Appendix F

Water Resources Baseline Study

Stantec

Stantec Experts-conseils ltée
100 Alexis-Nihon Boulevard, Suite 110
Saint-Laurent, QC H4M 2N6
Tel: (514) 739-0708
Fax: (514) 739-8499

Water Resources Baseline Study

Kami Concentrate Storage and Load-Out Facility, Québec

Prepared for

Alderon Iron Ore Corp.
10 Fort William Place, 8th Floor,
Baine Johnston Centre
St. John's, NL
A1C 5W2

Final Report

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EXECUTIVE SUMMARY

Alderon Iron Ore Corp. (Alderon) is proposing to develop an iron ore mine in western Labrador, and build associated infrastructure at the Port of Sept-Îles, in Sept-Îles, Québec (the Project). The Kami Iron Ore Project will produce up to 16 million metric tonnes of iron ore concentrate per year. This concentrate will be transported by existing rail to the Kami Concentrate Storage and Load-out Facility (the Kami Terminal) at the Port of Sept-Îles, where Project-related components will be located on land within the jurisdiction of the Port Authority of Sept-Îles.

Federal approvals will be required, which trigger the requirement for a federal environmental assessment (EA) under the *Canadian Environmental Assessment Act* (CEAA), at the comprehensive study level. The Project was registered in accordance with CEAA in October 2011.

In June 2012, a surface water quality sampling was conducted in the Local Study Area (LSA) of the Kami Terminal as part of the Water Resources Baseline Study which is being submitted in support of the federal environmental assessment

Field work consisted of collecting surface water samples from ruisseau à la Baleine (3 samples), an unnamed stream (3 samples), as well as from the baie des Sept-Îles (2 samples) located in the vicinity of the proposed Kami Terminal, located in Sept-Îles, Quebec. The locations of the sampling stations are indicated on Figure 2.3. The samples were analyzed for the following parameters: pH, total dissolved solid (TDS), total suspended solids (TSS), color, turbidity, hardness, extractible metals (Al, Ag, As, Ba, Cd, Co, Cr, Cr IV, Cu, Fe, Hg, Se, Sb, Mn, Mo, Na, Ni, Pb, Zn), total alkalinity, acidity, total cyanide, total phosphorus (P), ammoniacal nitrogen (N-NH_3), and petroleum hydrocarbons C_{10}-C_{50} (PH C_{10}-C_{50}), ^{226}Ra.

The principal objective of this study was to establish the baseline environmental quality of the surface water bodies located in the vicinity of the site. No exceedences of the various criteria were noted in the baie des Sept-Îles samples. As for the six surface water samples collected from the ruisseau à la Baleine (3 samples) and an unnamed stream (3 samples): 1) All six surface water samples exhibited aluminum concentrations (0.23 to 0.76 mg/L) exceeded the CCME *Aquatic Life Guideline* and one (SW12-01) exceeded the Québec *Surface Water Criterion for the Protection of Aquatic Life* (chronic effect). The upstream surface water sample (SW12-09) collected from the unnamed stream also exceeded the Québec acute effect criterion; 2) The upstream surface water sample (SW12-01) collected from ruisseau à la Baleine exhibited a copper concentration (0.12 mg/L) that exceeded the applicable CCME *Aquatic Life Guideline* and the Québec *Surface Water Criterion for the Protection of Aquatic Life* (chronic and acute effects). The rest of the samples exhibited copper concentrations that were beneath the laboratory detection limit (<0.003 mg/l); 3) Five of the six surface water samples exhibited iron concentrations (0.8 to 1.4 mg/L) that exceeded the CCME *Aquatic Life Guideline*. One of the downstream samples (SW12-03) also exceeded the Québec *Surface Water Criterion for the Protection of Aquatic Life* (chronic effect).

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1.0 INTRODUCTION

Alderon Iron Ore Corp. (Alderon) is proposing to develop an iron ore mine in western Labrador, and build associated infrastructure at the Port of Sept-Îles, Québec. The mine Property is located approximately 6 km south from the Wabush Mines mining lease owned by Cliffs Natural Resources Inc. (Cliffs) and in the vicinity of the towns of Wabush, Labrador City, and Fermont. The Kami Iron Ore Mine will be located entirely within Labrador, and includes construction, operation, and rehabilitation and closure of an open pit, waste rock disposal areas, processing infrastructure, a tailings management facility (TMF), ancillary infrastructure to support the mine and process plant, and a rail transportation component. The mine will produce up to 16 million metric tonnes of iron ore concentrate per year. Concentrate will be transported by existing rail to the Kami Concentrate Storage and Load-out Facility (the Kami Terminal) at the Port of Sept-Îles, where Kami Terminal components will be located on land within the jurisdiction of the Port Authority of Sept-Îles. No Kami Terminal activities are proposed within the marine environment. The Kami Terminal general location is indicated in Figure 1.1.

Federal approvals will be required, which trigger the requirement for a federal environmental assessment under the *Canadian Environmental Assessment Act* (CEAA), at the comprehensive study level. The Project was registered in accordance with the CEAA in October 2011.

This baseline study is being submitted in support of the federal environmental assessment.

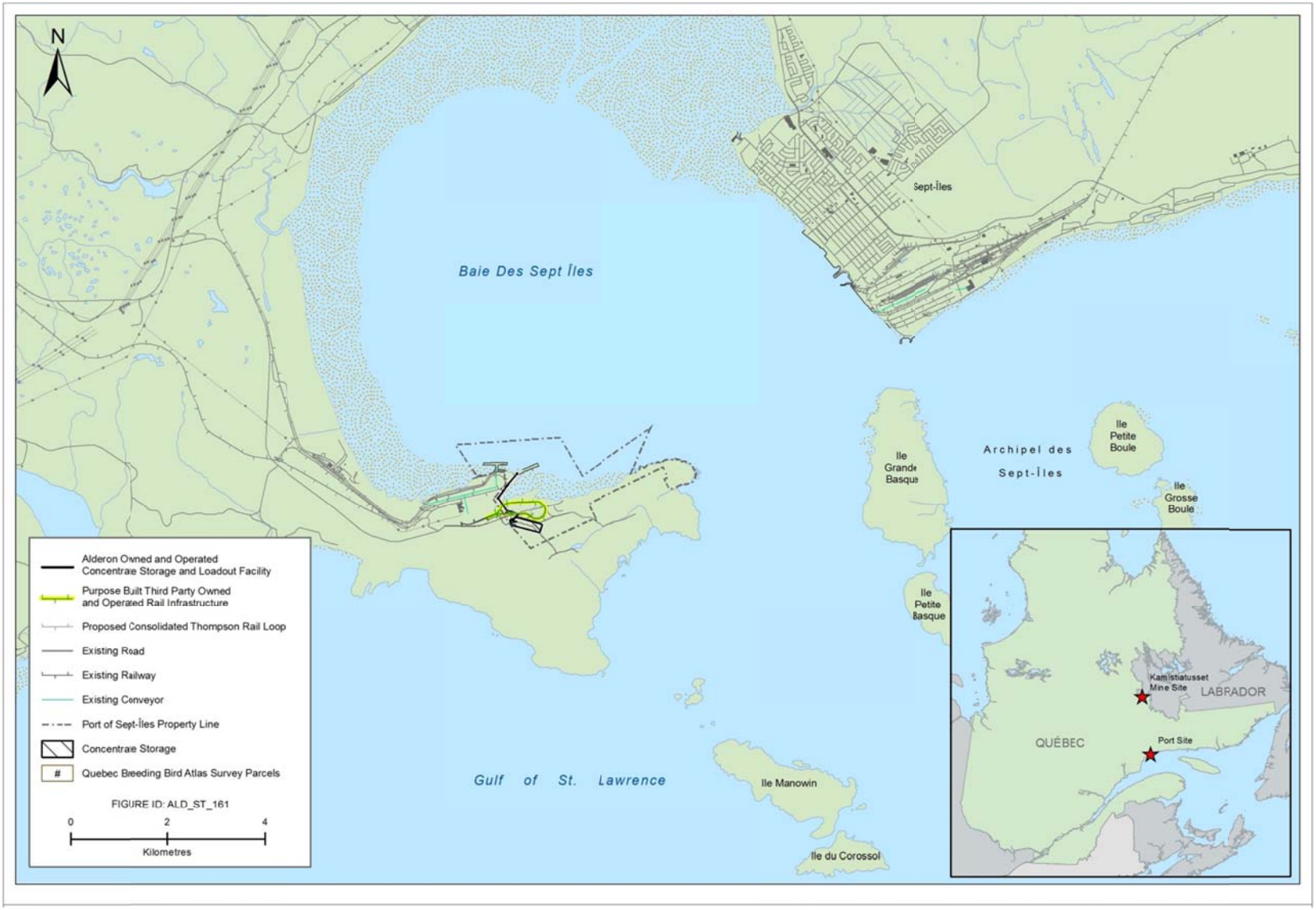
1.1 Overview of Kami Iron Ore Project

The Kami Terminal is located on port land and will provide the required infrastructure to transport and store iron ore concentrate (up to 16 million tonnes per year) prior to shipping the product to market. The concentrate will first be transported from the proposed Kami Iron Ore Mine in western Labrador by the existing Québec North Shore and Labrador (QNS&L) and Chemin de Fer Arnaud (CFA) railways to the Port of Sept-Îles, where it will be stored for a short time prior to shipping. Concentrate will be stored in a live stockpile managed by a stacker-reclaimer unit. The volume of concentrate stored at any one time will depend on the rail delivery schedule from the mine and the vessel loading schedule.

The Kami Terminal will include construction, operation, and closure / decommissioning of the following primary components:

- A concentrate storage area;
- A rail loop;
- Ancillary infrastructure to support the concentrate storage, loud-out and shipping, such as storage train positioner and rail car dumper; substation; stacker-reclaimer; transfer house; supply conveyors; and maintenance facilities.

Figure 1.1 General Kami Terminal Location



1.2 Surface Water Quality Assessment

Alderon Resources Inc. (Alderon) has retained Stantec Consulting Ltd. (Stantec) to complete an Environment Impact Statement (EIS) in support of the development Kami Terminal at the Port of Sept-Îles in Eastern Québec. An environmental assessment is required under the *Canadian Environmental Assessment Act*. In addition, as per the request of the Port of Sept-Îles, the Kami Terminal will be in compliance with *Directive 019* of the *ministère du Développement durable, de l'Environnement et des Parcs* (MDDEP). This document is intended to satisfy the requirements of both jurisdictions including any requirements that may be unique to only one. It was prepared with the assistance and guidance of the EIS Guidelines for the Project prepared by the Canadian Environmental Assessment Agency (CEA Agency) and the Newfoundland and Labrador Department of Environment and Conservation (NLDEC).

This document presents baseline chemical information for the surface water bodies, including streams and the baie des Sept-Îles, located in the vicinity of the proposed the Kami Terminal.

1.3 Study Team

The Water Resources Baseline Study was conducted by Stantec. The Study Team included a study manager, a senior advisor/reviewer, a field lead, a data analyst and report writers (Table 2.1). All team members have in-depth knowledge and experience in their fields of expertise and a broad knowledge of the work conducted by other experts in related fields. Brief biographical statements, highlighting project roles and responsibilities and relevant education and employment experience, are provided below.

Table 1.1 Study Team – Surface Water Quality Baseline Study

Role	Personnel
Study Manager	Pierre-Olivier Laliberté
Senior Advisor / Reviewer	Graeme Wallace
Field Lead	Patrick Marcoux
Data Analysis and Report Preparation	Julie Massicotte, Fabien Pitre
GIS	Heather Ward

Pierre-Olivier Laliberté, B.Sc., holds a bachelor's degree in biology and has followed environmental studies at the graduate level at the Université de Sherbrooke. He has taken part in several environmental and social impact assessments. The main projects he has participated in include assessments for wharves, roads and mining projects. These projects have also included various biophysical characterization studies (avifauna, water quality, vegetation, fish habitat and sediment characterization) as well as public and aboriginal consultations, which involved the collection and analysis of interview data. He has also completed over 300 Phase I and II environmental site assessments, including soil and groundwater sampling, asbestos containing material surveys and the rehabilitation of industrial, commercial and residential properties. He is fluently bilingual.

Graeme Wallace, M.Sc., holds a master's degree in geology and a diploma in groundwater contamination and waste management. He is a geologist with over 20 years of experience in the environmental consulting industry. Since 2004, Mr. Wallace has been recognized as an

accredited expert by the Québec MDDEP. He has been involved in over thirty environmental assessments and remedial projects at industrial and commercial sites (gas stations, manufacturing plants, etc.) that were triggered as a result of the application of Section IV.2.1 of the *Québec Environment Quality Act*. The work performed included planning, supervision of the field work, development of remedial action plans, attestation of characterization and remediation reports, and preparation of any required Notices of Contamination and Decontamination. He has worked on a broad range of environmental projects including Phase I, Phase II and Phase III ESAs of commercial industrial properties, hydrogeological and methane studies of landfills, implementation of product recovery systems, remediation of contaminated sites, and risk assessments in Canada and the United States. He was an internal consultant at the Canadian Pacific Railway Company for 12 years where he acted as a project manager for a wide number of environmental projects involving many different railway sites across Eastern Canada.

Patrick Marcoux, B.Sc., is a junior environmental technician at Stantec. He is currently completing his master's degree in environmental assessment at Concordia University, in Montréal. He is holder of a bachelor's degree in biology, with a specialization in molecular and cellular biology. During his first year with Stantec, Mr. Marcoux has participated in many soil and groundwater characterization campaigns. In addition, Mr. Marcoux has worked as a research scientist in a clinical research facility and was research assistant at Concordia University.

Julie Massicotte, B.Sc., M.Sc., has a background in biology and a master's degree in environmental sciences. As part of the Environmental Management Group in the Montréal office of Stantec, she has been involved with many environmental assessments as a data researcher, assessor, co-author of reports and project manager. She plays a key role in project coordination of many EAs. Her main accomplishments include the Renard Diamond Mine (Stornoway Diamond), the Cross Lake Mine and access road (Xstrata Nickel), the Mistissini Bridge, Borrow pit and Access (Cree Nation of Mistissini), the Deception Baie Wharf Refurbishment (Xstrata Nickel), the Rabaska LNG (SNC Lavalin), the Laniel Dam Refurbishment Project (Public Works Government Services Canada), the refurbishment of two bridges near Deception Baie (Falconbridge) and the permitting of a quarry in Whapmagoostui, Nunavik (Whapmagoostui First Nation / 6016961 Canada Inc). She also prepared terms of reference for a follow up of EIA (Macal River Upstream Storage Facility, Belize). Before joining Stantec, Julie contributed to the natural resources management of the Gatineau Park through several projects (monitoring, survey, mapping). She also participated in different research projects as a research assistant (weeds, bats, spruce budworm).

Fabien Pitre, B.Sc., M.Sc., has a bachelor's degree in environmental geology and a master's degree in earth sciences from the Université du Québec à Montréal. Before joining Stantec, Mr. Pitre has worked, among others, for Dillon Consulting Limited as an Environmental Scientist and for the Université du Québec à Montréal as a Research Associate. Mr. Pitre has worked on various environmental projects for the railway industry and for the hydrocarbon exploration and extraction industry. Mr. Pitre is bilingual. He is licensed as a Professional Geologist in Québec and holds a reliability status clearance with the Canadian and International Industrial Security Directorate of Public Works and Government Services Canada.

2.0 RATIONALE AND OBJECTIVES

Monitoring of surface water is a component of *Directive 019 sur l'industrie minière* of the MDDEP. In order to later evaluate future monitoring results, a baseline survey of the environmental quality of the surface water bodies located in the vicinity of the proposed facility needs to be performed.

The scope of work of the Study included:

- Delineation and presentation of study area(s) of adequate scales for the surface water baseline investigation;
- Presentation of the methods used to describe and characterize the existing environmental surface water quality.
- Collection of representative samples from all the surface water bodies located within the vicinity of the proposed Kami Terminal.

The surface water quality assessment is intended to characterize the baseline conditions in watersheds potentially affected by the proposed development of the Kami Terminal. The study was designed to gain a better understanding of the current conditions of the streams near the site and of the baie de Sept-Îles in order to facilitate interpretation of future surface water monitoring results.

3.0 STUDY AREA

3.1 Description of the Survey Area

Local Study Area

The LSA is the maximum area within which environmental effects related to the Kami Terminal can be predicted or measured with a reasonable degree of accuracy and confidence. The LSA includes the PDA and any adjacent areas where environmental effects related to the Kami Terminal may reasonably be expected to occur, which are defined as the anse à Brochu and anse à la Baleine sub-watersheds (Figure 3.1).

Regional Study Area

The RSA is the area within which cumulative environmental effects for the Water Resources may occur, depending on physical and biological conditions and the type and location of other past, present, and reasonably foreseeable projects. The RSA takes into account the area of influence limited to the baie des Sept-Îles (Figure 3.2).

Figure 3.1 Local Study Area

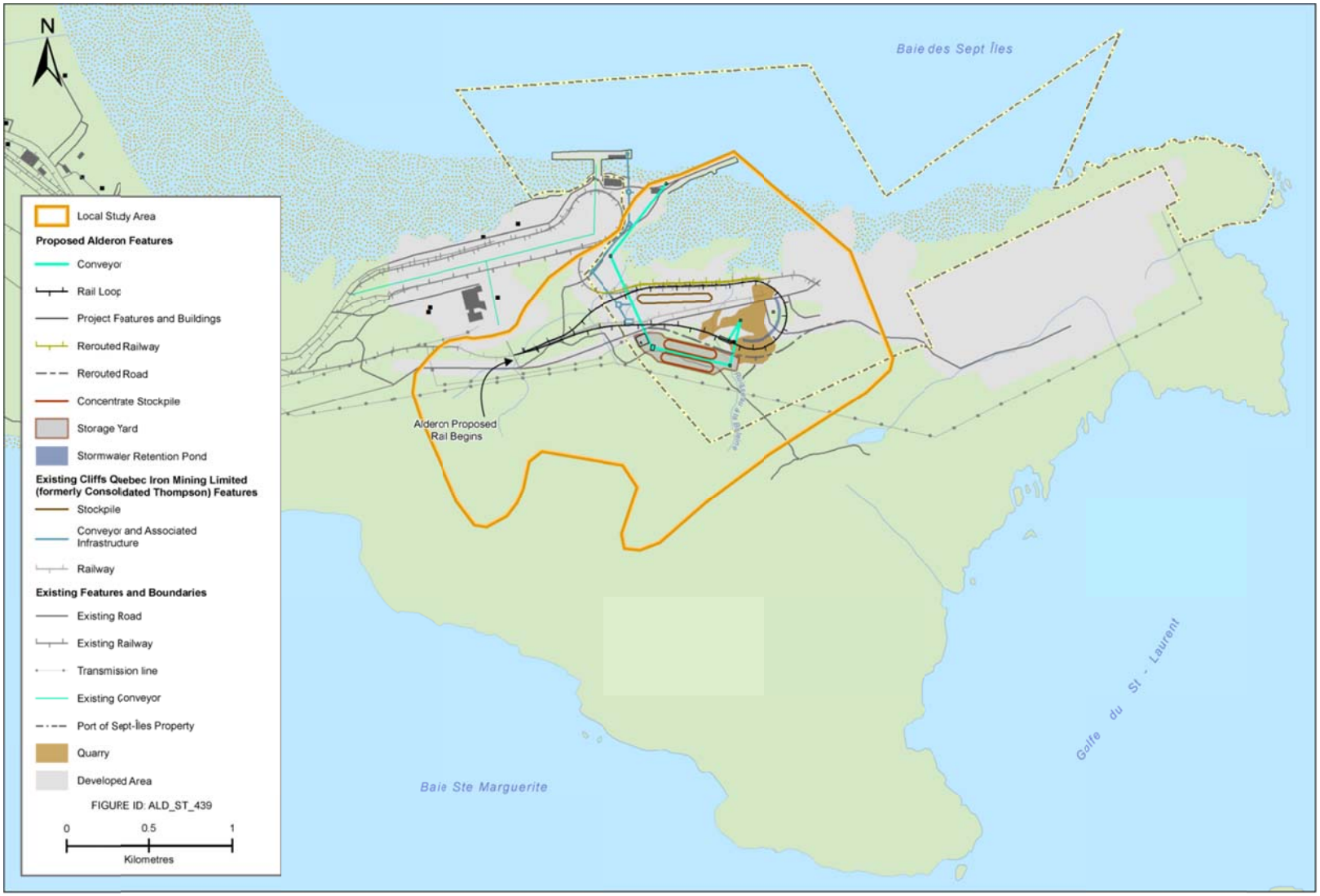


Figure 3.2 Regional Study Area

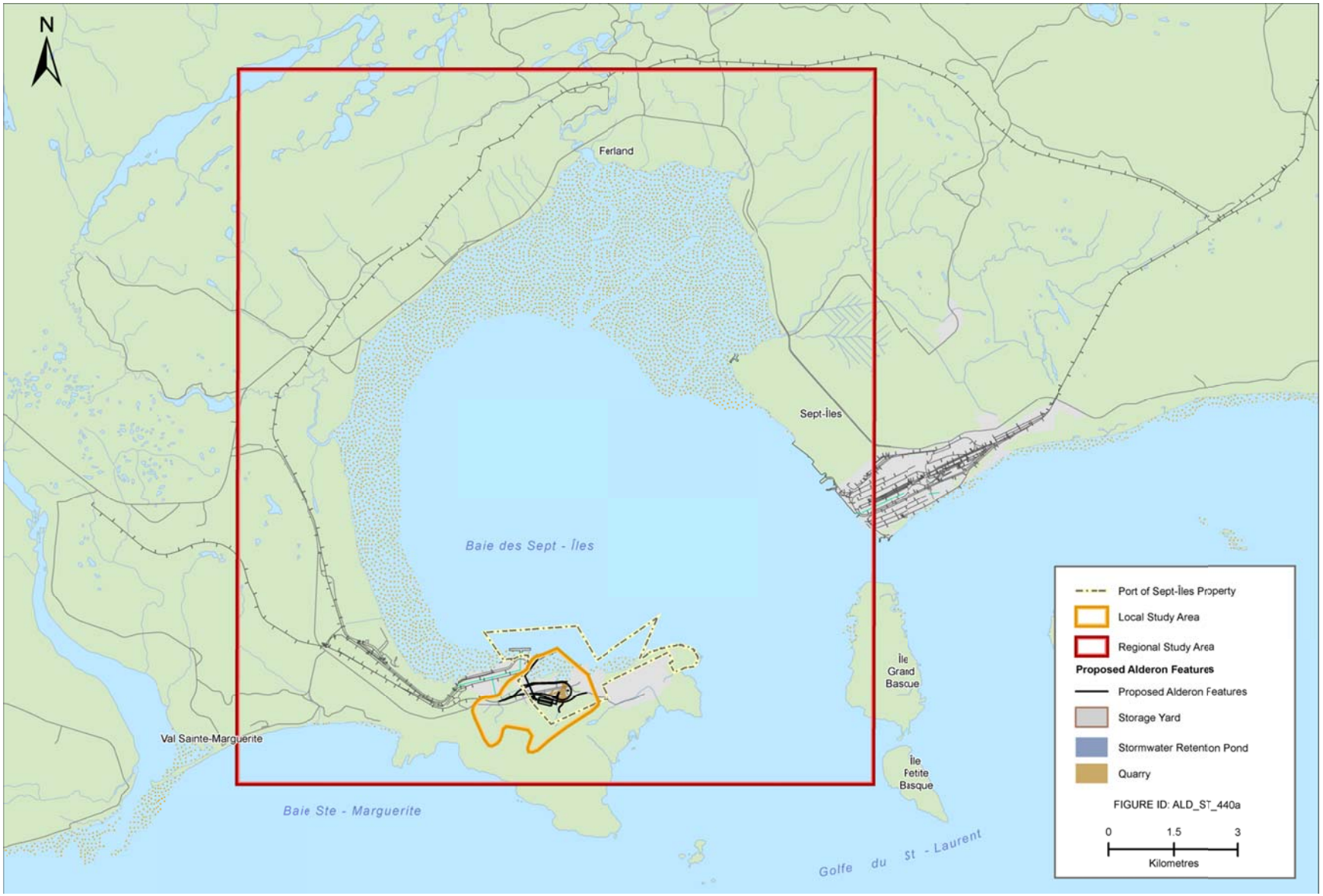
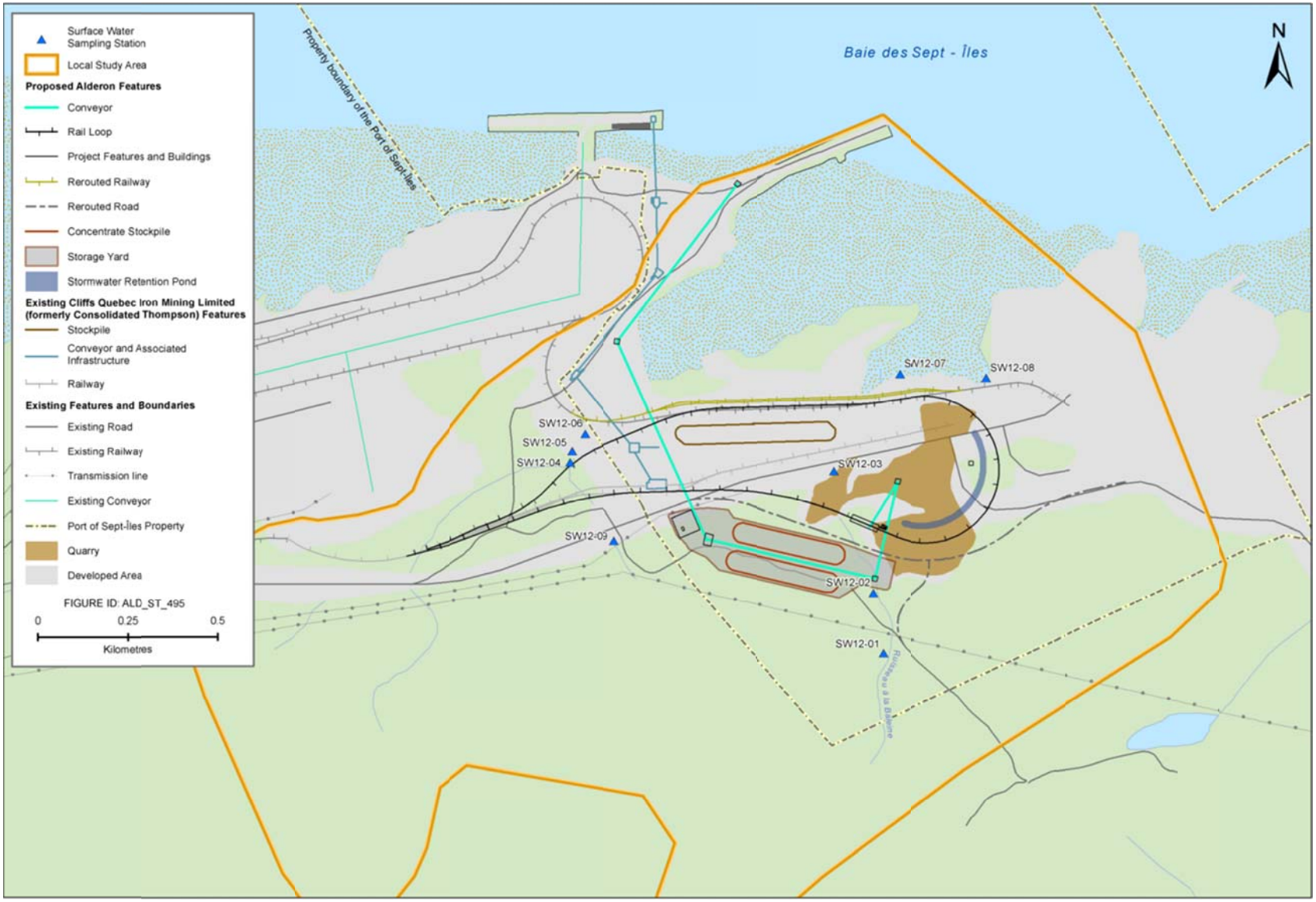


Figure 3.3 Surface Water Sampling Locations



4.0 METHODS

Water samples were collected by grab sampling and submitted to Maxxam analytical labs for analysis. The surface water sampling procedures followed the requirements contained in the *Guide de caractérisation des terrains* (MDDEP, 2003) and its associated documents.

For each location, an empty sampling bottle provided by the laboratory was rinsed with the water present at the sampling location, was used to fill all the other bottles. This method decreased the handling of various chemical products during the field work and prevented the discharge of preservative agents to the naturel environment. Special attention was given to avoiding the creation of turbidity by disturbing the environment before sampling. If necessary, the water sample was collected upstream of a disturbed zone. The surface water samples were placed in bottles supplied by the laboratory that contained preservative agents when necessary.

Samples were sent to Montréal using Expedibus. The samples were picked up by Maxxam Analytics Inc. laboratory at the Gare d'autocars de Montréal. Maxxam is a member of, and accredited by, the Canadian Association for Laboratory Accreditation (CALA) in addition to being accredited by the *Centre d'Expertise d'Analyse Environnementale du Québec* of the MDDEP.

Water Quality Sampling

- Eight (8) water quality samples were taken by manual grab on June 11th 2012 in streams near the site and in the bay. A field duplicate sample was also taken.

4.1 Data Analysis

Analytical parameters for surface water quality samples are included in Table 4.1

Table 4.1 Water Quality Sampling Analytical Constituents

Cations	General Chemistry	Other Constituents	Metals
Calcium, Magnesium, Sodium	Alkalinity, Hardness, pH, Total Suspended Solids	Acidity, Ammonia Nitrogen, Real Color, Total Cyanide, Total Dissolved Solids, Total Phosphorus, Radium-226, Turbidity, Total Petroleum Hydrocarbons C_{10}-C_{50}	Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Baron, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Mercury, Molybdenum, Nickel, Selenium, Silver, Zinc

4.2 Quality Assurance / Quality Control Procedures

Sampling quality assurance (QA) and quality control (QC) was conducted in keeping with laboratory, regulatory and industry standards. QA / QC included the following measures:

- Laboratory sample vial pre-labeling;
- Trained and experienced sampling technician team of at least two persons;
- Routine random field duplicate collection;
- Sample thermal preservation plans;
- Primary chain of custody form completion and secondary review by alternate sampling technician;
- Ensuring the integrity of the samples with proper shipping protocols for sample delivery to lab;
- Analytical QA / QC in the Maxxam lab; and,
- Analytical data review by qualified person subsequent to lab reporting.

5.0 STUDY OUTPUTS

5.1 Regulatory Guidance and Criteria

Analytical results of surface water samples were compared to the following criteria:

- Maximum Mean Acceptable Concentration and Maximum Acceptable Concentration from the MDDEP (*Directive 019* criteria);
- *Protection of Aquatic Life* criteria found in the Canadian Council of Ministers of the Environment (CCME) *Aquatic Life Guidelines*; and,
- *Surface Water Quality Criteria for Protection of Aquatic Life* (Chronic and Acute effects) contained in the MDDEP *Critères de qualité de l'eau de surface*.

5.2 Local Hydrology

The LSA is located on Pointe-Noire of the Marconi Peninsula, which extends eastward out into the Gulf of St. Lawrence, the world's largest river estuary. The Peninsula is bound to the north by baie des Sept-Îles, to the east by the Gulf of St. Lawrence, and to the south by baie Sainte-Marguerite. The Peninsula covers an area of approximately 14.8 km^2. The Peninsula is part of the Atlantic Ocean, St. Lawrence drainage sub-basin, and the rivière Moisie sub-sub basin (NRCan 2010).

Drainage on the peninsula appears to either flow north towards baie des Sept-Îles or south towards baie Sainte-Marguerite, with the eastern extremity of the peninsula draining eastward into the Gulf of St. Lawrence. The drainage divide appears to be centrally located along the peninsula's east-west axis with a parallel drainage pattern clearly visible on the south side of the peninsula. The topographic map of the Marconi Peninsula (1:20,000) shows one lake within the peninsula, lac Brochu, situated to the southeast of the LSA. Lac Brochu drains southeastward, to the natural harbour of Petit Havre des Innus on the peninsula's east shore, along the Gulf of St. Lawrence.

The ruisseau à la Baleine, a second order intermittent stream, crosses the LSA. This watercourse is fed by runoff waters from the upstream surrounding areas and flows northward into baie des Sept-Îles near Pointe à la Baleine. Near the shoreline, ruisseau à la Baleine has been channeled and flows through a series of underground culverts. A small third order intermittent stream (unnamed stream) is also present on the western side of the LSA. This watercourse also drains northward into baie des Sept-Îles, south of anse à Brochu

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Table 5.1 Analytical Results for Surface Water (Freshwater) in the Kami Terminal Area

Parameters	Units	MDDEP Directive 019[1] Final Effluent		CWQG[2] Protection of Aquatic Life	MDDEP Surface Water Quality [3] Protection of Aquatic Life		Analytical Results					
							Ruisseau à la Baleine			Unnamed Stream		
Sample ID		Monthly Mean Acceptable Concentration	Maximum Acceptable Concentration	Long term	Chronic effect	Acute effect	SW12-01	SW12-02	SW12-03	SW12-04	SW12-06	SW12-09
Sampling Date							2012-06-11	2012-06-11	2012-06-11	2012-06-12	2012-06-12	2012-06-12
Conventional parameters												
pH	pH	6 to 9.5		6.5 to 9.0	6.5 to 9.0	5.0 to 9.0	5.07	6.93	7.14	7.52	7.54	5.82
Total dissolved solids	ppm	nc	nc	nc	nc	nc	83	70	160	160	170	150
Total suspended solids	mg/L	*15*	30	narrative	narrative[4]	narrative[4]	19	<2	6	23	20	2
Color	UCV	nc	nc	narrative[5]	nc	nc	180	57	58	66	68	120
Turbidity	NTU	nc	nc	narrative[6]	narrative[6]	narrative[6]	0.3	0.3	5.2	27	17	0.6
Hardness	mg/L	nc	nc	nc	nc	nc	5	55	54	98	89	9
Petroleum hydrocarbons												
PH C_{10}-C_{50}	mg/L	nc	2	nc	nc	nc	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Metals												
Aluminium (Al)	mg/L	nc	nc	0.005 mg/L. pH <6.5; 0.1 mg/L. pH ≥6.5	0.087 [7]	0.75 [7]	0.72	0.23	0.39	0.38	0.3	0.76
Antimony (Sb)	mg/L	nc	nc	nc	0.24	1.1	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Arsenic (As)	mg/L	*0.2*	0.4	0.005	0.15	0.34	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Barium (Ba)	mg/L	nc	nc	nc	0.16 / 0.28 [8]	0.45 / 0.79 [8]	<0.03	<0.03	<0.03	0.03	<0.03	<0.03
Cadmium (Cd)	mg/L	nc	nc	0.0001 / 0.0002 [7]	0.0001 / 0.0002 [8]	0.0008 / 0.0014 [8]	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium (Cr VI)	mg/L	nc	nc	0.001	0.011	0.016	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008
Chromium, total (Cr)	mg/L	nc	nc	nc	nc	nc	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Cobalt (Co)	mg/L	nc	nc	nc	0.1	0.37	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Copper (Cu)	mg/L	0.3	0.6	0.001 [8]	0.004 / 0.006 [8]	0.006 / 0.009 [8]	0.12	<0.003	<0.003	<0.003	<0.003	<0.003
Iron (Fe)	mg/L	*3*	6	0.3	1.3	3.4	0.9	0.2	1.4	0.8	0.8	0.8
Lead (Pb)	mg/L	*0.2*	0.4	0.001 [8]	0.001 / 0.002 [8]	0.024 / 0.046 [8]	<0.001	<0.001	<0.001	0.004	0.003	<0.001
Manganese (Mn)	mg/L	nc	nc	nc	0.8 / 1.3 [8]	1.8 / 2.8 [8]	0.60	0.059	0.25	0.63	0.7	0.55
Mercury (Hg)	mg/L	nc	nc	0.000026	0.00091	0.0016	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Molybdenum (Mo)	mg/L	nc	nc	0.073	3.2	29	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Phosphorus, total (P)	mg/L	nc	nc	narrative[9]	0.03	nc	<0.01	0.03	0.03	<0.01	0.02	0.02
Nickel (Ni)	mg/L	*0.5*	1	0.06 [8]	0.02 / 0.04 [8]	0.21 / 0.32 [8]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium (Se)	mg/L	nc	nc	0.001	0.005	0.062	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Silver (Ag)	mg/L	nc	nc	0.0001	0.0001	0.0004 / 0.001 [7]	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Sodium (Na)	mg/L	nc	nc	nc	nc	nc	4.0	5.2	19	26	27	4.5
Zinc (Zn)	mg/L	*0.5*	1	0.03	0.053 / 0.083 [8]	0.053 / 0.083 [8]	0.013	0.009	<0.005	0.015	0.014	0.01
Anions												
Alkalinity, total	mg/L	nc	nc	nc	narrative[9]	nc	<1	44	50	63	62	3
Acidity	mg/L	nc	nc	nc	nc	nc	52	<10	<10	<10	<10	12
Cyanide, total	mg/L	*1*	2	0.005 (as free CN)	0.005 (as free CN)	0.022 (as free CN)	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Phosphorus	mg/L	nc	nc	narrative[10]	0.03	nc	<0.01	0.03	0.03	<0.01	0.02	0.02
Nitrogen ammonia (N-NH3)	mg/L	nc	nc	nc	1.9 [11]	26 / 21 [11]	<0.02	<0.02	0.09	0.03	0.03	<0.02
Other												
^{226}Ra	Bq/L	nc	nc	**nc**	nc	**nc**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

1 *Directive 019 sur l'industrie minière* – mars 2012, MDDEP, 1989, rev. 2012
2 CCME, *Canadian Environmental Quality Guidelines*, 1987, 1999
3 *Critères de qualité de l'eau de surface du Québec*, MDDEP, 2009, rev. 2012.
4 In clear water (low suspended solids concentrations (<25 mg/L)): maximum increase of 5 mg/L from background levels (chronic effect) and maximum increase of 25 mg/L from background levels (acute effect).
5 True Colour: The mean absorbance of filtered water samples at 456 nm shall not be significantly higher than the seasonally adjusted expected value for the system under consideration.
Apparent Colour: The mean percent transmission of white light per metre shall not be significantly less than the seasonally adjusted expected value for the system under consideration.
6 Clear flow: Maximum increase of 8 NTUs from background levels (acute effect). Maximum average increase of 2 NTUs from background levels (chronic effect/long term).
7 Aluminium: the chronic effect criteria should be used only for waters with hardness < 10 mg/L and pH around 6.5. The acute effect criteria should be used for water with pH <6.5 or > 9.0.
8 This parameter increases with hardness. The value mentioned in the table corresponds to a mean hardness of 38 mg/L (CaCO3) for ruisseau à la Baleine and 65 mg/L (CaCO3) for the unnamed stream respectively.
9 Ultra-oligotrophic <4 µg/L; Oligotrophic 4-10 µg/L; Mesotrophic 10-20 µg/L; Meso-eutrophic 20-35 µg/L; Eutrophic 35-100 µg/L; Hyper-eutrophic >100 µg/L
10 Sensitivity to acidification varies with alkalinity: High sensitivity <10 mg/L; Average sensitivity: 10 – 20 mg/L; Low sensitivity: >20 mg/L
11 This parameter varies with pH and temperature. The value mentioned in the table corresponds to a pH of 6.5 and a temperature of 9°C for ruisseau à la Baleine and a pH of 7.0 and a temperature of 9°C for the unnamed stream.

Table 5.2 Analytical Results for Surface Water (Marine Water) in the Kami Terminal Area

Parameters	Units	MDDEP Directive 019[1] Final Effluent		CWQG[2] Protection of Aquatic Life Marine Environment	MDDEP Surface Water Quality [3] Protection of Aquatic Life Marine Environment		Analytical Results	
Sample ID		Monthly Mean Acceptable Concentration	Maximum Acceptable Concentration	Long term	Chronic effect	Acute effect	SW12-07	SW12-08
Sampling Date							2012-06-11	2012-06-12
Conventional Parameters								
pH	pH	6 to 9.5		**7.0 to 8.7**	7.0 to 8.7	**5.0 to 9.0**	7.96	7.75
Total dissolved solids	ppm	nc	nc	**nc**	nc	**nc**	27000	27000
Total suspended solids	mg/L	*15*	30	**nc**	narrative[4]	**narrative[4]**	24	34
Color	UCV	nc	nc	**narrative[5]**	nc	**nc**	10	8
Turbidity	NTU	nc	nc	**narrative[6]**	narrative[6]	**narrative[6]**	1.7	0.5
Hardness	mg/L	nc	nc	**nc**	nc	**nc**	4600	4500
Petroleum hydrocarbons								
PH C_{10}-C_{50}	mg/L	nc	2	**nc**	nc	**nc**	<0.1	<0.1
Metals								
Aluminium (Al)	mg/L	nc	nc	**nc**	nc	**nc**	0.06	0.05
Antimony (Sb)	mg/L	nc	nc	**nc**	0.5	**1.5**	<0.006	<0.006
Arsenic (As)	mg/L	*0.2*	0.4	**0.0125**	0.036	**0.069**	<0.002	<0.002
Barium (Ba)	mg/L	nc	nc	**nc**	nc	**nc**	<0.03	<0.03
Cadmium (Cd)	mg/L	nc	nc	**0.00012**	0.0093	**0.043**	<0.001	<0.001
Chromium (Cr VI)	mg/L	nc	nc	**0.0015**	0.05	**1.1**	<0.008	<0.008
Chromium, total (Cr)	mg/L	nc	nc	**nc**	nc	**nc**	<0.03	<0.03
Cobalt (Co)	mg/L	nc	nc	**nc**	nc	**nc**	<0.03	<0.03
Copper (Cu)	mg/L	0.3	0.6	**nc**	0.0037	**0.0058**	<0.003	<0.003
Iron (Fe)	mg/L	*3*	6	**nc**	nc	**nc**	0.2	<0.1
Lead (Pb)	mg/L	*0.2*	0.4	**nc**	0.0085	**0.22**	<0.001	<0.001
Manganese (Mn)	mg/L	nc	nc	**nc**	nc	**nc**	0.032	0.018
Mercury (Hg)	mg/L	nc	nc	**0.000016**	0.0011	**0.0021**	<0.0001	<0.0001
Molybdenum (Mo)	mg/L	nc	nc	**nc**	nc	**nc**	<0.03	<0.03
Phosphorus, total (P)	mg/L	nc	nc	**nc**	nc	**nc**	0.05	0.04
Nickel (Ni)	mg/L	*0.5*	1	**nc**	0.0083	**0.075**	<0.01	<0.01
Selenium (Se)	mg/L	nc	nc	**nc**	0.071	**0.3**	<0.001	<0.001
Silver (Ag)	mg/L	nc	nc	**nc**	nc	**0.00115**	<0.0003	<0.0003
Sodium (Na)	mg/L	nc	nc	**nc**	nc	**nc**	5200	4900
Zinc (Zn)	mg/L	*0.5*	1	**nc**	0.086	**0.095**	<0.005	<0.005
Anions								
Alkalinity, total	mg/L	nc	nc	**nc**	nc	**nc**	95	86
Acidity	mg/L	nc	nc	**nc**	nc	**nc**	12	12
Cyanide, total	mg/L	*1*	2	**nc**	1 (as free CN)	**1 (as free CN)**	<0.003	<0.003
Nitrogen ammonia (N-NH3)	mg/L	nc	nc	**nc**	nc	**nc**	<0.02	<0.02
Other								
^{226}Ra	Bq/L	nc	nc	**nc**	nc	**nc**	0.01	0.02

Notes

1 *Directive 019 sur l'industrie minière*, MDDEP, 1989, rev. 2012

2 CCME, *Canadian Environmental Quality Guidelines*, 1987, 1999

3 *Critères de qualité de l'eau de surface du Québec*, MDDEP, 2009, rev. 2012.

4 In clear water (low suspended solids concentrations (<25 mg/L)): maximum increase of 5 mg/L from background levels (chronic effect) and maximum increase of 25 mg/L from background levels (acute effect).

5 True Colour: The mean absorbance of filtered water samples at 456 nm shall not be significantly higher than the seasonally adjusted expected value for the system under consideration.
Apparent Colour: The mean percent transmission of white light per metre shall not be significantly less than the seasonally adjusted expected value for the system under consideration.

6 Clear flow: Maximum increase of 8 NTUs from background levels (acute effect). Maximum average increase of 2 NTUs from background levels (chronic effect/long term).

5.3 Water Quality

The analytical results for freshwater samples collected from ruisseau à la Baleine (3 samples) and the unnamed stream (3 samples) are presented in Table 5.1. Surface water samples were collected from first order streams that are located near the headwaters of both ruisseau à la Baleine (SW12-01) and the unnamed stream (SW12-09). The rest of the surface water samples were collected from the downstream second or third order segments into which the first order streams flow into.

Both samples collected from upstream first order segments of the ruisseau à la Baleine (SW12-01) and unnamed stream (SW12-09) are characterized by a low pH levels (5.07 and 5.82, respectively) that are outside the acceptable ranges contained in the CCME *Aquatic Life Guidelines*, the Québec *Surface Water Criteria for the Protection of Aquatic Life* (chronic exposure) and *Directive 019*. These samples are also characterized by low hardness (5 and 9 mg) and low total alkalinity (<1 and 3 mg/L as $CaCO_3$), and high color (180 and 120 UCV). Both samples are acidic with acidities of 52 mg/L as $CaCO_3$ (SW12-01) and 12 mg/L as $CaCO_3$.

The downstream samples (SW12-02 and SW12-03) collected from ruisseau à la Baleine exhibited a normal pH (6.93 and 7.14), higher hardness (55 and 54 mg/L), higher total alkalinity (44 and 50 mg/L as $CaCO_3$), lower acidity (<10 mg/L as $CaCO_3$), and lower color (57 and 58 UCV) relative to the upstream samples. The results for the downstream samples (SW12-04 and SW12-06) collected from the unnamed stream were similar with the pH (7.52 and 7.54), hardness (98 and 89 mg/L), and total alkalinity (63 and 62 mg/L as $CaCO_3$) being slightly higher than those measured in the ruisseau à la Baleine.

The total dissolved solids range between 70 to 160 ppm in the surface water samples collected from ruisseau à la Baleine, whereas the results for the samples collected from the unnamed stream were slightly less variable (150 to 170 ppm). The total suspended solids (TSS; <2 to 23 mg/L) and turbidity (0.3 to 27 NTU) measurements were highly variable in both streams. The TSS concentrations of the upstream sample collected from ruisseau à la Baleine as well as the two downstream samples collected from the unnamed stream exceeded the *Directive 019* Criterion (Acceptable Monthly Mean) for wastewater discharges to the environment.

All six surface water samples collected from the two streams exhibited PH C_{10}-C_{50}, antimony, arsenic, cadmium, hexavalent chromium, total chromium, cobalt, mercury, molybdenum, nickel, selenium, silver, and total cyanide concentrations that were below the applicable laboratory detection limit. It should be noted that the laboratory detection for several metals (e.g., cobalt) were higher than one or more of the potentially applicable CCME or Québec surface water criteria. These samples also exhibited barium (<0.03 to 0.03 mg/L), lead (<0.001 to 0.004 mg/L), manganese (0.059 to 0.7 mg/L), total phosphorous (<0.01 to 0.3 mg/L, zinc (<0.005 to 0.015 mg/L), and ammonia nitrogen (<0.02 to 0.09 mg/L) concentrations that were all below the potentially applicable CCME and Québec surface water criteria. The sodium concentrations of the samples ranged from 4 to 27 mg/L.

With the exception of pH and TSS (see above), none of the surface water samples collected from the streams exceeded the available *Directive 019* criteria. However, the following exceedences of CCME *Aquatic Life Guidelines* or the Québec *Surface Water Criteria* were detected:

- All six surface water samples exhibited aluminum concentrations (0.23 to 0.76 mg/L) that exceeded the CCME *Aquatic Life Guidelines* and one (SW12-01) exceeded the Québec *Surface Water Criterion for the Protection of Aquatic Life* (chronic effect). The upstream surface water sample (SW12-09) collected from the unnamed stream also exceeded the Québec acute effect criterion.
- The upstream surface water sample (SW12-01) collected from ruisseau à la Baleine exhibited a copper concentration (0.12 mg/L) that exceeded the applicable CCME *Aquatic Life Guideline and the Québec Surface Water Criterion for the Protection of Aquatic Life* (chronic and acute effects). The rest of the samples exhibited copper concentrations that were beneath the laboratory detection limit (<0.003 mg/l).
- Five of the six surface water samples exhibited iron concentrations (0.8 to 1.4 mg/L) that exceeded the CCME *Aquatic Life Guideline*. One of the downstream samples (SW12-03) also exceeded the Québec *Surface Water Criterion for the Protection of Aquatic Life* (chronic effect).

The differences between the chemical compositions of the surface samples collected from the upstream first order segments of both streams and the downstream second or third order segments are attributed to the lower buffering capacity of the rock or soil within the drainage area of the first order stream. It may also be a reflection of the forest makeup (i.e. a larger percentage of coniferous trees). The low pH of the first order segments may be responsible for the elevated concentrations of aluminum and other metals that were measured in the upstream surface water samples relative to the downstream ones.

Analytical results for estuarine samples are presented in Table 5.2. The two samples of water collected from baie des Sept-Îles exhibited a normal pH (7.96 and 7.75), high total alkalinity (95 and 86 mg/L as $CaCO_3$), low acidity (12 mg/L as $CaCO_3$), and low color (10 and 8 UCV). The TSS concentrations exceeded the *Directive 019* Criterion (Acceptable Monthly Mean for both samples and Maximum Acceptable Concentration for one sample) for wastewater discharges to the environment. None of the surface water samples exceeded the available *Directive 019* criteria, CCME *Aquatic Life Guidelines* and the Québec *Surface Water Criteria*.

5.4 Summary

In June 2012, Stantec conducted a surface water sampling in the LSA for the Water Resources Baseline Study. Surface water samples were collected from ruisseau à la Baleine (3 samples), the unnamed stream (3 samples), as well as from the baie des Sept-Îles (2 samples) located in the vicinity of the proposed Kami Terminal in Sept-Îles, Quebec, herein referred to as the site. The samples were analyzed for the following parameters: pH, total dissolved solid (TDS), total suspended solids (TSS), color, turbidity, hardness, extractible metals (Al, Ag, As, Ba, Cd, Co, Cr, Cr IV, Cu, Fe, Hg, Se, Sb, Mn, Mo, Na, Ni, Pb, Zn), total alkalinity, acidity, total cyanide, total

phosphorus (P), ammoniacal nitrogen ($N\text{-}NH_3$), and petroleum hydrocarbons C_{10}-C_{50} (PH C_{10}-C_{50}), ^{226}Ra.

The principal objective of this study was to establish the baseline environmental quality of the surface water bodies located in the vicinity of the site.

No exceedences of relevant criteria were noted in the baie des Sept-Îles samples.

As for the six surface water samples collected from the ruisseau à la Baleine (3 samples) and the unnamed stream (3 samples):

- All six surface water samples exhibited aluminum concentrations (0.23 to 0.76 mg/L) exceeded the CCME *Aquatic Life Guideline* and one (SW12-01) exceeded the Québec *Surface Water Criterion for the Protection of Aquatic Life* (chronic effect). The upstream surface water sample (SW12-09) collected from the unnamed stream also exceeded the Québec acute effect criterion.

- The upstream surface water sample (SW12-01) collected from ruisseau à la Baleine exhibited a copper concentration (0.12 mg/L) that exceeded the applicable CCME *Aquatic Life Guideline and the Québec Surface Water Criterion for the Protection of Aquatic Life* (chronic and acute effects). The rest of the samples exhibited copper concentrations that were below the laboratory detection limit (<0.003 mg/l).
- Five of the six surface water samples exhibited iron concentrations (0.8 to 1.4 mg/L) that exceeded the CCME *Aquatic Life Guideline*. One of the downstream samples (SW12-03) also exceeded the Québec *Surface Water Criterion for the Protection of Aquatic Life* (chronic effect).

6.0 INFORMATION SOURCES

6.1 Literature Cited

Canadian Council of Ministers of the Environment (CCME). Canadian Environmental Quality Guidelines. Online Accessed in June 2012.

Guay, I., Roussel, T. *Critères de qualité de l'eau de surface. Ministère du Développement Durable de l'Environnement et des Parcs* (MDDEP). April 2012

Ministère du Développement durable, de l'Environnement, et des Parcs (MDDEP). *Directive 019 sur l'industrie minière*. March 2012.

APPENDIX A

Certificates of Analysis

Attention:
Pierre-Olivier Laliberté
STANTEC CONSULTING LTD
Montreal
100, boulevard Alexis-Nihon
Suite 110
Ville Saint-Laurent, PQ
CANADA H4M 2N6

Your P.O. #: 546
Your Project #: 121614000
Site Location: POINTE NOIRE
Your C.O.C. #: 77799

Report Date: 2012/07/03
Report #: NM-406294

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B229839
Received: 2012/06/14, 10:45

Sample Matrix: SURFACE WATER
Samples Received: 10

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Primary reference
Sample rec'd - no analysis requested	1	N/A	2012/06/14		
Acidity	9	N/A	2012/06/19	STL SOP-00057	MA.315 Alc-Aci 1.0
Total Alkalinity (pH end point 4.5)	9	N/A	2012/06/14	STL SOP-00038	SM 2320B
Extra Sample Rec'd - archived	31	N/A	2012/06/14		
Petroleum Hydrocarbons (C10-C50)	9	2012/06/14	2012/06/16	STL SOP-00173	MA.400 - Hyd 1.1
Total Cyanide	9	2012/06/18	2012/06/18	STL SOP-00035	MA. 300 - CN 1.1
Real Color	9	N/A	2012/06/14	STL SOP-00046	MA. 103 - Col. 2.0
Hexavalent Chromium (Cr 6+)	9	N/A	2012/06/14	STL SOP-00037	MA. 200 - CrHex 1.1
Hardness	9	2012/06/18	2012/06/18	STL SOP-00006	MA.200- Mét 1.2
Mercury by ICP-MS	9	2012/06/18	2012/06/18	STL SOP-00006	MA.200- Mét 1.2
Total Suspended Solids	9	2012/06/18	2012/06/19	STL SOP-00015	MA. 104 - S.S. 1.1
Metals by ICP-MS	9	2012/06/18	2012/06/19	STL SOP-00006	MA.200- Mét 1.2
Metals by ICP	9	2012/06/18	2012/06/18	STL SOP-00006	MA.200- Mét 1.2
Ammonia Nitrogen	9	N/A	2012/06/20	STL SOP-00040	MA. 300 - N 1.1
pH	8	N/A	2012/06/14	STL SOP-00038	MA.100- pH1.1
pH	1	N/A	2012/06/15	STL SOP-00038	MA.100- pH1.1
Total Phosphorus	9	2012/06/18	2012/06/18	STL SOP-00006	MA.200- Mét 1.2
Radium 226 (1)	9	N/A	N/A		
Total Dissolved Solids	9	2012/06/18	2012/06/20	STL SOP-00050	MA. 103 - S.T. 1.0
Turbidity	9	N/A	2012/06/14	STL SOP-00022	MA. 103 - Tur. 1.0

(1) This test was performed by Becquerel- Kitimat Rd. Ontario

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Your P.O. #: 546
Your Project #: 121614000
Site Location: POINTE NOIRE
Your C.O.C. #: 77799

Attention:
Pierre-Olivier Laliberté
STANTEC CONSULTING LTD
Montreal
100, boulevard Alexis-Nihon
Suite 110
Ville Saint-Laurent, PQ
CANADA H4M 2N6

Report Date: 2012/07/03
Report #: NM-406294

CERTIFICATE OF ANALYSIS

-2-

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Maria Manarolis, Customer Service
Email: MManarolis@maxxam.ca
Phone# (514) 448-9001 Ext:4236

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam Job #: B229839
Report Date: 2012/07/03

STANTEC CONSULTING LTD
Client Project #: 121614000
Site Location: POINTE NOIRE
Your P.O. #: 546
Sampler Initials: PM

HYDROCARBONS BY GCFID (SURFACE WATER)

Maxxam ID		R25812	R25892	R25893	R25894	R25897		
Sampling Date		2012/06/11	2012/06/11	2012/06/11	2012/06/12	2012/06/12		
COC Number		77799	77799	77799	77799	77799		
	Units	**SW12-01**	**SW12-02**	**SW12-03**	**SW12-04**	**SW12-06**	**RDL**	**QC Batch**
Total Petroleum Hydro.								
Petroleum Hydrocarbons (C10-C50)	ug/L	<100	<100	<100	<100	<100	100	1017218
Surrogate Recovery (%)								
1-Chlorooctadecane	%	74	76	83	79	80	N/A	1017218

N/A = Not Applicable
RDL = Reportable Detection Limit

Maxxam ID		R25898	R25899	R25900	R25901		
Sampling Date		2012/06/11	2012/06/11	2012/06/12	2012/06/12		
COC Number		77799	77799	77799	77799		
	Units	**SW12-07**	**SW12-08**	**SW12-09**	**DUP-2012-06-12-A**	**RDL**	**QC Batch**
Total Petroleum Hydro.							
Petroleum Hydrocarbons (C10-C50)	ug/L	<100	<100	<100	<100	100	1017218
Surrogate Recovery (%)							
1-Chlorooctadecane	%	84	84	81	82	N/A	1017218

N/A = Not Applicable
RDL = Reportable Detection Limit

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Maxxam Job #: B229839
Report Date: 2012/07/03

STANTEC CONSULTING LTD
Client Project #: 121614000
Site Location: POINTE NOIRE
Your P.O. #: 546
Sampler Initials: PM

METALS (SURFACE WATER)

Maxxam ID		R25812	R25812	R25892	R25893	R25894	R25897		
Sampling Date		2012/06/11	2012/06/11	2012/06/11	2012/06/11	2012/06/12	2012/06/12		
COC Number		77799	77799	77799	77799	77799	77799		
	Units	**SW12-01**	**SW12-01 Lab-Dup**	**SW12-02**	**SW12-03**	**SW12-04**	**SW12-06**	**RDL**	**QC Batch**
METALS									
Mercury (Hg)	mg/L	<0.0001	N/A	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	1018306
Total Hardness (CaCO3)	mg/L	5	N/A	55	54	98	89	1	1018306
Total phosphorous	mg/L	<0.01	0.02	0.03	0.03	<0.01	0.02	0.01	1018432
Aluminum (Al)	mg/L	0.72	N/A	0.23	0.39	0.38	0.30	0.03	1018306
Antimony (Sb)	mg/L	<0.006	N/A	<0.006	<0.006	<0.006	<0.006	0.006	1018306
Silver (Ag)	mg/L	<0.0003	N/A	<0.0003	<0.0003	<0.0003	<0.0003	0.0003	1018306
Arsenic (As)	mg/L	<0.002	N/A	<0.002	<0.002	<0.002	<0.002	0.002	1018306
Barium (Ba)	mg/L	<0.03	N/A	<0.03	<0.03	0.03	<0.03	0.03	1018306
Cadmium (Cd)	mg/L	<0.001	N/A	<0.001	<0.001	<0.001	<0.001	0.001	1018306
Chromium (Cr)	mg/L	<0.03	N/A	<0.03	<0.03	<0.03	<0.03	0.03	1018306
Cobalt (Co)	mg/L	<0.03	N/A	<0.03	<0.03	<0.03	<0.03	0.03	1018306
Copper (Cu)	mg/L	0.12	N/A	<0.003	<0.003	<0.003	<0.003	0.003	1018306
Lead (Pb)	mg/L	<0.001	N/A	<0.001	<0.001	0.004	0.003	0.001	1018306
Manganese (Mn)	mg/L	0.60	N/A	0.059	0.25	0.63	0.70	0.003	1018306
Molybdenum (Mo)	mg/L	<0.03	N/A	<0.03	<0.03	<0.03	<0.03	0.03	1018306
Nickel (Ni)	mg/L	<0.01	N/A	<0.01	<0.01	<0.01	<0.01	0.01	1018306
Selenium (Se)	mg/L	<0.001	N/A	<0.001	<0.001	<0.001	<0.001	0.001	1018306
Sodium (Na)	mg/L	4.0	N/A	5.2	19	26	27	0.2	1018306
Zinc (Zn)	mg/L	0.013	N/A	0.009	<0.005	0.015	0.014	0.005	1018306
Iron (Fe)	mg/L	0.9	N/A	0.2	1.4	0.8	0.8	0.1	1018306
Magnesium (Mg)	mg/L	0.6	N/A	1.3	2.5	6.9	6.5	0.2	1018306
Calcium (Ca)	mg/L	1.0	N/A	20	18	28	25	0.5	1018306

N/A = Not Applicable
RDL = Reportable Detection Limit

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Maxxam Job #: B229839
Report Date: 2012/07/03

STANTEC CONSULTING LTD
Client Project #: 121614000
Site Location: POINTE NOIRE
Your P.O. #: 546
Sampler Initials: PM

METALS (SURFACE WATER)

Maxxam ID		R25898	R25899		R25900	R25901		
Sampling Date		2012/06/11	2012/06/11		2012/06/12	2012/06/12		
COC Number		77799	77799		77799	77799		
	Units	**SW12-07**	**SW12-08**	**RDL**	**SW12-09**	**DUP-2012-06-12-A**	**RDL**	**QC Batch**
METALS								
Mercury (Hg)	mg/L	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	0.0001	1018306
Total Hardness (CaCO3)	mg/L	4600	4500	1	9	76	1	1018306
Total phosphorous	mg/L	0.05	0.04	0.01	0.02	0.02	0.01	1018432
Aluminum (Al)	mg/L	0.06	0.05	0.03	0.76	0.31	0.03	1018306
Antimony (Sb)	mg/L	<0.006	<0.006	0.006	<0.006	<0.006	0.006	1018306
Silver (Ag)	mg/L	<0.0003	<0.0003	0.0003	<0.0003	<0.0003	0.0003	1018306
Arsenic (As)	mg/L	<0.002	<0.002	0.002	<0.002	<0.002	0.002	1018306
Barium (Ba)	mg/L	<0.03	<0.03	0.03	<0.03	<0.03	0.03	1018306
Cadmium (Cd)	mg/L	<0.001	<0.001	0.001	<0.001	<0.001	0.001	1018306
Chromium (Cr)	mg/L	<0.03	<0.03	0.03	<0.03	<0.03	0.03	1018306
Cobalt (Co)	mg/L	<0.03	<0.03	0.03	<0.03	<0.03	0.03	1018306
Copper (Cu)	mg/L	<0.003	<0.003	0.003	<0.003	<0.003	0.003	1018306
Lead (Pb)	mg/L	<0.001	<0.001	0.001	<0.001	0.002	0.001	1018306
Manganese (Mn)	mg/L	0.032	0.018	0.003	0.55	0.60	0.003	1018306
Molybdenum (Mo)	mg/L	<0.03	<0.03	0.03	<0.03	<0.03	0.03	1018306
Nickel (Ni)	mg/L	<0.01	<0.01	0.01	<0.01	<0.01	0.01	1018306
Selenium (Se)	mg/L	<0.001	<0.001	0.001	<0.001	<0.001	0.001	1018306
Sodium (Na)	mg/L	5200	4900	20	4.5	27	0.2	1018306
Zinc (Zn)	mg/L	<0.005	<0.005	0.005	0.010	0.006	0.005	1018306
Iron (Fe)	mg/L	0.2	<0.1	0.1	0.8	0.7	0.1	1018306
Magnesium (Mg)	mg/L	920	910	0.2	0.9	5.4	0.2	1018306
Calcium (Ca)	mg/L	310	310	0.5	2.1	22	0.5	1018306

RDL = Reportable Detection Limit

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

Maxxam Job #: B229839
Report Date: 2012/07/03

STANTEC CONSULTING LTD
Client Project #: 121614000
Site Location: POINTE NOIRE
Your P.O. #: 546
Sampler Initials: PM

CONVENTIONAL PARAMETERS (SURFACE WATER)

Maxxam ID		R25812	R25892	R25893	R25894	R25897		
Sampling Date		2012/06/11	2012/06/11	2012/06/11	2012/06/12	2012/06/12		
COC Number		77799	77799	77799	77799	77799		
	Units	**SW12-01**	**SW12-02**	**SW12-03**	**SW12-04**	**SW12-06**	**RDL**	**QC Batch**
CONVENTIONALS								
Acidity as CaCO3	mg/L	52	<10	<10	<10	<10	10	1018733
Hexavalent Chromium (Cr 6+)	mg/L	<0.008	<0.008	<0.008	<0.008	<0.008	0.008	1017201
Nitrogen ammonia (N-NH3)	mg/L	<0.02	<0.02	0.09	0.03	0.03	0.02	1018948
pH	pH	5.07	6.93	7.14	7.52	7.54	N/A	1017237
Real Color	UCV	180	57	58	66	68	2	1017219
Total Cyanide (CN)	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	0.003	1018217
Turbidity	NTU	0.3	0.3	5.2	27	17	0.1	1017264
Alkalinity Total (as CaCO3) pH 4.5	mg/L	<1	44	50	63	62	1	1017251
Total Dissolved Solids	mg/L	83	70	160	160	170	10	1018177
Total suspended solids (TSS)	mg/L	19	<2	6	23	20	2	1018257

RDL = Reportable Detection Limit

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

Maxxam Job #: B229839
Report Date: 2012/07/03

STANTEC CONSULTING LTD
Client Project #: 121614000
Site Location: POINTE NOIRE
Your P.O. #: 546
Sampler Initials: PM

CONVENTIONAL PARAMETERS (SURFACE WATER)

Maxxam ID		R25897	R25898	R25898	R25899	R25900		
Sampling Date		2012/06/12	2012/06/11	2012/06/11	2012/06/11	2012/06/12		
COC Number		77799	77799	77799	77799	77799		
	Units	**SW12-06 Lab-Dup**	**SW12-07**	**SW12-07 Lab-Dup**	**SW12-08**	**SW12-09**	**RDL**	**QC Batch**
CONVENTIONALS								
Acidity as CaCO3	mg/L	N/A	12	N/A	12	12	10	1018733
Hexavalent Chromium (Cr 6+)	mg/L	N/A	<0.008	N/A	<0.008	<0.008	0.008	1017201
Nitrogen ammonia (N-NH3)	mg/L	N/A	<0.02	N/A	<0.02	<0.02	0.02	1018948
pH	pH	N/A	7.96	8.15	7.75	5.82	N/A	1017237
Real Color	UCV	N/A	10	N/A	8	120	2	1017219
Total Cyanide (CN)	mg/L	N/A	<0.003	N/A	<0.003	<0.003	0.003	1018217
Turbidity	NTU	N/A	1.7	N/A	0.5	0.6	0.1	1017264
Alkalinity Total (as CaCO3) pH 4.5	mg/L	N/A	95	85	86	3	1	1017251
Total Dissolved Solids	mg/L	N/A	27000	N/A	27000	150	10	1018177
Total suspended solids (TSS)	mg/L	21	24	N/A	34	2	2	1018257

N/A = Not Applicable
RDL = Reportable Detection Limit

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

Maxxam Job #: B229839
Report Date: 2012/07/03

STANTEC CONSULTING LTD
Client Project #: 121614000
Site Location: POINTE NOIRE
Your P.O. #: 546
Sampler Initials: PM

CONVENTIONAL PARAMETERS (SURFACE WATER)

Maxxam ID		R25900	R25901	R25901		
Sampling Date		2012/06/12	2012/06/12	2012/06/12		
COC Number		77799	77799	77799		
	Units	**SW12-09 Lab-Dup**	**DUP-2012-06-12-A**	**DUP-2012-06-12-A Lab-Dup**	**RDL**	**QC Batch**
CONVENTIONALS						
Acidity as CaCO3	mg/L	N/A	<10	N/A	10	1018733
Hexavalent Chromium (Cr 6+)	mg/L	N/A	<0.008	N/A	0.008	1017201
Nitrogen ammonia (N-NH3)	mg/L	N/A	0.05	N/A	0.02	1018948
pH	pH	N/A	7.57	N/A	N/A	1017237
Real Color	UCV	N/A	63	N/A	2	1017219
Total Cyanide (CN)	mg/L	<0.003	0.003	N/A	0.003	1018217
Turbidity	NTU	N/A	16	N/A	0.1	1017264
Alkalinity Total (as CaCO3) pH 4.5	mg/L	N/A	60	N/A	1	1017251
Total Dissolved Solids	mg/L	N/A	180	180	10	1018177
Total suspended solids (TSS)	mg/L	N/A	10	N/A	2	1018257

N/A = Not Applicable
RDL = Reportable Detection Limit

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

Maxxam Job #: B229839
Report Date: 2012/07/03

STANTEC CONSULTING LTD
Client Project #: 121614000
Site Location: POINTE NOIRE
Your P.O. #: 546
Sampler Initials: PM

GENERAL COMMENTS

Condition of sample(s) upon receipt: GOOD except for the following:
Total Cyanide: The maximum volume of base has been added but the sample pH is still <12.: R25898
Total Cyanide: Insufficient preservative, pH adjusted upon receipt at the laboratory.: R25899
Real Color: Holding time already past.: R25812, R25892, R25893, R25898, R25899
Hexavalent Chromium (Cr 6+): Holding time already past.: R25812, R25892, R25893, R25894, R25897, R25898, R25899, R25900, R25901
pH: Holding time already past.: R25812, R25892, R25893, R25894, R25897, R25898, R25899, R25900, R25901
Turbidity: Holding time already past.: R25812, R25892, R25893, R25898, R25899

HYDROCARBONS BY GCFID (SURFACE WATER)

Please note that the results have not been corrected for QC recoveries (spiked blank and surrogates). Please note that the results have been corrected for the method blank.

METALS (SURFACE WATER)

Please note that the results have not been corrected for QC recoveries nor for the method blank results.
Reported detection limits are multiplied by dilution factors used for sample analysis.

CONVENTIONAL PARAMETERS (SURFACE WATER)

Please note that the results have not been corrected for QC recoveries nor for the method blank results.
Holding time not respected for pH analysis.

Results relate only to the items tested.

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

STANTEC CONSULTING LTD
Attention: Pierre-Olivier Laliberté
Client Project #: 121614000
P.O. #: 546
Site Location: POINTE NOIRE

Quality Assurance Report

Maxxam Job Number: B229839

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units
1017201	DKH	Spiked Blank	Hexavalent Chromium (Cr 6+)	2012/06/14		96	%
		Method Blank	Hexavalent Chromium (Cr 6+)	2012/06/14	<0.008		mg/L
1017218	FV1	Spiked Blank	1-Chlorooctadecane	2012/06/16		85	%
			Petroleum Hydrocarbons (C10-C50)	2012/06/16		84	%
		Method Blank	1-Chlorooctadecane	2012/06/16		90	%
			Petroleum Hydrocarbons (C10-C50)	2012/06/16	140, RDL=100		ug/L
1017219	NC4	QC Standard	Real Color	2012/06/14		101	%
		Method Blank	Real Color	2012/06/14	<2		UCV
1017237	MR4	Spiked Blank	pH	2012/06/14		100	%
		Spiked Blank DUP	pH	2012/06/14		100	%
1017251	MR4	Spiked Blank	Alkalinity Total (as CaCO3) pH 4.5	2012/06/14		95	%
		Method Blank	Alkalinity Total (as CaCO3) pH 4.5	2012/06/14	<1		mg/L
1017264	NC4	QC Standard	Turbidity	2012/06/14		90	%
		Method Blank	Turbidity	2012/06/14	0.1, RDL=0.1		NTU
1018177	LD2	Spiked Blank	Total Dissolved Solids	2012/06/20		98	%
		Spiked Blank DUP	Total Dissolved Solids	2012/06/20		97	%
		Method Blank	Total Dissolved Solids	2012/06/20	<10		mg/L
1018217	DB2	QC Standard	Total Cyanide (CN)	2012/06/18		91	%
		Spiked Blank	Total Cyanide (CN)	2012/06/18		100	%
		Method Blank	Total Cyanide (CN)	2012/06/18	<0.003		mg/L
1018257	LD2	Spiked Blank	Total suspended solids (TSS)	2012/06/19		97	%
		Spiked Blank DUP	Total suspended solids (TSS)	2012/06/19		98	%
		Method Blank	Total suspended solids (TSS)	2012/06/19	<2		mg/L
1018306	MCA	Spiked Blank	Mercury (Hg)	2012/06/19		101	%
			Aluminum (Al)	2012/06/19		98	%
			Antimony (Sb)	2012/06/19		104	%
			Silver (Ag)	2012/06/19		100	%
			Arsenic (As)	2012/06/19		99	%
			Barium (Ba)	2012/06/19		108	%
			Cadmium (Cd)	2012/06/19		100	%
			Chromium (Cr)	2012/06/19		102	%
			Cobalt (Co)	2012/06/19		99	%
			Copper (Cu)	2012/06/19		97	%
			Lead (Pb)	2012/06/19		105	%
			Manganese (Mn)	2012/06/19		106	%
			Molybdenum (Mo)	2012/06/19		104	%
			Nickel (Ni)	2012/06/19		116	%
			Selenium (Se)	2012/06/19		100	%
			Sodium (Na)	2012/06/19		97	%
			Zinc (Zn)	2012/06/19		99	%
			Iron (Fe)	2012/06/19		101	%
			Magnesium (Mg)	2012/06/19		97	%
			Calcium (Ca)	2012/06/19		99	%
		Method Blank	Mercury (Hg)	2012/06/19	<0.0001		mg/L
			Total Hardness (CaCO3)	2012/06/19	<1		mg/L
			Aluminum (Al)	2012/06/19	<0.03		mg/L
			Antimony (Sb)	2012/06/19	<0.006		mg/L
			Silver (Ag)	2012/06/19	<0.0003		mg/L
			Arsenic (As)	2012/06/19	<0.002		mg/L
			Barium (Ba)	2012/06/19	<0.03		mg/L
			Cadmium (Cd)	2012/06/19	<0.001		mg/L
			Chromium (Cr)	2012/06/19	<0.03		mg/L
			Cobalt (Co)	2012/06/19	<0.03		mg/L
			Copper (Cu)	2012/06/19	<0.003		mg/L
			Lead (Pb)	2012/06/19	<0.001		mg/L

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STANTEC CONSULTING LTD
Attention: Pierre-Olivier Laliberté
Client Project #: 121614000
P.O. #: 546
Site Location: POINTE NOIRE

Quality Assurance Report (Continued)

Maxxam Job Number: B229839

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units
1018306	MCA	Method Blank	Manganese (Mn)	2012/06/19	<0.003		mg/L
			Molybdenum (Mo)	2012/06/19	<0.03		mg/L
			Nickel (Ni)	2012/06/19	<0.01		mg/L
			Selenium (Se)	2012/06/19	<0.001		mg/L
			Sodium (Na)	2012/06/19	<0.2		mg/L
			Zinc (Zn)	2012/06/19	0.007, RDL=0.005		mg/L
			Iron (Fe)	2012/06/19	<0.1		mg/L
			Magnesium (Mg)	2012/06/19	<0.2		mg/L
			Calcium (Ca)	2012/06/19	<0.5		mg/L
1018432	MCA	Spiked Blank	Total phosphorous	2012/06/18		103	%
		Method Blank	Total phosphorous	2012/06/18	<0.01		mg/L
1018733	NC4	Calibration Check	Acidity as CaCO3	2012/06/19		100	%
		QC Standard	Acidity as CaCO3	2012/06/19		101	%
		Spiked Blank	Acidity as CaCO3	2012/06/19		101	%
1018948	DKH	Spiked Blank	Nitrogen ammonia (N-NH3)	2012/06/20		98	%
		Method Blank	Nitrogen ammonia (N-NH3)	2012/06/20	<0.02		mg/L

RDL = Reportable Detection Limit
Calibration Check: A calibration standard analyzed at different times to evaluate on-going calibration accuracy.
QC Standard: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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Validation Signature Page

Maxxam Job #: B229839

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Corina Tue, B.Sc., Chemist

Delia Barbul, B.Sc., Chemist

Kathie Quevillon, B.Sc., Chemist

Steliana Calestru, B.Sc. Chemist

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam Analytics International Corporation o/a Maxxam Analytique

889, montée de Liesse, Saint-Laurent, Quebec Canada H4T 1P5 Téléphone:(514) 448-9001 Ligne sans frais:1-877-462-9926 Télécopieur:(514)-448-9199 www.maxxam.ca

BORDEREAU DE TRANSMISSION D'ÉCHANTILLONS STANTEC

INFORMATION FACTURATION:		INFORMATION RAPPORT (si différente de facturation):		INFORMATION PROJET:		À l'usage du laboratoire seulement:	
Compagnie:	#1681 STANTEC CONSULTING LTD	Compagnie:	#999 STANTEC CONSULTING LTD	N° de cotation:	B20269	# DOSSIER MAXXAM:	# COMMANDE BOUTEILLES: 77799
Attention de:	Refinery Payables	Attention de:	Pierre-Olivier Laliberté	N° tâche:	546		
Adresse:	P.O. Box 38212	Adresse:	100, boulevard Alexis-Nihon Suite 110	N° de projet:	121614000		
	Dartmouth NS B3B 1X2		Ville Saint-Laurent PQ H4M 2N6	N° engagement OPC:		# CHAINE DE RESPONSABILITÉ: C#77799-01-01	CHARGÉ(E) DE PROJETS: MARIA MANAROLIS
Téléphone:	Téléc.:	Téléphone:	4240 Téléc.: (514)739-8499	# de site:	POINTE NOIRE		
Courriel:	Stantec.Accounts.Payable.Invoices@Stantec.com	Courriel:	PierreOlivier.Laliberte@stantec.com;labmontreal	Échantillonneur:	P. MARCOUX		

CRITÈRES ET RÉGLEMENTS:

- ☐ Politique
- ☐ RDS
- ☐ RMD
- ☐ REIMR
- Essai de pompage: ☐ 24h (Art. 6.1&6.2) ☐ 48h (Art. 6.2) ☐ 72h (Art. 6.1&6.2)
- Règ. CUM: ☐ Égout sanitaire Art.10 ☐ Égout pluvial Art.11
- Qualité Eau Potable: ☐ Règ. Pâtes & Papiers (Art.104) ☐ Règ. Pates & Papiers (Art.112) ☐ Municipal ☐ Non-municipal
- Autre (spécifier): _____

INSTRUCTIONS SPÉCIALES: RÉSULTATS EN ANGLAIS

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

ANALYSES REQUISES (S.V.P soyez précis).

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 Requis: _____ Heure requise: _____

Veuillez noter que tout échantillon reçu après 15H00, sera considéré comme reçu le lendemain (jour ouvrable) à 9H00.

	Étiquette Codebar	Identification de l'échantillon	Date Prélevé	Heure	Matrice	Eau potable règlementée ? (O / N)	métaux à filtrer au labo ? (O / N)	Métaux dissous:Al,Ag,As,Ba,Cd,Co,C	suite: Hg,Fe,Se,Sb,Mn,Mo,Na,Ni,Pb	Chrome Hexavalent (Cr 6+)	Dureté	Turbidité	Matières en suspension	Conductivité	Coliformes fécaux	Coliformes totaux	Demande biochimique en oxgène (5 jours)	# de Contenants	Commentaires
1		SW12-01	2012/06/11		EAU SURFACE													14	14-Jun-12 10:45 MARIA MANAROLIS B229839
2		SW12-02	2012/06/11															14	
3		SW12-03	2012/06/11															14	
4		SW12-04	2012/06/12															14	
5		SW12-05	2012/06/12															14	
6		SW12-06	2012/06/12															14	
7		SW12-07	2012/06/11															14	
8		SW12-08	2012/06/11															14	
9		SW12-09	2012/06/12															13	8,8,8 / 8,6,9 /
10		DUP-2012-06-12-A	2012/06/12		↓													14	7,5,3 / 6,8,6 / 10,12,13

STANDARD

*DÉSSAISI PAR: (Signature)	Date: (AAAA/MM/JJ)	Heure:	REÇU PAR: (Signature)	Date: (AAAA/MM/JJ)	Heure:	# de pots utilisés et non retournés
Robert Boudrias	2012/06/14	10h45		2012/06/14	10h45	

À l'usage du laboratoire seulement

Court Délai de Conservation	Température (°C) de Reception	Sceau légal intact sur la glacière
X		

2012/07/03 17:46

* 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

ÉCHANTILLON à conserver (1)

- SW12-05

ÉCHANTILLONS pour analyse immédiate (9)

- SW12-01
- SW12-02
- SW12-03
- SW12-04
- SW12-06
- SW12-07
- SW12-08
- SW12-09 (voir note ci-dessous)
- DUP-2012-06-12-A

PARAMÈTRES (à mesurer pour chacun des 9 échantillons ci-dessus)

- Acidité
- Alcalinité totale
- Azote ammoniacale
- Chrome hexavalent
- Couleur
- Cyanures totaux
- Dureté
- Hydrocarbures pétroliers C10-C50
- Métaux extractibles (Al, Ag, As, Ba, Cd, Co, Cr, Cu, Fe, Hg, Se, Sb, Mn, Mo, Na, Ni, Pb, Zn)
- pH
- Phosphore total
- Radium 226
- Solides totaux dissous (voir note ci-dessous pour SW12-09)
- Solides totaux en suspension
- Turbidité

Note : pour l'échantillon **SW12-09**, il nous n'avons pas de bouteille servant à l'analyse des **solides totaux dissous**. Es-tu en mesure d'effectuer cette analyse à partir des autres bouteilles disponibles pour cet échantillon? Si oui, stp procède avec cette analyse. Si non, on annule ce paramètre pour cet échantillon.

Merci et bonne journée!

Pierre-Olivier Laliberté
Chargé de projet
Stantec
100 boulevard Alexis-Nihon bureau 110
Saint-Laurent (Québec) H4M 2N6
Ph: (514) 340-2180
Fx: (514) 739-8499
Cell: (514) 605-9541
Pierre-Olivier.Laliberte@stantec.com
stantec.com

2012/06/14