Fe)	2015/11/04		100	%
			Manganèse (Mn)	2015/11/04		103	%
			Mercure (Hg)	2015/11/04		99	%
			Nickel (Ni)	2015/11/04		96	%
			Plomb (Pb)	2015/11/04		96	%
			Sodium (Na)	2015/11/04		103	%
			Zinc (Zn)	2015/11/04		97	%
1531161	JF1	Blanc de méthode	Bore (B)	2015/11/04	<0.05		mg/L
			Cadmium (Cd)	2015/11/04	<0.001		mg/L
			Chrome (Cr)	2015/11/04	<0.005		mg/L
			Fer (Fe)	2015/11/04	<0.1		mg/L
			Manganèse (Mn)	2015/11/04	<0.003		mg/L
			Mercure (Hg)	2015/11/04	<0.0001		mg/L
			Nickel (Ni)	2015/11/04	<0.01		mg/L
			Plomb (Pb)	2015/11/04	<0.001		mg/L

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Adresse du site: LEET WASWANIPI
Initiales du préleveur: MF

RAPPORT ASSURANCE QUALITÉ (SUITE)

Lot AQ/CQ	Init	Type CQ	Groupe	Date Analysé	Valeur	Réc	Unités
			Sodium (Na)	2015/11/04	<0.2		mg/L
			Zinc (Zn)	2015/11/04	<0.005		mg/L
1531239	DKH	Blanc fortifié	Azote ammoniacal (N-NH3)	2015/11/04		93	%
1531239	DKH	Blanc de méthode	Azote ammoniacal (N-NH3)	2015/11/04	<0.02		mg/L
1531777	LD2	Échantillon fortifié	DCO	2015/11/05		96	%
1531777	LD2	MRC	DCO	2015/11/05		97	%
1531777	LD2	Blanc fortifié	DCO	2015/11/05		98	%
1531777	LD2	Blanc de méthode	DCO	2015/11/05	<10		mg/L
1531869	JF1	Blanc fortifié	Bore (B)	2015/11/05		104	%
			Cadmium (Cd)	2015/11/05		101	%
			Chrome (Cr)	2015/11/05		99	%
			Fer (Fe)	2015/11/05		103	%
			Manganèse (Mn)	2015/11/05		106	%
			Mercure (Hg)	2015/11/05		103	%
			Nickel (Ni)	2015/11/05		99	%
			Plomb (Pb)	2015/11/05		98	%
			Sodium (Na)	2015/11/05		105	%
			Zinc (Zn)	2015/11/05		98	%
1531869	JF1	Blanc de méthode	Bore (B)	2015/11/05	<0.05		mg/L
			Cadmium (Cd)	2015/11/05	<0.001		mg/L
			Chrome (Cr)	2015/11/05	<0.005		mg/L
			Fer (Fe)	2015/11/05	<0.1		mg/L
			Manganèse (Mn)	2015/11/05	<0.003		mg/L
			Mercure (Hg)	2015/11/05	<0.0001		mg/L
			Nickel (Ni)	2015/11/05	<0.01		mg/L
			Plomb (Pb)	2015/11/05	<0.001		mg/L
			Sodium (Na)	2015/11/05	<0.2		mg/L
			Zinc (Zn)	2015/11/05	<0.005		mg/L
1531905	MH1	MRC	Phénols-4AAP	2015/11/05		101	%
1531905	MH1	Blanc fortifié	Phénols-4AAP	2015/11/05		96	%
1531905	MH1	Blanc de méthode	Phénols-4AAP	2015/11/05	<0.002		mg/L
1531962	DP3	MRC	Sulfures (exprimés en S2-)	2015/11/05		77	%
1531962	DP3	Blanc de méthode	Sulfures (exprimés en S2-)	2015/11/05	<0.02		mg/L
1532466	CN1	MRC	DCO	2015/11/06		103	%
1532466	CN1	Blanc fortifié	DCO	2015/11/06		101	%

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RAPPORT ASSURANCE QUALITÉ (SUITE)

Lot AQ/CQ	Init	Type CQ	Groupe	Date Analysé	Valeur	Réc	Unités
1532466	CN1	Blanc de méthode	DCO	2015/11/06	<10		mg/L

Échantillon fortifié: Échantillon auquel a été ajouté une quantité connue d'un ou de plusieurs composés chimiques d'intérêt. Sert à évaluer les interférences dues à la matrice.

MRC: Un échantillon de concentration connue préparé dans des conditions rigoureuses par un organisme externe. Utilisé pour vérifier la justesse de la méthode.

Blanc fortifié: Un blanc, d'une matrice exempte de contaminants, auquel a été ajouté une quantité connue d'analyte provenant généralement d'une deuxième source. Utilisé pour évaluer la précision de la méthode.

Blanc de méthode: Une partie aliquote de matrice pure soumise au même processus analytique que les échantillons, du prétraitement au dosage. Sert à évaluer toutes contaminations du laboratoire.

Surrogate: Composé se comportant de façon similaire aux composés analysés et ajouté à l'échantillon avant l'analyse. Sert à évaluer la qualité de l'extraction.

Réc = Récupération

(1) La récupération ou l'écart relatif (RPD) pour ce composé est en dehors des limites de contrôle, mais l'ensemble du contrôle qualité rencontre les critères d'acceptabilité pour cette analyse

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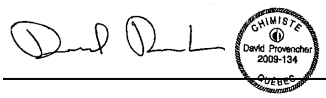
PAGE DES SIGNATURES DE VALIDATION

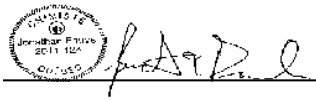
Les résultats analytiques ainsi que les données de contrôle-qualité contenus dans ce rapport furent vérifiés et validés par les personnes suivantes:

Alain Saint-Jean, B.Sc., Chimiste, Superviseur

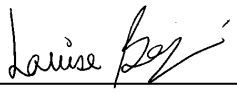
Dochka Koleva Hristova, B.Sc., Chimiste



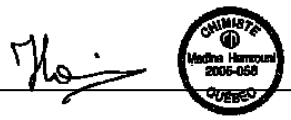
David Provencher, B.Sc., Chimiste, Québec



Jonathan Fauvel, B.Sc, Chimiste



Louise Beaupre, Microbiologiste, B. Sc., Spécialiste Scientifique



Madina Hamrouni, B.Sc., Chimiste

Salim Guerrouahene

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Les résultats analytiques ainsi que les données de contrôle-qualité contenus dans ce rapport furent vérifiés et validés par les personnes suivantes:

Maxxam a mis en place des procédures qui protègent contre l'utilisation non autorisée de la signature électronique et emploie les «signataires» requis, conformément à la section 5.10.2 de la norme ISO/CEI 17025:2005(E). Veuillez vous référer à la page des signatures de validation pour obtenir les détails des validations pour chaque division.

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CONDITIONS ET MODALITÉS

Les conditions et modalités qui suivent s'appliquent aux Services à être fournis par Maxxam Analytique Inc. (« Maxxam »). Aux fins du présent document, les « Services » comprennent les services fournis par Maxxam tels qu'ils sont décrits ou mentionnés au verso du présent formulaire, et comprennent tous les services et rapports s'y rattachant. En cas de conflit avec celles-ci et toutes autres conditions et modalités contenues dans tout bon de commande ou autre document relativement aux services dont Maxxam n'a pas expressément convenu par écrit, les présentes conditions et modalités auront préséance :

Responsabilité :

Maxxam a comme seule et unique responsabilité de fournir des Services en conformité avec les normes professionnelles généralement admises à l'aide de méthodes et de procédures d'analyses admises et s'il y a lieu accréditées, sauf si des norm moindres sont ordonnées par le client dont le nom appara verso du présent formulaire (« Client »). La responsabilit Maxxam en rapport avec l'exécution ou la non-exécution Services vise le Client uniquement, et non les successe ayants droit, associés, affiliés, dirigeants, employés, directe fournisseurs, clients de Maxxam ou du client ni toute tierce pa et se limite au coût réel de l'analyse spécifique incluse dans Services. Maxxam n'a aucune responsabilité de quelque s concernant les dommages-intérêts indirects, exemplai accessoires, spéciaux ou punitifs, y compris les profits perc même si Maxxam a été informée de la possibilité de dommages-intérêts. Sauf tel que précité, Maxxam décline to responsabilité, explicite ou implicite, incluant sans restriction toute responsabilité de qualité marchande ou de justesse pour un but particulier. Le Client s'engage à indemniser et à dégager Maxxam de toute responsabilité en ce qui a trait à toutes les réclamations, tous les dommages-intérêts et toutes les pertes y compris les frais juridiques en rapport avec ou découlant de l'exécution des Services, sauf uniquement tel que précité.

Confidentialité :

Tous les résultats et informations obtenus par Maxxam seront gardés strictement confidentiels à moins que (i) le Client l'ordonne autrement par écrit, (ii) toute information divulguée soit au moment de sa divulgation ou subséquemment généralement connue du public sans bris d'un quelconque accord de confidentialité avec Maxxam, ou (iii) la divulgation soit ordonnée par la loi, dans un tel cas Maxxam déploiera les efforts raisonnables sur le plan commercial pour donner au Client un préavis par écrit de toute divulgation devant être faite, et aux frais du Client, Maxxam coopérera entièrement avec le Client dans le but d'obtenir des ordonnances préventives, un traitement confidentiel ou toute autre mesure préventive disponible visant à protéger la confidentialité des informations dont la divulgation est exigée.

Assurance :

Une preuve d'assurance peut être obtenue sur demande.

Frais minimums :

Des frais minimums jusqu'à concurrence de 250,00 $ peuvent s'appliquer à toute commande de travaux d'analyse.

Prix :

Les prix publiés des services d'analyse peuvent être assujettis à des changements sans préavis.

Entreposage des échantillons :

Veuillez communiquer avec un représentant du service à la clientèle de Maxxam pour obtenir les détails et la confirmation de la période d'entreposage « sans frais » pour certains types d'échantillons. Des périodes d'entreposage plus longues que

élimination, Maxxam se réserve le droit de facturer des frais pour leur élimination en toute sécurité. Les échantillons d'eau comporteront des frais d'élimination jusqu'à concurrence de 8,00 $ par échantillon. Les autres types d'échantillons comporteront des frais d'élimination jusqu'à concurrence de 8,00 $ du kilo.

Tous les frais d'élimination ci-dessus et leur application sont assujettis à un accord préalable avec Maxxam.

Échantillons dangereux :

Les échantillons soupçonnés d'être dangereux doivent être clairement indiqués comme tels avant leur envoi au laboratoire.

Modalités :

Paiement à 30 jours net, frais mensuels de service de 1,5 % sur les comptes en souffrance. Un bon de commande, un chèque ou une demande de crédit peuvent être exigés avant le début des travaux. Les comptes en souffrance de 90 jours ou plus peuvent être soumis à une agence de recouvrement.

Analyse sur mesure :

Maxxam offre l'un des plus vaste éventail de services de laboratoire au Canada. Si vous avez besoin d'une analyse d'échantillons, ou de paramètres, qui n'apparaissent pas dans le présent tableau de prix, veuillez nous appeler pour discuter de vos besoins. Nous examinerons vos demandes et vous fournirons une soumission basée sur l'ampleur du projet.

Chaîne de possession :

Des formulaires Chaîne de possession (« CDP ») seront fournis et doivent être utilisés. Toutes les directives relatives aux exigences en matière d'analyse et de rapport ainsi qu'un formulaire CDP signé doivent être fournis avec les échantillons. Le manquement à le faire peut se traduire par un retard du délai d'exécution dans le traitement des échantillons ou le refus d'accepter les échantillons.

Fournitures d'échantillonnage :

Les bouteilles, cylindres, agents de conservation, étiquettes et formulaires pour les échantillons peuvent être commandés au moment de la demande des services. Veuillez communiquer avec votre représentant du service à la clientèle pour obtenir les exigences en ce qui concerne la taille des échantillons et les protocoles d'échantillonnage et/ou pour faire une commande. Certains contenants pour les échantillons peuvent être obtenus uniquement en vertu de frais d'achat ou de location. Veuillez vous informer auprès de votre représentant du service à la clientèle pour de plus amples détails.

Échantillons aux fins d'analyse médico-légale :

Maxxam a tant l'expertise que les procédures à l'appui pour assurer le traitement adéquat des échantillons médico-légaux. Veuillez aviser le laboratoire des directives à suivre avant l'envoi de l'échantillon. La consultation, le témoin expert, l'analyse médico-légale et la comparution devant un tribunal s'élèvent à 250 $ l'heure ou en fonction d'un accord préalable.

Service d'urgence : (en 24 heures ou moins)

Pour les projets exigeant un traitement très rapide en cas d'urgence, l'analyse débutera dès la réception des échantillons correctement documentés et se poursuivra jusqu'à l'achèvement des travaux (tant pendant les heures normales de bureau qu'en dehors de ces heures). Service offert seulement en vertu de dispositions prises au préalable avec le laboratoire Maxxam de votre région. Le service d'urgence comporte une surcharge allant jusqu'à 100 % sur le prix courant. Des frais peuvent également s'appliquer pour les heures supplémentaires de travail.

Service express/prioritaire : (en 48 heures ou moins)

Pour les projets exigeant un délai d'exécution serré, un service express/prioritaire est offert. L'analyse débutera dès la réception des échantillons correctement documentés et se poursuivra pendant les heures normales de bureau. L'analyse est habituellement exécutée dans les deux jours ouvrables mais une confirmation doit être obtenue auprès du laboratoire avant l'envoi des échantillons. Le service express/prioritaire comporte une surcharge allant jusqu'à 50 % sur le prix courant.

Maxxam
Une société du Groupe Bureau Veritas

Maxxam Analytics International Corporation o/a Maxxam Analytics
889, Montée de Liesse, Saint-Laurent, Quebec Canada H4T 1P5 Tel:(514) 448-9001 Toll-Free 800-563-6266 Fax:(514) 448-9199 www.maxxam.ca

30-Oct-15 10:00
Rodrigo Caffarengo
B566632
RG2 MTL-0141

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INFORMATION FACTURATION:		Information Rapport		Information Projet	
Compagnie	#4087 STANTEC CONSULTING LTD	Compagnie		N° de cotation	B50248
Attention de	ACCOUNTS PAYABLE	Attention de	Patrick Leblanc-DiStefano	N° de commande	
Adresse	P.O. Box 38212	Adresse		N° de projet	167020019
	Dartmouth NS B3B 1X2			Nom du projet	LEET Wastewater
Téléphone	Téléc	Téléphone	Téléco	# de site	
Courriel	accounts.payable.invoices@stantec.com	Courriel	patrick.leblanc-distefano@dessau.com	Échantillonneur	Michaël Frigon

toire seulement

Commande: 129626

Chargé(e) de Projets: Rodrigo Caffarengo

C#129626-01-01

Critères et Règlements
- [ ] Politique
- [ ] ROS
- [ ] RMD
- [ ] REIMR
- Autre (spécifier)

Essai de pompage: [ ] 24h (Art. 6.1&6.2) [ ] 48h (Art. 6.2) [ ] 72h (Art. 6.1&6.2)
Rég. CUM: [ ] Égout sanitaire Art.10 [ ] Égout pluvial Art.11
Qualité Eau Potable: [ ] Rég. Pâtes & Papiers (Art.104) [ ] Rég. Pâtes & Papiers (Art.112) [ ] Municipal [ ] Non-municipality

Instructions spéciales

Remarque: Pour les échantillons d'eau potable soumis à la réglementation - S.V.P utiliser le formulaire client rattaché à l'eau potable

Conserver les échantillons en milieu froid (< 10 oC) de l'échantillonnage à la livraison chez Maxxam

Délais requis

S.V.P notifier à l'avance en cas de projet urgent

Délai Régulier [X]
(Sera applicable si le délai de l'urgence n'est pas précisé)
Délai Régulier = 5 Jours ouvrables pour la plupart des analyses.
S.V.P Veuillez noter que le délai pour certaines analyses telles que la DBO5 et les Dioxines/Furannes est > 5 jours - Contactez votre chargé de projets pour les détails.

Délai rapide (Si applicable à tous les échantillons)
Date Requise: _____ Heure Requise: _____ [ ]
Veuillez noter que tout échantillon reçu après 15H00, sera considéré comme reçu le lendemain (jour ouvrable) à 9H00.

	Étiquette codebar de l'échantillon	Identification de l'échantillon	Date d'échantillonn	Heure	Matrice	Eau potable réglementée ? (O / N)	métaux à filtrer au labo ? (O / N)	Azote ammoniacal	Benzène, toluène, éthylbenzène, xylène	Anions (Cl, SO4)	Coliformes fécaux	Cyanures totaux	Sulfures (exprimés en S2-)	Conductivité	Demande chimique en oxygène	Demande biochimique en oxygène (5 jours)	Métaux dissous (B, Cd, Cr, Fe, Mn, Hg, Ni, Pb, Na, Zn)	# of Bottles	Commentaires
1		PO-01-15	15-10-29		Eau Sout.		0	X	X	X	X	X	X	X	X	X	X	11	
2		PO-02-15					0												
3		PO-03-15					0												
4		PO-04-15					0												
5																			
6																			
7																			
8																			
9																			
10																			

* DESSAISI PAR: (Signature)	Date: (AAAA/MM/JJ)	Heure	REÇU PAR: (Signature)	Date: (AAAA/MM/JJ)	Heure	Contenants utilisés et non soumis	Réservé au laboratoire: Court Délai de Conservation	Temperature (°C) de Reception	Sceau légal intact sur la glacière
Michaël Frigon	15-10-29	20h00	Anni Metsamartila ANNI METSAMARTILA	2015/10/30	10:00		[ ]	9° 8° 9°	[ ] Oui [✓] Non

* IL EST DE LA RESPONSABILITÉ DE LA PERSONNE RAPPORTANT L'ÉCHANTILLON DE S'ASSURER DE L'EXACTITUDE DU BORDEREAU DE TRANSMISSION. UN MANQUEMENT À CETTE PROCEDURE PEUT SE TRADUIRE PAR UN RETARD DANS LE DÉLAI ANALYTIQUE.

Blanc: Maxxam Jaune: Client

Maxxam Analytics International Corporation o/a Maxxam Analytics

ICE - YES

Maxxam
Une société du Groupe Bureau Veritas

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889, Montée de Liesse, Saint-Laurent, Quebec Canada H4T 1P5 Tel:(514) 448-9001 Toll-Free:800-563-6266 Fax:(514) 448-9199 www.maxxam.ca

Bordereau de Transmission d'Échantillons

Page 1 of 2

INFORMATION FACTURATION:		Information Rapport		Information Projet		À l'usage du laboratoire seulement	
Compagnie	#4087 STANTEC CONSULTING LTD	Compagnie		N° de cotation	B50248	# dossier Maxxam	# Commande:
Attention de	ACCOUNTS PAYABLE	Attention de	Patrick Leblanc-DiStefano	N° de commande			129626
Adresse	P.O. Box 38212	Adresse		N° de projet	167020019	Bordereau de Transmission d'Échantillons	Chargé(e) de Projets
	Dartmouth NS B3B 1X2			Nom du projet		C#129626-01-02	Rodrigo Caffarengo
Téléphone	Téléc	Téléphone	Téléco	# de site			
Courriel	accounts.payable.invoices@stantec.com	Courriel	patrick.leblanc-distefano@dessau.com	Échantillonneur			

Critères et Règlements

- ☐ Politique
- ☐ RDS
- ☐ RMD
- ☐ REIMR
- Autre (spécifier)

Essai de pompage: ☐ 24h (Art. 6.1&6.2) ☐ 48h (Art. 6.2) ☐ 72h (Art. 6.1&6.2)

Rég. CUM: ☐ Égout sanitaire Art.10 ☐ Égout pluvial Art.11

Qualité Eau Potable: ☐ Rég. Pâtes & Papiers (Art.104) ☐ Rég. Pâtes & Papiers (Art.112) ☐ Municipal ☐ Non-municipality

Instructions spéciales

Analyses demandées

Délais requis

S.V.P notifier à l'avance en cas de projet urgent

Délai Régulier
(Sera applicable si le délai de l'urgence n'est pas précisé) ☒
Délai Régulier = 5 Jours ouvrables pour la plupart des analyses.
S.V.P Veuillez noter que le délai pour certaines analyses telles que la DBO5 et les Dioxines/Furannes est > 5 jours - Contactez votre chargé de projets pour les détails.

Délai rapide (Si applicable à tous les échantillons)
Date Requise: _____ Heure Requise: _____ ☐
Veuillez noter que tout échantillon reçu après 15H00, sera considéré comme reçu le lendemain (jour ouvrable) à 9H00.

Remarque: Pour les échantillons d'eau potable soumis à la réglementation - S.V.P utiliser le formulaire client rattaché à l'eau potable

Conserver les échantillons en milieu froid (< 10 oC) de l'échantillonnage à la livraison chez Maxxam

	Étiquette codebar de l'échantillon	Identification de l'échantillon	Date d'échantillonn	Heure	Matrice	Eau potable réglementée ? (O / N)	métaux à filtrer au labo ? (O / N)	Phénols totaux par 4-AAP	Nitrate et/ou Nitrite								# of Bottles	Commentaires
1		PO-01-15	15-10-29		eau sout		0	X	X								11	
2		PO-02-15	|		|		0	|	|								|	
3		PO-03-15	|		|		0	|	|								|	
4		PO-04-15	|		|		0	|	|								|	
5																		
6																		
7																		
8																		
9																		
10																		

* DESSAISI PAR: (Signature)	Date: (AAAA/MM/JJ)	Heure	REÇU PAR: (Signature)	Date: (AAAA/MM/JJ)	Heure	Contenants utilisés et non soumis	Réservé au laboratoire		
Michael Fuegan	15-10-29	20h00	Anni Metsamartila	2015/10/30	10:00		Court Délai de Conservation ☐	Temperature (°C) de Reception 9° 8° 9°	Sceau légal intact sur la glacière ☐ Oui ☒ Non

* IL EST DE LA RESPONSABILITÉ DE LA PERSONNE RAPPORTANT L'ÉCHANTILLON DE S'ASSURER DE L'EXACTITUDE DU BORDEREAU DE TRANSMISSION. UN MANQUEMENT À CETTE PROCÉDURE PEUT SE TRADUIRE PAR UN RETARD DANS LE DÉLAI ANALYTIQUE.

Blanc: Maxxam Jaune: Client

Maxxam Analytics International Corporation o/a Maxxam Analytics

ICE-YES