Implementation of the Remedial Action Plan – Year 4, Former U.S. Military Site, Hopedale, NL

Prepared for:
Newfoundland Department of Environment and Conservation
4th Floor Confederation Building, West Block
St. John's, NL A1B 4J6

Prepared by:
Aivek Stantec Limited Partnership
141 Kelsey Drive
St. John's, NL A1B 0L2
Tel: (709) 576-1458
Fax: (709) 576-2126

Final Report

File No. 121413099

June 17, 2015

Executive Summary

Aivek Stantec Limited Partnership (Stantec) was retained by the Newfoundland and Labrador Department of Environment and Conservation (NLDEC) to supervise environmental site remediation and conduct confirmatory sampling during Year 4 of the Implementation of the Remedial Action Plan (RAP) at the Former U.S. Military Site in Hopedale, Newfoundland and Labrador (NL). The remediation program was carried out in response to a Remedial Action Plan/Risk Management Plan (RAP/RMP) prepared for the Site in 2010 (refer to Stantec Report No. 121410103, dated May 17, 2010).

In 2014, the Government of Newfoundland and Labrador committed funds to support ongoing remediation efforts in Hopedale for three (3) years. The following scope of work was proposed for Year 4 of the Implementation of the RAP:

Year 4 (2014-2015)

- Removal of treated soil from the temporary biopile.
- Remediation of polychlorinated biphenyl (PCB)-impacted soil at the Main Base (estimated 1,500 tonnes).
- Remediation of total petroleum hydrocarbon (TPH)-impacted soil at the Main Base, BMEWS and POL Compound, with associated soil placement in the temporary biopile (estimated 1,700 tonnes).

Year 4 site remediation activities were carried out at the Former U.S. Military Site between September 7 and 28, 2014 and October 7 and November 2, 2014. Remedial activities were undertaken by Sanexen Environmental Services Inc. (Sanexen) of Brossard, Quebec (QC), who engaged Budgell's Equipment and Rentals (Budgell's) of Triton, NL and local hires. Stantec personnel maintained a record of activities while on-site and collected confirmatory soil samples.

The following is a summary of remedial activities carried out at the Site in Year 4.

- The existing biopile was sampled following NLDEC's standard Certificate of Authorization (COA) for soil treatment facilities. Concentrations of TPH in the composite soil samples were below 1,000 mg/kg.
- Approvals were obtained from the Happy Valley-Goose Bay Government Services Centre and the Inuit Community Government of Hopedale to dispose of treated soil in the Hopedale landfill. Soil was transported to the landfill on October 7, 2014 and was stockpiled in a designated area for use as landfill cover material. A 450 mm thick layer of soil was left in place at the bottom of the biopile containment cell to minimize the risk of damage to the bottom liner.

- A total of 1,697.82 tonnes of TPH-impacted soil was removed from impacted areas of the Site and placed in the biopile containment cell for treatment. Confirmatory soil sampling was carried out along the limits of the remedial excavations to ensure that soil remaining on-site contained concentrations of TPH below the applicable site-specific target level (SSTL) of 1,700 mg/kg. TPH-impacted soil was removed from the following areas:
  - BMEWS: 792.74 tonnes of TPH-impacted soil was removed from the area surrounding monitor well MW64, and test pits BMEWS-TP2, BMEWS-TP3, BMEWS-TP4, TP-102 and BMEWS-TP11 (referred to as "BMEWS-Area 1") and from an area where metal debris removal was carried out (referred to as "BMEWS-Area 2"). Additional TPH-impacted soil removal is required along the southeast sidewall of BMEWS-Area 1 and in the area surrounding BS20 and 14-BMEWS-BS301 (referred to as "BMEWS-Area 3"). The lower portion of BMEWS-Area 1 was backfilled with 176.0 tonnes of clean fill. Additional backfill will be placed at BMEWS-Area 1 once remediation in the southeast portion of the excavation is completed.
  - Main Base: 177.72 tonnes of TPH-impacted soil was removed from the area surrounding samples 13-MB-BS8 and 13-MB-BS9 (referred to as "Main Base-Area 7") and 13-MB-BS4 and 13-MB-BS6 (referred to as "Main Base-Area 8"). Additional TPH-impacted soil removal is required to the east, south and west of Main Base-Area 7 and in the area surrounding MW-6 and MB-TP5 (referred to as "Main Base-Area 9"). Remediation at Main Base-Area 7 is deemed complete. Once TPH remediation at Main Base is complete, the areas will be backfilled.
  - POL Compound: 727.36 tonnes of TPH-impacted soil was removed from the area surrounding samples MW-24, TP-140, TP-141, TP-142, POL-TP1, POL-TP4, POL-TP6 and BS42 (referred to as "POL-Area 1"). TPH remediation at POL-Area 1 is deemed complete. The area was backfilled with 525.1 tonnes of clean fill. No further work is considered necessary to address TPH-impacted soil at the POL Compound.
- Biopile maintenance activities, consisting of the addition of specified nutrients and mechanical aeration were carried out following the placement of TPH-impacted soil in the biopile containment cell. A cover was placed over the biopile and was secured in place using clean sand.
- Metal debris removed from the TPH remedial excavations at BMEWS was stockpiled on tarps at the Laydown Area at Pit No. 1. Boulders were placed at the entrance to Pit No.1 to block public access over the winter months. The metal debris will be transported to a metal recycling facility at a later date.
- A total of 1,513.62 tonnes of PCB-impacted soil was removed from Main Base and was transported to Saint-Ambroise, QC by sea for PCB destruction. Confirmatory soil sampling was carried out along the limits of the remedial excavation to ensure that soil remaining on-site contains concentrations of PCBs below the residential SSTL of 9 mg/kg. PCB-impacted soil was removed from the area surrounding samples 6514, 21484, 22435, 22443, 22444, 22474, 22475, 22478, 22479, 22482, 22483, 22484, 22488, 22492, 22493, 22494, 22496, 22538, BS110, MB-BS1, MB-BS3, MB-BS5, MB-BS10, 13-MB-BS13 (referred to as "Main Base-Area 1").

Additional soil removal is required along the northern limits of the remedial excavation, in the vicinity of samples 22420, 22424, 22469, 22470, 22471, 13-MB-BS12 and 22400. PCB soil removal is also required in the vicinity of samples 22705 (referred to as "Main Base-Area 4"), 6456 (referred to as "Main Base-Area 5") and 13-POLW-BS1 (referred to as "POL West-Area 1"). Sludge removal is required at the septic tank along the northern of the Main Base (referred to as "Main Base-Area 6"). Once PCB remediation at Main Base is complete, the areas will be backfilled, as necessary.

- Metal debris removed from the PCB remedial excavation at Main Base (1.66 tonnes) was stockpiled on tarps at the Laydown Area at Pit No. 1. This metal was kept separate from the metal debris unearth at the BMEWS site. Boulders were placed at the entrance to Pit No.1 to block public access over the winter months. PCBs were detected in two of five swab samples collected from the surfaces of five randomly selected pieces of metal. The results indicate that PCBs are present on the metal surface or in the residual soil on the debris. The metal debris will be transported to an appropriate treatment or recycling facility at a later date (dependent on the results of additional sampling to be carried out following additional surface cleaning).

Recommendations

Based on the results of the Year 4 of the Implementation of the RAP program, Stantec makes the following recommendations:

1. Complete the removal of TPH-impacted soil exceeding the SSTL of 1,700 mg/kg in areas specified for remediation at BMEWS (estimated 240 tonnes) and Main Base (estimated 530 tonnes). Once clean boundaries are obtained, return the Site to its original condition. This will include backfilling, levelling and/or the placement of topsoil, as necessary.

2. Complete the removal of PCB-impacted soil exceeding the SSTL of 9 mg/kg at Main Base (estimated 636 tonnes). Once clean boundaries are obtained, return the Site to its original condition. This will include backfilling, levelling and/or the placement of topsoil, as necessary.

3. Remove excess soil from the metal debris removed from Main Base and re-sample. The metal debris is currently stockpiled on liners at the Laydown Area. If metal debris contains PCBs, treat as PCB-impacted waste and transport to an appropriate facility for treatment and disposal; otherwise, transport off-site to a metal recycling facility.

4. Transport un-impacted metal debris from BMEWS off-site to a metal recycling facility. The metal debris is currently stockpiled on liners at the Laydown Area.

5. Monitor concentrations of TPH in the biopile. If concentrations of TPH In the biopile exceed the landfill acceptance limit during the next round of confirmatory soil sampling, submit five (5) representative soil samples from of the impacted material for laboratory analysis of TPH/BTEX (benzene, toluene, ethylbenzene and xylenes), inorganics, available metals, microbiology and grain size to determine soil characteristics and requirements for soil augmentation. Perform maintenance activities, as necessary.

6. Continue remediation efforts at the Former U.S. Military Site in accordance with the RAP/RMP and the recommendations provided by the Stakeholder Scientific Advisory Working Group.

The statements made in the Executive Summary are subject to the same limitations included in the Closure Section 6.0 and are to be read in conjunction with the remainder of this report.

Table of Contents

LIST OF APPENDICES

LIST OF DRAWINGS

LIST OF TABLES

1.0 INTRODUCTION

Aivek Stantec Limited Partnership (Stantec) was retained by the Newfoundland and Labrador Department of Environment and Conservation (NLDEC) to supervise environmental site remediation and conduct confirmatory sampling during Year 4 of the Implementation of the Remedial Action Plan (RAP) at the Former U.S. Military Site in Hopedale, Newfoundland and Labrador (NL) (see Drawing No. 121413099-200-EE-01 in Appendix A). The remediation program was carried out in response to a Remedial Action Plan/Risk Management Plan (RAP/RMP) prepared for the Site in 2010 (refer to Stantec Report No. 121410103, dated May 17, 2010).

The following report describes the work completed during Year 4 of the Implementation of the RAP field program and was prepared specifically and solely for the above project. It presents all of the factual findings and laboratory results of the work completed at the Site between September and November 2014.

1.1 Site Description and History

The Inuit Community of Hopedale is located on the Labrador coast, 148 air miles to the north of Goose Bay, Labrador and has no outside road access. Coastal boat service is available to the community from mid-summer to late fall.

Construction of a military base and radar site in Hopedale, NL commenced in 1952 and was completed in 1957. The Hopedale military base and radar site was a station on the United States Air Force (USAF) Pinetree Line and was also the most easterly site on the Mid-Canada Line of antennae stations which had extended across the country. The military base and radar site was one of a series of sites that functioned as a Ballistic Missile Early Warning System (BMEWS) where enemy aircraft penetrating the northeastern approaches to the continent were identified and information was communicated to the United States. It has been reported that during peak operations, the Site housed up to 300 personnel.

In Hopedale, the Former U.S. Military Site consists of three (3) main hilltop installations located north of the community, with various support sites located along the gravel road that extends from the wharf up to the hilltop sites. The three (3) hilltop installations of the Former U.S. Military Site are elevated between 100 m and 150 m above sea level, and include (from west to east): the BMEWS area, the Main Base and the Mid-Canada Line antennae area.

The military base and radar site in Hopedale were operated from 1957 until 1969 by the United States government. The base was closed down in 1969 and the radome and radar antennae were removed. Portions of the remaining site were operated by Canadian Marconi as a telecommunications site until 1972 and by ITT as a telecommunications site until 1975. The complex was finally closed in 1975. Most of the remaining aboveground structures were demolished and buried in several undocumented locations throughout the Site in the mid-1980s.

At that time, limited clean-up efforts were carried out and included the removal and disposal of polychlorinated biphenyl (PCB)-containing transformers. All that currently remains of the Former U.S. Military Site is the foundations and floor slabs of buildings and the foundations and bases of antennae. Two (2) antennae, with associated operations buildings and satellite dishes are currently being operated by Bell Aliant in the BMEWS area. Four (4) antennae, with associated operations buildings and a helicopter pad are currently being operated by Nav Canada in the Mid-Canada Line area.

The natural environment in Hopedale is typical of Labrador Coastal Barrens. Bedrock is granite and gneiss, and is largely exposed. Where present, soil cover on the hills is relatively thin (generally < 0.5 m), with accumulations of rock, gravel, sand and organic matter in low lying areas. Deeply incised U-shaped valleys occur in conjunction with steep-sided, rounded mountains and fjords that extend well inland. Large bogs can be found in the low-lying areas.

Drainage from the BMEWS area is in all directions (i.e., to the north, east, south and west), including to the south towards the community's main drinking water supply source, Reservoir Lake (approximately 300 m to the south). Drainage from the Main Base and Mid-Canada Line is in all directions, including to the south and southwest towards the Small Pond Bog, which empties into the stream that flows through the Residential Subdivision and empties into Hopedale Harbour.

During Year 4 of the Implementation of the RAP, remedial activities were carried out in three (3) areas of the Former U.S. Military Site: the BMEWS area, Main Base and the POL Compound. The former Helicopter Pad/Pit No. 1 was used as a staging area for the temporary storage of impacted materials. The locations of these areas in relation to the overall Site are shown on Drawing No. 121413099-200-EE-02 in Appendix A.

The BMEWS site has an area of approximately one (1) hectare and is located on top of a hill approximately 800 m northwest of a Residential Subdivision in the Community of Hopedale. The area formerly included four (4) troposcatter antennae (two large and two small) that served as a Ballistic Missile Early Warning System (BMEWS). The area also included operations buildings. Historical photographs indicate the presence of two large aboveground storage tanks in the BMEWS area. All that currently remains in the BMEWS area are the antennae bases (i.e., concrete foundations) and building foundations. Operational telecommunications structures and towers are located in the southwest portion of the BMEWS area. Terrain in the BMEWS area is moderately to steeply sloped and surface drainage (apparent groundwater flow direction) appears to be in all directions. Two drainage courses were identified that could potentially transport water from the BMEWS area to Reservoir Lake. Vegetation in the area is limited and consists of patches of grasses and some low bushes. Bedrock and boulder outcroppings are common in the BMEWS area.

The Main Base (also referred to as "the old base", "the upper site" and the "TACAN site" in previous environmental reports) has an area of approximately 45 hectares and is located on the

top of a hill approximately 600 m northeast of a Residential Subdivision in the Community of Hopedale. The Main Base served as the Tactical Air Navigation Site (TACAN) when the Site was operational and included the radar complex, maintenance building, generator building, accommodations buildings and several additional buildings required to service the complex. All that remains of the former site infrastructure are the concrete foundations. Terrain in the vicinity of the Main Base is moderately sloped and surface drainage (apparent groundwater flow direction) appears to be in all directions. There are distinct drainage courses in the Main Base area that drain to the northwest through the former sewage outfall area, to the southeast towards Pit No. 2 and to the southwest. The area consists of gravel, bedrock outcrops and low vegetation and alders.

The POL Compound is located south of the main access road, immediately south of Pit No. 1/Helipad. Previous environmental reports revealed that the area was likely used as a former storage area for petroleum, oil and lubricants (POL). It is believed that waste materials at the Site may have been disposed of by pushing materials into the gully to the south. Terrain at the POL Compound consists of a relatively flat area of exposed bedrock and soil, with a vegetated gully located further south. The area is relatively flat, allowing for water to pool in the area during rainfall events. Surface drainage (apparent groundwater flow direction) is expected to be south/southwest towards Old Dump Pond. Standing water and tar-like debris were previously observed in this area.

A Laydown Area was established at the Pit No. 1/Helipad site during Year 1 of the Implementation of the RAP to temporarily store PCB-impacted soil pending shipment out of Hopedale. The Pit No. 1/Helipad area is located off of the main access road. The area is a heavily worked area consisting of gravel and boulders with low vegetation along the perimeter. Terrain in the area is relatively flat, with pooled water along the northwest boundary of the area and a steep drop to the southeast. Surface drainage (apparent groundwater flow direction) is expected to be to the southeast towards Pit No. 3. This area has been identified as a possible former waste site/drum storage area (ESG, 2007).

In 2011, a temporary biopile was constructed adjacent to the community's landfill to receive 5,322 tonnes of total petroleum hydrocarbon (TPH)-impacted soil from the Old School Site in Hopedale, NL (project completed on behalf of the Newfoundland and Labrador Department of Education). *Ex-situ* soil treatment was carried out in the biopile using enhanced natural attenuation. The biopile consists of one (1) containment cell that measures approximately 61 m long by 22 m wide by 2 m deep. The cell was constructed with impermeable high density polyethylene (HDPE) liners that extend over perimeter berms with an approximate 1:1 slope. An entrance ramp with a 4:1 slope is present along the southeast portion of the cell. The ground surface surrounding the biopile slopes slightly towards the northeast and is covered with grass, shrubs and some trees. The biopile is bordered by the local landfill to the west, a cemetery to the east and undeveloped land to the northeast and south/southwest. A northeast flowing drainage ditch runs around the biopile, through the local landfill and empties into the waters of Black Head Tickle.

1.2 Previous Environmental Investigations

Several environmental assessment reports have been produced (mainly since 1996) relating to potential and actual contamination at and in the vicinity of the Former U.S. Military Site and Residential Subdivision in Hopedale, Labrador. In 2009 and 2010, Stantec conducted a Phase II/III Environmental Site Assessment (ESA), Human Health and Ecological Risk Assessment (HHERA) and Remedial Action Plan/Risk Management Plan (RAP/RMP) at the Former U.S. Military Site and Residential Subdivision on behalf of the NLDEC (refer to Stantec, 2010). Stantec also supervised limited-remediation of PCB-impacted tar in three (3) areas of the former military and radar site at that time and the removal of total of three (3) tandem dump truck loads of debris from the stream in the Residential Subdivision (surficial debris) and from test pits excavated in the Residential Subdivision (excavated debris).

For the purposes of the 2010 human health risk assessment, the Site was divided into the following two (2) areas to adequately reflect the expected human exposure time and activities: the "Residential Area" where residents of Hopedale would be expected to spend the majority of their time and the "Former Radar Site" where residents of Hopedale would be expected to occasionally visit for recreational purposes (e.g., berry picking, hunting, walking). Ecological receptors with relatively small home ranges could spend their entire life in one particular portion of the Site; therefore, the Site was divided into three (3) areas for the purposes of risk modelling for ecological receptors with relatively small home ranges. The results of the HHERA indicated the potential for adverse risks to human and/or ecological receptors from exposure to TPH, PCBs and/or metals impacts at the Site; therefore, precautionary actions, remedial activities and risk management strategies were recommended for the control of hazards identified at the Site.

Stantec recommended that soil be remediated in certain areas of the Site in order to eliminate unacceptable risks to individual human receptors and to populations of ecological receptors. It was recommended that all soil containing concentrations of chemicals of concern (COCs) in exceedance of site-specific target levels (SSTLs) derived for the protection of human health be remediated (PCB and antimony-impacted soil in the Residential Area and PCB-impacted soil at the Former Radar Site). It was also recommended that selected areas containing concentrations of COCs in exceedance of SSTLs derived for the protection of ecological health (TPH, lead, antimony, chromium and cadmium) be remediated in order to produce site-wide exposure point concentrations (EPCs) less than the calculated SSTLs. NLDEC requested that Stantec apply the residential SSTL of 9 mg/kg to PCB-impacted soil over the entire site. This decision was made following consultation with the Inuit Community Government of Hopedale (ICGH) based on their potential future plans for residential expansion in certain areas of the Former Radar Site, as well as their concerns with maintaining traditional use of the land around the Former Radar Site. The remedial targets applied in the RAP and areas requiring remediation are summarized in Table 1.1. Additional information on how the SSTLs were calculated and how the remedial areas were selected is provided in the 2010 HHERA (Stantec, 2010).

Table 1.1 Summary of Remedial Targets

Chemical of Concern	Remedial Target (mg/kg)	Source	Areas Requiring Remediation
PCBs	9	HHRA	Old Dump Pond* Wharf Area/Pipeline* Residential Subdivision (stream)* BMEWS* Main Base Old Base1 Pit No. 1
TPH	1,700	ERA	BMEWS Main Base Pit No. 3 POL Compound
Metals (Residential Area)	Antimony: 30	HHRA	Old Dump Pond
Metals (Former Radar Site)	Antimony: 5 Chromium: 20 Cadmium: 1.3 Lead: 75	ERA	BMEWS Main Base Mid-Canada Line POL Compound
Notes: * Area remediated during Years 1 to 3 of the Implementation of the RAP.			

In the summer of 2010, Stantec conducted additional soil and sediment delineation, soil vapour monitoring, and a preliminary marine sampling program at the Site to address data gaps and/or actions recommended in the 2010 Phase II/III ESA and HHERA report, and recommendations provided through consultation with the Nunatsiavut Government (NG) (refer to Stantec, 2011). Volume estimates were refined for areas requiring soil remediation. Elevated concentrations of PCBs were detected in sediment and fish samples collected from Hopedale Harbour and from select sediment samples collected from freshwater ponds and streams near the Former U.S. Military Base; therefore, a comprehensive marine study was recommended.

A Stakeholder Scientific Advisory Working Group (referred to as the "Stakeholder Committee") consisting of representatives from the Inuit Community Government of Hopedale (ICGH), NG, Labrador Grenfell Health, the Labrador and Aboriginal Affairs Office, NLDEC and technical advisors was established in 2011 to advise on go-forward work plans at the Site. Based on the remedial options evaluation, the preferred options for soil remediation were as follows:

- PCB-Impacted Soil: Stockpile soil and transport to a licensed soil treatment facility.
- TPH-Impacted Soil: Pre-treat soil in temporary on-site biopile and place soil in the local landfill once treated.

- Metals-Impacted Soil: Prior to selecting a remedial option, perform bioaccessibility testing on metals impacted soil requiring remediation and re-evaluate the SSTLs for metals within the HHERA.

Priorities were assigned to different areas requiring remediation, with the highest priority assigned to PCB-impacted soil in the Residential Area and PCB-impacted soil located up-gradient of the community water supply source (the BMEWS site), followed by PCB-impacted areas in the remaining areas, then TPH-impacted areas, then metals-impacted areas. Consideration was given to the anticipated soil treatment times for TPH when preparing a go forward work plan.

In 2011, the Government of Newfoundland and Labrador committed funds to support remediation efforts in Hopedale for three (3) years. During each year, site remediation and investigative work was conducted in accordance with NLDEC budget allowances. Between 2011 and 2013, remediation was carried out in the Residential Subdivision, Old Dump Pond, Pipeline/Wharf and BMEWS areas. A total of 2,265.15 tonnes of PCB-impacted soil was transported off-site for treatment and disposal at an approved soil treatment facility in Saint-Ambroise, Québec (QC). With the exception of a strip of un-remediated soil located adjacent to the Old Dump Pond, no further PCB remediation was deemed necessary in these areas in accordance with SSTLs calculated for the Site as part of the HHERA (Stantec, 2010). Remedial activities were described in written reports prepared following each year of Implementation of the RAP (refer to Stantec, 2012, Stantec, 2014a and Stantec, 2014b). During the 2011 to 2013 period, a comprehensive Marine Study was also carried out in Hopedale Harbour and in freshwater lakes surrounding Hopedale. The results of the Marine Study were summarized in a Summary Report on Loadings, Sediment Inventory, and Present and Future Outlook for PCB Impacts in Hopedale Harbour report (refer to Stantec, 2014c) and were included in a Human Health Risk Assessment for the Consumption of Country Foods in the Town of Hopedale (Stantec, 2014d). Additional soil delineation was carried out in several areas of the Site in 2014 to refine volume estimates in support of future remediation programs (Stantec, 2014e).

In 2014, the Government of Newfoundland and Labrador committed funds for an additional three (3) years to support ongoing remediation efforts in Hopedale. The following scope of work was proposed for Years 4 to 6 of the Implementation of the RAP:

<u>Year 4 (2014-2015)</u>

- Removal of treated soil from the temporary biopile.
- Remediation of PCB-impacted soil at the Main Base (estimated 1,500 tonnes).
- Remediation of TPH-impacted soil at the Main Base, BMEWS and POL Compound, with associated soil placement in the temporary biopile (estimated 1,700 tonnes).

Year 5 (2015-2016)

- Remediation of impacted soil in areas that were not finished in Year 4, if necessary.
- Remediation of PCB-impacted soil at Old Base 1 and Pit No. 1 (estimated 670 tonnes).
- Remediation of metals-impacted soil at Old Dump Pond, BMEWS, Main Base, Mid-Canada Line and POL Compound (estimated 200 tonnes).
- Biopile maintenance, including soil tilling and nutrient placement.

Year 6 (2016-2017)

- Remediation of impacted soil in areas that were not finished in Year 5, if necessary.
- Removal of treated soil from the temporary biopile.
- Remediation of TPH-impacted soil at Pit No. 3 (estimated 7,110 tonnes).

Site remediation and investigative work was to be conducted in accordance with annual NLDEC budget allowances. The work scope was meant to be revised each year and was meant to be flexible based on the actual volumes of soil removed from each site and the time required for treatment of TPH-impacted soil in the biopile. The proposed work scope was designed based on the assumption that it would take 2 years for concentrations of TPH in soil to be reduced below the landfill acceptance criteria of 1,000 mg/kg. The Stakeholder Committee agreed with the above recommendations for the Years 4 to 6 of the Implementation of the RAP.

1.3 Scope of Work

The scope of work for Year 4 of the Implementation of the Remedial Action Plan, as described in Stantec's proposal submitted to NLDEC on March 20, 2014 and the Work Plan provided to NLDEC on September 5, 2014, was as follows:

1. Tender Preparation

    1.1 Prepare tender documents for remediation of TPH, PCB and/or metals impacted soil over a three (3) year period as defined by NLDEC, using Municipal Affairs template and master specifications and review bid submissions.

2. Remediation of TPH-Impacted Soil

    2.1 Obtain all applicable approvals and/or permits to transport soil currently contained in the temporary biopile to the local landfill for disposal and use as cover material;

    2.2 Obtain necessary permits from the NLDEC Pollution Prevention Division to continue using the temporary biopile to treat additional TPH-impacted soil in Hopedale, Labrador;

2.3 Supervise the removal of soil currently stored in the temporary biopile and transportation to the local landfill (pending approval). Inspect cell liners and supervise any necessary repair work;

2.4 Supervise the removal of TPH-impacted soil from the BMEWS, Main Base and the POL Compound and soil placement in the existing temporary biopile, in accordance with budget allowances;

2.5 Collect a minimum of 40 confirmatory soil samples from the final limits of the excavations and submit for laboratory analysis of TPH/BTEX (rush turnaround time);

2.6 Once confirming results have been received, monitor the backfilling of the excavations with clean fill material (to be sourced from the Community of Hopedale) or site grading, as necessary;

2.7 Collect five (5) representative soil samples from the impacted material and submit for laboratory analysis of TPH/BTEX, inorganics, available metals, microbiology and grain size to document baseline petroleum hydrocarbon concentrations and soil characteristics, and to determine requirements for soil augmentation; and,

2.8 Supervise the addition of fertilizer/nutrients to the biopile and biopile cover installation.

3. Remediation of PCB-Impacted Soil

3.1 Supervise the remediation of PCB-impacted soil at the Main Base, in accordance with budget allowances;

3.2 Collect a minimum of 30 confirmatory soil samples from the final limits of the excavation(s) and submit for analysis of Total PCBs (rush turnaround time); and,

3.3 Once confirming results have been received, monitor the backfilling of the excavations with clean fill material (to be sourced from the Community of Hopedale) or site grading, as necessary.

Item 2.7 above was not completed in Year 4 of the Implementation of the RAP. It is recommended this task be completed at the beginning of Year 5 of the Implementation of the RAP in conjunction with confirmatory soil sampling of the biopile. Backfilling was only completed in areas that were fully remediated in Year 4 in order to reduce the potential for contamination of clean material. Topsoil was not placed in Year 4 due wet conditions at the time remediation was completed and the increased potential for soil erosion. These items will be completed before the end of the 3-year contract.

Following the tendering process, Sanexen Environmental Services Inc. (Sanexen) was retained by NLDEC for remedial work at the Former U.S. Military Site and Residential Subdivision during Years 4

to 6 of the Implementation of the RAP. Sanexen was responsible for site preparation, the excavation of impacted soil and debris from specified areas, and the proper disposal of impacted materials (including shipment).

1.4 Regulatory Framework

NLDEC Policy Directive PPD05-01 allows a site owner to use either of two approaches when remediating chemical impacts on a site. These approaches are outlined in the *Guidance Document for the Management of Impacted Sites, Version 2.0* (January 2014). The purpose of this guidance document is to provide a clear process for the management of impacted sites in Newfoundland and Labrador that result in the satisfactory resolution of environmental contamination, which may present an unacceptable risk to human health and ecological receptors. The guidance document incorporates recent scientific and regulatory advances in this area that have resulted from work at the international, national and regional levels.

Remediation of chemical impacts in various site media (e.g., soil, sediment, groundwater, surface water) can be completed using a criteria-based approach or a risk-based approach. Under the criteria-based remedial approach, the defined site impacts are remediated to levels below existing regulatory guidelines for the appropriate media. Under the risk-based remedial approach, the defined site impacts are remediated to levels below site-specific target levels (SSTLs) that are developed for the site during a site-specific human health risk assessment (HHRA) and ecological risk assessment (ERA) (if necessary).

For simple sites and sites with limited impacts, a criteria-based approach to remediation is often applied to guide the extent of removal of impacted media from the site. For more complex sites and sites with extensive impacts from multiple chemicals of concern (COCs), a human health and/or ecological risk assessment is often completed, based on the actual site conditions and the actual human and ecological usage of the site, to derive SSTLs to determine remedial options or a risk management strategy for the site. Experience at other former Pinetree military sites in Newfoundland and Labrador indicates that a risk-based remedial approach is the most appropriate for a complex site such as the one in Hopedale.

As part of the HHERA (Stantec, 2010), SSTLs were calculated for certain metals, petroleum hydrocarbons and PCBs. Where necessary, SSTLs were derived in accordance with the methods presented in *A Protocol for the Derivation of Environmental and Human Health Soil Quality Guidelines* (Canadian Council of Ministers of the Environment (CCME), 2006). The specific methods employed to develop the SSTLs are consistent with CCME and Health Canada protocols as referenced above, and with standard human health risk assessment methodologies. The derivation of SSTLs for petroleum hydrocarbons (TPH, BTEX) was made with the aid of Groundwater Services, Inc. (GSI) RBCA Toolkit for Atlantic Canada, Version 2.1. The spreadsheet model is based on the exposure and mass transport equations presented in the appendix of the ASTM PS-104 Standard Provisional Guide for Risk-Based Corrective Action

(ASTM, 2000). Table 1.1 in Section 1.2 summarizes the SSTLs applied as remedial targets at the Site.

2.0 DESCRIPTION OF SITE WORK

Year 4 site remediation activities at the Former U.S. Military Site consisted of site preparation, biopile maintenance activities, the excavation and removal of TPH and PCB-impacted soil, confirmatory soil sampling, shipment of PCB-impacted soil to an approved soil treatment facility and site reinstatement. Stantec personnel were onsite during site remediation between September 7 and 28, 2014 and October 7 and November 2, 2014.

Remedial activities were undertaken by Sanexen Environmental Services Inc. (Sanexen) of Brossard, Quebec (QC) under separate contract to NLDEC. Sanexen engaged Budgell's Equipment and Rentals (Budgell's) of Triton, NL, who provided heavy equipment, including excavators, loaders and dump trucks, equipment operators and labourers. Sanexen supplied a scale system to weigh remediated soil, metal and backfill. The scale was installed on a front end loader and was calibrated on-site. Stantec personnel maintained a record of activities while on-site and collected confirmatory soil samples.

2.1 Biopile Confirmatory Soil Sampling

On September 8, 2014, confirmatory soil sampling was carried out at the biopile to confirm that concentrations of TPH in soil were below the target concentration of 1,000 mg/kg. The HDPE cover was removed and test pits were excavated with the aid of a track-mounted excavator supplied and operated by Budgell's. Stantec personnel recorded details of subsurface conditions encountered during excavation and collected confirmatory soil samples.

Soil sampling was carried following composite soil sampling protocols outlined in NLDEC's standard Certificate of Authorization (COA) for soil treatment facilities. Soil samples were collected from fifteen (15) test pits by bulk sample methods over continuous 0.5 m intervals, to a maximum depth of 1.5 m. The test pits were not extended to the bottom of the biopile (approximately 2.0 m deep) in order to prevent damage to the bottom liner. To obtain average petroleum hydrocarbon concentrations within each horizon of the biopile, soil samples from the same depths were combined to form composite samples following the confirmatory sampling protocol provided in NLDEC's standard COA for soil treatment facilities. Two (2) composite samples from the 0.0 to 0.5 m horizon (14-BP-COMPA1 and 14-BP-COMPA2), two (2) composite samples from the 0.5 to 1.0 m horizon (14-BP-COMPB1 and 14-BP-COMPB2) and two (2) composite samples from the 1.0 to 1.5 m horizon (14-BP-COMPC1 and 14-BP-COMPC2) were submitted to Maxxam Analytics in St. John's, NL for analysis of petroleum hydrocarbons. The test pit locations are shown on Drawing No. 121413099-200-EE-06 in Appendix A.

The results of biopile sampling indicated that concentrations of TPH in soil were below 1,000 mg/kg (further details provided in Section 3.1); therefore Stantec applied for approvals to

dispose of this soil in the Hopedale Landfill. Approvals were granted by the Happy Valley-Goose Bay Government Services Centre on August 26, 2014 and by the ICGH on September 27, 2014.

2.2 Biopile Dismantling

On October 7, 2014, treated soil was removed from the temporary biopile, transported to the local landfill and stockpiled for use as cover material. Soil removal and transportation was carried out using a track mounted excavator and tandem dump trucks. A 450 mm thick layer of soil was left in place at the bottom of the biopile containment cell to minimize the risk of damage to the bottom liner. Photos taken of the biopile are provided in Appendix B.

2.3 Site Preparation

Eleven (11) areas were assigned for remediation in Year 4. Table 2.1 presents the names that was used to identify the remedial areas during Year 4 of the Implementation of the RAP.

Table 2.1 Assigned Names for Remedial Areas

Assigned Name	Remedial Objective	Impacted Sample Locations
BMEWS-Area 1	TPH	MW-64, BMEWS-TP2, BMEWS-TP3, BMWES-TP4, TP-102, BMEWS-TP11
BMEWS-Area 3	TPH	BS20
Main Base-Area 1	PCBs, TPH	6514, 21484, 22420, 22424, 22435, 22443, 22444, 22469, 22470, 22471, 22474, 22475, 22478, 22479, 22482, 22483, 22484, 22488, 22492, 22493, 22494, 22496, 22538, 22705, BS110, MB-BS1, MB-BS3, MB-BS5, MB-BS10, 13-MB-BS12, 13-MB-BS13, 13-MB-BS1, 22474, 22475, 22400
Main Base-Area 4	PCBs	22705
Main Base-Area 5	PCBs	6546
Main Base-Area 6	PCBs	Septic Tank
Main Base-Area 7	TPH	13-MB-BS8, 13-MB-BS9
Main Base-Area 8	TPH	13-MB-BS4, 13-MB-BS6
Main Base-Area 9	TPH	MW-6, MB-TP5
POLW-Area 1	PCBs	13-POLW-BS10
POL-Area 1	TPH	TP-140, TP-141, TP-142, MW-24, POL-TP1, POL-TP4, POL-TP6, BS42

The following site preparations were undertaken prior to the commencement of the Year 4 remedial activities:

- The Main Base access road, BMEWS access road and Old Dump Pond Road access road were upgraded using clean backfill material obtained from a local rock pit in order to permit safe excavator and truck traffic between the access roads and the remediation areas.
- Site clearing and grubbing was conducted in the areas requiring soil removal for PCBs and TPH at BMEWS, Main Base and the POL Compound. All grubbings were cut above ground, with roots left in place. Grubbings were transported to the local landfill for disposal.
- The areas requiring remediation were marked out in the field using survey stakes and spray paint based on the results of previous investigations.
- Confirmatory soil sampling was conducted along the limits of the marked out remedial areas in areas that were accessible and shallow. Samples were collected at BMEWS-Area 1 (14-BMEWS-BS101 to 14-BMEWS-BS107), BMEWS-Area 3 (14-BMEWS-BS301 to 14-BMEWS-BS303), Main Base-Area 4 (14-MB-BS401 to 14-MB-BS403), Main Base-Area 5 (14-MB-BS501, 14-MB-BS502), Main Base-Area 7 (14-MB-BS701 to 14-MB-BS706), Main Base-Area 8 (14-MB-BS801 to 14-MB-BS803), Main Base-Area 9 (14-MB-BS901 to 14-MB-BS904), POLW-Area 1 (14-POLW-BS101 to 14-POLW-BS103) and POL-Area 1 (14-POL-BS101 to 14-POL-BS110). The samples were collected manually by bulk sample methods. The samples were visually examined in the field for any evidence of impacts and were placed in clean glass jars with Teflon liners. Samples were placed on ice in sample coolers which were shipped to Maxxam Analytics Inc. in St. John's, NL and Bedford, NS for analysis of TPH or PCBs, based on the contaminant of concern. Unsubmitted duplicate samples were shipped to Stantec's office in St. John's, NL to be archived. Sample locations are shown on Drawing Nos. 121413099-200-EE-03 to 121413099-EE-05 in Appendix A.

The following site preparations were undertaken at Pit No. 1 prior to the commencement of the Year 4 remedial activities:

- Boulders at the entrance to the pit were moved to allow access.
- Crushed stone was used to level the Staging Area that would be used to fill soil bags and the Laydown Areas designated for temporary storage of filled soil bags, pending transportation out of Hopedale. Berms were formed along the southeast (downgradient) limits of the worked areas. The staging and laydown areas were covered with 40 mil HDPE liners.

2.4 Excavation of TPH-Impacted Soil and Confirmatory Sampling

The remediation of TPH-impacted soil was carried out at BMEWS, Main Base and the POL Compound. Remediation progressed in each area until clean boundaries (i.e., less than the remedial target) were encountered or until the annual tonnage allowance was reached. Soil was removed with a Deere 270D track-mounted excavator and was loaded into rock trucks or tandem dump trucks for transportation to the temporary biopile. In areas that were difficult to access with heavy machinery and in areas of shallow overburden over bedrock, soil was

manually excavated into enviro-bags using shovels and transported to the temporary biopile. Photos taken during Year 4 of the Implementation of the RAP are provided in Appendix B.

Confirmatory soil sampling was conducted as remediation progressed to confirm that concentrations of TPH in soil remaining at the Site were below the applicable SSTL. Confirmatory soil samples were collected from the sidewalls of the excavations. Soils were sampled by bulk sample methods. Sidewall samples were collected just above groundwater, where encountered. In locations were groundwater was not encountered due to the presence of shallow bedrock, sidewall samples were collected just above bedrock. Confirmatory soil sample locations were recorded while in the field in relation to site structures/features. Sample locations are shown on Drawing Nos. 121413099-200-EE-03 to 121413099-200-EE-05 in Appendix A. Where possible, duplicate soil samples were collected at each sample location. The soil samples were visually examined in the field for impacts. The samples were placed into clean glass jars and were placed on ice in sample coolers for transportation. Samples were shipped directly to Maxxam Analytics Inc. in St. John's, NL for rush analysis of TPH and BTEX parameters. Duplicate samples were shipped to Stantec's office in St. John's, NL for archive.

The excavation of TPH-impacted soil at BMEWS began in the northern portion of BMEWS-Area 1 and extended south. The results of the initial round of confirmatory soil sampling at BMEWS-Area 1 indicated that additional soil removal was required in the vicinity of sample 14-BMEWS-BS104; therefore the excavation was expanded in this area. The area was excavated to bedrock, which was encountered at depths ranging from 0.3 m to 0.6 m. The limits of the BMEWS-Area 1 remedial excavation are shown on Drawing No. 121413099-200-EE-03 in Appendix A.

Metal debris was observed protruding from the ground to the east of BMEWS-Area 1 and was removed to eliminate physical hazards during site work. Metal debris consisted mainly of steel girders, large pieces of steel and vehicle parts. Metal debris encountered in the excavation was shaken/brushed to remove excess soil, and the metal debris was transported to the Laydown Area where it was stockpiled on tarps for storage until it is transported out of Hopedale for recycling during a subsequent year of the Implementation of the RAP. A cable encountered in the excavation was sampled to confirm that it did not contain PCBs. A bulk sample was collected from the cable and was submitted for PCB analysis (Cable-1). PCBs were not detected in the sample (refer to Section 3.1 for further details). Soil removed from this area (referred to as BMEWS-Area 2) contained a minor petroleum hydrocarbon odour; therefore soil removed during metal debris removal was disposed of at the biopile. Sidewall samples were collected from the limits of the excavation to determine the concentrations of TPH in soil. Concentrations of TPH were below the applicable SSTL of 1,700 mg/kg. The excavation extended to bedrock. Groundwater was not encountered at this location. The limits of the BMEWS-Area 2 excavation are shown on Drawing No. 121413099-200-EE-03 in Appendix A.

The excavation of TPH-impacted soil at Main Base-Area 7 began in the vicinity of sample 14-MB-BS706 and extended to the southwest. The excavation was terminated on bedrock and ranged in depth from 0.15 m to 0.4 m. Groundwater was not encountered in the excavation. The limits

of the Main Base-Area 7 remedial excavation are shown on Drawing No. 121413099-200-EE-04 in Appendix A.

The excavation of TPH-impacted soil at Main Base-Area 8 began in the vicinity of sample 14-MB-BS801 and extended to the south/southeast. The results of the initial round of confirmatory soil sampling at Main Base-Area 8 indicated that additional soil removal was required in the vicinity of sample 14-MB-BS802; therefore the limits of the excavation were expanded in this area, which corresponded to a drainage route. The excavation was terminated on bedrock and ranged in depth from approximately 0.15 m to 0.25 m in the upper portion of the excavation, and approximately 0.6 m in the lower southeast portion of the excavation, where the drainage route was identified. Groundwater was not encountered in the remedial excavation. The limits of the Main Base-Area 8 remedial excavation are shown on Drawing No. 121413099-200-EE-04 in Appendix A.

The excavation of TPH-impacted soil at the POL Compound began in the vicinity of 14-POL-BS110 and extended to the southwest. An area of soil surrounding a utility pole at the Site was left in place to prevent undermining. The results of the initial and subsequent rounds of confirmatory soil sampling at POL-Area 1 indicated that additional soil removal was required in the vicinity of samples 14-POL-BS101, 14-POL-BS102, 14-POL-BS103, 14-POL-BS104, 14-POL-BS105, 14-POL-BS107, 14-POL-BS109 and 14-POL-BS111; therefore the limits of the excavation were expanded in these areas. The excavation was terminated on bedrock. The overburden thickness at the POL Compound ranged from 0 m (exposed bedrock) to 0.4 m. Groundwater was encountered in certain areas of the excavation. Two (2) grab samples were collected from water pooled in the excavation on October 20, 2014 to determine if treatment was required. The results of the groundwater sampling indicated that concentrations of dissolved TPH were below the applicable Tier I Risk Based Screening Levels (RBSLs) and Ecological Screening Levels (ESLs) (further details provided in Section 3.3). The limits of the POL-Area 1 remedial excavation are shown on Drawing No. 121413099-200-EE-05 in Appendix A.

On October 25, 2014, the weight of TPH-impacted soil removed reached the Year 4 allowance of 1,700 tonnes; therefore, soil removal was halted. At that time, 792.74 tonnes of TPH-impacted soil was removed from BMEWS, 727.36 tonnes of TPH-impacted soil was removed from the POL Compound and 177.72 tonnes of TPH-impacted soil was removed from Main Base, for a total of 1,697.82 tonnes of TPH-impacted soil removed from the Site in Year 4. Remediation at BMEWS-Area 2, Main Base-Area 8 and POL-Area 1 was deemed complete as samples collected from the final limits of these excavations contained concentrations of TPH below the remedial target of 1,700 mg/kg (refer to Section 3.1 for further details). Additional soil removal was deemed necessary in the southeast corner of BMEWS-Area 1 (soil not yet removed up to sample 14-BMEWS-BS107) and south of sample in the vicinity of samples 14-MB-BS701, 14-MB-BS702, 14-MB-BS703 and 14-MB-BS705 at Main Base-Area 7. BMEWS-Area 3 and Main Base-Area 9 were not remediated during Year 4 of the Implementation of the RAP.

2.5 Excavation of PCB-Impacted Soil and Confirmatory Sampling

The remediation of PCB-impacted soil was carried out at Main Base. Remediation progressed until clean boundaries (i.e., less than the remedial target) were encountered or until the annual tonnage allowance was reached. Soil was removed with a Deere 270D track-mounted excavator, a Deere 50C track-mounted mini-excavator and manually using shovels. Soil was loaded into rock trucks and was transported to the Staging Area at the Pit No. 1 where it was loaded into UN-approved Quatrex-27 bulk bags with internal membrane using a Deere 50C track-mounted mini-excavator. Once filled, the soil bags were tied shut and temporarily stacked on liners at the Laydown Area. Photos taken during Year 4 of the Implementation of the RAP are provided in Appendix B.

The excavation of PCB-impacted soil at Main Base began in the southern portion of Main Base-Area 1 and extended up-hill to the northwest and northeast. The results of the initial round of confirmatory soil sampling at Main Base-Area 1 indicated that soil along the PCB/TPH remedial excavation boundary at sample location 14-MB-BS706 contained PCBs below the residential SSTL of 9 mg/kg (refer to Section 3.2 for further details). The excavation extended to bedrock. The overburden thickness at Main Base-Area 1 ranged from 0 m (exposed bedrock) to approximately 1.0 m. Groundwater was not encountered in the remedial excavation.

A tar-like substance identified in the vicinity of former sample 22488 at Main Base-Area 1 was removed from bedrock using shovels and a jack-hammer. Sampling conducted by ESG in 2006 indicated that the substance contained elevated concentrations of PCBs (554,000 mg/kg in sample 22489). The substance was placed in soil bags with PCB-impacted soil.

When the Year 4 tonnage approached the Year 4 allowance of 1,500 tonnes on October 19, 2014, remedial excavation was halted. The Staging Area was remediated at that time by excavating and bagging bottom liners and the upper layer of soil (approx. 5 cm). A total of 1,149 bags were filled with PCB-impacted soil during Year 4 of the Implementation of the RAP.

Once the remediation of PCB-impacted soil was completed, confirmatory soil samples were collected along the northeast sidewall of the excavation (14-MB-BS101 and 14-MB-BS102) to verify the concentrations of PCBs in soil remaining on the site. No confirmatory soil sampling was conducted along the southeast, southwest or north-central sidewalls of the excavation due to the presence of exposed bedrock. The confirmatory soil samples were collected by bulk sample methods. The samples were visually examined in the field for any evidence of impacts and were placed in clean glass jars with Teflon liners. Samples were placed on ice in sample coolers which were shipped to Maxxam Analytics Inc. in Bedford, NS for analysis of PCBs. Unsubmitted duplicate samples were shipped to Stantec's office in St. John's, NL to be archived.

A small amount of buried metal debris was encountered in the Main Base-Area 1 remedial excavation. Metal debris consisted of pipes, girders and rebar and other small pieces of metal. Metal encountered in the excavation was manually segregated from the soil. Residual soil was shaken/scraped from the metal and placed in soil bags, then the metal was transported to the

Laydown Area where it was weighed and stockpiled on tarps for sampling and temporary storage. The total weight of metal recovered from the Main Base remedial excavation was 1.66 tonnes. This metal was kept separate from the metal unearthed at BMEWS. On October 27, 2014, Stantec randomly selected five (5) pieces of metal in the Main Base metal stockpile for PCB sampling. Each piece was swabbed over a 10 cm by 10 cm area (i.e., 100 cm^2) using a swab provided by Maxxam Analytics Inc. that was saturated with hexane (14-Swab1 to 14-Swab5). All swab samples were frozen and shipped on ice in sample coolers to Maxxam Analytics Inc. in Bedford, NS for analysis of PCB content.

Two (2) shipments of PCB-impacted soil were made during Year 4 of the Implementation of the RAP. Each shipment was done using a ship (the Long Island) owned and operated by Ray Berkshire Ltd. of Arnold's Cove, NL. The soil bags were transported from the Laydown Area to the American Dock (approximately 1 km) using a flatbed truck and rock truck and were loaded onto the ship using a boom. The first shipment was loaded between October 8 and 11, 2014 and had a reported weight of 804.3 tonnes. The second shipment was loaded between October 31 and November 1, 2014 and had a reported weight of 709.32 tonnes. Sanexen provided placards and shipment manifests in accordance with Transportation of Dangerous Goods (TDG) and International Maritime Dangerous Goods (IMDG) codes for each shipment.

The soil was transported by sea to the Grande-Anse Marine Terminal in Port Saguenay, Quebec (QC) where the soil bags were transferred to B-train tractor trailers and transported approximately 30 km to the Récupère Sol (a division of Benev Capital Inc. (BCI)) thermal treatment facility in Saint-Ambroise, QC. Soil was weighed upon arrival at the facility, for a reported combined total of 1,513.62 tonnes. Récupère Sol operates a thermal oxidation treatment unit that operates in accordance with the Quebec Ministry of Sustainable Development, Environment, Wildlife and Parks "<A" Treatment Criteria (i.e., <0.05 mg/kg). Certificates of Destruction for the PCB-impacted soil removed during Year 4 of the Implementation of the RAP are provided in Appendix E.

2.6 Biopile Maintenance

Biopile maintenance activities, consisting of the addition of specified nutrients and mechanical aeration, were completed on October 25, 2014 under the supervision of Stantec personnel. A total of three (3) trenches aligned in a north-south orientation were excavated in parallel succession along the length of the biopile to facilitate the application of nutrients. Each trench measured approximately 1.0 m wide by 1.5 m deep. Excavated soil was temporarily stockpiled in a windrow (i.e., a build-up of material stored along the edge of the newly excavated area) adjacent to the trench from which it was excavated. Caution was taken not to damage the underlying liner during the advancement of each trench. The following nutrients were added evenly to each trench and windrow of excavated soil:

- 50 x 25 kg bags, urea nitrogen fertilizer (46-0-0)
- 5 x 25 kg bags, triple super phosphate fertilizer (0-46-0)

- 4 x 25 kg bags, potassium sulphate fertilizer (0-0-50, plus 17% sulphur)
- 3 x 25 kg bags, ammonium phosphate fertilizer

The trenches were then backfilled with excavated material and the biopile was leveled. Approximately 2:1 slopes were formed along each face of the biopile, as per design specifications. A cover was placed over the containment cell on December 6, 2014 and was secured in place using clean sand. Photos taken of the biopile during Year 4 of the Implementation of the RAP are provided in Appendix B.

2.7 Backfilling and Reinstatement Activities

The POL-Area 1 and BMEWS-Area 2 remedial excavations were backfilled and levelled following soil removal using 525.1 tonnes and 24.24 tonnes of clean backfill, respectively. The lower portion of the BMEWS-Area 1 remedial excavation was backfilled following soil removal using 72.14 tonnes of clean backfill in order to minimize safety concerns. Backfill consisted of clean 100 mm minus sized material obtained from a local rock pit. The remainder of the remedial areas will be backfilled once remediation is completed during subsequent years of the Implementation of the RAP. Topsoil will also be replaced in selected areas of the Site during subsequent years of the Implementation of the RAP.

The following site closure activities were undertaken at the Site prior to departure:

- The northeast sidewall of the Main Base-Area 1 remedial excavation was sloped as a safety precaution and boulders and barricades were placed along the edge to prevent access.
- The remedial sites were tidied up by removing any debris or equipment.
- Boulders were placed at the entrance to Pit No.1 to block access.
- Public notice signs were installed at the entrance to Pit No. 1 and the Biopile.

3.0 RESULTS

3.1 TPH in Soil

Petroleum hydrocarbon (TPH/BTEX) analysis was conducted on 63 soil samples collected during Year 4 of the Implementation of the RAP. Results of the laboratory analysis of petroleum hydrocarbons in soil are presented in Tables C.1, C.2, C.3 and C.4 in Appendix C. The corresponding analytical reports from Maxxam Analytics Inc. are presented in Appendix D.

<u>Biopile</u>

Petroleum hydrocarbon (TPH/BTEX) analysis was conducted on six (6) composite confirmatory soil samples collected from the biopile in 2014. Results of the laboratory analysis of biopile soil samples for TPH are presented in Table C.1 in Appendix C.

TPH was detected in all six (6) composite confirmatory soil samples collected from the biopile. BTEX parameters were not detected in the soil samples. The concentrations of TPH ranged from 410 mg/kg in sample 14-BP-COMPA2 to 930 mg/kg in 14-BP-COMPC2, which were below the typical landfill acceptance criteria of 1,000 mg/kg. Based on these results, the soil met the acceptance criteria for disposal at the local landfill.

BMEWS

Petroleum hydrocarbon (TPH/BTEX) analysis was conducted on 18 confirmatory soil samples and three (3) field duplicate samples collected from the limits of the remedial excavations at BMEWS (14-BMEWS-BS101 to 14-BMEWS-BS109, 14-BMEWS-BS202 to 14-BMEWS-BS205, 14-BMEWS-BS301 to 14-BMEWS-BS305, 14-Field Dup 1, 14-Field Dup 4 and 14-Field Dup 5). Results of the laboratory analysis of BMEWS soil samples for petroleum hydrocarbons are presented in Table C.2 in Appendix C.

TPH was detected in all 21 of the confirmatory soil samples collected from BMEWS in Year 4. With the exception of xylenes that were detected below the applicable Tier I ESL and Tier I RBSL in 14-BMEWS-BS104 (soil removed), BTEX parameters were not detected in any of the BMEWS samples.

Seven (7) confirmatory soil samples were initially collected from the presumed limits of the BMEWS-Area 1 remedial excavation (14-BMEWS-BS101 to 14-BMEWS-BS107). The concentration of TPH in sample 14-BMEWS-BS104 (2,900 mg/kg) exceeded the SSTL of 1,700 mg/kg, therefore additional soil was removed in this area and two (2) additional confirmatory soil samples were collected (14-BMEWS-BS108 and 14-BMEWS-BS109). The concentrations of TPH in soil samples collected along the final limits of the BMEWS-Area 1 excavation ranged from 37 mg/kg in sample 14-BMEWS-BS108 to 1,100 mg/kg in sample 14-BMEWS-BS102. BMEWS-Area 1 was not fully remediated in Year 4 of the Implementation of the RAP; however, clean boundaries have been determined.

Four (4) confirmatory soil samples were collected from the limits of the BMEWS-Area 2 excavation following soil removal (14-BMEWS-BS202 to 14-BMEWS-BS205). The concentrations of TPH in these soil samples ranged from 150 mg/kg in sample 14-BMEWS-BS103 to 220 mg/kg in sample 14-BMEWS-BS204, which were below the applicable SSTL of 1,700 mg/kg. No further soil removal was carried out in this area.

Three (3) confirmatory soil samples were initially collected from the presumed limits of the BMEWS-Area 3 remedial excavation (14-BMEWS-301 to 14-BMEWS-BS303). The concentration of TPH in sample 14-BMEWS-BS301 (1,700 mg/kg) was equal to the SSTL of 1,700 mg/kg, therefore the marked out limits of this remedial area were expanded in the vicinity of sample 14-BMEWS-BS301. Two (2) confirmatory soil samples were collected along the new proposed limits of BMEWS-Area 3 (14-BMEWS-BS304 and 14-BMEWS-BS305). The concentrations of TPH in soil samples collected along the final proposed limits of BMEWS-Area 3 ranged from 130 mg/kg in sample 14-BMEWS-BS305 to 200 mg/kg in samples 14-BMEWS-BS302 and 14-BMEWS-303. Note

that BMEWS-Area 3 was not remediated in Year 4 of the Implementation of the RAP; however, clean boundaries have been determined.

Main Base

Petroleum hydrocarbon (TPH/BTEX) analysis was conducted on 15 confirmatory soil samples and one (1) field duplicate sample collected from the limits of the remedial excavations at Main Base (14-MB-BS701 to 14-MB-BS705, 14-MB-BS801 to 14-MB806, 14-MB-BS901 to 14-MB-BS904 and 14-Field Dup 2). Petroleum hydrocarbon analysis was also conducted on the laboratory duplicate of one (1) soil sample collected from Main Base (14-MB-BS902 Lab-Dup). Results of the laboratory analysis of Main Base soil samples for petroleum hydrocarbons are presented in Table C.3 in Appendix C.

TPH was detected in all 15 of the confirmatory soil samples collected from Main Base in Year 4. With the exception of toluene that was detected below the applicable Tier I ESL and Tier I RBSL in 14-MB-BS804, 14-MB-BS805 and 14-MB-BS806, BTEX parameters were not detected in any of the Main Base samples.

Six (6) confirmatory soil samples were initially collected from the presumed limits of the Main Base-Area 7 remedial excavation (14-MB-BS701 to 14-MB-BS705). The concentrations of TPH in samples 14-MB-BS701 (14,000 mg/kg), 14-MB-BS702 (42,000 mg/kg), 14-MB-BS703 (6,600 mg/kg) and 14-MB-BS705 (6,800 mg/kg) exceeded the SSTL of 1,700 mg/kg, therefore additional soil removal was recommended in these areas. This work was not carried out during Year 4 of the Implementation of the RAP. The extent of TPH impacts in soil in this area has not been fully delineated.

Three (3) confirmatory soil samples were initially collected from the presumed limits of the Main Base-Area 8 remedial excavation (14-MB-BS801 to 14-MB-BS803). The concentration of TPH in sample 14-MB-BS802 (7,100 mg/kg) exceeded the SSTL of 1,700 mg/kg, therefore additional soil removal was carried out in this area and three (3) additional confirmatory soil samples were collected (14-MB-BS804, 14-MB-BS805 and 14-MB-BS806). The concentrations of TPH in soil samples collected along the final limits of the Main Base-Area 8 excavation ranged from 25 mg/kg in sample 14-MB-BS804 to 730 mg/kg in sample 14-MB-BS801, which were below the applicable SSTL of 1,700 mg/kg. No further soil removal was carried out in this area.

Four (4) confirmatory soil samples were initially collected from the presumed limits of the Main Base-Area 9 remedial excavation (14-MB-BS901 to 14-MB-BS904). The concentrations of TPH in samples 14-MB-BS902 (21,000 mg/kg) and 14-MB-BS903 (9,200 mg/kg) exceeded the SSTL of 1,700 mg/kg, therefore the proposed limits of this remedial area should be expanded in the vicinity of these samples. Main Base-Area 9 was not remediated in Year 4 of the Implementation of the RAP; however, clean boundaries along the north and west have been determined. Former test pits MB-TP6, MB-TP8 and MB-TP9, located further east, south and west contained concentrations of TPH below the SSTL of 1,700 mg/kg (refer to Drawing No. 121413099-200-EE-04 in Appendix A).

POL Compound

Petroleum hydrocarbon (TPH/BTEX) analysis was conducted on 20 confirmatory soil samples collected from the limits of the remedial excavation at the POL Compound (14-POL-BS101 to 14-POL-BS120). Petroleum hydrocarbon analysis was also conducted on the laboratory duplicates of three (3) soil samples collected from the POL Compound (14-POL-BS103 Lab-Dup, 14-POL-BS117 Lab-Dup and 14-POL-BS120 Lab-Dup). Results of the laboratory analysis of Main Base soil samples for petroleum hydrocarbons are presented in Table C.4 in Appendix C.

TPH was detected in all 20 of the confirmatory soil samples collected from the POL Compound in Year 4. With the exception of toluene that was detected below the applicable Tier I ESL and Tier I RBSL in samples 14-POL-BS111, 14-POL-BS112, 14-POL-BS113, 14-POL-BS114 and 14-POL-BS116, BTEX parameters were not detected in any of the POL Compound samples.

Ten (10) confirmatory soil samples were initially collected from the presumed limits of the POL-Area 1 remedial excavation (14-POL-BS101 to 14-POL-BS110). The concentrations of TPH in samples 14-POL-BS101 (33,000 mg/kg), 14-POL-BS102 (14,000 mg/kg), 14-POL-BS103 (6,900 mg/kg), 14-POL-BS104 (21,000 mg/kg), 14-POL-BS105 (18,000 mg/kg), 14-POL-BS107 (2,000 mg/kg) and 14-POL-BS109 (2,800 mg/kg) exceeded to the SSTL of 1,700 mg/kg. Additional soil was removed in the vicinity of samples 14-POL-BS102 to 14-POL-BS106 and 14-POL-BS109 and five (5) additional confirmatory soil samples were collected (14-POL-BS111 to 14-POL-BS115). The concentrations of TPH in sample 14-POL-BS111 (2,300 mg/kg) exceeded the SSTL of 1,700 mg/kg. Additional soil was removed in the vicinity of samples 14-POL-BS101 and 14-POL-BS111 and four (4) confirmatory soil samples were collected (14-POL-BS116 to 14-POL-BS120). The concentrations of TPH in soil along the final limits of the remedial excavation at POL-Area 1 ranged from 17 mg/kg in sample 14-POL-BS117 to 980 mg/kg in sample 14-POL-BS113, which are below the SSTL of 1,700 mg/kg. No further soil removal was carried out in this area.

3.2 PCBs in Soil

PCB analysis was conducted on 12 soil samples collected from Main Base during Year 4 of the Implementation of the RAP, including 11 confirmatory soil samples (14-MB-BS101, 14-MB-BS102, 14-MB-BS401 to 14-MB-BS403, 14-MB-BS501, 14-MB-BS502, 14-MB-BS706, and 14-POLW-BS101 to 14-POLW-BS103) and one (1) field duplicate sample (14-Field Dup3). PCB analysis was also conducted on the laboratory duplicates of two (2) soil samples collected from Main Base (14-MB-BS501 Lab-Dup and 14-MB-BS706 Lab-Dup). Results of the laboratory analysis of PCBs in soil are presented in Table C.5 in Appendix C. The corresponding analytical reports from Maxxam Analytics Inc. are presented in Appendix D.

Three (3) confirmatory soil samples were collected from the limits of the Main Base-Area 1 remedial excavation (14-MB-BS101, 14-MB-BS102 and 14-MB-BS706). The concentrations of PCBs in samples 14-MB-BS101 (0.23 mg/kg), 14-MB-BS102 (0.33 mg/kg) and 14-MB-BS706 (non-detect) were below the residential SSTL of 9 mg/kg. Additional soil removal is required to the north of

the Main Base-Area 1 excavation, in areas that were not remediated as part of Year 4 of the Implementation of the RAP.

Three (3) confirmatory soil samples were collected from the presumed limits of the Main Base-Area 4 remedial excavation (14-MB-BS401 to 14-MB-BS403). The concentrations of PCBs in samples 14-MB-BS401 (0.23 mg/kg), 14-MB-BS402 (0.52 mg/kg) and 14-MB-BS403 (0.17 mg/kg) were below the residential SSTL of 9 mg/kg. Main Base-Area 4 was not remediated in Year 4 of the Implementation of the RAP; however, clean boundaries have been determined.

Two (2) confirmatory soil samples were collected from the presumed limits of the Main Base-Area 5 remedial excavation (14-MB-BS501 to 14-MB-BS502). The concentrations of PCBs in samples 14-MB-BS501 (non-detect) and 14-MB-BS502 (3.9 mg/kg) were below the residential SSTL of 9 mg/kg. Main Base-Area 5 was not remediated in Year 4 of the Implementation of the RAP; however, clean boundaries have been determined.

Three (3) confirmatory soil samples were collected from the presumed limits of the POL West-Area 1 remedial excavation at Main Base (14-POLW-BS101 to 14-POLW-BS103). The concentrations of PCBs in samples 14-POLW-BS101 (2.1 mg/kg), 14-POLW-BS102 (1.0 mg/kg) and 14-POLW-BS103 (0.67 mg/kg) were below the residential SSTL of 9 mg/kg. POL West-Area 1 was not remediated in Year 4 of the Implementation of the RAP; however, clean boundaries have been determined.

3.3 TPH in Groundwater

Petroleum hydrocarbon (TPH/BTEX) analysis was conducted on two (2) groundwater samples collected from The POL-Area 1 remedial excavation. Results of the laboratory analysis of groundwater samples for petroleum hydrocarbons are presented in Table C.6 in Appendix C. The corresponding analytical reports from Maxxam Analytics Inc. are presented in Appendix D.

TPH was detected in samples 14-POL-SW1 (0.35 mg/L) and 14-POL-SW2 (2.7 mg/L) at concentrations below the applicable Tier I ESLs and Tier I RBSLs for a residential site with coarse grained soil and fuel oil impacts (> solubility limit and 20 mg/L, respectively). The concentrations of petroleum hydrocarbon fractions F2 and F3 were also below the applicable Tier I ESLs. BTEX parameters were not detected in the samples.

3.4 PCBs on Debris

PCB analysis was conducted on one (1) bulk sample collected from a cable unearthed in BMEWS-Area 2 (14-Cable-1) and five (5) swab samples collected metal unearthed at Main Base-Area 1 (14-Swab1 to 14-Swab5). Results of the laboratory analysis of the bulk sample and swab samples for total PCB content are presented in Table C.7 in Appendix C. The corresponding analytical reports from Maxxam Analytics Inc. are presented in Appendix D. For reference, detected concentrations of PCBs were compared to the CCME Recommended Permissible

Surface Contamination Criterion recommended for transformer metal components destined for recycling by smelting (10 µg/100 cm^2) (CCME, 1995).

PCBs were detected in 14-Swab1 (17 µg/100 cm^2) and 14-Swab2 (14 µg/100 cm^2) at concentrations exceeding the CCME criterion for transformer metal components (10 µg/100 cm^2). PCBs were not detected in the bulk cable sample or the remaining swab samples. The results of PCB swab sampling indicate that further soil removal from the metal and re-sampling is required. The metal debris is currently stored on liners at the Laydown Area.

4.0 SUMMARY OF ADDITIONAL SOIL REQUIRING REMEDIATION

Based on the results of confirmatory soil sampling carried out as part of the current remediation program, the estimated areas and volumes of PCB and TPH-impacted soil remaining at BMEWS and Main Base that require removal were evaluated and are summarized in Table 4.1.

Table 4.1 Summary of TPH and PCB-Impacted Soil Requiring Remediation – BMEWS and Main Base

Remedial Area	Remedial Objectives	Sample Locations	Area (m2)	Depth (m)	Weight (tonnes)
BMEWS-Area 1	TPH	Between BMEWS-TP2 and 14-BMEWS-BS107	100	1.0	180
BMEWS-Area 3	TPH	BS20, 14-MB-BS301	70	0.5	60
Main Base-Area 1 east	PCB	22469, 22470, 22471,	300	1.0	540
Main Base-Area 1 west	PCB	22400, 22420, 22424, 13-MB-BS12	800 @ 30% coverage	0.1	40
Main Base-Area 4	PCB	22705	25	0.7	30
Main Base-Area 5	PCB	6546	5	0.1	1
Main Base-Area 6	PCBs in septic tank sludge	Septic Tank	-	-	5
Main Base-Area 7	TPH	14-MB-BS701, 14-MB-BS702, 14-MB-BS703, 14-MB-BS705	400 (*not fully delineated)	0.4	290
Main Base-Area 9	TPH	MW6, MB-TP5	270	0.5	240
POL West-Area 1	PCB	13-POLW-BS10	100	0.1	20

Drawing Nos. 121413099-200-EE-03 and 12141309-200-EE-04 in Appendix A show the estimated areas of soil requiring TPH and PCB remediation at BMEWS and Main Base.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Stantec supervised environmental site remediation and conducted confirmatory soil sampling in the BMEWS, Main Base and POL Compound areas in Hopedale, NL during Year 4 of the Implementation of the RAP at the Former U.S. Military Site in Hopedale, NL. Site remediation was carried out in response to recommendations provided in a RAP/RMP prepared by Stantec in 2009, additional delineation program carried out by Stantec in 2010 and 2013, and a mutually agreeable work plan developed by the Stakeholder Committee.

The following is a summary of remedial activities carried out at the Site in Year 4.

- The existing biopile was sampled following NLDEC's standard Certificate of Authorization (COA) for soil treatment facilities. Concentrations of TPH in the composite soil samples were below 1,000 mg/kg.
- Approvals were obtained from the Happy Valley-Goose Bay Government Services Centre and the Inuit Community Government of Hopedale to dispose of treated soil in the Hopedale landfill. Soil was transported to the landfill on October 7, 2014 and was stockpiled in a designated area for use as landfill cover material. A 450 mm thick layer of soil was left in place at the bottom of the biopile containment cell to minimize the risk of damage to the bottom liner.
- A total of 1,697.82 tonnes of TPH-impacted soil was removed from impacted areas of the Site and placed in the biopile containment cell for treatment. Confirmatory soil sampling was carried out along the limits of the remedial excavations to ensure that soil remaining on-site contained concentrations of TPH below the applicable SSTL of 1,700 mg/kg. TPH-impacted soil was removed from the following areas:
    - o BMEWS: 792.74 tonnes of TPH-impacted soil was removed from the area surrounding monitor well MW64, and test pits BMEWS-TP2, BMEWS-TP3, BMEWS-TP4, TP-102 and BMEWS-TP11 (referred to as "BMEWS-Area 1") and from an area where metal debris removal was carried out (referred to as "BMEWS-Area 2"). Additional TPH-impacted soil removal is required along the southeast sidewall of BMEWS-Area 1 and in the area surrounding BS20 and 14-BMEWS-BS301 (referred to as "BMEWS-Area 3"). The lower portion of BMEWS-Area 1 was backfilled with 176.0 tonnes of clean fill. Additional backfill will be placed at BMEWS-Area 1 once remediation in the southeast portion of the excavation is completed.
    - o Main Base: 177.72 tonnes of TPH-impacted soil was removed from the area surrounding samples 13-MB-BS8 and 13-MB-BS9 (referred to as "Main Base-Area 7") and 13-MB-BS4 and 13-MB-BS6 (referred to as "Main Base-Area 8"). Additional TPH-impacted soil removal is required to the east, south and west of Main Base-Area 7 and in the area surrounding MW-6 and MB-TP5 (referred to as "Main Base-Area 9"). Remediation at Main

Base-Area 7 is deemed complete. Once TPH remediation at Main Base is complete, the areas will be backfilled.

- o POL Compound: 727.36 tonnes of TPH-impacted soil was removed from the area surrounding samples MW-24, TP-140, TP-141, TP-142, POL-TP1, POL-TP4, POL-TP6 and BS42 (referred to as "POL-Area 1"). TPH remediation at POL-Area 1 is deemed complete. The area was backfilled with 525.1 tonnes of clean fill. No further work is considered necessary to address TPH-impacted soil at the POL Compound.

- Biopile maintenance activities, consisting of the addition of specified nutrients and mechanical aeration were carried out following the placement of TPH-impacted soil in the biopile containment cell. A cover was placed over the biopile and was secured in place using clean sand.
- Metal debris removed from the TPH remedial excavations at BMEWS was stockpiled on tarps at the Laydown Area at Pit No. 1. Boulders were placed at the entrance to Pit No.1 to block public access over the winter months. The metal debris will be transported to a metal recycling facility at a later date.
- A total of 1,513.62 tonnes of PCB-impacted soil was removed from Main Base and was transported to Saint-Ambroise, QC by sea for PCB destruction. Confirmatory soil sampling was carried out along the limits of the remedial excavation to ensure that soil remaining on-site contains concentrations of PCBs below the residential SSTL of 9 mg/kg. PCB-impacted soil was removed from the area surrounding samples 6514, 21484, 22435, 22443, 22444, 22474, 22475, 22478, 22479, 22482, 22483, 22484, 22488, 22492, 22493, 22494, 22496, 22538, BS110, MB-BS1, MB-BS3, MB-BS5, MB-BS10, 13-MB-BS13 (referred to as "Main Base-Area 1"). Additional soil removal is required along the northern limits of the remedial excavation, in the vicinity of samples 22420, 22424, 22469, 22470, 22471, 13-MB-BS12 and 22400. PCB-soil removal is also required in the vicinity of samples 22705 (referred to as "Main Base-Area 4"), 6456 (referred to as "Main Base-Area 5") and 13-POLW-BS1 (referred to as "POL West-Area 1"). Sludge removal is required at the septic tank along the northern of the Main Base (referred to as "Main Base-Area 6").
- Metal debris removed from the PCB remedial excavation at Main Base (1.66 tonnes) was stockpiled on tarps at the Laydown Area at Pit No. 1. This metal was kept separate from the metal debris unearthed at the BMEWS site. Boulders were placed at the entrance to Pit No.1 to block public access over the winter months. PCBs were detected in two of five pieces of metal that were randomly selected for sampling. The results indicate that PCBs are present on the metal surface or in the residual soil on the debris. The metal debris will be transported to an appropriate treatment or recycling facility at a later date (dependent on the results of additional sampling to be carried out following additional surface cleaning).

5.2 Recommendations

Based on the results of the Year 4 of the Implementation of the RAP program, Stantec makes the following recommendations:

1. Complete the removal of TPH-impacted soil exceeding the SSTL of 1,700 mg/kg in areas specified for remediation at BMEWS (estimated 240 tonnes) and Main Base (estimated 530 tonnes). Once clean boundaries are obtained, return the site to its original condition. This will include backfilling, levelling and/or the placement of topsoil, as necessary.

2. Complete the removal of PCB-impacted soil exceeding the SSTL of 9 mg/kg at Main Base (estimated 636 tonnes). Once clean boundaries are obtained, return the Site to its original condition. This will include backfilling, levelling and/or the placement of topsoil, as necessary.

3. Remove excess soil from the metal debris removed from Main Base and re-sample. The metal debris is currently stockpiled on liners at the Laydown Area. If metal contains PCBs, treat as PCB-impacted waste and transport to an appropriate facility for treatment and disposal; otherwise, transport off-site to a metal recycling facility.

4. Transport un-impacted metal debris from BMEWS off-site to a metal recycling facility. The metal debris is currently stockpiled on liners at the Laydown Area.

5. Monitor concentrations of TPH in the biopile. If concentrations of TPH In the biopile exceed the landfill acceptance limit during the next round of confirmatory soil sampling, submit five (5) representative soil samples from of the impacted material for laboratory analysis of TPH/BTEX, inorganics, available metals, microbiology and grain size to determine soil characteristics and requirements for soil augmentation. Perform maintenance activities, as necessary.

6. Continue remediation efforts at the Former U.S. Military Site in accordance with the RAP/RMP and the recommendations provided by the Stakeholder Scientific Advisory Working Group.

6.0 CLOSURE

This report documents work that was performed in accordance with generally accepted professional standards at the time and location in which the services were provided. No other representations, warranties or guarantees are made concerning the accuracy or completeness of the data or conclusions contained within this report, including no assurance that this work has uncovered all potential liabilities associated with the identified property.

This report provides an evaluation of selected environmental conditions associated with the identified portion of the property that was assessed at the time the work was conducted and is based on information obtained by and/or provided to Stantec at that time. There are no assurances regarding the accuracy and completeness of this information. All information received from the client or third parties in the preparation of this report has been assumed by Stantec to be correct. Stantec assumes no responsibility for any deficiency or inaccuracy in information received from others.

CLOSURE
June 17, 2015

The opinions in this report can only be relied upon as they relate to the condition of the portion of the identified property that was assessed at the time the work was conducted. Activities at the property subsequent to Stantec's assessment may have significantly altered the property's condition. Stantec cannot comment on other areas of the property that were not assessed.

Conclusions made within this report consist of Stantec's professional opinion as of the time of the writing of this report, and are based solely on the scope of work described in the report, the limited data available and the results of the work. They are not a certification of the property's environmental condition. This report should not be construed as legal advice.

This report has been prepared for the exclusive use of the client identified herein and any use by any third party is prohibited. Stantec assumes no responsibility for losses, damages, liabilities or claims, howsoever arising, from third party use of this report.

The locations of any utilities, buildings and structures, and property boundaries illustrated in or described within this report, if any, including pole lines, conduits, water mains, sewers and other surface or sub-surface utilities and structures are not guaranteed. Before starting work, the exact location of all such utilities and structures should be confirmed and Stantec assumes no liability for damage to them.

The conclusions are based on the site conditions encountered by Stantec at the time the work was performed at the specific testing and/or sampling locations, and conditions may vary among sampling locations. Factors such as areas of potential concern identified in previous studies, site conditions (e.g., utilities) and cost may have constrained the sampling locations used in this assessment. In addition, analysis has been carried out for only a limited number of chemical parameters, and it should not be inferred that other chemical species are not present. Due to the nature of the investigation and the limited data available, Stantec does not warrant against undiscovered environmental liabilities nor that the sampling results are indicative of the condition of the entire site. As the purpose of this report is to identify site conditions which may pose an environmental risk; the identification of non-environmental risks to structures or people on the Site is beyond the scope of this assessment.

CLOSURE
June 17, 2015

Should additional information become available which differs significantly from our understanding of conditions presented in this report, Stantec specifically disclaims any responsibility to update the conclusions in this report.

This report was prepared by Anna Roy, M.A.Sc., P.Eng. and reviewed by Jim Slade, P.Eng., P.Geo.

Respectfully submitted,

AIVEK STANTEC LIMITED PARTNERSHIP

Anna Roy, M.A.Sc., P.Eng.
Environmental Engineer

Jim Slade, P.Eng., P.Geo.
Principal, Senior Environmental Engineer

7.0 REFERENCES

American Society for Testing and Materials (ASTM), 2000. E-2081-00 Standard Guide for Risk-Based Corrective Action. Volume 11.04.

Agra Earth & Environmental, 1998. Phase II Reconnaissance Testing Program, Former US Military Facility, Hopedale, Labrador. Report No. TF12701, dated November 22, 1998.

Canadian Council of Ministers of the Environment (CCME). 1995. PCB Transformer Decontamination Standards and Protocols. CCME EPC-HW-105E, December 1995.

CCME, 1999. Canadian Environmental Quality Guidelines (CEQG). Winnipeg, MB. Available at: http://ceqg-rcqe.ccme.ca/

CCME, 2006. A Protocol for the Derivation of Environmental and Human Health Soil Quality Guidelines. CCME: Winnipeg.

Environmental Sciences Group (ESG), 2007. Hopedale Former Military Site Soil delineation Report, Hopedale, Newfoundland & Labrador. RMC-CCE-ES-07-10. May 2007.

Newfoundland Department of Environment and Conservation (NLDEC), 2014. Contaminated Sites Cleanup Criteria, Policy Directive PPD05-01, Version 2.0. Updated January 29, 2014.

Stantec, 2010. Phase II/III Environmental Site Assessment, Human Health and Ecological Risk Assessments and Remedial Action / Risk Management Plan for the Former U.S. Military Site and Residential Subdivision at Hopedale, Labrador. Project No. 121410103, final report dated May 17, 2010.

Stantec, 2011. Additional Delineation and Risk Assessment Re-evaluation, Former U.S. Military Site and Residential Subdivision, Hopedale, Labrador. Project No. 121411170, final report dated February 28, 2011.

Stantec, 2012. Implementation of Remedial Action Plan – Year 1, Former U.S. Military Site and Residential Subdivision, Hopedale, Labrador. Project No. 121413099.200, final report dated April 30, 2012.

Stantec 2014a. Implementation of Remedial Action Plan – Year 2, Former U.S. Military Site and Residential Subdivision, Hopedale, Labrador. Project No. 121411777.300, final report dated February 4, 2014.

Stantec, 2014b. Implementation of the Remedial Action Plan – Year 3. Former U.S. Military Site and Residential Subdivision, Hopedale, Labrador. Project No. 121411777.600, final report dated April 15, 2014.

Stantec, 2014c. Summary Report on Loadings, Sediment Inventory, and Present and Future Outlook for PCB Impacts in Hopedale Harbour. Project No. 121411777.610, final report dated July 10, 2014.

Stantec, 2014d. Human Health Risk Assessment for the Consumption of Country Foods in the Town of Hopedale, NL, Project No. 121413099, final report dated October 31, 2014.

Stantec, 2014e. Additional Delineation and Updated Remedial Action Plan, Former U.S. Military Site, Hopedale, Labrador. Project No. 121411777.610, final report dated July 18, 2014.

APPENDIX A

Drawings

NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIED IN STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

CLIENT:
NEWFOUNDLAND AND LABRADOR
DEPARTMENT OF ENVIRONMENT AND CONSERVATION

PROJECT TITLE:
IMPLEMENTATION OF REMEDIAL ACTION PLAN - YEAR 4,
FORMER U.S. MILITARY SITE, HOPEDALE, NL

DRAWING TITLE:
SITE LOCATION PLAN

SCALE:	DATE:	REV. No.
1:50,000	FEB. 27, 2015	0
DRAWN BY:	EDITED BY:	CHECKED BY:
N.M.	-	AR
DRAWING No:	CAD FILE:	
121413099-200-EE-01	121413099_200-EE-01.DWG	

Stantec

FILE NAME: T:\DOCS\121413099\TASK 200_REMEDIAL ACTION PLAN - YEAR 4\121413099_200-EE-01.dwg

27FEB15 12:00PM

CLIENT:
NEWFOUNDLAND AND LABRADOR DEPARTMENT OF ENVIRONMENT AND CONSERVATION

PROJECT TITLE:
IMPLEMENTATION OF REMEDIAL ACTION PLAN - YEAR 4, FORMER U.S. MILITARY SITE, HOPEDALE, NL

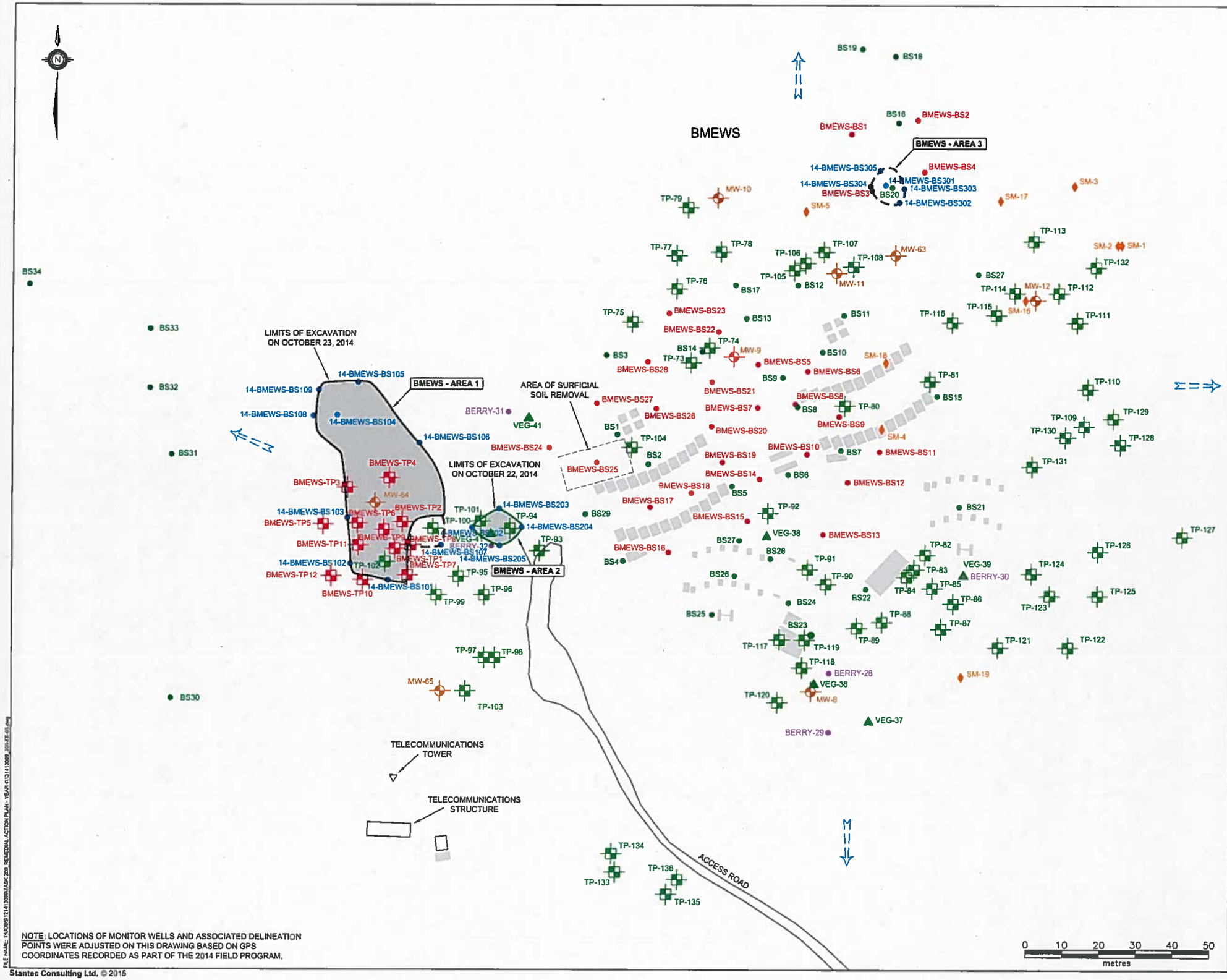
DRAWING TITLE:
SITE PLAN

SCALE:	DATE:	REV. No
1:12,000	FEB. 27, 2015	0
DRAWN BY:	EDITED BY:	CHECKED BY:
N.M.	-	AR
DRAWING No:	CAD FILE:	
121413099-200-EE-02	121413099_200-EE-02.DWG	

Stantec

FILE NAME: T:\DRS\121413099\TASK 200 REMEDIAL ACTION PLAN - YEAR 4\121413099_200-EE-02.dwg

27FEB15 2:00PM



LEGEND

- TEST PIT (STANTEC 2010)
- TEST PIT (STANTEC 2009)
- MONITOR WELL (STANTEC 2009)
- BULK SOIL SAMPLE (STANTEC 2014)
- BULK SOIL SAMPLE (STANTEC 2010)
- BULK SOIL SAMPLE (STANTEC 2009)
- BERRY SAMPLE (STANTEC 2009)
- VEGETATION SAMPLE (STANTEC 2009)
- SMALL MAMMALS (STANTEC 2009)
- INFERRED GROUNDWATER FLOW DIRECTION
- REMEDIAL EXCAVATION
- CONCRETE FOUNDATION
- APPROXIMATE EXTENT OF ADDITIONAL TPH-IMPACTED SOIL REQUIRING REMOVAL

NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

CLIENT:

NEWFOUNDLAND AND LABRADOR DEPARTMENT OF ENVIRONMENT AND CONSERVATION

PROJECT TITLE:

IMPLEMENTATION OF REMEDIAL ACTION PLAN - YEAR 4, FORMER U.S. MILITARY SITE, HOPEDALE, NL

DRAWING TITLE:

REMEDIATION AREAS AND SAMPLE LOCATION PLAN - BMEWS

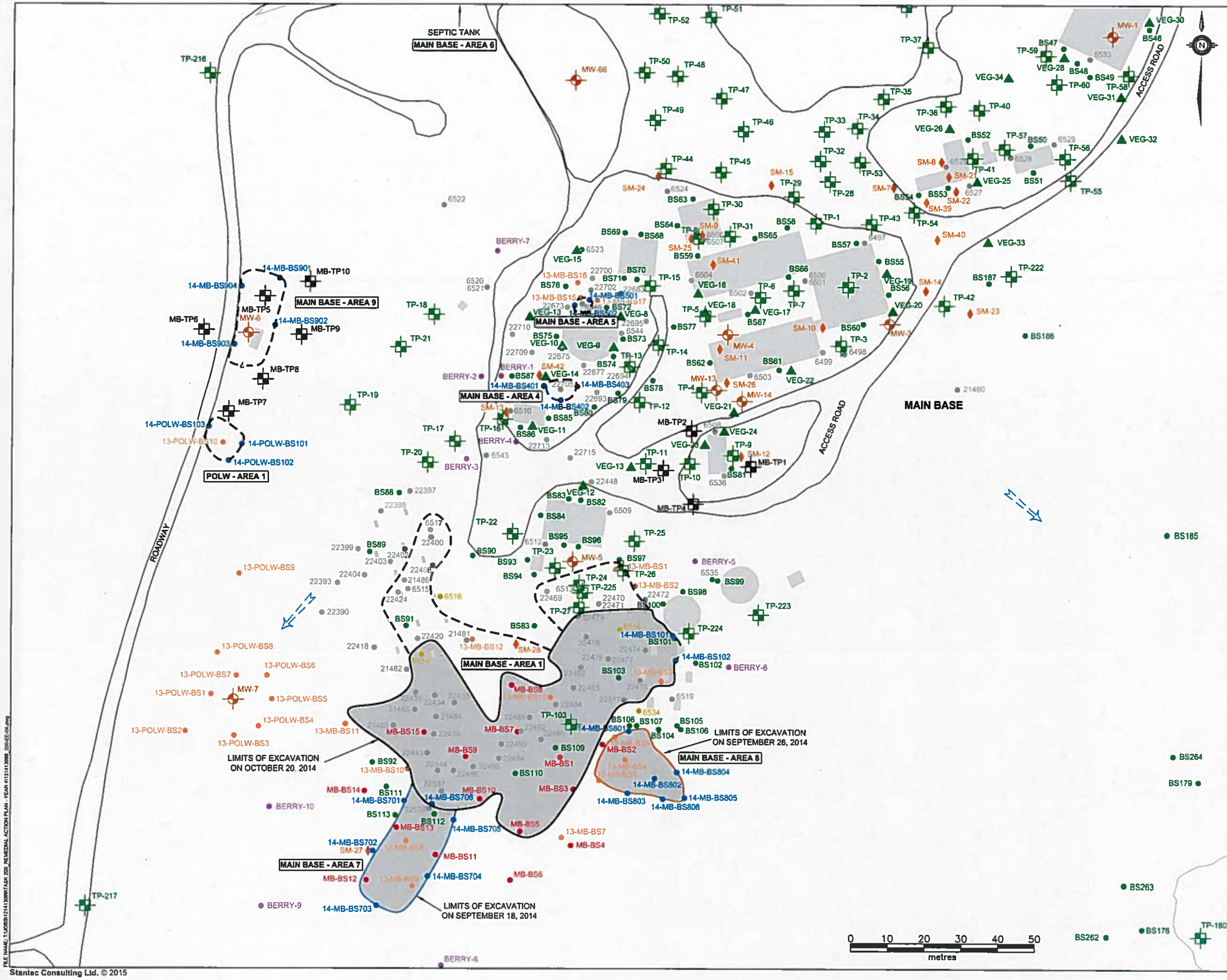
Stantec Consulting Ltd.

SCALE:	DATE:	REV. No.
1:1000	FEB. 27, 2015	0
DRAWN BY: N.M.	EDITED BY: -	CHECKED BY: AR
DRAWING No: 121413099-200-EE-03	CAD FILE: 121413099_200-EE-03.DWG	

Stantec

FILE NAME: T:\GIS\121413099\TASK 200 REMEDIAL ACTION PLAN - YEAR 4\121413099_200-EE-03.mxd

27FEB15 11:00AM



LEGEND

- TEST PIT (STANTEC 2010)
- TEST PIT (STANTEC 2009)
- MONITOR WELL (STANTEC 2009)
- BULK SOIL SAMPLE (STANTEC 2014)
- BULK SOIL SAMPLE (STANTEC 2013)
- BULK SOIL SAMPLE (STANTEC 2009)
- BULK SOIL SAMPLE (STANTEC 2010)
- BULK SOIL SAMPLE (ESG 2006)
- BULK SOIL SAMPLE (ESG 2004)
- BERRY SAMPLE (STANTEC 2009)
- VEGETATION SAMPLE (STANTEC 2009)
- SMALL MAMMALS (STANTEC 2009)
- UNKNOWN EXTENT OF IMPACTS
- INFERRED GROUNDWATER FLOW DIRECTION
- REMEDIAL EXCAVATION
- CONCRETE FOUNDATION
- APPROXIMATE EXTENT OF ADDITIONAL TPH/PCB-IMPACTED SOIL REQUIRING REMOVAL

NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

CLIENT:

NEWFOUNDLAND AND LABRADOR DEPARTMENT OF ENVIRONMENT AND CONSERVATION

PROJECT TITLE:

IMPLEMENTATION OF REMEDIAL ACTION PLAN - YEAR 4, FORMER U.S. MILITARY SITE, HOPEDALE, NL

DRAWING TITLE:

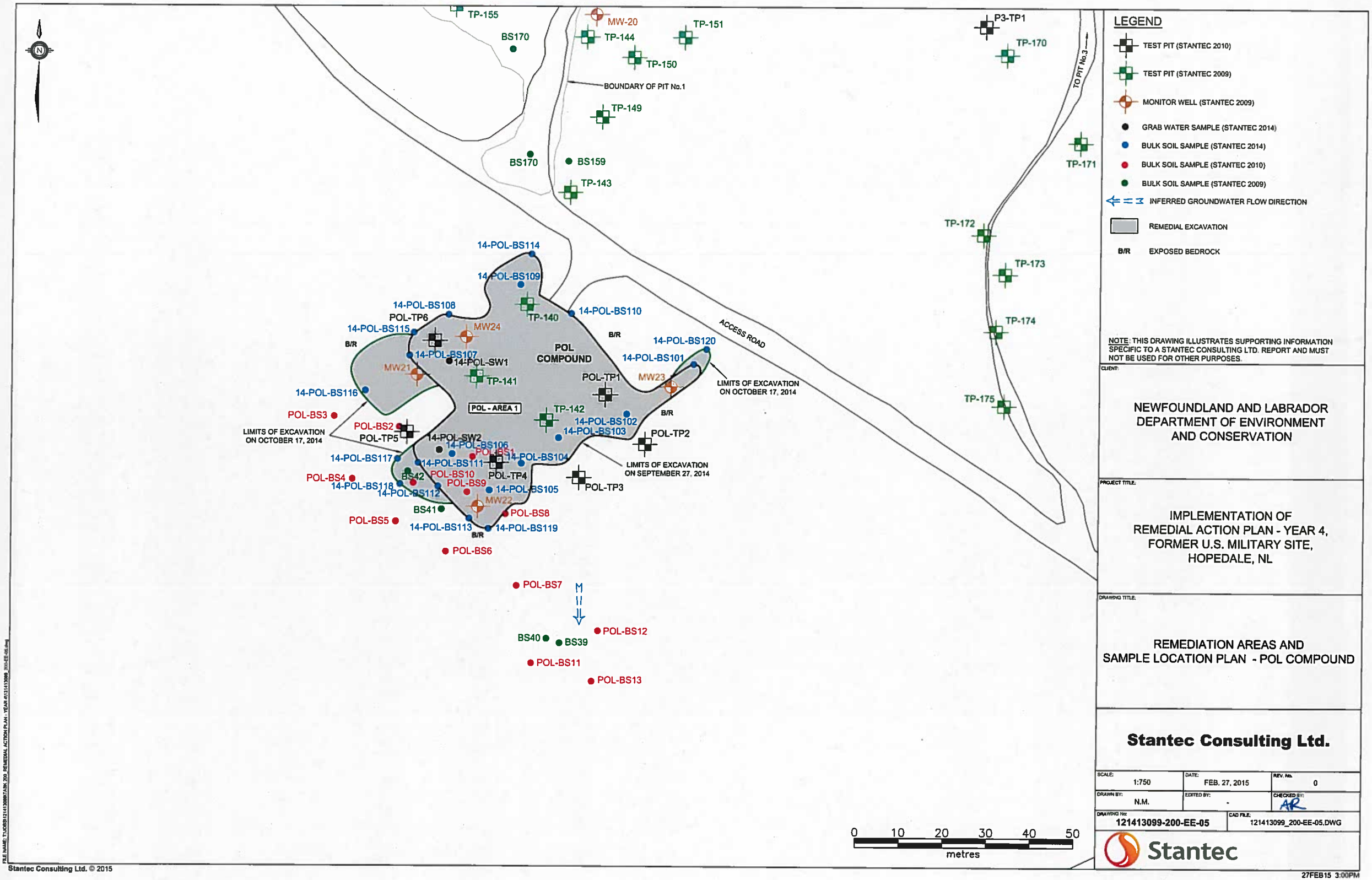
REMEDIATION AREAS AND SAMPLE LOCATION PLAN - MAIN BASE

Stantec Consulting Ltd.

SCALE:	DATE:	REV. No.
1:1000	FEB. 27, 2015	0
DRAWN BY: N.M.	EDITED BY: -	CHECKED BY: AR
DRAWING No: 121413099-200-EE-04	CAD FILE: 121413099_200-EE-04.DWG	

Stantec

27FEB15 3:00PM



LEGEND

- TEST PIT (STANTEC 2010)
- TEST PIT (STANTEC 2009)
- MONITOR WELL (STANTEC 2009)
- GRAB WATER SAMPLE (STANTEC 2014)
- BULK SOIL SAMPLE (STANTEC 2014)
- BULK SOIL SAMPLE (STANTEC 2010)
- BULK SOIL SAMPLE (STANTEC 2009)
- INFERRED GROUNDWATER FLOW DIRECTION
- REMEDIAL EXCAVATION
- B/R EXPOSED BEDROCK

NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

CLIENT:

NEWFOUNDLAND AND LABRADOR
DEPARTMENT OF ENVIRONMENT
AND CONSERVATION

PROJECT TITLE:

IMPLEMENTATION OF
REMEDIAL ACTION PLAN - YEAR 4,
FORMER U.S. MILITARY SITE,
HOPEDALE, NL

DRAWING TITLE:

REMEDIATION AREAS AND
SAMPLE LOCATION PLAN - POL COMPOUND

Stantec Consulting Ltd.

SCALE:	DATE:	REV. No.
1:750	FEB. 27, 2015	0
DRAWN BY: N.M.	EDITED BY: -	CHECKED BY: AR
DRAWING No: 121413099-200-EE-05	CAD FILE: 121413099_200-EE-05.DWG	

Stantec

27FEB15 3:00PM

NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

CLIENT: NEWFOUNDLAND AND LABRADOR DEPARTMENT OF ENVIRONMENT AND CONSERVATION	SCALE: 1:500 (approx.)	DATE: FEB. 27, 2015	REV. No. 0
	DRAWN BY: N.M.	EDITED BY: -	CHECKED BY: AR
PROJECT TITLE: IMPLEMENTATION OF REMEDIAL ACTION PLAN - YEAR 4, FORMER U.S. MILITARY SITE, HOPEDALE, LABRADOR	DRAWING No: 1214130996-200-EE-06	CAD FILE: 121413099_200-EE-06.DWG	
DRAWING TITLE: TEST PIT LOCATION PLAN - BIOPILE	Stantec		

FILE NAME: T:\JOBS\121413099\ISAH 300_REMEDIAL ACTION PLAN - YEAR 4\121413099_200-EE-06.dwg

27FEB15 12:00PM

APPENDIX B

Site Photographs

Site Photographs – Implementation of Remedial Action Plan – Year 4, Former U.S. Military Site, Hopedale, NL

Biopile

Photo 1 Biopile prior to dismantling in Year 4.

Photo 2 Test pit excavation on September 8, 2014.

Site Photographs – Implementation of Remedial Action Plan – Year 4, Former U.S. Military Site, Hopedale, NL

Photo 3 Removal of treated soil from the biopile.

Photo 4 Placement of TPH-impacted soil in the biopile containment cell.

Photo 5 Addition of biopile nutrients/fertilizers.

Photo 6 Aerial photo taken of the biopile on November 14, 2014.

BMEWS

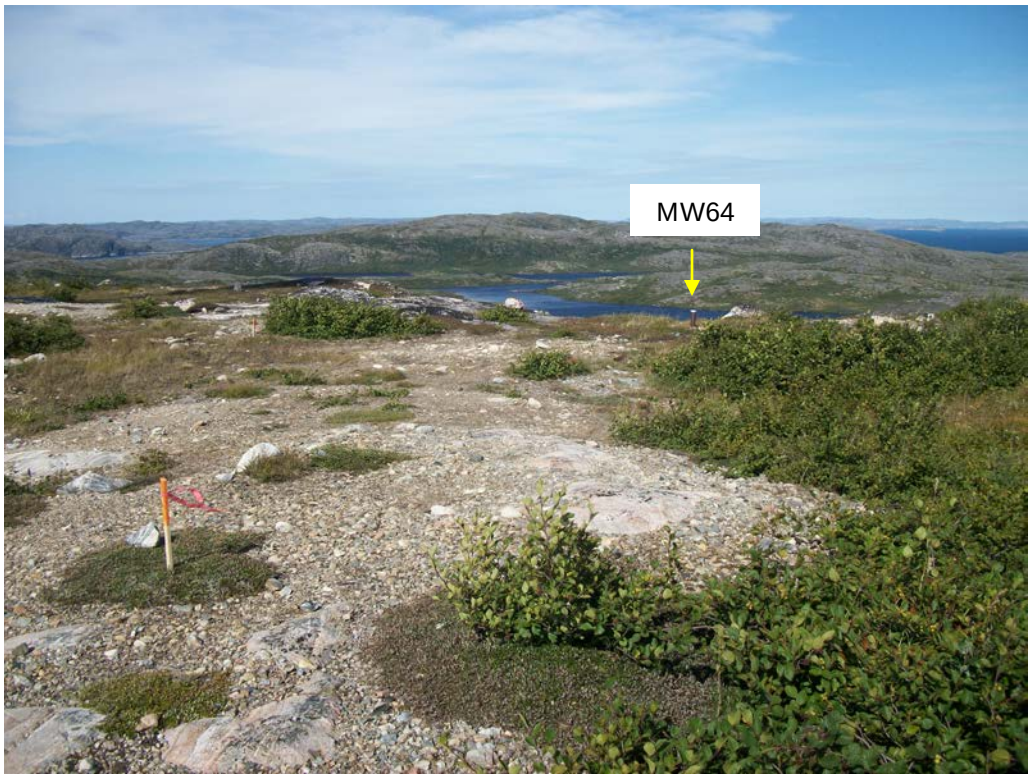


Photo 7 Southern portion of BMEWS-Area 1, looking north, prior to grubbing and soil removal.

Photo 8 Norther portion of BMEWS-Area 1, looking north, prior to grubbing and soil removal.

Photo 9 Metal debris at BMEWS-Area 2, prior to removal.

Photo 10 BMEWS-Area 3, looking northwest, prior to grubbing (note: this area was not remediated in 2014).

Photo 11 Soil removal at BMEWS-Area 1.

Photo 12 Upper (south) portion of BMEWS-Area 1 following soil removal, looking south. Circle shows area requiring additional soil removal.

Photo13 Lower (north) portion of BMEWS-Area 1 following soil removal, looking north.

Photo 14 Lower (north) portion of BMEWS-Area 1 partially backfilled, looking north.

Photo 15 Removal of metal at BMEWS-Area 2.

Photo 16 Metal removed from BMEWS-Area 2.

Photo 17 BMEWS-Area 2 excavation, looking west.

Photo 18 BMEWS-Area 2 excavation following backfilling, looking east.

Site Photographs – Implementation of Remedial Action Plan – Year 4, Former U.S. Military Site, Hopedale, NL

Main Base

Photo 19 Main Base-Area 1, looking northwest in area of samples 22474 and 22475, prior to grubbing and soil removal.

Photo 20 Main Base-Area 1, looking north, prior to grubbing and soil removal.

Photo 21 Main Base-Area 1, looking west, prior to grubbing and soil removal.

Photo 22 Main Base-Area 1, looking east, prior to grubbing and soil removal.

Photo 23 Main Base-Area 5, looking west, prior to grubbing (note: area not remediated in 2014).

Photo 24 Concrete opening of septic tank (note: area not remediated in 2014).

Photo 25 Main Base-Area 7, looking north, prior to grubbing and soil removal. Orange flagging tape marks boundary between PCB and TPH remedial excavations.

Photo 26 Grubbing at Main Base-Area 1.

Photo 27 PCB-impacted soil removal at Main Base-Area 1.

Photo 28 PCB-impacted soil removal at Main Base-Area 1.

Photo 29 PCB-impacted soil removal at Main Base-Area 1.

Photo 30 Removal of PCB-impacted soil and tar-like material in the vicinity of former sample 22488 at Main Base-Area 1.

Photo 31 Main Base-Area 1 following the removal of PCB-impacted soil, looking east.

Photo 32 Main Base-Area 1 following the removal of PCB-impacted soil and tar-like material in the vicinity of former sample 22488.

Photo 33 Boulders and barricades placed along the northeast limits of the Main Base-Area 1 excavation.

Photo 34 TPH-impacted soil removal at Main Base-Area 7.

Photo 35 TPH-impacted soil removal at Main Base-Area 7 (note: remaining soil on bedrock was manually removed using shovels).

Photo 36 Main Base-Area 8 following soil removal.

POL Compound

Photo 37 POL-Area 1, looking northwest, prior to grubbing and soil removal.

Photo 38 Removing grubbings from POL Compound site.

Photo 39 TPH-impacted soil removal at the POL Compound.

Photo 40 TPH-impacted soil removal at POL Compound (note: remaining soil on bedrock was manually removed using shovels).

Photo 41 POL-Area 1 during soil removal, looking north in the vicinity of MW-21.

Photo 42 POL-Area 1 during soil removal, looking south in the vicinity of MW-22.

Photo 43 Bags containing soil that was removed manually removed from bedrock.

Photo 44 POL-Area 1, looking southwest, following soil removal and backfilling.

Photo 45 POL-Area 1, looking southeast, following soil removal and backfilling.

Laydown Area

Photo 46 Levelling Staging Area at Pit No. 1 prior to receipt of Year 4 soil.

Photo 47 Staging Area liner and berm.

Photo 48 PCB-impacted soil in the Staging Area.

Photo 49 Loading PCB-impacted soil into enviro-bags at the Staging Area.

Photo 50 PCB-impacted soil bags.

Photo 51 PCB-impacted soil bags.

Soil Shipment

Photo 52 Long Island at the American Dock.

Photo 53 Loading soil bags.

Photo 54 Long Island cargo hold.

Photo 55 PCB-impacted soil bags in the ship's cargo hold.

Site Closure

Photo 56 Metal stored on tarps at Pit No. 1.

Photo 57 Former bag storage area.

Photo 58 Signs installed at the entrance to the Laydown/Staging Area at Pit No. 1 and boulders blocking access.

Photo 59 Biopile sign (note: photo was taken prior to the installation of the biopile cover).

APPENDIX C

Laboratory Analytical Results Summary Tables

Table C.1 Results of Laboratory Analysis of Petroleum Hydrocarbons in Soil
Implementation of the RAP - Year 4
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Date	Sample Depth (mbgs)	BTEX Parameters (mg/kg)				Total Petroleum Hydrocarbons (mg/kg)						Resemblance
			Benzene	Toluene	Ethyl-benzene	Xylenes	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{21})	F3 (C_{21}-C_{32})	Modified TPH - Tier I[2]	Chromatogram reached baseline at C_{32}[3]	
Units			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	-	-
RDL (2011)			0.03	0.03	0.03	0.05	3	10	10	15	20	-	-
RDL (2012-2014)			0.025	0.025	0.025	0.05	2.5	10	10	15	15		
Landfill acceptance criteria[1]			2.5	10,000	10,000	110	-	-	-	-	1,000	-	-
2011 Sampling													
11-BIOPILE-BS1	06-Nov-11	grab	nd	nd	nd	nd	14	570	91	nd	670	Yes	WFO
11-BIOPILE-BS2	06-Nov-11	grab	nd	nd	nd	nd	9	1,300	210	38	**1,500**	Yes	FO
11-BIOPILE-BS3	06-Nov-11	grab	nd	nd	nd	nd	48	610	89	23	770	Yes	FO
11-BIOPILE-BS4	06-Nov-11	grab	nd	nd	nd	nd	64	1,400	220	41	**1,700**	Yes	FO
11-BIOPILE-BS5	16-Nov-11	grab	nd	nd	nd	nd	6	140	30	nd	180	Yes	FO
2012 Sampling													
12-BP-TP1A	14-Jul-12	0.0 - 0.5	nd	nd	0.047	0.15	270	2,600	260	47	**3,200**	Yes	FO
12-BP-TP1B	14-Jul-12	0.5 - 1.0	nd	nd	nd	nd	260	3,400	340	58	**4,000**	Yes	FO
12-BP-TP2A	14-Jul-12	0.0 - 0.5	nd	nd	nd	nd	22	710	66	nd	800	Yes	FO
12-BP-TP2B	14-Jul-12	0.5 - 1.0	nd	nd	nd	nd	49	860	120	nd	**1,000**	Yes	FO
12-BP-TP3A	14-Jul-12	0.0 - 0.5	nd	nd	nd	nd	910	6,800	650	84	**8,400**	Yes	FO
12-BP-TP3B	14-Jul-12	0.5 - 1.0	nd	nd	nd	0.16	560	4,100	420	81	**5,200**	Yes	FO
12-BP-TP4A	14-Jul-12	0.0 - 0.5	nd	nd	nd	nd	120	2,300	240	37	**2,700**	Yes	FO
12-BP-TP4B	14-Jul-12	0.5 - 1.0	nd	nd	nd	nd	100	1,400	150	nd	**1,700**	Yes	FO
12-BP-TP5A	14-Jul-12	0.0 - 0.5	nd	nd	nd	nd	21	620	83	22	740	Yes	FO
12-BP-TP5B	14-Jul-12	0.5 - 1.0	nd	nd	nd	nd	30	600	120	nd	750	Yes	WFO
12-BP-TP6A	14-Jul-12	0.0 - 0.5	nd	nd	nd	nd	22	560	60	17	660	Yes	FO
12-BP-TP6B	14-Jul-12	0.5 - 1.0	nd	nd	nd	nd	5	82	nd	nd	87	Yes	WFO
12-BP-COMP A1	21-Oct-12	0.0 - 0.5 (composite)	nd	nd	nd	nd	63	1,500	190	51	**1,800**	Yes	FO
12-BP-COMP A2	21-Oct-12	0.0 - 0.5 (composite)	nd	nd	nd	nd	110	1,100	150	46	**1,400**	Yes	FO
12-BP-COMP B1	21-Oct-12	0.5 - 1.0 (composite)	nd	nd	0.036	0.15	230	1,800	220	45	**2,300**	Yes	FO
12-BP-COMP B2	21-Oct-12	0.5 - 1.0 (composite)	nd	0.058	nd	nd	73	1,200	160	42	**1,400**	Yes	FO
12-BP-COMP C1	21-Oct-12	1.0 - 1.5 (composite)	nd	nd	nd	0.062	120	1,400	170	30	**1,700**	Yes	FO
12-BP-COMP C2	21-Oct-12	1.0 - 1.5 (composite)	nd	nd	nd	nd	140	1,500	200	53	**1,900**	Yes	FO

Notes:

1 Typical landfill acceptance criteria. BTEX acceptance criteria based on Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guidelines (CSQGs) for a Commercial Site (2012) with coarse grained soil and non-potable groundwater

2 Modified TPH = Total petroleum hydrocarbons excluding total BTEX

3 If baseline was not reached at C_{32}, sample may contain carbon fractions >C_{32}

" - " No applicable guideline or does not apply

nd Not detected above standard RDL

RDL Reportable Detection Limit for routine analysis

mbgs Metres below ground surface

Bold / Shaded Concentration exceeds typical landfill acceptance criteria

Resemblence

FO Fuel oil fraction WFO Weathered fuel oil fraction

Table C.1 Results of Laboratory Analysis of Petroleum Hydrocarbons in Soil
Implementation of the RAP - Year 4
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Date	Sample Depth (mbgs)	BTEX Parameters (mg/kg)				Total Petroleum Hydrocarbons (mg/kg)						Resemblance
			Benzene	Toluene	Ethyl-benzene	Xylenes	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{21})	F3 (C_{21}-C_{32})	Modified TPH - Tier I[2]	Chromatogram reached baseline at C_{32}[3]	
Units			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	-	-
RDL (2011)			0.03	0.03	0.03	0.05	3	10	10	15	20	-	-
RDL (2012-2014)			0.025	0.025	0.025	0.05	2.5	10	10	15	15		
Landfill acceptance criteria[1]			2.5	10,000	10,000	110	-	-	-	-	1,000	-	-
2013 Sampling													
13-BP-COMP-A1	18-Aug-13	0.0 - 0.5 (composite)	nd	nd	nd	nd	15	420	77	26	540	Yes	WFO
13-BP-COMP-A1 Lab-Dup	18-Aug-13	0.0 - 0.5 (composite)	nd	nd	nd	nd	16	420	77	23	-	Yes	-
13-BP-COMP-A2	18-Aug-13	0.0 - 0.5 (composite)	nd	nd	nd	nd	12	370	71	25	480	Yes	WFO
13-BP-COMP-B1	18-Aug-13	0.5 - 1.0 (composite)	nd	nd	nd	nd	43	720	110	30	900	Yes	WFO
13-BP-COMP-B2	18-Aug-13	0.5 - 1.0 (composite)	nd	nd	nd	nd	32	560	83	25	700	Yes	WFO
13-BP-COMP-C1	18-Aug-13	1.0 - 1.5 (composite)	nd	nd	nd	nd	17	440	67	20	540	Yes	WFO
13-BP-COMP-C2	18-Aug-13	1.0 - 1.5 (composite)	nd	nd	nd	nd	20	370	57	21	460	Yes	WFO
2014 Sampling													
14-BP-COMPA1	09-Aug-14	0.0 - 0.5 (composite)	nd	nd	nd	nd	7.2	440	71	23	540	Yes	FO
14-BP-COMPA2	09-Aug-14	0.0 - 0.5 (composite)	nd	nd	nd	nd	5.6	320	58	23	410	Yes	FO
14-BP-COMPB1	09-Aug-14	0.5 - 1.0 (composite)	nd	nd	nd	nd	9.1	560	85	24	680	Yes	FO
14-BP-COMPB2	09-Aug-14	0.5 - 1.0 (composite)	nd	nd	nd	nd	11	690	110	22	840	Yes	FO
14-BP-COMPC1	09-Aug-14	1.0 - 1.5 (composite)	nd	nd	nd	nd	8.1	500	74	nd	590	Yes	FO
14-BP-COMPC2	09-Aug-14	1.0 - 1.5 (composite)	nd	nd	nd	nd	8.9	780	120	26	930	Yes	FO

Notes:

1 Typical landfill acceptance criteria. BTEX acceptance criteria based on Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guidelines (CSQGs) for a Commercial Site (2012) with coarse grained soil and non-potable groundwater

2 Modified TPH = Total petroleum hydrocarbons excluding total BTEX

3 If baseline was not reached at C_{32}, sample may contain carbon fractions >C_{32}

" - " No applicable guideline or does not apply

nd Not detected above standard RDL

RDL Reportable Detection Limit for routine analysis

mbgs Metres below ground surface

Bold / Shaded Concentration exceeds typical landfill acceptance criteria

Resemblence

FO Fuel oil fraction

WFO Weathered fuel oil fraction

Table C.2 Results of Laboratory Analysis of Petroleum Hydrocarbons in Soil - BMEWS
Implementation of the RAP - Year 4
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Depth (m)	BTEX Parameters (mg/kg)				Total Petroleum Hydrocarbons (mg/kg)					Resemblance	Comments
		Benzene	Toluene	Ethyl-benzene	Xylenes	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{21})	F3 (C_{21}-C_{32})	Reached Baseline at C_{32}?[4]	Modified TPH[5]	
RDL (2009 sampling)		0.03	0.03	0.03	0.05	3	15		15	-	20	-	-
Tier I ESLs - Plants and Soil Inv. [1]		31	75	55	95	210	150	300		-	-	-	-
Tier I RBSLs [2]		0.099	77	30	8.8	-	-	-	-	-	270	-	-
SSTL [3]		-	-	-	-	-	-	-	-	-	1,700	-	-
2009 Sampling - Stantec													
BS19	0.0 - 0.25	<0.03	<0.03	<0.03	<0.05	<3	110		280	-	**390**	FO/LO	-
BS20	0.0 - 0.25	<0.1	<0.1	<0.1	<0.3	<10	93,000		1,300	-	**94,000** (200)	FO	-
BS20 - Lab-Dup	0.0 - 0.25	-	-	-	-	-	95,000		1,500	-	-	-	-
BS30	0.0 - 0.15	<0.03	<0.03	<0.03	<0.05	<3	<15		<15	-	<20	-	-
BS35	0.0 - 0.15	<0.03	<0.03	<0.03	<0.05	<3	33		88	-	120	PLO, UFO/LO	-
TP79-BS2	1.1 - 1.2	<0.03	<0.03	<0.03	<0.05	<3	260		2,100	-	**2,400**	FO/LO	-
TP82-BS1	0.1 - 0.2	<0.03	<0.03	<0.03	<0.05	89	5,600		50	-	**5,800**	FO	-
TP91-BS2	0.7 - 0.8	<0.03	<0.03	<0.03	<0.05	<3	55		59	-	110	FO, PLO	-
TP96-BS2	1.0 - 1.1	<0.03	0.04	<0.03	<0.05	<3	20		110	-	130	LO	-
TP101-BS2	1.4 - 1.5	<0.03	<0.03	<0.03	<0.05	<3	40		120	-	160	WFO, LO	-
TP102-BS1	0.0 - 0.1	<0.03	<0.03	<0.03	0.20	57	27,000		300	-	**28,000** (80)	FO	-
TP103-BS2	0.9 - 1.0	<0.03	0.06	<0.03	<0.05	40	7,200		360	-	**7,600**	FO	-
TP107-BS2	0.9 - 1.0	<0.03	<0.03	<0.03	<0.05	<3	120		210	-	**320**	FO, FO/LO	-
TP118-BS2	1.7 - 1.8	<0.03	<0.03	<0.03	<0.05	130	5,700		32	-	**5,800**	FO	-
TP123-BS2	1.0 - 1.1	<0.03	<0.03	<0.03	<0.05	<3	80		230	-	**310**	FO/LO	-
TP127-BS2	0.7 - 0.8	<0.03	<0.03	<0.03	<0.05	<3	<15		49	-	49	PLO	-
TP139-BS2	1.0 - 1.1	<0.03	<0.03	<0.03	<0.05	280	9,100		<15	-	**9,400**	G/FO, FO	-

Notes:

1 = Atlantic Partnership in RBCA (Risk-Based Corrective Action) Implementation (PIRI) Tier I Soil Ecological Screening Levels (ESLs) for the Protection of Plants and Soil Invertebrates; Direct Soil Contact (Table 1a), for a residential site with coarse grained soil (2012, Revised 2015). Screening levels apply to the top 1.5 m of the soil profile.

2= Atlantic PIRI Tier I Risk Based Screening Levels (RBSLs) for a residential site with non-potable groundwater (Table 4a), coarse grained soil and fuel oil impacts (2012, Revised 2015).

3 = Site-specific target level (SSTL) calculated for TPH at the Former Radar Site (Stantec, 2010)

4 = Atlantic Partnership in RBCA Implementation analytical method does not analyze for >C_{32}. Laboratory certificate indicates (Yes or No) whether chromatogram for each sample returns to baseline after C_{32}. Samples are considered to have returned to baseline if the area from C_{32}-C_{36} is less than 10% of the area from C_{10}-C_{32}.

5 = Modified TPH = TPH C_6 - C_{32} (excluding BTEX).

"-" = Not analyzed, not applicable or no applicable guideline.

RDL = Reportable Detection Limit; < ## = Not detected above RDL noted

Underlined = Value exceeds Tier I ESL for the Protection of Plants and Soil Invertebrates (note: F1 and F2 ESLs were not applied to 2009 samples herein)

Bold = Value exceeds Tier I RBSL for residential land use

Shaded = Value exceeds SSTL calculated for the Former Radar Site (Stantec, 2010)

Resemblance:

FO = Fuel oil fraction
FO/LO = One product in fuel oil/lube oil range
G/FO = One product in the gasoline/fuel oil range
LO = Lube oil fraction
PLO = Possible lube oil fraction
UFO/LO = Unidentified compounds in the fuel oil/lube oil fraction
WFO = Weathered fuel oil fraction

Table C.2 Results of Laboratory Analysis of Petroleum Hydrocarbons in Soil - BMEWS
Implementation of the RAP - Year 4
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Depth (m)	BTEX Parameters (mg/kg)				Total Petroleum Hydrocarbons (mg/kg)						Resemblance	Comments
		Benzene	Toluene	Ethyl-benzene	Xylenes	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{21})	F3 (C_{21}-C_{32})	Reached Baseline at C_{32}?[4]	Modified TPH[5]		
RDL (2009 sampling)		0.03	0.03	0.03	0.05	3	15		15	-	20	-	-
RDL (2010 sampling)		0.03	0.03	0.03	0.05	3	10	10	15	-	20	-	-
Tier I ESLs - Plants and Soil Inv. [1]		31	75	55	95	210	150	300		-	-	-	-
Tier I RBSLs [2]		0.099	77	30	8.8	-	-	-	-	-	270	-	-
SSTL [3]		-	-	-	-	-	-	-	-	-	1,700	-	-
2009 Sampling - Stantec (...continued)													
MW9-SS3	1.2 - 1.8	<0.03	<0.03	<0.03	<0.05	<3	<15		<15	-	<20	-	-
MW10-SS1	0.0 - 0.15	<0.03	<0.03	<0.03	<0.05	<3	20		52	-	72	NRG	-
MW11-SS1	0.0 - 0.3	<0.03	<0.03	<0.03	<0.05	<3	110		380	-	**490**	WFO, LO	-
MW63-SS1	0.0 - 0.3	<0.03	<0.03	<0.03	<0.05	<3	64		190	-	250	FO/LO	-
MW64-SS1	0.0 - 0.5	<0.03	<0.03	<0.03	0.09	120	27,000		390	-	**28,000** (200)	FO	-
MW65-SS2	0.6 - 0.9	<0.03	<0.03	<0.03	0.13	65	1,800		220	-	**2,100**	FO, Possible LO	-
2010 Sampling - Stantec													
BMEWS-TP2 BS1	0.0 - 0.1	<0.03	<0.03	<0.03	<0.05	<3	13,000	4,600	370	-	**18,000**	FO	-
BMEWS-TP2 BS1 Lab-Dup	0.0 - 0.1	<0.03	<0.03	<0.03	<0.05	<3	12,000	4,300	290	-	-	-	-
BMEWS-TP3 BS1	0.0 - 0.3	<0.03	<0.03	0.11	5	860	21,000	2,400	150	-	**24,000**	FO	-
BMEWS-TP4 BS1	0.0 - 0.2	<0.03	<0.03	<0.03	2.3	570	28,000	3,200	130	-	**32,000**	FO	-
BMEWS-TP6 BS1	0. - 0.1	<0.03	<0.03	<0.03	0.07	<3	99	210	49	-	**360**	FO/LO	-
BMEWS-TP7 BS1	0. - 0.3	<0.03	<0.03	<0.03	<0.05	<3	300	80	100	-	**480**	WFO, NRLO	-
BMEWS-TP8 BS1	0. - 0.6	<0.03	<0.03	<0.03	<0.05	<3	19	30	88	-	140	WFO, NRLO	-
BMEWS-TP10 BS1	0. - 0.25	<0.03	<0.03	<0.03	<0.05	<3	13	17	30	-	60	WFO, NRLO	-

Notes:

1 = Atlantic Partnership in RBCA (Risk-Based Corrective Action) Implementation (PIRI) Tier I Soil Ecological Screening Levels (ESLs) for the Protection of Plants and Soil Invertebrates; Direct Soil Contact (Table 1a), for a residential site with coarse grained soil (2012, Revised 2015). Screening levels apply to the top 1.5 m of the soil profile.

2= Atlantic PIRI Tier I Risk Based Screening Levels (RBSLs) for a residential site with non-potable groundwater (Table 4a), coarse grained soil and fuel oil impacts (2012, Revised 2015).

3 = Site-specific target level (SSTL) calculated for TPH at the Former Radar Site (Stantec, 2010)

4 = Atlantic Partnership in RBCA Implementation analytical method does not analyze for >C_{32}. Laboratory certificate indicates (Yes or No) whether chromatogram for each sample returns to baseline after C_{32}. Samples are considered to have returned to baseline if the area from C_{32}-C_{36} is less than 10% of the area from C_{10}-C_{32}.

5 = Modified TPH = TPH C_6 - C_{32} (excluding BTEX).

"-" = Not analyzed, not applicable or no applicable guideline.

RDL = Reportable Detection Limit; < ## = Not detected above RDL noted

Underlined = Value exceeds Tier I ESL for the Protection of Plants and Soil Invertebrates (note: F1 and F2 ESLs were not applied to 2009 samples herein)

Bold = Value exceeds Tier I RBSL for residential land use

Shaded = Value exceeds SSTL calculated for the Former Radar Site (Stantec, 2010)

Resemblance

FO = Fuel oil fraction
LO = Lube oil fraction
FO/LO = One product in fuel oil/lube oil range
NRG = No resemblance to gasoline or diesel
WFO = Weathered fuel oil fraction

Table C.2 Results of Laboratory Analysis of Petroleum Hydrocarbons in Soil - BMEWS
Implementation of the RAP - Year 4
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Depth (m)	BTEX Parameters (mg/kg)				Total Petroleum Hydrocarbons (mg/kg)						Resemblance	Comments
		Benzene	Toluene	Ethyl-benzene	Xylenes	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{21})	F3 (C_{21}-C_{32})	Reached Baseline at C_{32}?[4]	Modified TPH[5]		
RDL (2010 sampling)		0.03	0.03	0.03	0.05	3	15		15	-	20	-	-
RDL (2014 sampling)		0.025	0.025	0.025	0.05	2.5	10	10	15	-	15	-	-
Tier I ESLs - Plants and Soil Inv. [1]		31	75	55	95	210	150	300		-	-	-	-
Tier I RBSLs [2]		0.099	77	30	8.8	-	-	-	-	-	270	-	-
SSTL [3]		-	-	-	-	-	-	-	-	-	1,700	-	-
2010 Sampling - Stantec (...continued)													
BMEWS-TP11 BS1	0.0 - 0.4	<0.03	<0.03	<0.03	<0.05	57	16,000	2,300	110	-	**19,000**	FO	-
BMEWS-TP111-10 (Field Dup of BMEWS-TP11 BS1)	0.0 - 0.4	<0.03	<0.03	<0.03	<0.05	97	20,000	2,700	140	-	**23,000**	WFO	-
BMEWS-BS1	0 - 0.1	<0.03	<0.03	<0.03	<0.05	<3	<10	<10	<15	-	<20	-	-
BMEWS-BS2	0 - 0.1	<0.03	<0.03	<0.03	<0.05	<3	<10	<10	75	-	75	NRLO	-
BMEWS-BS3	0 - 0.1	<0.03	<0.03	<0.03	<0.05	<3	<10	<10	88	-	88	NRLO	-
BMEWS-BS4	0 - 0.1	<0.03	<0.03	<0.03	<0.05	<3	<10	<10	83	-	83	NRLO	-
2014 Sampling - Stantec													
14-BMEWS-BS101	0.0 - 0.20	nd	nd	nd	nd	nd	96	69	86	No	250	WFO, ULO	-
14-BMEWS-BS102	0.0 - 0.45	nd	nd	nd	nd	4.5	930	72	43	Yes	**1,100**	WFO, ULO	-
14-FIELD DUP 1 (Field Dup of 14-BMEWS-BS102)	0.0 - 0.45	nd	nd	nd	nd	nd	420	52	84	Yes	**560**	WFO, ULO	-
14-BMEWS-BS103	0.0 - 0.40	nd	nd	nd	nd	nd	190	23	39	Yes	250	WFO, ULO	-
14-BMEWS-BS104	0.0 - 0.60	nd	nd	nd	4.7	120	2,000	490	280	Yes	**2,900**	WFO, ULO	-
14-BMEWS-BS105	0.0 - 0.50	nd	nd	nd	nd	nd	nd	nd	130	No	130	LO	-
14-BMEWS-BS106	0.0 - 0.40	<0.13	<0.13	<0.13	<0.025	<13	nd	18	190	No	210	LO, ULO	-

Notes:

1 = Atlantic Partnership in RBCA (Risk-Based Corrective Action) Implementation (PIRI) Tier I Soil Ecological Screening Levels (ESLs) for the Protection of Plants and Soil Invertebrates; Direct Soil Contact (Table 1a), for a residential site with coarse grained soil (2012, Revised 2015). Screening levels apply to the top 1.5 m of the soil profile.

2= Atlantic PIRI Tier I Risk Based Screening Levels (RBSLs) for a residential site with non-potable groundwater (Table 4a), coarse grained soil and fuel oil impacts (2012, Revised 2015).

3 = Site-specific target level (SSTL) calculated for TPH at the Former Radar Site (Stantec, 2010)

4 = Atlantic Partnership in RBCA Implementation analytical method does not analyze for >C_{32}. Laboratory certificate indicates (Yes or No) whether chromatogram for each sample returns to baseline after C_{32}. Samples are considered to have returned to baseline if the area from C_{32}-C_{36} is less than 10% of the area from C_{10}-C_{32}.

5 = Modified TPH = TPH C_6 - C_{32} (excluding BTEX).

"-" = Not analyzed, not applicable or no applicable guideline.

RDL = Reportable Detection Limit; < ## = Not detected above RDL noted

Underlined = Value exceeds Tier I ESL for the Protection of Plants and Soil Invertebrates (note: F1 and F2 ESLs were not applied to 2009 samples herein)

Bold = Value exceeds Tier I RBSL for residential land use

Shaded = Value exceeds SSTL calculated for the Former Radar Site (Stantec, 2010)

Resemblance

FO = Fuel oil fraction

LO = Lube oil fraction

NRLO = No resemblance to petroleum products in the lube oil range

ULO = Unidentified compound(s) in lube oil range

WFO = Weathered fuel oil fraction

Table C.2 Results of Laboratory Analysis of Petroleum Hydrocarbons in Soil - BMEWS
Implementation of the RAP - Year 4
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Depth (m)	BTEX Parameters (mg/kg)				Total Petroleum Hydrocarbons (mg/kg)						Resemblance	Comments
		Benzene	Toluene	Ethyl-benzene	Xylenes	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{21})	F3 (C_{21}-C_{32})	Reached Baseline at C_{32}?[4]	Modified TPH[5]		
RDL (2014 sampling)		0.025	0.025	0.025	0.05	2.5	10	10	15	-	15	-	-
Tier I ESLs - Plants and Soil Inv. [1]		31	75	55	95	210	150	300		-	-	-	-
Tier I RBSLs [2]		0.099	77	30	8.8	-	-	-	-	-	270	-	-
SSTL [3]		-	-	-	-	-	-	-	-	-	1,700	-	-
2014 Sampling - Stantec (... continued)[6]													
14-BMEWS-BS107	0.0 - 0.30	nd	nd	nd	nd	nd	nd	19	130	No	150	LO	-
14-BMEWS-BS108	0.0 - 0.5	nd	nd	nd	nd	nd	nd	nd	37	Yes	37	NRLO	-
14-BMEWS-BS109	0.0 - 0.6	nd	nd	nd	nd	nd	nd	nd	51	Yes	51	NRLO	-
14-BMEWS-BS202	2.0 - 2.2	nd	nd	nd	nd	nd	25	24	140	Yes	190	FO, NRLO	-
14-BMEWS-BS203	3.0 - 3.5	nd	nd	nd	nd	nd	19	21	110	Yes	150	NRFO/LO	-
14-FIELD DUP 4		nd	nd	nd	nd	nd	18	21	99	Yes	140	NRFO/LO	-
14-BMEWS-BS204	3.5 - 4.0	nd	nd	nd	nd	nd	73	30	120	Yes	220	FO, NRLO	-
14-FIELD DUP 5		nd	nd	nd	nd	nd	17	22	95	Yes	130	FO, NRLO	-
14-BMEWS-BS205	1.0 - 1.5	nd	nd	nd	nd	nd	30	30	150	Yes	210	FO, NRLO	-
14-BMEWS-BS301	0.0 - 0.40	nd	nd	nd	nd	nd	530	880	240	No	**1,700**	WFO, LO	-
14-BMEWS-BS302	0.0 - 0.30	nd	nd	nd	nd	nd	nd	29	170	No	200	ULO	-
14-BMEWS-BS303	0.0 - 0.35	nd	nd	nd	nd	nd	nd	40	160	No	200	ULO	-
14-BMEWS-BS304	0.0 - 0.35	nd	nd	nd	nd	nd	nd	nd	140	Yes	140	NRLO	-
14-BMEWS-BS305	0.0 - 0.35	nd	nd	nd	nd	nd	nd	nd	130	Yes	130	NRLO	-

Notes:

1 = Atlantic Partnership in RBCA (Risk-Based Corrective Action) Implementation (PIRI) Tier I Soil Ecological Screening Levels (ESLs) for the Protection of Plants and Soil Invertebrates; Direct Soil Contact (Table 1a), for a residential site with coarse grained soil (2012, Revised 2015). Screening levels apply to the top 1.5 m of the soil profile.

2= Atlantic PIRI Tier I Risk Based Screening Levels (RBSLs) for a residential site with non-potable groundwater (Table 4a), coarse grained soil and fuel oil impacts (2012, Revised 2015).

3 = Site-specific target level (SSTL) calculated for TPH at the Former Radar Site (Stantec, 2010)

4 = Atlantic Partnership in RBCA Implementation analytical method does not analyze for >C_{32}. Laboratory certificate indicates (Yes or No) whether chromatogram for each sample returns to baseline after C_{32}. Samples are considered to have returned to baseline if the area from C_{32}-C_{36} is less than 10% of the area from C_{10}-C_{32}.

5 = Modified TPH = TPH C_6 - C_{32} (excluding BTEX).

6 = Triple silica gel clean-up performed on samples prior to analysis to remove organic interferences.

RDL = Reportable Detection Limit; < ## = Not detected above RDL noted; "-" = Not analyzed, not applicable or no applicable guideline.

Underlined	= Value exceeds Tier I ESL for the Protection of Plants and Soil Invertebrates (note: F1 and F2 ESLs were not applied to 2009 samples herein)
Bold	= Value exceeds Tier I RBSL for residential land use
Shaded	= Value exceeds SSTL calculated for the Former Radar Site (Stantec, 2010)

Resemblance

FO = Fuel oil fraction
LO = Lube oil fraction
NRLO = No resemblance to petroleum products in the lube oil range
NRLO = No resemblance to petroleum products in the fuel oil/lube oil range
WFO = Weathered fuel oil fraction
ULO = Unidentified compound(s) in lube oil range

Table C.3 Results of Laboratory Analysis of Petroleum Hydrocarbons in Soil - Main Base
Implementation of the RAP - Year 4
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Depth (m)	BTEX Parameters (mg/kg)				Total Petroleum Hydrocarbons (mg/kg)						Resemblance	Comments
		Benzene	Toluene	Ethyl-benzene	Xylenes	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{21})	F3 (C_{21}-C_{32})	Reached Baseline at C_{32}?[4]	Modified TPH[5]		
RDL (2009 sampling)		0.03	0.03	0.03	0.05	3	15		15	-	20	-	-
Tier I ESLs - Plants and Soil Inv. [1]		31	75	55	95	210	150	300		-	-	-	-
Tier I RBSLs [2]		0.099	77	30	8.8	-	-	-	-	-	270	-	-
SSTL [3]		-	-	-	-	-	-	-	-	-	1,700	-	-
2009 Sampling - Stantec													
TP3-BS2	0.8 - 0.9	<0.03	<0.03	<0.03	<0.05	<3	**320**	290		-	**600**	WFO, LO	-
TP6-BS2	0.5 - 0.6	<0.03	<0.03	<0.03	<0.05	<3	3,900	270		-	**4,200**	WFO, LO	-
TP7-BS2	0.6 - 0.8	<0.3	<0.3	0.08	11	490	17,000	3,800		-	**22,000**	FO, LO	-
TP10-BS1	0.0 - 0.2	<0.03	<0.03	<0.03	<0.05	<3	2,200	83		-	**2,200**	WFO	-
TP12-BS2	0.8 - 0.9	<0.03	<0.03	<0.03	<0.05	<3	31	81		-	110	FO/LO	-
TP15-BS2	0.4 - 0.5	<0.03	<0.03	<0.03	<0.05	<3	28	130		-	160	LO	-
TP15-BS2-Lab-Dup	0.4 - 0.5	-	-	-	-	-	27	150		-	-	-	-
TP16-BS1	0.1 - 0.3	<0.03	<0.03	<0.03	<0.05	<3	56	110		-	170	FO/LO	-
TP18-BS2	1.3 - 1.4	<0.03	<0.03	<0.03	<0.05	<3	170	350		-	**510**	FO/LO, LO	-
TP21-BS2	0.9 - 1.0	<0.03	<0.03	<0.03	<0.05	<3	210	310		-	**520**	FO/LO, LO	-
TP24-BS2	1.0 - 1.1	<0.03	<0.03	<0.03	<0.05	<3	2,400	290		-	**2,700**	FO/LO, LO	-
TP30-BS2	1.2 - 1.3	<0.03	4.7	<0.03	<0.05	<3	29	160		-	180	LO	-
TP33-BS2	1.7 - 1.8	<0.03	<0.03	<0.03	<0.05	<3	50	200		-	250	LO	-
TP36-BS3	1.4 - 1.5	<0.03	<0.03	<0.03	<0.05	<3	<15	<15		-	<20	NRG	-
TP36-BS3-Lab-Dup	1.4 - 1.5	<0.03	<0.03	<0.03	<0.05	<3	-	-		-	-	-	-
TP37-BS1	0.0 - 0.2	<0.03	0.07	<0.03	<0.05	<3	36	360		-	**400**	LO	-
TP41-BS1	0.6 - 0.8	<0.03	<0.03	<0.03	<0.05	<3	45	380		-	**420**	FO, LO	-
TP42-BS2	1.3 - 1.5	<0.03	<0.03	<0.03	<0.05	<3	170	450		-	**620**	FO, LO	-

Notes:

1 = Atlantic Partnership in RBCA (Risk-Based Corrective Action) Implementation (PIRI) Tier I Soil Ecological Screening Levels (ESLs) for the Protection of Plants and Soil Invertebrates; Direct Soil Contact (Table 1a), for a residential site with coarse grained soil (2012, Revised 2015). Screening levels apply to the top 1.5 m of the soil profile.

2= Atlantic PIRI Tier I Risk Based Screening Levels (RBSLs) for a residential site with non-potable groundwater (Table 4a), coarse grained soil and fuel oil impacts (2012, Revised 2015).

3 = Site-specific target level (SSTL) calculated for TPH at the Former Radar Site (Stantec, 2010)

4 = Atlantic Partnership in RBCA Implementation analytical method does not analyze for >C_{32}. Laboratory certificate indicates (Yes or No) whether chromatogram for each sample returns to baseline after C_{32}. Samples are considered to have returned to baseline if the area from C_{32}-C_{36} is less than 10% of the area from C_{10}-C_{32}.

5 = Modified TPH = TPH C_6 - C_{32} (excluding BTEX).

"-" = Not analyzed, not applicable or no applicable guideline.

RDL = Reportable Detection Limit; < ## = Not detected above RDL noted

Underlined = Value exceeds Tier I ESL for the Protection of Plants and Soil Invertebrates (note: F1 and F2 ESLs were not applied to 2009 samples herein)

Bold = Value exceeds Tier I RBSL for residential land use

Shaded = Value exceeds SSTL calculated for the Former Radar Site (Stantec, 2010)

Resemblance:

FO = Fuel oil fraction
LO = Lube oil fraction
WFO = Weathered fuel oil fraction
FO/LO = One product in fuel oil/lube oil range
NRG = No resemblance to gasoline or diesel

Table C.3 Results of Laboratory Analysis of Petroleum Hydrocarbons in Soil - Main Base
Implementation of the RAP - Year 4
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Depth (m)	BTEX Parameters (mg/kg)				Total Petroleum Hydrocarbons (mg/kg)							
		Benzene	Toluene	Ethyl-benzene	Xylenes	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{21})	F3 (C_{21}-C_{32})	Reached Baseline at C_{32}?[4]	Modified TPH[5]	Resemblance	Comments
RDL (2009sampling)		0.03	0.03	0.03	0.05	3	15		15	-	20	-	-
Tier I ESLs - Plants and Soil Inv.[1]		31	75	55	95	210	150	300		-	-	-	-
Tier I RBSLs[2]		0.099	77	30	8.8	-	-	-	-	-	270	-	-
SSTL[3]		-	-	-	-	-	-	-	-	-	1,700	-	-
2009 Sampling - Stantec (...continued)													
TP43-BS2	1.5 - 1.7	<0.3	<0.3	<0.3	<0.5	800	22,000		2,300	-	**25,000**	FO, LO	-
TP44-BS2	1.7 - 1.9	<0.03	<0.03	<0.03	<0.05	<3	<15		<15	-	<20	NRG	-
TP52-BS1	0.1 - 0.2	<0.03	<0.03	<0.03	<0.05	<3	<15		20	-	20	PLO	-
TP53-BS1	0.4 - 0.6	<0.03	<0.03	<0.03	<0.05	<3	390		410	-	**800**	WFO, LO	-
TP54-BS2	1.2 - 1.3	<0.03	<0.03	<0.03	<0.05	<3	50		160	-	210	FO, LO	-
TP54-BS2-Lab-Dup	1.2 - 1.3	-	-	-	-	-	46		160	-	-	-	-
TP58-BS2	0.9 - 1.0	<0.03	<0.03	<0.03	<0.05	<3	180		1,200	-	**1,400**	FO/LO, LO	-
TP62-BS1	0.5 - 0.6	<0.03	<0.03	<0.03	<0.05	<3	48		160	-	210	FO/LO, LO	-
TP65-BS1	0.0 - 0.2	<0.03	<0.03	<0.03	<0.05	<3	20		69	-	89	PLO	-
TP68-BS2	0.7 - 0.9	<0.03	<0.03	<0.03	<0.05	<3	<15		44	-	44	NRG	-
TP69-BS2	1.3 - 1.4	<0.03	<0.03	<0.03	<0.05	<3	<15		50	-	50	PLO	-
TP214-BS1	0.6 - 0.7	<0.03	<0.03	<0.03	<0.05	<3	20		72	-	92	WFO, LO	-
TP214-BS1 Lab-Dup	0.6 - 0.7	<0.03	<0.03	<0.03	<0.05	<3	-		-	-	-	-	-
TP220-BS2	1.4 - 1.5	<0.03	<0.03	<0.03	<0.05	<3	22		110	-	130	LO	-
TP221-BS2	1.5 - 1.6	<0.03	<0.03	<0.03	<0.05	<3	580		2,000	-	**2,500**	LO	-
TP221-BS2-Lab-Dup	1.5 - 1.6	-	-	-	-	-	610		2,100	-	-	-	-
TP222-BS2	1.6 - 1.7	<0.03	<0.03	<0.03	<0.05	<3	60		300	-	**360**	LO	-
TP223-BS1	0.4 - 0.5	<0.03	<0.03	<0.03	<0.05	<3	<15		49	-	49	NRG	-

Notes:

1 = Atlantic Partnership in RBCA (Risk-Based Corrective Action) Implementation (PIRI) Tier I Soil Ecological Screening Levels (ESLs) for the Protection of Plants and Soil Invertebrates; Direct Soil Contact (Table 1a), for a residential site with coarse grained soil (2012, Revised 2015). Screening levels apply to the top 1.5 m of the soil profile.

2= Atlantic PIRI Tier I Risk Based Screening Levels (RBSLs) for a residential site with non-potable groundwater (Table 4a), coarse grained soil and fuel oil impacts (2012, Revised 2015).

3 = Site-specific target level (SSTL) calculated for TPH at the Former Radar Site (Stantec, 2010)

4 = Atlantic Partnership in RBCA Implementation analytical method does not analyze for >C_{32}. Laboratory certificate indicates (Yes or No) whether chromatogram for each sample returns to baseline after C_{32}. Samples are considered to have returned to baseline if the area from C_{32}-C_{36} is less than 10% of the area from C_{10}-C_{32}.

5 = Modified TPH = TPH C_6 - C_{32} (excluding BTEX).

"-" = Not analyzed, not applicable or no applicable guideline.

RDL = Reportable Detection Limit; < ## = Not detected above RDL noted

Underlined = Value exceeds Tier I ESL for the Protection of Plants and Soil Invertebrates (note: F1 and F2 ESLs were not applied to 2009 samples herein)

Bold = Value exceeds Tier I RBSL for residential land use

Shaded = Value exceeds SSTL calculated for the Former Radar Site (Stantec, 2010)

Resemblance

FO = Fuel oil fraction
FO/LO = One product in fuel oil/lube oil range
LO = Lube oil fraction
NRG = No resemblance to gasoline or diesel
PLO = Possible lube oil fraction
WFO = Weathered fuel oil fraction

Table C.3 Results of Laboratory Analysis of Petroleum Hydrocarbons in Soil - Main Base
Implementation of the RAP - Year 4
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Depth (m)	BTEX Parameters (mg/kg)				Total Petroleum Hydrocarbons (mg/kg)					Resemblance	Comments
		Benzene	Toluene	Ethyl-benzene	Xylenes	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{21})	F3 (C_{21}-C_{32})	Reached Baseline at C_{32}?[4]	Modified TPH[5]		
RDL (2010 sampling)		0.03	0.03	0.03	0.05	3	15		15	-	20	-	-
Tier I ESLs - Plants and Soil Inv. [1]		31	75	55	95	210	150	300		-	-	-	-
Tier I RBSLs [2]		0.099	77	30	8.8	-	-	-	-	-	270	-	-
SSTL [3]		-	-	-	-	-	-	-	-	-	1,700	-	-
2009 Sampling - Stantec (...continued)													
TP224-BS1	0.0 - 0.2	<0.03	<0.03	<0.03	<0.05	<3	160		32	-	200	WFO	-
TP225-BS2	1.6 - 1.7	<0.03	0.17	0.04	0.23	230	8,300		180	-	**8,700**	WFO	-
BS48	0.0 - 0.10	<0.03	<0.03	<0.03	<0.05	<3	62		490	-	**550**	LO, ULO	-
BS58	0.0 - 0.20	<0.03	<0.03	<0.03	<0.05	<3	<15		<15	-	<20	NRG	-
BS81	0.0 - 0.12	<0.03	<0.03	<0.03	<0.05	9	1,900		260	-	**2,200**	WFO, PLO	-
BS97	0.0 - 0.15	<0.03	<0.03	<0.03	<0.05	<3	33		320	-	**360**	LO	-
BS104	0.0 - 0.05	0.04	0.14	<0.03	<0.05	<3	60		290	-	**350**	FO/LO, LO	-
BS110	0.0 - 0.20	<0.03	<0.03	<0.03	<0.05	<3	67,000		3,700	-	**71,000**	WFO, PLO	-
BS112	0.0 - 0.22	<0.03	<0.03	<0.03	<0.05	<3	9,900		2,100	-	**12,000**	WFO	-
BS265	Not recorded	<0.03	<0.03	<0.03	<0.05	<3	76		670	-	**750**	LO	-
MW1-SS1	0.0 - 0.3	<0.03	<0.03	<0.03	<0.05	<3	270		290	-	**560**	FO/LO LO	-
MW2-SS1	0.0 - 0.5	<0.03	<0.03	<0.03	<0.05	<3	180		500	-	**680**	FO/LO LO	-
MW3-SS1	0.0 - 0.5	<0.03	<0.03	<0.03	<0.05	<3	400		590	-	**990**	WFO, LO	-
MW4-SS1	0.0 - 0.4	<0.03	<0.03	<0.03	<0.05	5	1,400		51	-	**1,500**	WFO, PLO	-
MW5-SS1	0.0 - 0.3	<0.03	<0.03	<0.03	<0.05	4	4,400		330	-	**4,700**	WFO, LO	-
MW6-SS1	0.0 - 0.6	<0.03	<0.03	<0.03	<0.05	40	12,000		460	-	**12,000**	WFO, LO	-
MW14-SS3	1.21 - 1.37	<0.03	<0.03	0.09	0.18	-	-		-	-	**2,000**	G/FO	-
Septic Tank	0.0 - 0.1	<0.03	15	<0.03	0.34	21	3,700		6,700	-	**10,000**	FO/LO, UFO/LO	-

Notes:

1 = Atlantic Partnership in RBCA (Risk-Based Corrective Action) Implementation (PIRI) Tier I Soil Ecological Screening Levels (ESLs) for the Protection of Plants and Soil Invertebrates; Direct Soil Contact (Table 1a), for a residential site with coarse grained soil (2012, Revised 2015). Screening levels apply to the top 1.5 m of the soil profile.

2= Atlantic PIRI Tier I Risk Based Screening Levels (RBSLs) for a residential site with non-potable groundwater (Table 4a), coarse grained soil and fuel oil impacts (2012, Revised 2015).

3 = Site-specific target level (SSTL) calculated for TPH at the Former Radar Site (Stantec, 2010)

4 = Atlantic Partnership in RBCA Implementation analytical method does not analyze for >C_{32}. Laboratory certificate indicates (Yes or No) whether chromatogram for each sample returns to baseline after C_{32}. Samples are considered to have returned to baseline if the area from C_{32}-C_{36} is less than 10% of the area from C_{10}-C_{32}.

5 = Modified TPH = TPH C_6 - C_{32} (excluding BTEX).

"-" = Not analyzed, not applicable or no applicable guideline.

RDL = Reportable Detection Limit; < ## = Not detected above RDL noted

Underlined = Value exceeds Tier I ESL for the Protection of Plants and Soil Invertebrates (note: F1 and F2 ESLs were not applied to 2009 samples herein)

Bold = Value exceeds Tier I RBSL for residential land use

Shaded = Value exceeds SSTL calculated for the Former Radar Site (Stantec, 2010)

Resemblance

FO = Fuel oil fraction

FO/LO = One product in fuel oil/lube oil range

G/FO = One product in the gasoline/fuel oil range

LO = Lube oil fraction

NRG = Does not resemble gasoline or diesel

UFO/LO = Unidentified compound(s) in fuel/lube oil range

ULO = Unidentified compound(s) in lube oil range

WFO = Weathered fuel oil fraction

Table C.3 Results of Laboratory Analysis of Petroleum Hydrocarbons in Soil - Main Base
Implementation of the RAP - Year 4
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Depth (m)	BTEX Parameters (mg/kg)				Total Petroleum Hydrocarbons (mg/kg)						Resemblance	Comments
		Benzene	Toluene	Ethyl-benzene	Xylenes	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{21})	F3 (C_{21}-C_{32})	Reached Baseline at C_{32}?[4]	Modified TPH[5]		
RDL (2010 sampling)		0.03	0.03	0.03	0.05	3	10	10	15	-	20	-	-
Tier I ESLs - Plants and Soil Inv. [1]		31	75	55	95	210	150	300		-	-	-	-
Tier I RBSLs [2]		0.099	77	30	8.8	-	-	-	-	-	270	-	-
SSTL [3]		-	-	-	-	-	-	-	-	-	1,700	-	-
2010 Sampling - Stantec													
MB-TP5 BS1	0.0 - 0.3	<0.03	<0.03	<0.03	<0.05	<3	9,400	1,900	940	-	**12,000**	WFO	-
MB-TP6 BS1	0.0 - 0.15	<0.03	<0.03	<0.03	<0.05	<3	14	12	140	-	160	WFO, LO	-
MB-TP8 BS1	0.0 - 0.15	<0.03	<0.03	<0.03	<0.05	<3	<10	<10	57	-	57	NRLO	-
MB-TP9 BS1	0.0 - 0.3	<0.03	<0.03	<0.03	<0.05	<3	<10	<10	65	-	65	NRLO	-
MB-BS1	0.0 - 0.15	<0.03	<0.03	<0.03	<0.05	<3	93	73	17,000	-	**17,000**	NRLO	Soil removed
MB-BS5	0.0 - 0.15	<0.03	<0.03	<0.03	<0.05	<3	12	<10	510	-	**520**	NRLO, FO	Soil removed
MB-BS9	0.0 - 0.1	<0.03	<0.03	<0.03	<0.05	<3	<10	<10	<15	-	<20	-	-
MB-BS10	0.0 - 0.1	<0.03	<0.03	<0.03	<0.05	<3	<10	<10	200	-	200	NRLO	Soil removed
MB-BS11	0.0 - 0.2	<0.03	<0.03	<0.03	<0.05	<3	<10	<10	60	-	60	NRLO	-
MB-BS13	0.0 - 0.15	<0.03	<0.03	<0.03	<0.05	<3	<10	<10	<15	-	<20	-	-
MB-BS13 Lab-Dup	0.0 - 0.15	<0.03	<0.03	<0.03	<0.05	<3	<10	<10	<15	-	-	-	-
MB-BS111	0.0 - 0.2	<0.03	<0.03	<0.03	<0.05	<3	<10	<10	19	-	<20	NRLO	-

Notes:

1 = Atlantic Partnership in RBCA (Risk-Based Corrective Action) Implementation (PIRI) Tier I Soil Ecological Screening Levels (ESLs) for the Protection of Plants and Soil Invertebrates; Direct Soil Contact (Table 1a), for a residential site with coarse grained soil (2012, Revised 2015). Screening levels apply to the top 1.5 m of the soil profile.

2= Atlantic PIRI Tier I Risk Based Screening Levels (RBSLs) for a residential site with non-potable groundwater (Table 4a), coarse grained soil and fuel oil impacts (2012, Revised 2015).

3 = Site-specific target level (SSTL) calculated for TPH at the Former Radar Site (Stantec, 2010)

4 = Atlantic Partnership in RBCA Implementation analytical method does not analyze for >C_{32}. Laboratory certificate indicates (Yes or No) whether chromatogram for each sample returns to baseline after C_{32}. Samples are considered to have returned to baseline if the area from C_{32}-C_{36} is less than 10% of the area from C_{10}-C_{32}.

5 = Modified TPH = TPH C_6 - C_{32} (excluding BTEX).

"-" = Not analyzed, not applicable or no applicable guideline.

RDL = Reportable Detection Limit; < ## = Not detected above RDL noted

Underlined = Value exceeds Tier I ESL for the Protection of Plants and Soil Invertebrates (note: F1 and F2 ESLs were not applied to 2009-2010 samples herein)

Bold = Value exceeds Tier I RBSL for residential land use

Shaded = Value exceeds SSTL calculated for the Former Radar Site (Stantec, 2010)

Resemblance

FO = Fuel oil fraction

LO = Lube oil fraction

NRLO = No resemblance to petroleum products in the lube oil range

WFO = Weathered fuel oil fraction

Table C.3 Results of Laboratory Analysis of Petroleum Hydrocarbons in Soil - Main Base
Implementation of the RAP - Year 4
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Depth (m)	BTEX Parameters (mg/kg)				Total Petroleum Hydrocarbons (mg/kg)						Resemblance	Comments
		Benzene	Toluene	Ethyl-benzene	Xylenes	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{21})	F3 (C_{21}-C_{32})	Reached Baseline at C_{32}?[4]	Modified TPH[5]		
RDL (2013 sampling)		0.025	0.025	0.025	0.05	2.5	10	10	15	15		-	-
Tier I ESLs - Plants and Soil Inv. [1]		31	75	55	95	210	150	300		-	-	-	-
Tier I RBSLs [2]		0.099	77	30	8.8	-	-	-	-	-	270	-	-
SSTL [3]		-	-	-	-	-	-	-	-	-	1,700	-	-
2013 Sampling - Stantec[6]													
13-MB-BS4B	0.25 - 0.5	<0.025	<0.025	<0.025	<0.050	18	14,000	6,900	730	Yes	**21,000**	WFO	Soil removed
13-MB-BS6	0.2 - 0.4	<0.025	<0.025	<0.025	<0.050	<2.5	2,500	3,100	310	Yes	**5,900**	WFO	Soil removed
13-MB-BS8	0.3 - 0.4	<0.025	<0.025	<0.025	<0.050	24	26,000	11,000	880	Yes	**37,000**	WFO	Soil removed
13-MB-BS9	0.0 - 0.3	<0.025	<0.025	<0.025	<0.050	<2.5	1,300	880	120	Yes	**2,300**	WFO	-
13-POLW-BS1	0.0 - 0.1	<0.025	<0.025	<0.025	<0.050	<2.5	<10	<10	<15	Yes	<15	-	-
13-POLW-BS2	0.0 - 0.04	<0.025	<0.025	<0.025	<0.050	<2.5	81	480	150	Yes	**710**	FO/LO	-
13-POLW-BS3	0.0 - 0.1	<0.025	<0.025	<0.025	<0.050	<2.5	710	570	110	Yes	**1,400**	WFO	-
13-POLW-BS5	0.0 - 0.1	<0.025	<0.025	<0.025	<0.050	<2.5	27	75	80	No	180	WFO, LO	-
13-POLW-BS11 (Field Duplicate of 13-POLW-BS5)	0.0 - 0.1	<0.025	<0.025	<0.025	<0.050	<2.5	20	47	93	No	160	WFO, LO	-
13-POLW-BS6	0.0 - 0.1	<0.025	<0.025	<0.025	<0.050	<2.5	110	280	66	Yes	**450**	WFO	-
13-POLW-BS7	0.0 - 0.1	<0.025	<0.025	<0.025	<0.050	<2.5	190	330	120	Yes	**640**	WFO	-
13-POLW-BS9	0.0 - 0.06	<0.025	<0.025	<0.025	<0.050	<2.5	<10	<10	97	No	97	NRLO	-
13-POLW-BS10	0.0 - 0.1	<0.025	<0.025	<0.025	<0.050	<2.5	<10	<10	78	No	78	PLO	-

Notes:

1 = Atlantic Partnership in RBCA (Risk-Based Corrective Action) Implementation (PIRI) Tier I Soil Ecological Screening Levels (ESLs) for the Protection of Plants and Soil Invertebrates; Direct Soil Contact (Table 1a), for a residential site with coarse grained soil (2012, Revised 2015). Screening levels apply to the top 1.5 m of the soil profile.

2= Atlantic PIRI Tier I Risk Based Screening Levels (RBSLs) for a residential site with non-potable groundwater (Table 4a), coarse grained soil and fuel oil impacts (2012, Revised 2015).

3 = Site-specific target level (SSTL) calculated for TPH at the Former Radar Site (Stantec, 2010)

4 = Atlantic Partnership in RBCA Implementation analytical method does not analyze for >C_{32}. Laboratory certificate indicates (Yes or No) whether chromatogram for each sample returns to baseline after C_{32}. Samples are considered to have returned to baseline if the area from C_{32}-C_{36} is less than 10% of the area from C_{10}-C_{32}.

5 = Modified TPH = TPH C_6 - C_{32} (excluding BTEX).

6 = Triple silica gel clean-up performed on samples prior to analysis to remove organic interferences.

"-" = Not analyzed, not applicable or no applicable guideline.

RDL = Reportable Detection Limit; < ## = Not detected above RDL noted

Underlined = Value exceeds Tier I ESL for the Protection of Plants and Soil Invertebrates (note: F1 and F2 ESLs were not applied to 2009-2010 samples herein)

Bold = Value exceeds Tier I RBSL for residential land use

Shaded = Value exceeds SSTL calculated for the Former Radar Site (Stantec, 2010)

Notes:

Resemblance

FO/LO = One product in fuel oil/lube oil range

LO = Lube oil fraction

NRLO = No resemblance to petroleum products in the lube oil range

PLO = Possible lube oil fraction

WFO = Weathered fuel oil fraction

Table C.3 Results of Laboratory Analysis of Petroleum Hydrocarbons in Soil - Main Base
Implementation of the RAP - Year 4
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Depth (m)	BTEX Parameters (mg/kg)				Total Petroleum Hydrocarbons (mg/kg)						Resemblance	Comments
		Benzene	Toluene	Ethyl-benzene	Xylenes	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{21})	F3 (C_{21}-C_{32})	Reached Baseline at C_{32}?[4]	Modified TPH[5]		
RDL (2014 sampling)		0.025	0.025	0.025	0.05	2.5	10	10	15	15		-	-
Tier I ESLs - Plants and Soil Inv. [1]		31	75	55	95	210	150	300		-	-	-	-
Tier I RBSLs [2]		0.099	77	30	8.8	-	-	-	-	-	270	-	-
SSTL [3]		-	-	-	-	-	-	-	-	-	1,700	-	-
2014 Sampling - Stantec[6]													
14-MB-BS701	0.0 - 0.4	<0.025	<0.025	<0.025	<0.050	<2.5	5,000	8,000	1,400	Yes	**14,000**	WFO	-
14-MB-BS702	0.0 - 0.4	<0.025	<0.025	<0.025	<0.050	<2.5	17,000	23,000	2,300	Yes	**42,000**	WFO	-
14-MB-BS703	0.0 - 0.15	<0.025	<0.025	<0.025	<0.050	<2.5	2,000	4,100	520	Yes	**6,600**	WFO	-
14-MB-BS704	0.0 - 0.15	<0.025	<0.025	<0.025	<0.050	<2.5	220	510	350	Yes	**1,100**	WFO, ULO	-
14-MB-BS705	0.0 - 0.4	<0.025	<0.025	<0.025	<0.050	<2.5	2,000	4,100	710	Yes	**6,800**	WFO	-
14-MB-BS801	0.0 - 0.25	<0.025	<0.025	<0.025	<0.050	<2.5	140	410	180	No	**730**	FO/LO, LO	-
14-MB-BS802	0.0 - 0.6	<0.025	<0.025	<0.025	<0.050	<2.5	3,500	3,300	280	Yes	**7,100**	WFO	Soil removed
14-MB-BS803	0.0 - 0.15	<0.025	<0.025	<0.025	<0.050	<2.5	<10	<10	25	Yes	25	ULO	-
14-MB-BS804	0.0 - 0.6	<0.025	0.65	<0.025	<0.050	<2.5	<10	<10	54	Yes	54	NRLO	-
14-MB-BS805	0.0 - 0.6	<0.025	0.29	<0.025	<0.050	<2.5	<10	<10	64	Yes	64	NRLO	-
14-MB-BS806	0.0 - 0.2	<0.050	0.45	<0.050	<0.10	<5	<10	<10	68	Yes	67	NRLO	-
14-MB-BS901	0.0 - 0.6	<0.025	<0.025	<0.025	<0.050	<2.5	960	460	220	Yes	**1,600**	WFO, LO	-
14-MB-BS902	0.0 - 0.25	<0.025	<0.025	<0.025	<0.050	110	15,000	4,600	1,200	Yes	**21,000**	WFO, LO	-
14-MB-BS902 Lab-Dup		<0.025	<0.025	<0.025	<0.050	56	-	-	-	-	-	-	-
14-MB-BS903	0.0 - 0.3	<0.025	<0.025	<0.025	<0.050	30	8,100	1,100	69	Yes	**9,200**	WFO	-
14-FIELD DUP 2 (Field Duplicate of 14-MB-BS903)		<0.025	<0.025	<0.025	<0.050	15	6,400	1,100	96	Yes	**7,700**	WFO	-
14-MB-BS904	0.0 - 0.2	<0.025	<0.025	<0.025	<0.050	13	430	340	260	Yes	**1,000**	WFO, LO	-

Notes:

1 = Atlantic Partnership in RBCA (Risk-Based Corrective Action) Implementation (PIRI) Tier I Soil Ecological Screening Levels (ESLs) for the Protection of Plants and Soil Invertebrates; Direct Soil Contact (Table 1a), for a residential site with coarse grained soil (2012, Revised 2015). Screening levels apply to the top 1.5 m of the soil profile.

2= Atlantic PIRI Tier I Risk Based Screening Levels (RBSLs) for a residential site with non-potable groundwater (Table 4a), coarse grained soil and fuel oil impacts (2012, Revised 2015).

3 = Site-specific target level (SSTL) calculated for TPH at the Former Radar Site (Stantec, 2010)

4 = Atlantic Partnership in RBCA Implementation analytical method does not analyze for >C_{32}. Laboratory certificate indicates (Yes or No) whether chromatogram for each sample returns to baseline after C_{32}. Samples are considered to have returned to baseline if the area from C_{32}-C_{36} is less than 10% of the area from C_{10}-C_{32}.

5 = Modified TPH = TPH C_6 - C_{32} (excluding BTEX).

6 = Triple silica gel clean-up performed on samples prior to analysis to remove organic interferences.

RDL = Reportable Detection Limit; < ## = Not detected above RDL noted; "-" = Not analyzed, not applicable or no applicable guideline.

Underlined = Value exceeds Tier I ESL for the Protection of Plants and Soil Invertebrates (note: F1 and F2 ESLs were not applied to 2009-2010 samples herein)

Bold = Value exceeds Tier I RBSL for residential land use

Shaded = Value exceeds SSTL calculated for the Former Radar Site (Stantec, 2010)

Resemblance

FO/LO = One product in fuel oil/lube oil range

LO = Lube oil fraction

NRLO = No resemblance to petroleum products in the lube oil range

ULO = Unidentified petroleum products in the lube oil range

WFO = Weathered fuel oil fraction

Table C.4 Results of Laboratory Analysis of Petroleum Hydrocarbons in Soil - POL Compound
Implementation of the RAP - Year 4
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Depth (m)	BTEX Parameters (mg/kg)				Total Petroleum Hydrocarbons (mg/kg)						Resemblance	Comments
		Benzene	Toluene	Ethyl-benzene	Xylenes	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{21})	F3 (C_{21}-C_{32})	Reached Baseline at C_{32}?[4]	Modified TPH[5]		
RDL (2009 sampling)		0.03	0.03	0.03	0.05	3	15		15	-	20	-	-
RDL (2010 sampling)		0.03	0.03	0.03	0.05	3	10	10	15	-	20	-	-
Tier I ESLs - Plants and Soil Inv. [1]		31	75	55	95	210	150	300		-	-	-	-
Tier I RBSLs [2]		0.099	77	30	8.8	-	-	-	-	-	270	-	-
SSTL [3]		-	-	-	-	-	-	-	-	-	1,700	-	-
2009 Sampling - Stantec													
TP140-BS1	0.2 - 0.3	<0.03	<0.03	<0.03	<0.05	<3	650		1,800	-	**2,400**	FO, LO	-
TP141-BS1	0.1 - 0.2	<0.04	1.2	<0.03	0.15	-	-		-	-	**25,000**	WFO, LO	-
TP142-BS1	0.2 - 0.3	<0.03	<0.03	<0.03	0.5	67	2,600		10,000	-	**13,000**	FO, LO	-
BS42	0.0 - 0.13	<0.03	<0.03	<0.03	<0.05	<3	1,700		10,000	-	**12,000**	WFO, LO	-
MW21-SS1	0.0 - 0.1	<0.03	<0.03	<0.03	<0.05	<3	250		1,100	-	**1,300**	WFO, LO	-
MW24-SS1	0.0 - 0.1	<0.03	<0.03	<0.03	<0.05	36	5,500		15,000	-	**21,000**	WFO, LO	-
2010 Sampling - Stantec													
POL-TP1 BS1	0.0 - 0.3	<0.03	0.37	<0.03	<0.05	<3	7,600	3,100	50,000	-	**60,000**	FO, LO	-
POL-TP2 BS1	0.0 - 0.15	<0.03	<0.03	<0.03	<0.05	<3	260	310	720	-	**1,300**	WFO, NRLO	-
POL-TP3 BS1	0.0 - 0.1	<0.03	<0.03	<0.03	<0.05	<3	<10	<10	69	-	69	NRLO	-
POL-TP4 BS1	0.0 - 0.15	<0.03	0.09	<0.03	<0.05	<3	2,400	1,200	13,000	-	**17,000**	WFO, LO	-
POL-TP5 BS1	0.0 - 0.25	<0.03	<0.03	<0.03	<0.05	<3	96	40	300	-	**440**	WFO, NRLO	-
POL-TP6 BS1	0.0 - 0.3	<0.03	<0.03	<0.03	<0.05	170	2,100	630	12,000	-	**15,000**	WFO, LO	-

Notes:

1 = Atlantic Partnership in RBCA (Risk-Based Corrective Action) Implementation (PIRI) Tier I Soil Ecological Screening Levels (ESLs) for the Protection of Plants and Soil Invertebrates; Direct Soil Contact (Table 1a), for a residential site with coarse grained soil (2012, Revised 2015). Screening levels apply to the top 1.5 m of the soil profile.

2= Atlantic PIRI Tier I Risk Based Screening Levels (RBSLs) for a residential site with non-potable groundwater (Table 4a), coarse grained soil and fuel oil impacts (2012, Revised 2015).

3 = Site-specific target level (SSTL) calculated for TPH at the Former Radar Site (Stantec, 2010)

4 = Atlantic Partnership in RBCA Implementation analytical method does not analyze for >C_{32}. Laboratory certificate indicates (Yes or No) whether chromatogram for each sample returns to baseline after C_{32}. Samples are considered to have returned to baseline if the area from C_{32}-C_{36} is less than 10% of the area from C_{10}-C_{32}.

5 = Modified TPH = TPH C_6 - C_{32} (excluding BTEX).

"-" = Not analyzed, not applicable or no applicable guideline.

RDL = Reportable Detection Limit; < ## = Not detected above RDL noted

Underlined = Value exceeds Tier I ESL for the Protection of Plants and Soil Invertebrates (note: F1 and F2 ESLs were not applied to 2009 samples herein)

Bold = Value exceeds Tier I RBSL for residential land use

Shaded = Value exceeds SSTL calculated for the Former Radar Site (Stantec, 2010)

Resemblance:

FO = Fuel oil fraction

LO = Lube oil fraction

NRLO = No resemblance to petroleum products in the lube oil range

WFO = Weathered fuel oil fraction

Table C.4 Results of Laboratory Analysis of Petroleum Hydrocarbons in Soil - POL Compound
Implementation of the RAP - Year 4
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Depth (m)	BTEX Parameters (mg/kg)				Total Petroleum Hydrocarbons (mg/kg)						Resemblance	Comments
		Benzene	Toluene	Ethyl-benzene	Xylenes	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{21})	F3 (C_{21}-C_{32})	Reached Baseline at C_{32}?[4]	Modified TPH[5]		
RDL (2010 sampling)		0.03	0.03	0.03	0.05	3	10	10	15	-	20	-	-
RDL (2014 sampling)		0.025	0.025	0.025	0.05	2.5	10	10	15	-	15	-	-
Tier I ESLs - Plants and Soil Inv. [1]		31	75	55	95	210	150	300		-	-	-	-
Tier I RBSLs [2]		0.099	77	30	8.8	-	-	-	-	-	270	-	-
SSTL [3]		-	-	-	-	-	-	-	-	-	1,700	-	-
2010 Sampling - Stantec (...continued)													
POL-BS2	0.0 - 0.1	<0.03	0.06	<0.03	<0.05	<3	<10	85	650	-	**730**	WFO, LO	-
POL-BS21 (POL-BS2 Field Dup.)	0.0 - 0.1	<0.03	0.15	<0.03	0.09	<3	<10	76	560	-	**630**	WFO, LO	-
POL-BS4	0.0 - 0.15	<0.03	<0.03	<0.03	<0.05	<3	<10	<10	<15	-	<20	-	-
POL-BS4 Lab-Dup	0.0 - 0.15	<0.03	<0.03	<0.03	<0.05	<3	<10	<10	<15	-	-	-	-
POL-BS5	0.0 - 0.15	<0.03	<0.03	<0.03	<0.05	<3	<10	<10	45	-	45	NRLO	
POL-BS9	0.0 - 0.1	<0.03	1.1	<0.03	<0.05	<3	<10	14	320	-	**340**	LO	
2014 Sampling - Stantec													
14-POL-BS101	0.0 - 0.25	nd	nd	nd	nd	nd	3,600	3,000	27,000	No	**33,000**	WFO, LO	
14-POL-BS102	0.0 - 0.10	nd	nd	nd	nd	nd	240	550	13,000	No	**14,000**	WFO, LO	
14-POL-BS103	0.0 - 0.12	<0.13	<0.13	<0.13	<0.25	<13	360	400	6,100	No	**6,900**	WFO, LO	
14-POL-BS103 Lab-Dup	0.0 - 0.12	<0.13	<0.13	<0.13	<0.25	<13	-	-	-	-	-	-	
14-POL-BS104	0.0 - 0.15	nd	nd	nd	nd	nd	2,700	2,300	16,000	No	**21,000**	WFO, LO	
14-POL-BS105	0.0 - 0.15	<0.13	<0.13	<0.13	<0.25	<13	1,000	1,500	16,000	No	**18,000**	WFO, LO	
14-POL-BS106	0.0 - 0.30	nd	nd	nd	nd	nd	nd	32	210	No	240	LO	
14-POL-BS107	0.0 - 0.20	nd	nd	nd	nd	nd	240	310	1,400	No	**2,000**	WFO, LO	
14-POL-BS108	0.0 - 0.40	nd	nd	nd	nd	nd	nd	nd	130	No	130	LO	

Notes:

1 = Atlantic Partnership in RBCA (Risk-Based Corrective Action) Implementation (PIRI) Tier I Soil Ecological Screening Levels (ESLs) for the Protection of Plants and Soil Invertebrates; Direct Soil Contact (Table 1a), for a residential site with coarse grained soil (2012, Revised 2015). Screening levels apply to the top 1.5 m of the soil profile.

2= Atlantic PIRI Tier I Risk Based Screening Levels (RBSLs) for a residential site with non-potable groundwater (Table 4a), coarse grained soil and fuel oil impacts (2012, Revised 2015).

3 = Site-specific target level (SSTL) calculated for TPH at the Former Radar Site (Stantec, 2010)

4 = Atlantic Partnership in RBCA Implementation analytical method does not analyze for >C_{32}. Laboratory certificate indicates (Yes or No) whether chromatogram for each sample returns to baseline after C_{32}. Samples are considered to have returned to baseline if the area from C_{32}-C_{36} is less than 10% of the area from C_{10}-C_{32}.

5 = Modified TPH = TPH C_6 - C_{32} (excluding BTEX).

"-" = Not analyzed, not applicable or no applicable guideline.

RDL = Reportable Detection Limit; < ## = Not detected above RDL noted

Underlined = Value exceeds Tier I ESL for the Protection of Plants and Soil Invertebrates (note: F1 and F2 ESLs were not applied to 2009 samples herein)

Bold = Value exceeds Tier I RBSL for residential land use

Shaded = Value exceeds SSTL calculated for the Former Radar Site (Stantec, 2010)

Resemblance

LO = Lube oil fraction NRLO = No resemblance to petroleum products in the lube oil range WFO = Weathered fuel oil fraction

Table C.4 Results of Laboratory Analysis of Petroleum Hydrocarbons in Soil - POL Compound
Implementation of the RAP - Year 4
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Depth (m)	BTEX Parameters (mg/kg)				Total Petroleum Hydrocarbons (mg/kg)						Resemblance	Comments
		Benzene	Toluene	Ethyl-benzene	Xylenes	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{21})	F3 (C_{21}-C_{32})	Reached Baseline at C_{32}?[4]	Modified TPH[5]		
RDL (2014 sampling)		0.025	0.025	0.025	0.05	2.5	10	10	15	-	15	-	-
Tier I ESLs - Plants and Soil Inv. [1]		31	75	55	95	210	150	300		-	-	-	-
Tier I RBSLs [2]		0.099	77	30	8.8	-	-	-	-	-	270	-	-
SSTL [3]		-	-	-	-	-	-	-	-	-	1,700	-	-
2014 Sampling - Stantec (... continued)[6]													
14-POL-BS109	0.0 - 0.07	nd	nd	nd	nd	nd	150	290	2,400	No	**2,800**	WFO, LO	-
14-POL-BS110	0.0 - 0.15	nd	nd	nd	nd	nd	nd	45	720	No	**770**	LO	-
14-POL-BS111	0.0 - 0.35	nd	0.45	nd	nd	nd	54	200	2,000	No	**2,300**	LO	-
14-POL-BS112	0.0 - 0.2	nd	0.12	nd	nd	nd	nd	nd	50	Yes	50	LO	-
14-POL-BS113	0.0 - 0.1	nd	0.085	nd	nd	nd	nd	52	620	No	**670**	FO, LO	-
14-POL-BS114	0.0 - 0.1	nd	0.031	nd	nd	nd	nd	nd	110	No	110	LO	-
14-POL-BS115	0.0 - 0.15	nd	nd	nd	nd	nd	nd	nd	100	Yes	100	NRLO	-
14-POL-BS116	0.0 - 0.4	nd	0.027	nd	nd	nd	16	55	910	No	**980**	LO	-
14-POL-BS117	0.0 - 0.4	nd	nd	nd	nd	nd	nd	nd	17	Yes	17	NRLO	-
14-POL-BS117 Lab-Dup		nd	nd	nd	nd	nd	nd	nd	27	-	-	-	-
14-POL-BS118	0.0 - 0.4	<0.050	<0.050	<0.050	<0.10	<5.0	nd	nd	100	Yes	100	NRLO	-
14-POL-BS119	0.0 - 0.4	<0.050	<0.050	<0.050	<0.10	<5.0	nd	nd	150	Yes	150	NRLO	-
14-POL-BS120	0.0 - 0.3	nd	nd	nd	nd	nd	nd	nd	120	No	120	LO	-
14-POL-BS120 Lab-Dup		nd	nd	nd	nd	nd	nd	nd	120	-	-	-	-

Notes:

1 = Atlantic Partnership in RBCA (Risk-Based Corrective Action) Implementation (PIRI) Tier I Soil Ecological Screening Levels (ESLs) for the Protection of Plants and Soil Invertebrates; Direct Soil Contact (Table 1a), for a residential site with coarse grained soil (2012, Revised 2015). Screening levels apply to the top 1.5 m of the soil profile.

2= Atlantic PIRI Tier I Risk Based Screening Levels (RBSLs) for a residential site with non-potable groundwater (Table 4a), coarse grained soil and fuel oil impacts (2012, Revised 2015).

3 = Site-specific target level (SSTL) calculated for TPH at the Former Radar Site (Stantec, 2010)

4 = Atlantic Partnership in RBCA Implementation analytical method does not analyze for >C_{32}. Laboratory certificate indicates (Yes or No) whether chromatogram for each sample returns to baseline after C_{32}. Samples are considered to have returned to baseline if the area from C_{32}-C_{36} is less than 10% of the area from C_{10}-C_{32}.

5 = Modified TPH = TPH C_6 - C_{32} (excluding BTEX).

6 = Triple silica gel clean-up performed on samples prior to analysis to remove organic interferences.

RDL = Reportable Detection Limit; < ## = Not detected above RDL noted; "-" = Not analyzed, not applicable or no applicable guideline.

Underlined = Value exceeds Tier I ESL for the Protection of Plants and Soil Invertebrates (note: F1 and F2 ESLs were not applied to 2009 samples herein)

Bold = Value exceeds Tier I RBSL for residential land use

Shaded = Value exceeds SSTL calculated for the Former Radar Site (Stantec, 2010)

Resemblance

FO = Fuel oil fraction

LO = Lube oil fraction

NRLO = No resemblance to petroleum products in the lube oil range

WFO = Weathered fuel oil fraction

Table C.5 Results of Laboratory Analysis of PCBs in Soil - Main Base
Implementation of the RAP - Year 4
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Depth (m)	Polychlorinated Biphenyls (PCBs)	Comments
	RDL	0.05	-
	Units	mg/kg	-
	CCME SQG[1]	1.3	-
	SSTL (Residential Area)[2]	9	-
ESG 2005			
6497*	0 - 0.1	nd	-
6498*	0 - 0.1	nd	-
6499*	0 - 0.1	**1.7**	-
6500*	0 - 0.1	nd	-
6502*	0 - 0.1	**1.6**	-
6503*	0 - 0.1	nd	-
6504	0 - 0.1	0.6	-
6505*	0 - 0.1	nd	-
6506*	0 - 0.1	nd	-
6507*	0.3	nd	-
6508*	0 - 0.1	nd	-
6509*	0 - 0.1	**1.8**	-
6510*	0 - 0.1	nd	-
6512*	0 - 0.1	nd	-
6513*	0 - 0.1	**4.2**	-
6514	0 - 0.1	**12,000**	Soil removed
6515*	0 - 0.1	nd	-
6516	0 - 0.1	nd	-
6517*	0 - 0.1	nd	-
6518	0 - 0.1	**3.5**	Soil removed
6519*	0 - 0.1	**2.2**	-
6520*	0 - 0.1	nd	-
6522*	0 - 0.1	nd	-
6523*	0 - 0.1	nd	-
6524*	0 - 0.1	nd	-
6525*	0 - 0.1	nd	-
6526*	0 - 0.1	nd	-
6527*	0 - 0.1	nd	-
6528*	0 - 0.1	nd	-
6529*	0 - 0.1	nd	-
6530	0 - 0.1	nd	-
6532*	0.3	nd	-
6533	0 - 0.1	**6.0**	-
6534	0 - 0.1	**4.0**	Soil removed
6535*	0 - 0.1	nd	-
6536*	0 - 0.1	nd	-
6537*	0.3 - 0.4	nd	-
6538*	0 - 0.1	nd	-
6539*	0 - 0.1	nd	-

Notes:

1 = Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guideline (SQG) for a Residential/Parkland Site (CCME on-line 2015)

2 = Site-Specific Target Level (SSTL) calculated for PCBs in the Residential Area (Stantec, 2010)

* = Analysis carried out with field test kit

RDL = Reportable Detection Limit for routine analysis

Lab-dup = Laboratory duplicate sample

< # = Not detected above RDL noted

Bold = Value exceeds CCME SQG for a residential/parkland site

Shaded = Value exceeds SSTL calculated for PCBs at the Residential Area (Stantec, 2010)

Table C.5 Results of Laboratory Analysis of PCBs in Soil - Main Base
Implementation of the RAP - Year 4
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Depth (m)	Polychlorinated Biphenyls (PCBs)	Comments
	RDL	0.05	-
	Units	mg/kg	-
	CCME SQG[1]	1.3	-
	SSTL (Residential Area)[2]	9	-
ESG 2005 (...continued)			
6540*	0.4 - 0.5	nd	-
6542*	0 - 0.1	nd	-
6543*	0 - 0.1	nd	-
6544	0 - 0.1	0.6	-
6545*	0 - 0.1	nd	-
6546	0 - 0.1	**33**	-
6597*	0 - 0.1	nd	-
6598*	0 - 0.1	nd	-
6599*	0 - 0.1	nd	-
21480	0 - 0.1	**2.0**	-
21482	0 - 0.1	nd	-
21483	0 - 0.1	**2.4**	-
21484	0 - 0.1	**28**	-
21485	0 - 0.1	**2.7**	-
21486	0 - 0.1	**2.1**	-
21558	0 - 0.1	1.0	-
21559	0 - 0.1	nd	-
21562	0 - 0.1	**1.4**	-
21563	0 - 0.1	nd	-
21566	0 - 0.1	nd	-
21567	0 - 0.1	0.6	-
ESG 2007			
22390	0 - 0.1	0.6	-
22393	0 - 0.1	0.7	-
22397	0 - 0.1	nd	-
22398	0 - 0.1	0.6	-
22399	0 - 0.1	nd	-
22400	0 - 0.1	**15.7**	-
22402	0 - 0.1	**6.0**	-
22403	0 - 0.1	**2.0**	-
22404	0 - 0.1	nd	-
22408	0 - 0.1	**1.8**	-
22418	0 - 0.1	nd	-
22420	0 - 0.1	**33**	-
22424	0 - 0.1	**24.3**	-
22433	0 - 0.1	**9.2**	Soil removed
22434	0 - 0.1	nd	Soil removed
22435	0 - 0.1	**15.5**	Soil removed
22439	0 - 0.1	**1.5**	Soil removed
22443	0 - 0.1	**9.6**	Soil removed

Notes:

1 = Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guideline (CSQG) for a Residential/Parkland Site (CCME on-line 2014)

2 = Site-Specific Target Level (SSTL) calculated for PCBs in the Residential Area (Stantec, 2010)

* = Analysis carried out with field test kit

RDL = Reportable Detection Limit for routine analysis; < # = Not detected above RDL noted

Lab-dup = Laboratory duplicate sample

Bold/Italics = Value exceeds CCME SQG for a residential/parkland site

Shaded = Value exceeds SSTL calculated for PCBs at the Residential Area (Stantec, 2010)

Table C.5 Results of Laboratory Analysis of PCBs in Soil - Main Base
Implementation of the RAP - Year 4
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Depth (m)	Polychlorinated Biphenyls (PCBs)	Comments
	RDL	0.05	-
	Units	mg/kg	-
	CCME SQG[1]	1.3	-
	SSTL (Residential Area)[2]	9	-
ESG 2007 (...continued)			
22444	0 - 0.1	**1,480**	Soil removed
22448	0 - 0.1	nd	-
22469	0 - 0.1	**13.5**	-
22470	0 - 0.1	**22.5**	-
22471	0 - 0.1	**22.4**	-
22472	0 - 0.1	nd	-
22474	0 - 0.1	**12.8**	Soil removed
22475	0 - 0.1	**12.7**	Soil removed
22476	0 - 0.1	0.6	Soil removed
22477	0 - 0.1	nd	-
22478	0 - 0.1	**73.1**	Soil removed
22479	0 - 0.1	**10.4**	Soil removed
22482	0 - 0.1	**152**	Soil removed
22483	0 - 0.1	**30.6**	Soil removed
22484	0 - 0.1	**56.5**	Soil removed
22485	0 - 0.1	0.6	Soil removed
22488	0 - 0.1	**20,200**	Soil removed
22492	0 - 0.1	**6,370**	Soil removed
22493	0 - 0.1	**44.2**	Soil removed
22494	0 - 0.1	**14.9**	Soil removed
22495	0 - 0.1	**3.4**	-
22496	0 - 0.1	**30.8**	Soil removed
22517	0 - 0.1	**8.1**	-
22537	0 - 0.1	**7.2**	Soil removed
22538	0 - 0.1	**82.5**	Soil removed
22673	0 - 0.1	nd	-
22675	0 - 0.1	2.2	-
22677	0 - 0.1	4.6	-
22683	0 - 0.1	1	-
22693	0 - 0.1	1.3	-
22694	0 - 0.1	4.9	-
22695	0 - 0.1	nd	-
22700	0 - 0.1	nd	-
22705	0 - 0.1	**1,300**	-
22709	0 - 0.1	nd	-
22713	0 - 0.1	nd	-
22715	0 - 0.1	0.7	-

Notes:

1 = Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guideline (CSQG) for a Residential/Parkland Site (CCME on-line 2014)

2 = Site-Specific Target Level (SSTL) calculated for PCBs in the Residential Area (Stantec, 2010)

* = Analysis carried out with field test kit

RDL = Reportable Detection Limit for routine analysis; < # = Not detected above RDL noted

Lab-dup = Laboratory duplicate sample

Bold/Italics = Value exceeds CCME SQG for a residential/parkland site

Shaded = Value exceeds SSTL calculated for PCBs at the Residential Area (Stantec, 2010)

Table C.5 Results of Laboratory Analysis of PCBs in Soil - Main Base
Implementation of the RAP - Year 4
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Depth (m)	Polychlorinated Biphenyls (PCBs)	Comments
	RDL	0.05	-
	Units	mg/kg	-
	CCME SQG[1]	1.3	-
	SSTL (Residential Area)[2]	9	-
2009 Sampling - Stantec			
TP7-BS2	0.6 - 0.8	<0.05	-
TP13-BS2	1.0 - 1.1	**2.3**	-
TP16-BS1	0.1 - 0.3	<0.05	-
TP20-BS2	0.4 - 1.3	**6.2**	-
TP21-BS2	0.9 - 1.0	**3.2**	-
TP24-BS2	1.0 - 1.1	<0.05	-
TP31-BS2	0.8 - 0.9	<0.05	-
TP37-BS1	0.0 - 0.2	<0.05	-
TP41-BS1	0.6 - 0.8	0.95	-
TP43-BS2	1.5 - 1.7	<0.05	-
TP52-BS1	0.1 - 0.2	<0.05	-
TP62-BS1	0.5 - 0.6	0.59	-
TP62-BS1-Lab-Dup	0.5 - 0.6	0.56	-
TP68-BS2	0.7 - 0.8	<0.05	-
TP69-BS2	1.3 - 1.4	0.51	-
TP214-BS1	0.6 - 0.7	<0.05	-
TP220-BS2	1.4 - 1.5	**3.4**	-
TP221-BS2	1.5 - 1.6	0.24	-
TP222-BS2	1.6 - 1.7	0.37	-
TP223-BS1	0.4 - 0.5	<0.05	-
TP224-BS1	0.0 - 0.2	<0.05	-
BS43	0.0 - 0.14	**1.7**	-
BS44	0.0 - 0.05	**2.2**	-
BS46	0.0 - 0.15	0.73	-
BS53	0.0 - 0.08	1.3	-
BS57	0.0 - 0.17	0.77	-
BS61	0.0 - 0.15	<0.05	-
BS65	0.0 - 0.15	0.38	-
BS68	0.0 - 0.22	<0.05	-
BS72	0.0 - 0.15	<0.05	-
BS75	0.0 - 0.05	0.30	-
BS76	0.0 - 0.04	0.09	-
BS78	0.0 - 0.10	0.06	-
BS81	0.0 - 0.12	**1.7**	-
BS84	0.0 - 0.10	0.81	-
BS91	0.0 - 0.12	1.3	-
BS95	0.0 - 0.05	**2.3**	-
BS95-Lab-Dup	0.0 - 0.05	**1.8**	-
BS100	0.0 - 0.15	**5.5**	-
BS110	0.0 - 0.20	**53**	Soil removed

Notes:

1 = Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guideline (CSQG) for a Residential/Parkland Site (CCME on-line 2014)

2 = Site-Specific Target Level (SSTL) calculated for PCBs in the Residential Area (Stantec, 2010)

* = Analysis carried out with field test kit

RDL = Reportable Detection Limit for routine analysis; < # = Not detected above RDL noted

Lab-dup = Laboratory duplicate sample

Bold/Italics = Value exceeds CCME SQG for a residential/parkland site

Shaded = Value exceeds SSTL calculated for PCBs at the Residential Area (Stantec, 2010)

Table C.5 Results of Laboratory Analysis of PCBs in Soil - Main Base
Implementation of the RAP - Year 4
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Depth (m)	Polychlorinated Biphenyls (PCBs)	Comments
RDL		0.05	-
Units		mg/kg	-
CCME SQG[1]		1.3	-
SSTL (Residential Area)[2]		9	-
2009 Sampling - Stantec (...continued)			
BS113	0.0 - 0.18	**1.4**	Soil removed
BS265	Not recorded	1.1	-
MW1-SS1	0.15 - 0.8	<0.05	-
MW14-SS3	1.2 - 1.4	<0.05	-
Septic Tank	0.0 - 0.1	**72**	-
2010 Sampling - Stantec			
MB-BS1	0.0 - 0.15	**41,000**	Soil removed
MB-BS1 Lab Dup	0.0 - 0.15	**39,000**	Soil removed
MB-BS3	0.0 - 0.15	**650**	Soil removed
MB-BS5	0.0 - 0.15	**1,600**	Soil removed
MB-BS7	0.0 - 0.1	**3.2**	-
MB-BS9	0.0 - 0.1	**6.4**	Soil removed
MB-BS10	0.0 - 0.1	**910**	Soil removed
2013 Sampling - Stantec			
13-MB-BS1	0.0 - 0.3	**12**	Tag No. 16
13-MB-BS2A	0.0 - 0.25	**3.0**	Tag No. 17
13-MB-BS2B	0.25 - 0.5	0.26	Tag No. 17
13-MB-BS2B Lab-Dup		0.33	
13-MB-BS3	0.0 - 0.02	**2.8**	Tag No. 18, Soil removed
13-MB-BS4A	0.15 - 0.25	<0.050	Tag No. 19
13-MB-BS4B	0.25 - 0.5	<0.050	Tag No. 19
13-MB-BS5	0.3 - 0.5	<0.050	Tag No. 20
13-MB-BS6	0.2 - 0.4	<0.050	Tag No. 21
13-MB-BS7	0.0 - 0.05	<0.050	Tag No. 22, Soil removed
13-MB-BS8	0.3 - 0.4	<0.050	Tag No. 23, Soil removed
13-MB-BS9	0.0 - 0.3	<0.050	Tag No. 24
13-MB-BS9 Lab-Dup		<0.050	
13-MB-BS10	0.0 - 0.1	0.28	Tag No. 25
13-MB-BS11	0.0 - 0.1	<0.050	Tag No. 26
13-MB-BS12	0.0 - 0.1	**8,400**	Tag No. 27
13-MB-BS14 (Field Dup. of 13-MB-BS12)		**8,900**	
13-MB-BS13	0.0 - 0.1	**5,300**	Tag No. 28, Soil removed
13-MB-BS15	0.0 - 0.2	0.17	Tag No. 39
13-MB-BS15 Lab-Dup		0.30	
13-MB-BS16	0.0 - 0.1	0.19	Tag No. 40
13-MB-BS17	0.0 - 0.1	0.16	Tag No. 41
13-POLW-BS1	0.0 - 0.1	0.15	Tag No. 33
13-POLW-BS3	0.0 - 0.1	<0.050	Tag No. 31

Notes:

1 = Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guideline (CSQG) for a Residential/Parkland Site (CCME on-line 2014)

2 = Site-Specific Target Level (SSTL) calculated for PCBs in the Residential Area (Stantec, 2010)

* = Analysis carried out with field test kit

RDL = Reportable Detection Limit for routine analysis; < # = Not detected above RDL noted

Lab-dup = Laboratory duplicate sample

Bold/Italics = Value exceeds CCME SQG for a residential/parkland site

Shaded = Value exceeds SSTL calculated for PCBs at the Residential Area (Stantec, 2010)

Table C.5 Results of Laboratory Analysis of PCBs in Soil - Main Base
Implementation of the RAP - Year 4
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Depth (m)	Polychlorinated Biphenyls (PCBs)	Comments
RDL		0.05	-
Units		mg/kg	-
CCME SQG[1]		1.3	-
SSTL (Residential Area)[2]		9	-
2013 Sampling - Stantec (... continued)			
13-POLW-BS5	0.0 - 0.1	**2.4**	Tag No. 29
13-POLW-BS11 (Field Dup. of 13-POLW-BS5)		1.2	
13-POLW-BS8	0.0 - 0.05	0.46	Tag No. 36
13-POLW-BS9	0.0 - 0.06	0.36	Tag No. 37
13-POLW-BS10	0.0 - 0.1	**22**	Tag No. 38
2014 Sampling - Stantec			
14-MB-BS101	0.5 - 1.0	0.23	-
14-FIELD DUP3 (Field duplicate of 14-MB-BS101)		0.12	-
14-MB-BS102	0.5 - 1.0	0.33	-
14-MB-BS401	0.0 - 1.2	0.78	-
14-MB-BS402	0.0 - 0.5	0.52	-
14-MB-BS403	0.0 - 0.6	0.17	-
14-MB-BS501	0.0 - 0.1	<0.05	-
14-MB-BS501 Lab-Dup		0.057	-
14-MB-BS502	0.0 - 0.1	3.9	-
14-MB-BS706	0.0 - 0.4	<0.05	-
14-MB-BS706 Lab-Dup		<0.05	-
14-POLW-BS101	0.0 - 0.1	2.1	-
14-POLW-BS102	0.0 - 0.15	1.0	-
14-POLW-BS103	0.0 - 0.2	0.67	-

Notes:

1 = Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guideline (CSQG) for a Residential/Parkland Site (CCME on-line 2014)

2 = Site-Specific Target Level (SSTL) calculated for PCBs in the Residential Area (Stantec, 2010)

* = Analysis carried out with field test kit

RDL = Reportable Detection Limit for routine analysis; < # = Not detected above RDL noted

Lab-dup = Laboratory duplicate sample

Bold/Italics = Value exceeds CCME SQG for a residential/parkland site

Shaded = Value exceeds SSTL calculated for PCBs at the Residential Area (Stantec, 2010)

Table C.6 Results of Laboratory Analysis of Petroleum Hydrocarbons in Groundwater - POL Compound
Implementation of the RAP - Year 4
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	BTEX Parameters (mg/L)				Total Petroleum Hydrocarbons (mg/L)					Resemblance
	Benzene	Toluene	Ethyl-benzene	Xylenes	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{32})	Returned to baseline?[4]	Modified TPH[5]	
RDL	0.0010	0.0010	0.0010	0.0020	0.010	0.050	0.10	-	-	-
Tier I ESLs - Plants and Soil Inv. [1]	61	59	20	31	7.1	1.8	-	-	-	-
Tier I ESLs - Aquatic Life (200 m) [2]	150	140	100	91	-	-	-	-	> Sol	-
Tier I RBSLs (Residential) [3]	13	20	20	20	-	-	-	-	20	-
14-POL-SW1	nd	nd	nd	nd	nd	0.097	0.25	Yes	0.35	FO, LO
14-POL-SW2	nd	nd	nd	nd	nd	1.6	1.1	Yes	2.7	FO

Notes:

1 = Atlantic Partnership in RBCA (Risk-Based Corrective Action) Implementation (PIRI) Tier I Ecological Screening Levels (ESLs) for Plant and Soil invertebrate Direct Contact with Shallow Groundwater (Table 2), for a residential site with coarse grained soil (2012, Revised 2014). ESLs are applicable only if groundwater is present within 3 m of ground surface.

2 = Atlantic PIRI Tier I ESLs for the Protection of Freshwater and Marine Aquatic Life (Table 3b) for gasoline/fuel oil/lube oil impacts. Values adjusted for a minimum distance of 200 m to a receiving aquatic environment (2012, Revised 2014).

3 = Atlantic PIRI Tier I Risk-Based Screening Levels (RBSLs) for Groundwater (Table 4b), for a commercial site with non-potable groundwater, coarse grained soil and gasoline/fuel oil/lube oil impacts (2012, Revised 2014).

4 =Atlantic Partnership in RBCA Implementation analytical method does not analyze for >C_{32}. Laboratory certificate indicates (Yes or No) whether chromatogram for each sample returns to baseline after C_{32}. Samples are considered to have returned to baseline if the area from C32-C_{36} is less than 10% of the area from C_{10}-C_{32}.

5 = Modified TPH = TPH C_6 - C_{32} (excluding BTEX).

RDL = Reportable Detection Limit.

nd = Not detected above standard RDL.

"-" = Not analyzed, not applicable or no applicable guideline.

Resemblance:

FO = One product in the fuel oil range LO = One product in the lube oil range

Table C.7 Results of Laboratory Analysis of PCBs on Debris
Implementation of the RAP - Year 4
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sampled Media	Polychlorinated Biphenyls (PCBs)
	RDL	5
	Units	µg/100 cm^2
	CCME Recommended Permissible Surface Contamination Criterion[1]	10
2014 Sampling - Stantec		
14-CABLE1	Cable (BMEWS)	nd
14-SWAB1	4 inch diameter steel pipe (Main Base)	**17**
14-SWAB2	8 inch diameter corrugated steel pipe (Main Base)	**14**
14-SWAB3	Steel tank (Main Base)	nd
14-SWAB4	16 x 24 inch piece of steel (Main Base)	nd
14-SWAB5	Electric pole (Main Base)	nd

Notes:

1 = Canadian Council of Ministers of the Environment (CCME) PCB Transformer Decontamination Standards and Protocols (1995) - Recommended Permissible Surface Contamination Criterion for transformer metal components destined for recycling by smelting

RDL = Reportable Detection Limit for routine analysis

Lab-dup = Laboratory duplicate sample

< # = Not detected above RDL noted

Bold/Shaded = Value exceeds the CCME Criterion

APPENDIX D

Laboratory Analytical Reports

Maxxam
A Bureau Veritas Group Company

Success Through Science®

Your P.O. #: 16300R-20
Your Project #: 121413099
Site Location: HOPEDALE-BIOPILE
Your C.O.C. #: ES895814

Attention:Anna Roy

Stantec Consulting Ltd
St. John's - Standing Offer
141 Kelsey Drive
St. John's, NL
A1B 0L2

Report Date: 2014/09/15
Report #: R3156355
Version: 2

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B4G6680
Received: 2014/09/11, 09:31

Sample Matrix: Soil
Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
TEH in Soil (PIRI) (1, 2)	6	2014/09/12	2014/09/12	ATL SOP 00111	Atl. PIRI v3 m
Moisture (1)	6	N/A	2014/09/12	ATL SOP 00001	OMOE Handbook 1983 m
VPH in Soil (PIRI) (1)	6	2014/09/12	2014/09/12	ATL SOP 00119	Atl. PIRI v3 m
ModTPH (T1) Calc. for Soil (1, 3)	6	N/A	2014/09/12	N/A	Atl. PIRI v3 m

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Maxxam Bedford
(2) Soils are reported on a dry weight basis unless otherwise specified.
(3) New RDLs in effect due to release of NS Contaminated Sites Regulations. Reduced RDL based on MDL study performance. Low level analytical run checks being implemented.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Michelle Hill, Project Manager
Email: MHill@maxxam.ca
Phone# (902)420-0203 Ext:289

==========

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.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4G6680
Report Date: 2014/09/15

Stantec Consulting Ltd
Client Project #: 121413099
Site Location: HOPEDALE-BIOPILE
Your P.O. #: 16300R-20
Sampler Initials: ARR

RBCA HYDROCARBONS IN SOIL (SOIL)

Maxxam ID		XM8719	XM8723	XM8724	XM8725	XM8726		
Sampling Date		2014/09/08 14:00	2014/09/08 14:00	2014/09/08 14:00	2014/09/08 14:00	2014/09/08 14:00		
COC Number		ES895814	ES895814	ES895814	ES895814	ES895814		
	Units	**14-BP-COMPA1**	**14-BP-COMPA2**	**14-BP-COMPB1**	**14-BP-COMPB2**	**14-BP-COMPC1**	**RDL**	**QC Batch**
Inorganics								
Moisture	%	6.6	5.6	7.0	6.8	9.3	1.0	3745589
Petroleum Hydrocarbons								
Benzene	mg/kg	ND	ND	ND	ND	ND	0.025	3745496
Toluene	mg/kg	ND	ND	ND	ND	ND	0.025	3745496
Ethylbenzene	mg/kg	ND	ND	ND	ND	ND	0.025	3745496
Xylene (Total)	mg/kg	ND	ND	ND	ND	ND	0.050	3745496
C6 - C10 (less BTEX)	mg/kg	7.2	5.6	9.1	11	8.1	2.5	3745496
>C10-C16 Hydrocarbons	mg/kg	440	320	560	690	500	10	3745508
>C16-C21 Hydrocarbons	mg/kg	71	58	85	110	74	10	3745508
>C21-<C32 Hydrocarbons	mg/kg	23	23	24	22	ND	15	3745508
Modified TPH (Tier1)	mg/kg	540	410	680	840	590	15	3743895
Reached Baseline at C32	mg/kg	Yes	Yes	Yes	Yes	Yes	N/A	3745508
Hydrocarbon Resemblance	mg/kg	COMMENT (1)	COMMENT (1)	COMMENT (1)	COMMENT (1)	COMMENT (1)	N/A	3745508
Surrogate Recovery (%)								
Isobutylbenzene - Extractable	%	121	117	119	122	117		3745508
n-Dotriacontane - Extractable	%	111	108	97	103	104		3745508
Isobutylbenzene - Volatile	%	99	95	96	92	95		3745496

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
(1) Fuel oil fraction.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4G6680
Report Date: 2014/09/15

Stantec Consulting Ltd
Client Project #: 121413099
Site Location: HOPEDALE-BIOPILE
Your P.O. #: 16300R-20
Sampler Initials: ARR

RBCA HYDROCARBONS IN SOIL (SOIL)

Maxxam ID		XM8728		
Sampling Date		2014/09/08 14:00		
COC Number		ES895814		
	Units	**14-BP-COMPC2**	**RDL**	**QC Batch**
Inorganics				
Moisture	%	7.8	1.0	3745589
Petroleum Hydrocarbons				
Benzene	mg/kg	ND	0.025	3745496
Toluene	mg/kg	ND	0.025	3745496
Ethylbenzene	mg/kg	ND	0.025	3745496
Xylene (Total)	mg/kg	ND	0.050	3745496
C6 - C10 (less BTEX)	mg/kg	8.9	2.5	3745496
>C10-C16 Hydrocarbons	mg/kg	780	10	3745508
>C16-C21 Hydrocarbons	mg/kg	120	10	3745508
>C21-<C32 Hydrocarbons	mg/kg	26	15	3745508
Modified TPH (Tier1)	mg/kg	930	15	3743895
Reached Baseline at C32	mg/kg	Yes	N/A	3745508
Hydrocarbon Resemblance	mg/kg	COMMENT (1)	N/A	3745508
Surrogate Recovery (%)				
Isobutylbenzene - Extractable	%	129		3745508
n-Dotriacontane - Extractable	%	102		3745508
Isobutylbenzene - Volatile	%	91		3745496

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
(1) Fuel oil fraction.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4G6680
Report Date: 2014/09/15

Stantec Consulting Ltd
Client Project #: 121413099
Site Location: HOPEDALE-BIOPILE
Your P.O. #: 16300R-20
Sampler Initials: ARR

GENERAL COMMENTS

TEH Analysis: Silica gel clean-up performed prior to analysis as per client request.

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4G6680
Report Date: 2014/09/15

QUALITY ASSURANCE REPORT

Stantec Consulting Ltd
Client Project #: 121413099
Site Location: HOPEDALE-BIOPILE
Your P.O. #: 16300R-20
Sampler Initials: ARR

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
3745496	Isobutylbenzene - Volatile	2014/09/12	101	60 - 140	96	60 - 140	100	%		
3745508	Isobutylbenzene - Extractable	2014/09/12	95	30 - 130	107	30 - 130	103	%		
3745508	n-Dotriacontane - Extractable	2014/09/12	106	30 - 130	103	30 - 130	107	%		
3745496	Benzene	2014/09/12	101	60 - 140	90	60 - 140	ND ,RDL=0.025	mg/kg	NC	50
3745496	C6 - C10 (less BTEX)	2014/09/12					ND ,RDL=2.5	mg/kg	NC	50
3745496	Ethylbenzene	2014/09/12	122	60 - 140	103	60 - 140	ND ,RDL=0.025	mg/kg	NC	50
3745496	Toluene	2014/09/12	138	60 - 140	99	60 - 140	ND ,RDL=0.025	mg/kg	NC	50
3745496	Xylene (Total)	2014/09/12	139	60 - 140	103	60 - 140	ND ,RDL=0.050	mg/kg	NC	50
3745508	>C10-C16 Hydrocarbons	2014/09/12	94	30 - 130	80	30 - 130	ND ,RDL=10	mg/kg	NC	50
3745508	>C16-C21 Hydrocarbons	2014/09/12	112	30 - 130	89	30 - 130	ND ,RDL=10	mg/kg	NC	50
3745508	>C21-<C32 Hydrocarbons	2014/09/12	113	30 - 130	94	30 - 130	ND ,RDL=15	mg/kg	NC	50

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

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.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

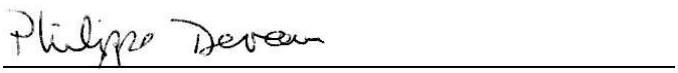
Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4G6680
Report Date: 2014/09/15

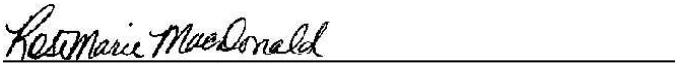
Stantec Consulting Ltd
Client Project #: 121413099
Site Location: HOPEDALE-BIOPILE
Your P.O. #: 16300R-20
Sampler Initials: ARR

VALIDATION SIGNATURE PAGE

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



Phil Deveau



Rose MacDonald, Scientific Specialist (Organics)

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.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Success Through Science®

Your P.O. #: 16300R-20
Your Project #: 121413099.200
Site Location: HOPEDALE CONF. SAMPLING

Attention:Jim Slade

Stantec Consulting Ltd
St. John's - Standing Offer
141 Kelsey Drive
St. John's, NL
A1B 0L2

Your C.O.C. #: ES895914, ES896014, ES896114, ES888714

Report Date: 2014/09/18
Report #: R3160776
Version: 1

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B4H0063
Received: 2014/09/16, 09:56

Sample Matrix: Soil
Samples Received: 34

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
TEH in Soil (PIRI) (1, 2)	21	2014/09/17	2014/09/17	ATL SOP 00111	Atl. PIRI v3 m
TEH in Soil (PIRI) (1, 2)	8	2014/09/17	2014/09/18	ATL SOP 00111	Atl. PIRI v3 m
Moisture (1)	34	N/A	2014/09/17	ATL SOP 00001	OMOE Handbook 1983 m
PCBs in soil by GC/ECD (1, 2)	5	2014/09/17	2014/09/18	ATL SOP 00106	EPA 8082 m
PCB Aroclor sum (soil) (1)	5	N/A	2014/09/18		Auto Calc.
VPH in Soil (PIRI) (1)	29	2014/09/16	2014/09/17	ATL SOP 00119	Atl. PIRI v3 m
ModTPH (T1) Calc. for Soil (1, 3)	29	N/A	2014/09/18	N/A	Atl. PIRI v3 m

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Maxxam Bedford
(2) Soils are reported on a dry weight basis unless otherwise specified.
(3) New RDLs in effect due to release of NS Contaminated Sites Regulations. Reduced RDL based on MDL study performance. Low level analytical run checks being implemented.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Michelle Hill, Project Manager
Email: MHill@maxxam.ca
Phone# (902)420-0203 Ext:289

==========

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.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4H0063
Report Date: 2014/09/18

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE CONF. SAMPLING
Your P.O. #: 16300R-20
Sampler Initials: AR

RBCA HYDROCARBONS IN SOIL (SOIL)

Maxxam ID		XO6161		XO6162		XO6163	XO6163		
Sampling Date		2014/09/10		2014/09/10		2014/09/10	2014/09/10		
COC Number		ES895914		ES895914		ES895914	ES895914		
	Units	**14-POL-BS101**	**RDL**	**14-POL-BS102**	**RDL**	**14-POL-BS103**	**14-POL-BS103 Lab-Dup**	**RDL**	**QC Batch**
Inorganics									
Moisture	%	44	1.0	44	1.0	68		1.0	3749762
Petroleum Hydrocarbons									
Benzene	mg/kg	ND	0.025	ND	0.025	ND	ND	0.13	3749511
Toluene	mg/kg	ND	0.025	ND	0.025	ND	ND	0.13	3749511
Ethylbenzene	mg/kg	ND	0.025	ND	0.025	ND	ND	0.13	3749511
Xylene (Total)	mg/kg	ND	0.050	ND	0.050	ND	ND	0.25	3749511
C6 - C10 (less BTEX)	mg/kg	ND	2.5	ND	2.5	ND	ND	13	3749511
>C10-C16 Hydrocarbons	mg/kg	3600	10	240	10	360		10	3750815
>C16-C21 Hydrocarbons	mg/kg	3000	10	550	10	400		10	3750815
>C21-<C32 Hydrocarbons	mg/kg	27000 (1)	150	13000 (1)	75	6100		15	3750815
Modified TPH (Tier1)	mg/kg	33000	150	14000	75	6900		15	3749311
Reached Baseline at C32	mg/kg	No	N/A	No	N/A	No		N/A	3750815
Hydrocarbon Resemblance	mg/kg	COMMENT (2)	N/A	COMMENT (2)	N/A	COMMENT (2)		N/A	3750815
Surrogate Recovery (%)									
Isobutylbenzene - Extractable	%	93		51		96			3750815
n-Dotriacontane - Extractable	%	188 (3)		29 (3)		117			3750815
Isobutylbenzene - Volatile	%	54 (4)		66		104 (5)	96 (5)		3749511

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
ND = Not detected
N/A = Not Applicable
(1) Elevated TEH RDL(s) due to sample dilution.
(2) Weathered fuel oil fraction. Lube oil fraction.
(3) TEH surrogate(s) not within acceptance limits due to sample dilution / product interference.
(4) VPH surrogate not within acceptance limits. Analysis was repeated with similar results.
(5) Elevated VPH RDL(s) due to sample dilution / matrix interference.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4H0063
Report Date: 2014/09/18

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE CONF. SAMPLING
Your P.O. #: 16300R-20
Sampler Initials: AR

RBCA HYDROCARBONS IN SOIL (SOIL)

Maxxam ID		XO6164		XO6165		XO6166	XO6167		
Sampling Date		2014/09/10		2014/09/10		2014/09/10	2014/09/10		
COC Number		ES895914		ES895914		ES895914	ES895914		
	Units	**14-POL-BS104**	**RDL**	**14-POL-BS105**	**RDL**	**14-POL-BS106**	**14-POL-BS107**	**RDL**	**QC Batch**
Inorganics									
Moisture	%	25	1.0	48	1.0	23	26	1.0	3749762
Petroleum Hydrocarbons									
Benzene	mg/kg	ND	0.025	ND	0.13	ND	ND	0.025	3749511
Toluene	mg/kg	ND	0.025	ND	0.13	ND	ND	0.025	3749511
Ethylbenzene	mg/kg	ND	0.025	ND	0.13	ND	ND	0.025	3749511
Xylene (Total)	mg/kg	ND	0.050	ND	0.25	ND	ND	0.050	3749511
C6 - C10 (less BTEX)	mg/kg	ND	2.5	ND	13	ND	ND	2.5	3749511
>C10-C16 Hydrocarbons	mg/kg	2700	10	1000	10	ND	240	10	3750815
>C16-C21 Hydrocarbons	mg/kg	2300	10	1500	10	32	310	10	3750815
>C21-<C32 Hydrocarbons	mg/kg	16000 (1)	150	16000 (1)	150	210	1400	15	3750815
Modified TPH (Tier1)	mg/kg	21000	150	18000	150	240	2000	15	3749311
Reached Baseline at C32	mg/kg	No	N/A	No	N/A	No	No	N/A	3750815
Hydrocarbon Resemblance	mg/kg	COMMENT (2)	N/A	COMMENT (2)	N/A	COMMENT (3)	COMMENT (2)	N/A	3750815
Surrogate Recovery (%)									
Isobutylbenzene - Extractable	%	96		85		95	91		3750815
n-Dotriacontane - Extractable	%	136 (4)		48 (4)		84	102		3750815
Isobutylbenzene - Volatile	%	59 (5)		94 (6)		98	101		3749511

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
(1) Elevated TEH RDL(s) due to sample dilution.
(2) Weathered fuel oil fraction. Lube oil fraction.
(3) Lube oil fraction.
(4) TEH surrogate(s) not within acceptance limits due to sample dilution / product interference.
(5) VPH surrogate not within acceptance limits. Analysis was repeated with similar results.
(6) Elevated VPH RDL(s) due to sample dilution / matrix interference.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4H0063
Report Date: 2014/09/18

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE CONF. SAMPLING
Your P.O. #: 16300R-20
Sampler Initials: AR

RBCA HYDROCARBONS IN SOIL (SOIL)

Maxxam ID		XO6168	XO6169	XO6170	XO6182	XO6183		
Sampling Date		2014/09/10	2014/09/10	2014/09/10	2014/09/10	2014/09/10		
COC Number		ES895914	ES895914	ES895914	ES896014	ES896014		
	Units	**14-POL-BS108**	**14-POL-BS109**	**14-POL-BS110**	**14-BMEWS-BS101**	**14-BMEWS-BS102**	**RDL**	**QC Batch**
Inorganics								
Moisture	%	15	14	52	20	15	1.0	3749762
Petroleum Hydrocarbons								
Benzene	mg/kg	ND	ND	ND	ND	ND	0.025	3749511
Toluene	mg/kg	ND	ND	ND	ND	ND	0.025	3749511
Ethylbenzene	mg/kg	ND	ND	ND	ND	ND	0.025	3749511
Xylene (Total)	mg/kg	ND	ND	ND	ND	ND	0.050	3749511
C6 - C10 (less BTEX)	mg/kg	ND	ND	ND	ND	4.5	2.5	3749511
>C10-C16 Hydrocarbons	mg/kg	ND	150	ND	96	930	10	3750815
>C16-C21 Hydrocarbons	mg/kg	ND	290	45	69	72	10	3750815
>C21-<C32 Hydrocarbons	mg/kg	130	2400	720	86	43	15	3750815
Modified TPH (Tier1)	mg/kg	130	2800	770	250	1100	15	3749311
Reached Baseline at C32	mg/kg	No	No	No	No	Yes	N/A	3750815
Hydrocarbon Resemblance	mg/kg	COMMENT (1)	COMMENT (2)	COMMENT (1)	COMMENT (3)	COMMENT (3)	N/A	3750815
Surrogate Recovery (%)								
Isobutylbenzene - Extractable	%	87	95	87	95	103		3750815
n-Dotriacontane - Extractable	%	92	17 (4)	85	100	100		3750815
Isobutylbenzene - Volatile	%	104	94	77	110	106		3749511

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
(1) Lube oil fraction.
(2) Weathered fuel oil fraction. Lube oil fraction.
(3) Weathered fuel oil fraction. Unidentified compound(s) in lube oil range.
(4) TEH surrogate(s) not within acceptance limits due to sample dilution / product interference.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4H0063
Report Date: 2014/09/18

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE CONF. SAMPLING
Your P.O. #: 16300R-20
Sampler Initials: AR

RBCA HYDROCARBONS IN SOIL (SOIL)

Maxxam ID		XO6184		XO6185	XO6186		XO6187		
Sampling Date		2014/09/10		2014/09/10	2014/09/10		2014/09/10		
COC Number		ES896014		ES896014	ES896014		ES896014		
	Units	**14-BMEWS-BS103**	**QC Batch**	**14-BMEWS-BS104**	**14-BMEWS-BS105**	**RDL**	**14-BMEWS-BS106**	**RDL**	**QC Batch**
Inorganics									
Moisture	%	20	3749762	29	28	1.0	23	1.0	3749762
Petroleum Hydrocarbons									
Benzene	mg/kg	ND	3749511	ND	ND	0.025	ND	0.13	3750807
Toluene	mg/kg	ND	3749511	ND	ND	0.025	ND	0.13	3750807
Ethylbenzene	mg/kg	ND	3749511	ND	ND	0.025	ND	0.13	3750807
Xylene (Total)	mg/kg	ND	3749511	4.7	ND	0.050	ND	0.25	3750807
C6 - C10 (less BTEX)	mg/kg	ND	3749511	120	ND	2.5	ND	13	3750807
>C10-C16 Hydrocarbons	mg/kg	190	3750815	2000	ND	10	ND	10	3750815
>C16-C21 Hydrocarbons	mg/kg	23	3750815	490	ND	10	18	10	3750815
>C21-<C32 Hydrocarbons	mg/kg	39	3750815	280	130	15	190	15	3750815
Modified TPH (Tier1)	mg/kg	250	3749311	2900	130	15	210	15	3749311
Reached Baseline at C32	mg/kg	Yes	3750815	Yes	No	N/A	No	N/A	3750815
Hydrocarbon Resemblance	mg/kg	COMMENT (1)	3750815	COMMENT (1)	COMMENT (2)	N/A	COMMENT (3)	N/A	3750815
Surrogate Recovery (%)									
Isobutylbenzene - Extractable	%	98	3750815	117	99		105		3750815
n-Dotriacontane - Extractable	%	102	3750815	125	124		93		3750815
Isobutylbenzene - Volatile	%	106	3749511	106	98 (4)		103 (5)		3750807

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
(1) Weathered fuel oil fraction. Unidentified compound(s) in lube oil range.
(2) Lube oil fraction.
(3) Lube oil fraction. Unidentified compound(s) in lube oil range.
(4) VPH samples were extracted using a flat-bed shaker instead of the accelerated mechanical shaker due to matrix incompatibility.
(5) Elevated VPH RDL(s) due to sample dilution / matrix interference.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4H0063
Report Date: 2014/09/18

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE CONF. SAMPLING
Your P.O. #: 16300R-20
Sampler Initials: AR

RBCA HYDROCARBONS IN SOIL (SOIL)

Maxxam ID		XO6188	XO6189	XO6190		XO6191		
Sampling Date		2014/09/10	2014/09/10	2014/09/10		2014/09/10		
COC Number		ES896014	ES896014	ES896014		ES896014		
	Units	**14-BMEWS-BS107**	**14-FIELD DUP 1**	**14-BMEWS-BS301**	**QC Batch**	**14-BMEWS-BS302**	**RDL**	**QC Batch**
Inorganics								
Moisture	%	13	24	55	3749762	54	1.0	3749762
Petroleum Hydrocarbons								
Benzene	mg/kg	ND	ND	ND	3750807	ND	0.025	3750807
Toluene	mg/kg	ND	ND	ND	3750807	ND	0.025	3750807
Ethylbenzene	mg/kg	ND	ND	ND	3750807	ND	0.025	3750807
Xylene (Total)	mg/kg	ND	ND	ND	3750807	ND	0.050	3750807
C6 - C10 (less BTEX)	mg/kg	ND	ND	ND	3750807	ND	2.5	3750807
>C10-C16 Hydrocarbons	mg/kg	ND	420	530	3750815	ND	10	3750821
>C16-C21 Hydrocarbons	mg/kg	19	52	880	3750815	29	10	3750821
>C21-<C32 Hydrocarbons	mg/kg	130	84	240	3750815	170	15	3750821
Modified TPH (Tier1)	mg/kg	150	560	1700	3749311	200	15	3749582
Reached Baseline at C32	mg/kg	No	Yes	No	3750815	No	N/A	3750821
Hydrocarbon Resemblance	mg/kg	COMMENT (1)	COMMENT (2)	COMMENT (3)	3750815	COMMENT (4)	N/A	3750821
Surrogate Recovery (%)								
Isobutylbenzene - Extractable	%	103	101	98	3750815	93		3750821
n-Dotriacontane - Extractable	%	129	113	105	3750815	126		3750821
Isobutylbenzene - Volatile	%	106	111	93	3750807	76		3750807

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
(1) Lube oil fraction.
(2) Weathered fuel oil fraction. Unidentified compound(s) in lube oil range.
(3) Weathered fuel oil fraction. Lube oil fraction.
(4) Unidentified compound(s) in lube oil range.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4H0063
Report Date: 2014/09/18

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE CONF. SAMPLING
Your P.O. #: 16300R-20
Sampler Initials: AR

RBCA HYDROCARBONS IN SOIL (SOIL)

Maxxam ID		XO6226		XO6232			XO6233		
Sampling Date		2014/09/10		2014/09/11			2014/09/11		
COC Number		ES896114		ES896114			ES896114		
	Units	**14-BMEWS-BS303**	**QC Batch**	**14-MB-BS901**	**RDL**	**QC Batch**	**14-MB-BS902**	**RDL**	**QC Batch**
Inorganics									
Moisture	%	66	3749762	17	1.0	3749762	49	1.0	3749762
Petroleum Hydrocarbons									
Benzene	mg/kg	ND	3750807	ND	0.025	3749511	ND	0.025	3750807
Toluene	mg/kg	ND	3750807	ND	0.025	3749511	ND	0.025	3750807
Ethylbenzene	mg/kg	ND	3750807	ND	0.025	3749511	ND	0.025	3750807
Xylene (Total)	mg/kg	ND	3750807	ND	0.050	3749511	ND	0.050	3750807
C6 - C10 (less BTEX)	mg/kg	ND	3750807	ND	2.5	3749511	110	2.5	3750807
>C10-C16 Hydrocarbons	mg/kg	ND	3750821	960	10	3750821	15000 (1)	50	3750821
>C16-C21 Hydrocarbons	mg/kg	40	3750821	460	10	3750821	4600 (1)	50	3750821
>C21-<C32 Hydrocarbons	mg/kg	160	3750821	220	15	3750821	1200	15	3750821
Modified TPH (Tier1)	mg/kg	200	3749582	1600	15	3749582	21000	50	3749582
Reached Baseline at C32	mg/kg	No	3750821	Yes	N/A	3750821	Yes	N/A	3750821
Hydrocarbon Resemblance	mg/kg	COMMENT (2)	3750821	COMMENT (3)	N/A	3750821	COMMENT (3)	N/A	3750821
Surrogate Recovery (%)									
Isobutylbenzene - Extractable	%	93	3750821	97		3750821	93		3750821
n-Dotriacontane - Extractable	%	110	3750821	113		3750821	112		3750821
Isobutylbenzene - Volatile	%	73	3750807	99		3749511	78		3750807

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
(1) Elevated TEH RDL(s) due to sample dilution.
(2) Unidentified compound(s) in lube oil range.
(3) Weathered fuel oil fraction. Lube oil fraction.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4H0063
Report Date: 2014/09/18

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE CONF. SAMPLING
Your P.O. #: 16300R-20
Sampler Initials: AR

RBCA HYDROCARBONS IN SOIL (SOIL)

Maxxam ID		XO6233		XO6234		XO6235	XO6242		
Sampling Date		2014/09/11		2014/09/11		2014/09/11	2014/09/11		
COC Number		ES896114		ES896114		ES896114	ES888714		
	Units	**14-MB-BS902 Lab-Dup**	**QC Batch**	**14-MB-BS903**	**RDL**	**14-MB-BS904**	**14-FIELD DUP 2**	**RDL**	**QC Batch**
Inorganics									
Moisture	%		3749762	16	1.0	12	31	1.0	3749762
Petroleum Hydrocarbons									
Benzene	mg/kg	ND	3750807	ND	0.025	ND	ND	0.025	3749511
Toluene	mg/kg	ND	3750807	ND	0.025	ND	ND	0.025	3749511
Ethylbenzene	mg/kg	ND	3750807	ND	0.025	ND	ND	0.025	3749511
Xylene (Total)	mg/kg	ND	3750807	ND	0.050	ND	ND	0.050	3749511
C6 - C10 (less BTEX)	mg/kg	56 (1)	3750807	30	2.5	13	15	2.5	3749511
>C10-C16 Hydrocarbons	mg/kg		3750821	8100 (2)	50	430	6400	10	3750821
>C16-C21 Hydrocarbons	mg/kg		3750821	1100 (2)	50	340	1100	10	3750821
>C21-<C32 Hydrocarbons	mg/kg		3750821	69	15	260	96	15	3750821
Modified TPH (Tier1)	mg/kg		3749582	9200	50	1000	7700	15	3749582
Reached Baseline at C32	mg/kg		3750821	Yes	N/A	Yes	Yes	N/A	3750821
Hydrocarbon Resemblance	mg/kg		3750821	COMMENT (3)	N/A	COMMENT (4)	COMMENT (3)	N/A	3750821
Surrogate Recovery (%)									
Isobutylbenzene - Extractable	%		3750821	125		98	92		3750821
n-Dotriacontane - Extractable	%		3750821	109		89	102		3750821
Isobutylbenzene - Volatile	%	79	3750807	83		87	99		3749511

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
ND = Not detected
N/A = Not Applicable
(1) Duplicate: results are outside acceptance limit. Analysis was repeated with similar results.
(2) Elevated TEH RDL(s) due to sample dilution.
(3) Weathered fuel oil fraction.
(4) Weathered fuel oil fraction. Lube oil fraction.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4H0063
Report Date: 2014/09/18

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE CONF. SAMPLING
Your P.O. #: 16300R-20
Sampler Initials: AR

RBCA HYDROCARBONS IN SOIL (SOIL)

Maxxam ID		XO6243	XO6244	XO6245		
Sampling Date		2014/09/11	2014/09/11	2014/09/11		
COC Number		ES888714	ES888714	ES888714		
	Units	**14-MB-BS801**	**14-MB-BS802**	**14-MB-BS803**	**RDL**	**QC Batch**
Inorganics						
Moisture	%	22	18	17	1.0	3749762
Petroleum Hydrocarbons						
Benzene	mg/kg	ND	ND	ND	0.025	3749511
Toluene	mg/kg	ND	ND	ND	0.025	3749511
Ethylbenzene	mg/kg	ND	ND	ND	0.025	3749511
Xylene (Total)	mg/kg	ND	ND	ND	0.050	3749511
C6 - C10 (less BTEX)	mg/kg	ND	ND	ND	2.5	3749511
>C10-C16 Hydrocarbons	mg/kg	140	3500	ND	10	3750821
>C16-C21 Hydrocarbons	mg/kg	410	3300	ND	10	3750821
>C21-<C32 Hydrocarbons	mg/kg	180	280	25	15	3750821
Modified TPH (Tier1)	mg/kg	730	7100	25	15	3749582
Reached Baseline at C32	mg/kg	No	Yes	Yes	N/A	3750821
Hydrocarbon Resemblance	mg/kg	COMMENT (1)	COMMENT (2)	COMMENT (3)	N/A	3750821
Surrogate Recovery (%)						
Isobutylbenzene - Extractable	%	87	89	91		3750821
n-Dotriacontane - Extractable	%	105	103	106		3750821
Isobutylbenzene - Volatile	%	104	88	107		3749511

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
(1) One product in fuel / lube range. Lube oil fraction.
(2) Weathered fuel oil fraction.
(3) Unidentified compound(s) in lube oil range.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4H0063
Report Date: 2014/09/18

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE CONF. SAMPLING
Your P.O. #: 16300R-20
Sampler Initials: AR

RESULTS OF ANALYSES OF SOIL

Maxxam ID		XO6227	XO6228	XO6229	XO6230	XO6231		
Sampling Date		2014/09/11	2014/09/11	2014/09/11	2014/09/11	2014/09/11		
COC Number		ES896114	ES896114	ES896114	ES896114	ES896114		
	Units	**14-MB-BS501**	**14-MB-BS502**	**14-POLW-BS101**	**14-POLW-BS102**	**14-POLW-BS103**	**RDL**	**QC Batch**
Inorganics								
Moisture	%	5.9	6.7	15	26	11	1.0	3749762

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4H0063
Report Date: 2014/09/18

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE CONF. SAMPLING
Your P.O. #: 16300R-20
Sampler Initials: AR

POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

Maxxam ID		XO6227	XO6227	XO6228	XO6229	XO6230	XO6231		
Sampling Date		2014/09/11	2014/09/11	2014/09/11	2014/09/11	2014/09/11	2014/09/11		
COC Number		ES896114	ES896114	ES896114	ES896114	ES896114	ES896114		
	Units	**14-MB-BS501**	**14-MB-BS501 Lab-Dup**	**14-MB-BS502**	**14-POLW-BS101**	**14-POLW-BS102**	**14-POLW-BS103**	**RDL**	**QC Batch**
PCBs									
Aroclor 1016	ug/g	ND	ND	ND	ND	ND	ND	0.050	3750831
Aroclor 1221	ug/g	ND	ND	ND	ND	ND	ND	0.050	3750831
Aroclor 1232	ug/g	ND	ND	ND	ND	ND	ND	0.050	3750831
Aroclor 1248	ug/g	ND	ND	ND	ND	ND	ND	0.050	3750831
Aroclor 1242	ug/g	ND	ND	ND	ND	ND	ND	0.050	3750831
Aroclor 1254	ug/g	ND	ND	3.1	ND	ND	ND	0.050	3750831
Aroclor 1260	ug/g	ND	0.057	0.81	2.1	1.0	0.67	0.050	3750831
Calculated Total PCB	ug/g	ND		3.9	2.1	1.0	0.67	0.050	3749578
Surrogate Recovery (%)									
Decachlorobiphenyl	%	91	97	85	122	103	120		3750831

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
ND = Not detected

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4H0063
Report Date: 2014/09/18

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE CONF. SAMPLING
Your P.O. #: 16300R-20
Sampler Initials: AR

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	13.5°C

TEH Analysis: Silica gel clean-up performed prior to analysis as per client request.

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4H0063
Report Date: 2014/09/18

QUALITY ASSURANCE REPORT

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE CONF. SAMPLING
Your P.O. #: 16300R-20
Sampler Initials: AR

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
3749511	Isobutylbenzene - Volatile	2014/09/17	100	60 - 140	101	60 - 140	100	%		
3750807	Isobutylbenzene - Volatile	2014/09/17	70	60 - 140	102	60 - 140	103	%		
3750815	Isobutylbenzene - Extractable	2014/09/17	96	30 - 130	100	30 - 130	94	%		
3750815	n-Dotriacontane - Extractable	2014/09/17	102	30 - 130	101	30 - 130	104	%		
3750821	Isobutylbenzene - Extractable	2014/09/17	69	30 - 130	96	30 - 130	91	%		
3750821	n-Dotriacontane - Extractable	2014/09/17	93	30 - 130	98	30 - 130	94	%		
3750831	Decachlorobiphenyl	2014/09/18	96	30 - 130	100	30 - 130	115	%		
3749511	Benzene	2014/09/17	142 (1)	60 - 140	102	60 - 140	ND ,RDL=0.025	mg/kg	NC	50
3749511	C6 - C10 (less BTEX)	2014/09/17					ND ,RDL=2.5	mg/kg	NC	50
3749511	Ethylbenzene	2014/09/17	191 (1)	60 - 140	101	60 - 140	ND ,RDL=0.025	mg/kg	NC	50
3749511	Toluene	2014/09/17	203 (1)	60 - 140	108	60 - 140	0.047 ,RDL=0.025	mg/kg	NC	50
3749511	Xylene (Total)	2014/09/17	209 (1)	60 - 140	108	60 - 140	ND ,RDL=0.050	mg/kg	NC	50
3750807	Benzene	2014/09/17	105	60 - 140	102	60 - 140	ND ,RDL=0.025	mg/kg	NC	50
3750807	C6 - C10 (less BTEX)	2014/09/17					ND ,RDL=2.5	mg/kg	67 (3)	50
3750807	Ethylbenzene	2014/09/17	108	60 - 140	101	60 - 140	ND ,RDL=0.025	mg/kg	NC	50
3750807	Toluene	2014/09/17	132	60 - 140	106	60 - 140	ND , RDL=0.040 (2)	mg/kg	NC	50
3750807	Xylene (Total)	2014/09/17	119	60 - 140	110	60 - 140	ND ,RDL=0.050	mg/kg	NC	50
3750815	>C10-C16 Hydrocarbons	2014/09/17	72	30 - 130	81	30 - 130	ND ,RDL=10	mg/kg	NC	50
3750815	>C16-C21 Hydrocarbons	2014/09/17	82	30 - 130	89	30 - 130	ND ,RDL=10	mg/kg	NC	50
3750815	>C21-<C32 Hydrocarbons	2014/09/17	84	30 - 130	94	30 - 130	ND ,RDL=15	mg/kg	NC	50
3750821	>C10-C16 Hydrocarbons	2014/09/18	NC	30 - 130	91	30 - 130	ND ,RDL=10	mg/kg	2.6 (4)	50
3750821	>C16-C21 Hydrocarbons	2014/09/18	NC	30 - 130	107	30 - 130	ND ,RDL=10	mg/kg	3.5 (4)	50
3750821	>C21-<C32 Hydrocarbons	2014/09/18	NC	30 - 130	101	30 - 130	ND ,RDL=15	mg/kg	0	50
3750831	Aroclor 1016	2014/09/18					ND ,RDL=0.050	ug/g	NC	50
3750831	Aroclor 1221	2014/09/18					ND ,RDL=0.050	ug/g	NC	50
3750831	Aroclor 1232	2014/09/18					ND ,RDL=0.050	ug/g	NC	50
3750831	Aroclor 1242	2014/09/18					ND ,RDL=0.050	ug/g	NC	50
3750831	Aroclor 1248	2014/09/18					ND ,RDL=0.050	ug/g	NC	50
3750831	Aroclor 1254	2014/09/18	123	30 - 130	106	30 - 130	ND ,RDL=0.050	ug/g	NC	50
3750831	Aroclor 1260	2014/09/18					ND ,RDL=0.050	ug/g	NC	50

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4H0063
Report Date: 2014/09/18

QUALITY ASSURANCE REPORT(CONT'D)

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE CONF. SAMPLING
Your P.O. #: 16300R-20
Sampler Initials: AR

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

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.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) Matrix Spike: results are outside acceptance limit. Analysis was repeated with similar results.

(2) Elevated VPH RDL(s) due to detected levels in the method blank.

(3) Duplicate: results are outside acceptance limit. Analysis was repeated with similar results.

(4) Elevated TEH RDL(s) due to sample dilution.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4H0063
Report Date: 2014/09/18

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE CONF. SAMPLING
Your P.O. #: 16300R-20
Sampler Initials: AR

VALIDATION SIGNATURE PAGE

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

Alan Stewart, Scientific Specialist (Organics)

Rose MacDonald, Scientific Specialist (Organics)

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.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam
A Bureau Veritas Group Company

Success Through Science®

Your P.O. #: 16300R-20
Your Project #: 121413099.200
Site Location: HOPEDALE REMEDIATION YEAR 4
Your C.O.C. #: ES888714

Attention:Jim Slade

Stantec Consulting Ltd
St. John's - Standing Offer
141 Kelsey Drive
St. John's, NL
A1B 0L2

Report Date: 2014/09/22
Report #: R3164019
Version: 2

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B4H2103
Received: 2014/09/18, 09:26

Sample Matrix: Soil
Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
TEH in Soil (PIRI) (1, 2)	5	2014/09/19	2014/09/19	ATL SOP 00111	Atl. PIRI v3 m
Moisture (1)	6	N/A	2014/09/19	ATL SOP 00001	OMOE Handbook 1983 m
PCBs in soil by GC/ECD (1, 2)	1	2014/09/19	2014/09/19	ATL SOP 00106	EPA 8082 m
PCB Aroclor sum (soil) (1)	1	N/A	2014/09/19		Auto Calc.
VPH in Soil (PIRI) (1)	5	2014/09/19	2014/09/19	ATL SOP 00119	Atl. PIRI v3 m
ModTPH (T1) Calc. for Soil (1, 3)	5	N/A	2014/09/19	N/A	Atl. PIRI v3 m

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Maxxam Bedford
(2) Soils are reported on a dry weight basis unless otherwise specified.
(3) New RDLs in effect due to release of NS Contaminated Sites Regulations. Reduced RDL based on MDL study performance. Low level analytical run checks being implemented.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Michelle Hill, Project Manager
Email: MHill@maxxam.ca
Phone# (902)420-0203 Ext:289

==========

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.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4H2103
Report Date: 2014/09/22

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE REMEDIATION YEAR 4
Your P.O. #: 16300R-20
Sampler Initials: RBP, RMP

RBCA HYDROCARBONS IN SOIL (SOIL)

Maxxam ID		XP5174		XP5179		XP5180	XP5181		
Sampling Date		2014/09/13		2014/09/13		2014/09/13	2014/09/13		
COC Number		ES888714		ES888714		ES888714	ES888714		
	Units	**14-MB-BS701**	**RDL**	**14-MB-BS702**	**RDL**	**14-MB-BS703**	**14-MB-BS704**	**RDL**	**QC Batch**
Inorganics									
Moisture	%	59	1.0	78	1.0	44	69	1.0	3754478
Petroleum Hydrocarbons									
Benzene	mg/kg	ND	0.025	ND	0.025	ND	ND	0.025	3754303
Toluene	mg/kg	ND	0.025	ND	0.025	ND	ND	0.025	3754303
Ethylbenzene	mg/kg	ND	0.025	ND	0.025	ND	ND	0.025	3754303
Xylene (Total)	mg/kg	ND	0.050	ND	0.050	ND	ND	0.050	3754303
C6 - C10 (less BTEX)	mg/kg	ND	2.5	ND	2.5	ND	ND	2.5	3754303
>C10-C16 Hydrocarbons	mg/kg	5000	10	17000	10	2000	220	10	3754353
>C16-C21 Hydrocarbons	mg/kg	8000	10	23000 (1)	50	4100	510	10	3754353
>C21-<C32 Hydrocarbons	mg/kg	1400	15	2300	15	520	350	15	3754353
Modified TPH (Tier1)	mg/kg	14000	15	42000	50	6600	1100	15	3752641
Reached Baseline at C32	mg/kg	Yes	N/A	Yes	N/A	Yes	Yes	N/A	3754353
Hydrocarbon Resemblance	mg/kg	COMMENT (2)	N/A	COMMENT (2)	N/A	COMMENT (2)	COMMENT (3)	N/A	3754353
Surrogate Recovery (%)									
Isobutylbenzene - Extractable	%	106		104		110	112		3754353
n-Dotriacontane - Extractable	%	95		113		120	119		3754353
Isobutylbenzene - Volatile	%	74		43 (4)		109	75		3754303

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
(1) Elevated TEH RDL(s) due to sample dilution.
(2) Weathered fuel oil fraction.
(3) Weathered fuel oil fraction. Unidentified compound(s) in lube oil range.
(4) VPH surrogate not within acceptance limits due to matrix interference.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4H2103
Report Date: 2014/09/22

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE REMEDIATION YEAR 4
Your P.O. #: 16300R-20
Sampler Initials: RBP, RMP

RBCA HYDROCARBONS IN SOIL (SOIL)

Maxxam ID		XP5182		
Sampling Date		2014/09/13		
COC Number		ES888714		
	Units	**14-MB-BS705**	**RDL**	**QC Batch**
Inorganics				
Moisture	%	73	1.0	3754478
Petroleum Hydrocarbons				
Benzene	mg/kg	ND	0.025	3754303
Toluene	mg/kg	ND	0.025	3754303
Ethylbenzene	mg/kg	ND	0.025	3754303
Xylene (Total)	mg/kg	ND	0.050	3754303
C6 - C10 (less BTEX)	mg/kg	ND	2.5	3754303
>C10-C16 Hydrocarbons	mg/kg	2000	10	3754353
>C16-C21 Hydrocarbons	mg/kg	4100	10	3754353
>C21-<C32 Hydrocarbons	mg/kg	710	15	3754353
Modified TPH (Tier1)	mg/kg	6800	15	3752641
Reached Baseline at C32	mg/kg	Yes	N/A	3754353
Hydrocarbon Resemblance	mg/kg	COMMENT (1)	N/A	3754353
Surrogate Recovery (%)				
Isobutylbenzene - Extractable	%	109		3754353
n-Dotriacontane - Extractable	%	119		3754353
Isobutylbenzene - Volatile	%	51 (2)		3754303

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
(1) Weathered fuel oil fraction.
(2) VPH surrogate not within acceptance limits due to matrix interference.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4H2103
Report Date: 2014/09/22

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE REMEDIATION YEAR 4
Your P.O. #: 16300R-20
Sampler Initials: RBP, RMP

RESULTS OF ANALYSES OF SOIL

Maxxam ID		XP5183		
Sampling Date		2014/09/14		
COC Number		ES888714		
	Units	**14-MB-BS706**	**RDL**	**QC Batch**
Inorganics				
Moisture	%	56	1.0	3754478

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4H2103
Report Date: 2014/09/22

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE REMEDIATION YEAR 4
Your P.O. #: 16300R-20
Sampler Initials: RBP, RMP

POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

Maxxam ID		XP5183	XP5183		
Sampling Date		2014/09/14	2014/09/14		
COC Number		ES888714	ES888714		
	Units	**14-MB-BS706**	**14-MB-BS706 Lab-Dup**	**RDL**	**QC Batch**
PCBs					
Aroclor 1016	ug/g	ND	ND	0.050	3754683
Aroclor 1221	ug/g	ND	ND	0.050	3754683
Aroclor 1232	ug/g	ND	ND	0.050	3754683
Aroclor 1248	ug/g	ND	ND	0.050	3754683
Aroclor 1242	ug/g	ND	ND	0.050	3754683
Aroclor 1254	ug/g	ND	ND	0.050	3754683
Aroclor 1260	ug/g	ND	ND	0.050	3754683
Calculated Total PCB	ug/g	ND		0.050	3752763
Surrogate Recovery (%)					
Decachlorobiphenyl	%	79	84		3754683

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
ND = Not detected

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4H2103
Report Date: 2014/09/22

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE REMEDIATION YEAR 4
Your P.O. #: 16300R-20
Sampler Initials: RBP, RMP

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	7.0°C

TEH Analysis: Silica gel clean-up performed prior to analysis as per client request.

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4H2103
Report Date: 2014/09/22

QUALITY ASSURANCE REPORT

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE REMEDIATION YEAR 4
Your P.O. #: 16300R-20
Sampler Initials: RBP, RMP

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
3754303	Isobutylbenzene - Volatile	2014/09/19	107	60 - 140	105	60 - 140	109	%		
3754353	Isobutylbenzene - Extractable	2014/09/19	100	30 - 130	105	30 - 130	100	%		
3754353	n-Dotriacontane - Extractable	2014/09/19	103	30 - 130	104	30 - 130	110	%		
3754683	Decachlorobiphenyl	2014/09/19	83	30 - 130	82	30 - 130	82	%		
3754303	Benzene	2014/09/19	98	60 - 140	82	60 - 140	ND ,RDL=0.025	mg/kg	NC	50
3754303	C6 - C10 (less BTEX)	2014/09/19					ND ,RDL=2.5	mg/kg	NC	50
3754303	Ethylbenzene	2014/09/19	118	60 - 140	97	60 - 140	ND ,RDL=0.025	mg/kg	NC	50
3754303	Toluene	2014/09/19	137	60 - 140	92	60 - 140	ND ,RDL=0.025	mg/kg	NC	50
3754303	Xylene (Total)	2014/09/19	135	60 - 140	96	60 - 140	ND ,RDL=0.050	mg/kg	NC	50
3754353	>C10-C16 Hydrocarbons	2014/09/19	81	30 - 130	85	30 - 130	ND ,RDL=10	mg/kg	NC	50
3754353	>C16-C21 Hydrocarbons	2014/09/19	98	30 - 130	93	30 - 130	ND ,RDL=10	mg/kg	NC	50
3754353	>C21-<C32 Hydrocarbons	2014/09/19	104	30 - 130	112	30 - 130	ND ,RDL=15	mg/kg	NC	50
3754683	Aroclor 1016	2014/09/19					ND ,RDL=0.050	ug/g	NC	50
3754683	Aroclor 1221	2014/09/19					ND ,RDL=0.050	ug/g	NC	50
3754683	Aroclor 1232	2014/09/19					ND ,RDL=0.050	ug/g	NC	50
3754683	Aroclor 1242	2014/09/19					ND ,RDL=0.050	ug/g	NC	50
3754683	Aroclor 1248	2014/09/19					ND ,RDL=0.050	ug/g	NC	50
3754683	Aroclor 1254	2014/09/19	101	30 - 130	111	30 - 130	ND ,RDL=0.050	ug/g	NC	50
3754683	Aroclor 1260	2014/09/19					ND ,RDL=0.050	ug/g	NC	50

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

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.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

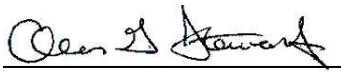
Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4H2103
Report Date: 2014/09/22

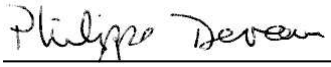
Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE REMEDIATION YEAR 4
Your P.O. #: 16300R-20
Sampler Initials: RBP, RMP

VALIDATION SIGNATURE PAGE

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



Alan Stewart, Scientific Specialist (Organics)



Phil Deveau

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.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Success Through Science®

Your P.O. #: 16300R-20
Your Project #: 121413099.200
Site Location: HOPEDALE-YEAR 4
Your C.O.C. #: N/A

Attention:Jim Slade

Stantec Consulting Ltd
St. John's - Standing Offer
141 Kelsey Drive
St. John's, NL
A1B 0L2

Report Date: 2014/10/03
Report #: R3177234
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B4I1957
Received: 2014/10/01, 10:40

Sample Matrix: Soil
Samples Received: 12

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
TEH in Soil (PIRI) (1, 2)	12	2014/10/01	2014/10/02	ATL SOP-00197	Atl. PIRI v3 m
Moisture	12	N/A	2014/10/02	ATL SOP-00196	OMOE Handbook 1983 m
VPH in Soil (PIRI)	12	2014/10/02	2014/10/02	ATL SOP 00199	Atl. PIRI v3 m
ModTPH (T1) Calc. for Soil (3)	12	N/A	2014/10/03	N/A	Atl. PIRI v3 m

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Reported on a dry weight basis.
(2) Soils are reported on a dry weight basis unless otherwise specified.
(3) New RDLs in effect due to release of NS Contaminated Sites Regulations. Reduced RDL based on MDL study performance. Low level analytical run checks being implemented.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Rob Whelan, Laboratory Manager
Email: RWhelan@maxxam.ca
Phone# (709)754-0203

==========

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.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4I1957
Report Date: 2014/10/03

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE-YEAR 4
Your P.O. #: 16300R-20
Sampler Initials: RMP

RBCA HYDROCARBONS IN SOIL (SOIL)

Maxxam ID		XU6959	XU6959	XU6973		XU6974		
Sampling Date		2014/09/26	2014/09/26	2014/09/26		2014/09/26		
COC Number		N/A	N/A	N/A		N/A		
	Units	**14-MB-BS804**	**14-MB-BS804 Lab-Dup**	**14-MB-BS805**	**RDL**	**14-MB-BS806**	**RDL**	**QC Batch**
Inorganics								
Moisture	%	31	28	36	1.0	39	1.0	3768881
Petroleum Hydrocarbons								
Benzene	mg/kg	ND		ND	0.025	ND	0.050	3770666
Toluene	mg/kg	0.65		0.29	0.025	0.45	0.050	3770666
Ethylbenzene	mg/kg	ND		ND	0.025	ND	0.050	3770666
Xylene (Total)	mg/kg	ND		ND	0.050	ND	0.10	3770666
C6 - C10 (less BTEX)	mg/kg	ND		ND	2.5	ND	5.0	3770666
>C10-C16 Hydrocarbons	mg/kg	ND		ND	10	ND	10	3769264
>C16-C21 Hydrocarbons	mg/kg	ND		ND	10	ND	10	3769264
>C21-<C32 Hydrocarbons	mg/kg	54		64	15	68	15	3769264
Modified TPH (Tier1)	mg/kg	54		64	15	67	15	3768722
Reached Baseline at C32	mg/kg	Yes		Yes	N/A	Yes	N/A	3769264
Hydrocarbon Resemblance	mg/kg	SEECOMMENT (1)		SEECOMMENT (1)	N/A	SEECOMMENT (1)	N/A	3769264
Surrogate Recovery (%)								
Isobutylbenzene - Extractable	%	104		101		88		3769264
n-Dotriacontane - Extractable	%	113 (2)		115 (2)		120 (2)		3769264
Isobutylbenzene - Volatile	%	89		94		117		3770666

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
ND = Not detected
N/A = Not Applicable
(1) No resemblance to petroleum products in lube oil range.
(2) Triple silica gel cleanup was used to remove organic interferences from sample extract as per client request.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4I1957
Report Date: 2014/10/03

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE-YEAR 4
Your P.O. #: 16300R-20
Sampler Initials: RMP

RBCA HYDROCARBONS IN SOIL (SOIL)

Maxxam ID		XU6975	XU6976	XU6977	XU6978		
Sampling Date		2014/09/26	2014/09/26	2014/09/26	2014/09/26		
COC Number		N/A	N/A	N/A	N/A		
	Units	**14-BMEWS-BS108**	**14-BMEWS-BS109**	**14-BMEWS-BS-304**	**14-BMEWS-BS305**	**RDL**	**QC Batch**
Inorganics							
Moisture	%	38	36	72	71	1.0	3768881
Petroleum Hydrocarbons							
Benzene	mg/kg	ND	ND	ND	ND	0.025	3770666
Toluene	mg/kg	ND	ND	ND	ND	0.025	3770666
Ethylbenzene	mg/kg	ND	ND	ND	ND	0.025	3770666
Xylene (Total)	mg/kg	ND	ND	ND	ND	0.050	3770666
C6 - C10 (less BTEX)	mg/kg	ND	ND	ND	ND	2.5	3770666
>C10-C16 Hydrocarbons	mg/kg	ND	ND	ND	ND	10	3769264
>C16-C21 Hydrocarbons	mg/kg	ND	ND	ND	ND	10	3769264
>C21-<C32 Hydrocarbons	mg/kg	37	51	140	130	15	3769264
Modified TPH (Tier1)	mg/kg	37	51	140	130	15	3768722
Reached Baseline at C32	mg/kg	Yes	Yes	Yes	Yes	N/A	3769264
Hydrocarbon Resemblance	mg/kg	SEECOMMENT (1)	SEECOMMENT (1)	SEECOMMENT (1)	SEECOMMENT (1)	N/A	3769264
Surrogate Recovery (%)							
Isobutylbenzene - Extractable	%	104	104	94	104		3769264
n-Dotriacontane - Extractable	%	111 (2)	118 (2)	118 (2)	118 (2)		3769264
Isobutylbenzene - Volatile	%	103	96	62	55 (3)		3770666

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
(1) No resemblance to petroleum products in lube oil range.
(2) Triple silica gel cleanup was used to remove organic interferences from sample extract as per client request.
(3) Isobutylbenzene recovery not within acceptance limits; moisture exceeds 50%.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4I1957
Report Date: 2014/10/03

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE-YEAR 4
Your P.O. #: 16300R-20
Sampler Initials: RMP

RBCA HYDROCARBONS IN SOIL (SOIL)

Maxxam ID		XU6979	XU6980	XU6981	XU6982		
Sampling Date		2014/09/27	2014/09/27	2014/09/27	2014/09/27		
COC Number		N/A	N/A	N/A	N/A		
	Units	**14-POL-BS111**	**14-POL-BS112**	**14-POL-BS113**	**14-POL-BS114**	**RDL**	**QC Batch**
Inorganics							
Moisture	%	28	15	43	11	1.0	3768881
Petroleum Hydrocarbons							
Benzene	mg/kg	ND	ND	ND	ND	0.025	3770666
Toluene	mg/kg	0.45	0.12	0.085	0.031	0.025	3770666
Ethylbenzene	mg/kg	ND	ND	ND	ND	0.025	3770666
Xylene (Total)	mg/kg	ND	ND	ND	ND	0.050	3770666
C6 - C10 (less BTEX)	mg/kg	ND	ND	ND	ND	2.5	3770666
>C10-C16 Hydrocarbons	mg/kg	54	ND	ND	ND	10	3769264
>C16-C21 Hydrocarbons	mg/kg	200	ND	52	ND	10	3769264
>C21-<C32 Hydrocarbons	mg/kg	2000	50	620	110	15	3769264
Modified TPH (Tier1)	mg/kg	2300	50	670	110	15	3768722
Reached Baseline at C32	mg/kg	No	Yes	No	No	N/A	3769264
Hydrocarbon Resemblance	mg/kg	SEECOMMENT (1)	SEECOMMENT (1)	SEECOMMENT (2)	SEECOMMENT (1)	N/A	3769264
Surrogate Recovery (%)							
Isobutylbenzene - Extractable	%	97	104	101	103		3769264
n-Dotriacontane - Extractable	%	121 (3)	113 (3)	119 (3)	117 (3)		3769264
Isobutylbenzene - Volatile	%	88	91	115	89		3770666

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
(1) Lube oil fraction.
(2) One product in fuel oil range. Lube oil fraction.
(3) Triple silica gel cleanup was used to remove organic interferences from sample extract as per client request.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4I1957
Report Date: 2014/10/03

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE-YEAR 4
Your P.O. #: 16300R-20
Sampler Initials: RMP

RBCA HYDROCARBONS IN SOIL (SOIL)

Maxxam ID		XU6983		
Sampling Date		2014/09/27		
COC Number		N/A		
	Units	**14-POL-BS115**	**RDL**	**QC Batch**
Inorganics				
Moisture	%	62	1.0	3768881
Petroleum Hydrocarbons				
Benzene	mg/kg	ND	0.025	3770666
Toluene	mg/kg	ND	0.025	3770666
Ethylbenzene	mg/kg	ND	0.025	3770666
Xylene (Total)	mg/kg	ND	0.050	3770666
C6 - C10 (less BTEX)	mg/kg	ND	2.5	3770666
>C10-C16 Hydrocarbons	mg/kg	ND	10	3769264
>C16-C21 Hydrocarbons	mg/kg	ND	10	3769264
>C21-<C32 Hydrocarbons	mg/kg	100	15	3769264
Modified TPH (Tier1)	mg/kg	100	15	3768722
Reached Baseline at C32	mg/kg	Yes	N/A	3769264
Hydrocarbon Resemblance	mg/kg	SEECOMMENT (1)	N/A	3769264
Surrogate Recovery (%)				
Isobutylbenzene - Extractable	%	83		3769264
n-Dotriacontane - Extractable	%	118 (2)		3769264
Isobutylbenzene - Volatile	%	70		3770666

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
(1) No resemblance to petroleum products in lube oil range.
(2) Triple silica gel cleanup was used to remove organic interferences from sample extract as per client request.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4I1957
Report Date: 2014/10/03

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE-YEAR 4
Your P.O. #: 16300R-20
Sampler Initials: RMP

GENERAL COMMENTS

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4I1957
Report Date: 2014/10/03

QUALITY ASSURANCE REPORT

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE-YEAR 4
Your P.O. #: 16300R-20
Sampler Initials: RMP

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
3769264	Isobutylbenzene - Extractable	2014/10/02	95	30 - 130	98	30 - 130	99	%		
3769264	n-Dotriacontane - Extractable	2014/10/02	108	30 - 130	106	30 - 130	98	%		
3770666	Isobutylbenzene - Volatile	2014/10/03			96	60 - 140	82	%		
3768881	Moisture	2014/10/02							11	25
3769264	>C10-C16 Hydrocarbons	2014/10/02	81	30 - 130	85	30 - 130	ND ,RDL=10	mg/kg	NC	50
3769264	>C16-C21 Hydrocarbons	2014/10/02	91	30 - 130	96	30 - 130	ND ,RDL=10	mg/kg	NC	50
3769264	>C21-<C32 Hydrocarbons	2014/10/02	91	30 - 130	96	30 - 130	ND ,RDL=15	mg/kg	NC	50
3770666	Benzene	2014/10/03			94	60 - 140	ND ,RDL=0.025	mg/kg	NC	50
3770666	C6 - C10 (less BTEX)	2014/10/03					ND ,RDL=2.5	mg/kg	NC	50
3770666	Ethylbenzene	2014/10/03			98	60 - 140	ND ,RDL=0.025	mg/kg	NC	50
3770666	Toluene	2014/10/03			95	60 - 140	ND ,RDL=0.025	mg/kg	NC	50
3770666	Xylene (Total)	2014/10/03			101	60 - 140	ND ,RDL=0.050	mg/kg	NC	50

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

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.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4I1957
Report Date: 2014/10/03

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE-YEAR 4
Your P.O. #: 16300R-20
Sampler Initials: RMP

VALIDATION SIGNATURE PAGE

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

Paula Chaplin, Project Manager

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.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam
A Bureau Veritas Group Company

Success Through Science®

Your P.O. #: 16300R-20
Your Project #: 121413099.200
Site Location: HOPEDALE- YEAR 4
Your C.O.C. #: N/A

Attention:Jim Slade

Stantec Consulting Ltd
St. John's - Standing Offer
141 Kelsey Drive
St. John's, NL
A1B 0L2

Report Date: 2014/10/06
Report #: R3179652
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B4I2906
Received: 2014/10/02, 09:34

Sample Matrix: Soil
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Moisture (1)	3	N/A	2014/10/02	ATL SOP 00001	OMOE Handbook 1983 m
Low Level PCB in Soil by GC-ECD (1)	3	2014/10/02	2014/10/03	ATL SOP 00106	EPA 8082 m
PCB Aroclor sum (low level soil) (1)	3	N/A	2014/10/06		Auto Calc.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Maxxam Bedford

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Michelle Hill, Project Manager
Email: MHill@maxxam.ca
Phone# (902)420-0203 Ext:289
==========
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.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4I2906
Report Date: 2014/10/06

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE- YEAR 4
Your P.O. #: 16300R-20
Sampler Initials: RMP

RESULTS OF ANALYSES OF SOIL

Maxxam ID		XV1837	XV1838	XV1839		
Sampling Date		2014/09/27	2014/09/27	2014/09/27		
COC Number		N/A	N/A	N/A		
	Units	**14-MB-BS401**	**14-MB-BS402**	**14-MB-BS403**	**RDL**	**QC Batch**
Inorganics						
Moisture	%	17	11	11	1.0	3770436

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4I2906
Report Date: 2014/10/06

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE- YEAR 4
Your P.O. #: 16300R-20
Sampler Initials: RMP

PCB'S AND DDT BY GC-ECD (SOIL)

Maxxam ID		XV1837	XV1837	XV1838	XV1839		
Sampling Date		2014/09/27	2014/09/27	2014/09/27	2014/09/27		
COC Number		N/A	N/A	N/A	N/A		
	Units	**14-MB-BS401**	**14-MB-BS401 Lab-Dup**	**14-MB-BS402**	**14-MB-BS403**	**RDL**	**QC Batch**
PCBs							
Aroclor 1016	mg/kg	ND	ND	ND	ND	0.010	3771030
Aroclor 1221	mg/kg	ND	ND	ND	ND	0.010	3771030
Aroclor 1232	mg/kg	ND	ND	ND	ND	0.010	3771030
Aroclor 1248	mg/kg	ND	ND	ND	ND	0.010	3771030
Aroclor 1242	mg/kg	ND	ND	ND	ND	0.010	3771030
Aroclor 1254	mg/kg	0.31	0.26	0.084	0.047	0.010	3771030
Aroclor 1260	mg/kg	0.47	0.56	0.44	0.12	0.010	3771030
Calculated Total PCB	mg/kg	0.78		0.52	0.17	0.010	3770622
Surrogate Recovery (%)							
Decachlorobiphenyl	%	87 (1)	83 (1)	87 (1)	85 (1)		3771030

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
ND = Not detected
(1) PCB:Unidentified (possibly halogenated) compounds detected.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4I2906
Report Date: 2014/10/06

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE- YEAR 4
Your P.O. #: 16300R-20
Sampler Initials: RMP

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.3°C

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4I2906
Report Date: 2014/10/06

QUALITY ASSURANCE REPORT

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE- YEAR 4
Your P.O. #: 16300R-20
Sampler Initials: RMP

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
3771030	Decachlorobiphenyl	2014/10/03	90	70 - 130	98	70 - 130	92	%		
3771030	Aroclor 1016	2014/10/03					ND ,RDL=0.010	mg/kg	NC	50
3771030	Aroclor 1221	2014/10/03					ND ,RDL=0.010	mg/kg	NC	50
3771030	Aroclor 1232	2014/10/03					ND ,RDL=0.010	mg/kg	NC	50
3771030	Aroclor 1242	2014/10/03					ND ,RDL=0.010	mg/kg	NC	50
3771030	Aroclor 1248	2014/10/03					ND ,RDL=0.010	mg/kg	NC	50
3771030	Aroclor 1254	2014/10/03	NC	N/A	105	N/A	ND ,RDL=0.010	mg/kg	18	50
3771030	Aroclor 1260	2014/10/03					ND ,RDL=0.010	mg/kg	18	50

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

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.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4I2906
Report Date: 2014/10/06

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE- YEAR 4
Your P.O. #: 16300R-20
Sampler Initials: RMP

VALIDATION SIGNATURE PAGE

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

Rose MacDonald, Scientific Specialist (Organics)

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.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Your P.O. #: 16300R-20
Your Project #: 121413099.200
Site Location: HOPEDALE-YEAR 4
Your C.O.C. #: B088617

Attention:Jim Slade

Stantec Consulting Ltd
St. John's - Standing Offer
141 Kelsey Drive
St. John's, NL
A1B 0L2

Report Date: 2014/10/27
Report #: R3201690
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B4J7026
Received: 2014/10/22, 09:40

Sample Matrix: Soil
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
TEH in Soil (PIRI) (1, 2)	2	2014/10/23	2014/10/27	ATL SOP-00197	Atl. PIRI v3 m
TEH in Soil (PIRI) (2)	3	2014/10/24	2014/10/27	ATL SOP-00197	Atl. PIRI v3 m
Moisture	5	N/A	2014/10/24	ATL SOP-00196	OMOE Handbook 1983 m
VPH in Soil (PIRI)	2	2014/10/23	2014/10/24	ATL SOP 00199	Atl. PIRI v3 m
VPH in Soil (PIRI)	3	2014/10/24	2014/10/27	ATL SOP 00199	Atl. PIRI v3 m
ModTPH (T1) Calc. for Soil (3)	1	N/A	2014/10/25	N/A	Atl. PIRI v3 m
ModTPH (T1) Calc. for Soil (3)	4	N/A	2014/10/27	N/A	Atl. PIRI v3 m

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Reported on a dry weight basis.
(2) Soils are reported on a dry weight basis unless otherwise specified.
(3) New RDLs in effect due to release of NS Contaminated Sites Regulations. Reduced RDL based on MDL study performance. Low level analytical run checks being implemented.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Rob Whelan, Laboratory Manager
Email: RWhelan@maxxam.ca
Phone# (709)754-0203

==========

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.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4J7026
Report Date: 2014/10/27

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE-YEAR 4
Your P.O. #: 16300R-20
Sampler Initials: RBP

RBCA HYDROCARBONS IN SOIL (SOIL)

Maxxam ID		YC3195		YC3213	YC3213		
Sampling Date		2014/10/17		2014/10/17	2014/10/17		
COC Number		B088617		B088617	B088617		
	Units	**14-POL-BS116**	**QC Batch**	**14-POL-BS117**	**14-POL-BS117 Lab-Dup**	**RDL**	**QC Batch**
Inorganics							
Moisture	%	25	3795651	7.8		1.0	3795651
Petroleum Hydrocarbons							
Benzene	mg/kg	ND	3797842	ND	ND	0.025	3795878
Toluene	mg/kg	0.027	3797842	ND	ND	0.025	3795878
Ethylbenzene	mg/kg	ND	3797842	ND	ND	0.025	3795878
Xylene (Total)	mg/kg	ND	3797842	ND	ND	0.050	3795878
C6 - C10 (less BTEX)	mg/kg	ND	3797842	ND	ND	2.5	3795878
>C10-C16 Hydrocarbons	mg/kg	16	3797826	ND	ND	10	3795885
>C16-C21 Hydrocarbons	mg/kg	55	3797826	ND	ND	10	3795885
>C21-<C32 Hydrocarbons	mg/kg	910	3797826	17	27	15	3795885
Modified TPH (Tier1)	mg/kg	980	3794119	17		15	3794119
Reached Baseline at C32	mg/kg	No	3797826	Yes	Yes	N/A	3795885
Hydrocarbon Resemblance	mg/kg	SEECOMMENT (1)	3797826	SEECOMMENT (2)		N/A	3795885
Surrogate Recovery (%)							
Isobutylbenzene - Extractable	%	91	3797826	104	107		3795885
n-Dotriacontane - Extractable	%	119 (3)	3797826	99 (3)	103		3795885
Isobutylbenzene - Volatile	%	73	3797842	116	108		3795878

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
ND = Not detected
N/A = Not Applicable
(1) Lube oil fraction.
(2) No resemblance to petroleum products in lube oil range.
(3) Triple silica gel cleanup was used to remove organic interferences from sample extract as per client request.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4J7026
Report Date: 2014/10/27

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE-YEAR 4
Your P.O. #: 16300R-20
Sampler Initials: RBP

RBCA HYDROCARBONS IN SOIL (SOIL)

Maxxam ID		YC3216	YC3217			YC3218		
Sampling Date		2014/10/17	2014/10/17			2014/10/17		
COC Number		B088617	B088617			B088617		
	Units	**14-POL-BS118**	**14-POL-BS119**	**RDL**	**QC Batch**	**14-POL-BS120**	**RDL**	**QC Batch**
Inorganics								
Moisture	%	26	60	1.0	3795651	11	1.0	3795651
Petroleum Hydrocarbons								
Benzene	mg/kg	ND	ND	0.050	3797842	ND	0.025	3795887
Toluene	mg/kg	ND	ND	0.050	3797842	ND	0.025	3795887
Ethylbenzene	mg/kg	ND	ND	0.050	3797842	ND	0.025	3795887
Xylene (Total)	mg/kg	ND	ND	0.10	3797842	ND	0.050	3795887
C6 - C10 (less BTEX)	mg/kg	ND	ND	5.0	3797842	ND	2.5	3795887
>C10-C16 Hydrocarbons	mg/kg	ND	ND	10	3797826	ND	10	3795888
>C16-C21 Hydrocarbons	mg/kg	ND	ND	10	3797826	ND	10	3795888
>C21-<C32 Hydrocarbons	mg/kg	100	150	15	3797826	120	15	3795888
Modified TPH (Tier1)	mg/kg	100	150	15	3794119	120	15	3794119
Reached Baseline at C32	mg/kg	Yes	Yes	N/A	3797826	No	N/A	3795888
Hydrocarbon Resemblance	mg/kg	SEECOMMENT (1)	SEECOMMENT (1)	N/A	3797826	SEECOMMENT (2)	N/A	3795888
Surrogate Recovery (%)								
Isobutylbenzene - Extractable	%	99	106		3797826	80		3795888
n-Dotriacontane - Extractable	%	107 (3)	115 (3)		3797826	101 (3)		3795888
Isobutylbenzene - Volatile	%	95 (4)	89 (4)		3797842	99		3795887

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
(1) No resemblance to petroleum products in lube oil range.
(2) Lube oil fraction.
(3) Triple silica gel cleanup was used to remove organic interferences from sample extract as per client request.
(4) Elevated VPH RDL(s) due to sample dilution.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4J7026
Report Date: 2014/10/27

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE-YEAR 4
Your P.O. #: 16300R-20
Sampler Initials: RBP

RBCA HYDROCARBONS IN SOIL (SOIL)

Maxxam ID		YC3218		
Sampling Date		2014/10/17		
COC Number		B088617		
	Units	**14-POL-BS120 Lab-Dup**	**RDL**	**QC Batch**
Inorganics				
Moisture	%	9.5	1.0	3795651
Petroleum Hydrocarbons				
Benzene	mg/kg	ND	0.025	3795887
Toluene	mg/kg	ND	0.025	3795887
Ethylbenzene	mg/kg	ND	0.025	3795887
Xylene (Total)	mg/kg	ND	0.050	3795887
C6 - C10 (less BTEX)	mg/kg	ND	2.5	3795887
>C10-C16 Hydrocarbons	mg/kg	ND	10	3795888
>C16-C21 Hydrocarbons	mg/kg	ND	10	3795888
>C21-<C32 Hydrocarbons	mg/kg	120	15	3795888
Reached Baseline at C32	mg/kg	No	N/A	3795888
Surrogate Recovery (%)				
Isobutylbenzene - Extractable	%	93		3795888
n-Dotriacontane - Extractable	%	100		3795888
Isobutylbenzene - Volatile	%	87		3795887

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
ND = Not detected
N/A = Not Applicable

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4J7026
Report Date: 2014/10/27

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE-YEAR 4
Your P.O. #: 16300R-20
Sampler Initials: RBP

GENERAL COMMENTS

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4J7026
Report Date: 2014/10/27

QUALITY ASSURANCE REPORT

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE-YEAR 4
Your P.O. #: 16300R-20
Sampler Initials: RBP

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
3795878	Isobutylbenzene - Volatile	2014/10/24			109	60 - 140	96	%		
3795885	Isobutylbenzene - Extractable	2014/10/25	98	30 - 130	102	30 - 130	102	%		
3795885	n-Dotriacontane - Extractable	2014/10/25	101	30 - 130	109	30 - 130	101	%		
3795887	Isobutylbenzene - Volatile	2014/10/23			102	60 - 140	93	%		
3795888	Isobutylbenzene - Extractable	2014/10/27	100	30 - 130	93	30 - 130	96	%		
3795888	n-Dotriacontane - Extractable	2014/10/27	103	30 - 130	101	30 - 130	97	%		
3797826	Isobutylbenzene - Extractable	2014/10/27	98	30 - 130	97	30 - 130	97	%		
3797826	n-Dotriacontane - Extractable	2014/10/27	107	30 - 130	108	30 - 130	97	%		
3797842	Isobutylbenzene - Volatile	2014/10/27			88	60 - 140	96	%		
3795651	Moisture	2014/10/24							15	25
3795878	Benzene	2014/10/24			95	60 - 140	ND ,RDL=0.025	mg/kg	NC	50
3795878	C6 - C10 (less BTEX)	2014/10/24					ND ,RDL=2.5	mg/kg	NC	50
3795878	Ethylbenzene	2014/10/24			80	60 - 140	ND ,RDL=0.025	mg/kg	NC	50
3795878	Toluene	2014/10/24			88	60 - 140	ND ,RDL=0.025	mg/kg	NC	50
3795878	Xylene (Total)	2014/10/24			85	60 - 140	ND ,RDL=0.050	mg/kg	NC	50
3795885	>C10-C16 Hydrocarbons	2014/10/25	88	30 - 130	93	30 - 130	ND ,RDL=10	mg/kg	NC	50
3795885	>C16-C21 Hydrocarbons	2014/10/25	91	30 - 130	91	30 - 130	ND ,RDL=10	mg/kg	NC	50
3795885	>C21-<C32 Hydrocarbons	2014/10/25	115	30 - 130	93	30 - 130	ND ,RDL=15	mg/kg	NC	50
3795887	Benzene	2014/10/24			89	60 - 140	ND ,RDL=0.025	mg/kg	NC	50
3795887	C6 - C10 (less BTEX)	2014/10/24					ND ,RDL=2.5	mg/kg	NC	50
3795887	Ethylbenzene	2014/10/24			95	60 - 140	ND ,RDL=0.025	mg/kg	NC	50
3795887	Toluene	2014/10/24			95	60 - 140	ND ,RDL=0.025	mg/kg	NC	50
3795887	Xylene (Total)	2014/10/24			98	60 - 140	ND ,RDL=0.050	mg/kg	NC	50
3795888	>C10-C16 Hydrocarbons	2014/10/27	82	30 - 130	77	30 - 130	ND ,RDL=10	mg/kg	NC	50
3795888	>C16-C21 Hydrocarbons	2014/10/27	96	30 - 130	86	30 - 130	ND ,RDL=10	mg/kg	NC	50
3795888	>C21-<C32 Hydrocarbons	2014/10/27	NC	30 - 130	86	30 - 130	ND ,RDL=15	mg/kg	1.1	50
3797826	>C10-C16 Hydrocarbons	2014/10/27	94	30 - 130	89	30 - 130	ND ,RDL=10	mg/kg	NC	50
3797826	>C16-C21 Hydrocarbons	2014/10/27	92	30 - 130	95	30 - 130	ND ,RDL=10	mg/kg	NC	50
3797826	>C21-<C32 Hydrocarbons	2014/10/27	87	30 - 130	91	30 - 130	ND ,RDL=15	mg/kg	NC	50
3797842	Benzene	2014/10/27			91	60 - 140	ND ,RDL=0.025	mg/kg	NC	50
3797842	C6 - C10 (less BTEX)	2014/10/27					ND ,RDL=2.5	mg/kg	NC	50

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4J7026
Report Date: 2014/10/27

QUALITY ASSURANCE REPORT(CONT'D)

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE-YEAR 4
Your P.O. #: 16300R-20
Sampler Initials: RBP

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
3797842	Ethylbenzene	2014/10/27			76	60 - 140	ND ,RDL=0.025	mg/kg	NC	50
3797842	Toluene	2014/10/27			83	60 - 140	ND ,RDL=0.025	mg/kg	NC	50
3797842	Xylene (Total)	2014/10/27			81	60 - 140	ND ,RDL=0.050	mg/kg	NC	50

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

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.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

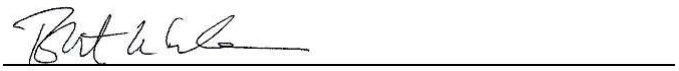
Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4J7026
Report Date: 2014/10/27

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE-YEAR 4
Your P.O. #: 16300R-20
Sampler Initials: RBP

VALIDATION SIGNATURE PAGE

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



Rob Whelan, Laboratory Manager

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.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam
A Bureau Veritas Group Company

Success Through Science®

Your P.O. #: 16300R-20
Your Project #: 121413099.200
Site Location: HOPEDALE-CONF. SAMPLING
Your C.O.C. #: N/A

Attention:Jim Slade

Stantec Consulting Ltd
St. John's - Standing Offer
141 Kelsey Drive
St. John's, NL
A1B 0L2

Report Date: 2014/10/24
Report #: R3199003
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B4J7103
Received: 2014/10/22, 10:46

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
TEH in Water (PIRI)	2	2014/10/23	2014/10/24	ATL SOP 00198	Atl. PIRI v3 m
VPH in Water (PIRI) (1)	2	N/A	2014/10/23	ATL SOP 00118	Atl. PIRI v3 m
ModTPH (T1) Calc. for Water	2	N/A	2014/10/24	N/A	Atl. PIRI v3 m

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Maxxam Bedford

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Rob Whelan, Laboratory Manager
Email: RWhelan@maxxam.ca
Phone# (709)754-0203
==========
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.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4J7103
Report Date: 2014/10/24

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE-CONF. SAMPLING
Your P.O. #: 16300R-20
Sampler Initials: AR

RBCA HYDROCARBONS IN WATER (WATER)

Maxxam ID		YC3478	YC3481		
Sampling Date		2014/10/20	2014/10/20		
COC Number		N/A	N/A		
	Units	**14-POL-SW1**	**14-POL-SW2**	**RDL**	**QC Batch**
Petroleum Hydrocarbons					
Benzene	mg/L	ND	ND	0.0010	3794534
Toluene	mg/L	ND	ND	0.0010	3794534
Ethylbenzene	mg/L	ND	ND	0.0010	3794534
Xylene (Total)	mg/L	ND	ND	0.0020	3794534
C6 - C10 (less BTEX)	mg/L	ND	ND	0.010	3794534
>C10-C16 Hydrocarbons	mg/L	0.097	1.6	0.050	3796003
>C16-C21 Hydrocarbons	mg/L	0.062	0.68	0.050	3796003
>C21-<C32 Hydrocarbons	mg/L	0.19	0.46	0.10	3796003
Modified TPH (Tier1)	mg/L	0.35	2.7	0.10	3794238
Reached Baseline at C32	mg/L	Yes	Yes	N/A	3796003
Hydrocarbon Resemblance	mg/L	SEECOMMENT (1)	SEECOMMENT (2)	N/A	3796003
Surrogate Recovery (%)					
Isobutylbenzene - Extractable	%	65	99		3796003
n-Dotriacontane - Extractable	%	70 (3)	107 (4)		3796003
Isobutylbenzene - Volatile	%	99	94		3794534

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
(1) One product in fuel oil range. One product in lube oil range.
(2) One product in fuel oil range.
(3) Surrogate recovery(ies) not within acceptance limits due to matrix/co-extractive interference.
(4) TEH sample contained sediment.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4J7103
Report Date: 2014/10/24

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE-CONF. SAMPLING
Your P.O. #: 16300R-20
Sampler Initials: AR

GENERAL COMMENTS

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4J7103
Report Date: 2014/10/24

QUALITY ASSURANCE REPORT

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE-CONF. SAMPLING
Your P.O. #: 16300R-20
Sampler Initials: AR

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
3794534	Isobutylbenzene - Volatile	2014/10/23	102	70 - 130	100	70 - 130	103	%		
3796003	Isobutylbenzene - Extractable	2014/10/24	87	30 - 130	105	30 - 130	105	%		
3796003	n-Dotriacontane - Extractable	2014/10/24	92	30 - 130	110	30 - 130	105	%		
3794534	Benzene	2014/10/23	108	70 - 130	113	70 - 130	ND ,RDL=0.0010	mg/L	NC	40
3794534	C6 - C10 (less BTEX)	2014/10/23					ND ,RDL=0.010	mg/L	2.7	40
3794534	Ethylbenzene	2014/10/23	104	70 - 130	108	70 - 130	ND ,RDL=0.0010	mg/L	NC	40
3794534	Toluene	2014/10/23	105	70 - 130	111	70 - 130	ND ,RDL=0.0010	mg/L	4.1	40
3794534	Xylene (Total)	2014/10/23	104	70 - 130	108	70 - 130	ND ,RDL=0.0020	mg/L	NC	40
3796003	>C10-C16 Hydrocarbons	2014/10/24	72	30 - 130	84	30 - 130	ND ,RDL=0.050	mg/L	NC	40
3796003	>C16-C21 Hydrocarbons	2014/10/24	82	30 - 130	94	30 - 130	ND ,RDL=0.050	mg/L	NC	40
3796003	>C21-<C32 Hydrocarbons	2014/10/24	81	30 - 130	93	30 - 130	ND ,RDL=0.10	mg/L	NC	40

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

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.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4J7103
Report Date: 2014/10/24

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE-CONF. SAMPLING
Your P.O. #: 16300R-20
Sampler Initials: AR

VALIDATION SIGNATURE PAGE

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

Paula Chaplin, Project Manager

Phil Deveau

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.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam
A Bureau Veritas Group Company

Success Through Science®

Your P.O. #: 16300R-40
Your Project #: 121413099.200
Site Location: HOPEDALE- CONF. SAMPLING
Your C.O.C. #: N/A

Attention:Anna Roy

Stantec Consulting Ltd
St. John's - Standing Offer
141 Kelsey Drive
St. John's, NL
A1B 0L2

Report Date: 2014/10/24
Report #: R3199096
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B4J8197
Received: 2014/10/23, 10:09

Sample Matrix: Soil
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Moisture (1)	3	N/A	2014/10/24	ATL SOP 00001	OMOE Handbook 1983 m
PCBs in soil by GC/ECD (1, 2)	3	2014/10/23	2014/10/24	ATL SOP 00106	EPA 8082 m
PCB Aroclor sum (soil) (1)	3	N/A	2014/10/24		Auto Calc.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Maxxam Bedford
(2) Soils are reported on a dry weight basis unless otherwise specified.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Michelle Hill, Project Manager
Email: MHill@maxxam.ca
Phone# (902)420-0203 Ext:289
==========
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.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4J8197
Report Date: 2014/10/24

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE- CONF. SAMPLING
Your P.O. #: 16300R-40
Sampler Initials: AR

RESULTS OF ANALYSES OF SOIL

Maxxam ID		YC8299	YC8300	YC8301		
Sampling Date		2014/10/20	2014/10/20	2014/10/20		
COC Number		N/A	N/A	N/A		
	Units	**14-MB-BS101**	**14-MB-BS102**	**14-FIELD DUP3**	**RDL**	**QC Batch**
Inorganics						
Moisture	%	16	23	25	1.0	3795717

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4J8197
Report Date: 2014/10/24

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE- CONF. SAMPLING
Your P.O. #: 16300R-40
Sampler Initials: AR

POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

Maxxam ID		YC8299	YC8300	YC8301		
Sampling Date		2014/10/20	2014/10/20	2014/10/20		
COC Number		N/A	N/A	N/A		
	Units	**14-MB-BS101**	**14-MB-BS102**	**14-FIELD DUP3**	**RDL**	**QC Batch**
PCBs						
Aroclor 1016	ug/g	ND	ND	ND	0.050	3796178
Aroclor 1221	ug/g	ND	ND	ND	0.050	3796178
Aroclor 1232	ug/g	ND	ND	ND	0.050	3796178
Aroclor 1248	ug/g	ND	ND	ND	0.050	3796178
Aroclor 1242	ug/g	ND	ND	ND	0.050	3796178
Aroclor 1254	ug/g	ND	ND	ND	0.050	3796178
Aroclor 1260	ug/g	0.23	0.33	0.12	0.050	3796178
Calculated Total PCB	ug/g	0.23	0.33	0.12	0.050	3796051
Surrogate Recovery (%)						
Decachlorobiphenyl	%	99 (1)	98	95		3796178

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
(1) PCB samples were extracted using a flat-bed shaker instead of the accelerated mechanical shaker due to matrix incompatibility.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4J8197
Report Date: 2014/10/24

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE- CONF. SAMPLING
Your P.O. #: 16300R-40
Sampler Initials: AR

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	8.2°C

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4J8197
Report Date: 2014/10/24

QUALITY ASSURANCE REPORT

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE- CONF. SAMPLING
Your P.O. #: 16300R-40
Sampler Initials: AR

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
3796178	Decachlorobiphenyl	2014/10/24	99	30 - 130	103	30 - 130	98	%		
3796178	Aroclor 1016	2014/10/24					ND ,RDL=0.050	ug/g	NC	50
3796178	Aroclor 1221	2014/10/24					ND ,RDL=0.050	ug/g	NC	50
3796178	Aroclor 1232	2014/10/24					ND ,RDL=0.050	ug/g	NC	50
3796178	Aroclor 1242	2014/10/24					ND ,RDL=0.050	ug/g	NC	50
3796178	Aroclor 1248	2014/10/24					ND ,RDL=0.050	ug/g	NC	50
3796178	Aroclor 1254	2014/10/24	74	30 - 130	110	30 - 130	ND ,RDL=0.050	ug/g	NC	50
3796178	Aroclor 1260	2014/10/24					ND ,RDL=0.050	ug/g	NC	50

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

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.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4J8197
Report Date: 2014/10/24

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE- CONF. SAMPLING
Your P.O. #: 16300R-40
Sampler Initials: AR

VALIDATION SIGNATURE PAGE

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

Rose MacDonald, Scientific Specialist (Organics)

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.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Success Through Science®

Your P.O. #: 16300R-20
Your Project #: 121413099.200
Site Location: HOPEDALE-BMEWS
Your C.O.C. #: N/A

Attention:Anna Roy

Stantec Consulting Ltd
St. John's - Standing Offer
141 Kelsey Drive
St. John's, NL
A1B 0L2

Report Date: 2014/10/28
Report #: R3203054
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B4K0438
Received: 2014/10/27, 09:30

Sample Matrix: Soil
Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
TEH in Soil (PIRI) (1, 2)	6	2014/10/27	2014/10/28	ATL SOP-00197	Atl. PIRI v3 m
Moisture	6	N/A	2014/10/28	ATL SOP-00196	OMOE Handbook 1983 m
VPH in Soil (PIRI)	6	2014/10/27	2014/10/28	ATL SOP 00199	Atl. PIRI v3 m
ModTPH (T1) Calc. for Soil (3)	6	N/A	2014/10/28	N/A	Atl. PIRI v3 m

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Reported on a dry weight basis.
(2) Soils are reported on a dry weight basis unless otherwise specified.
(3) New RDLs in effect due to release of NS Contaminated Sites Regulations. Reduced RDL based on MDL study performance. Low level analytical run checks being implemented.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Rob Whelan, Laboratory Manager
Email: RWhelan@maxxam.ca
Phone# (709)754-0203

==========

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.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4K0438
Report Date: 2014/10/28

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE-BMEWS
Your P.O. #: 16300R-20
Sampler Initials: AR

RBCA HYDROCARBONS IN SOIL (SOIL)

Maxxam ID		YE0580	YE0581	YE0582	YE0583		
Sampling Date		2014/10/22	2014/10/22	2014/10/22	2014/10/22		
COC Number		N/A	N/A	N/A	N/A		
	Units	**14-BMEWS-BS202**	**14-BMEWS-BS203**	**14-BMEWS-BS204**	**14-BMEWS-BS205**	**RDL**	**QC Batch**
Inorganics							
Moisture	%	24	22	20	25	1.0	3799973
Petroleum Hydrocarbons							
Benzene	mg/kg	ND	ND	ND	ND	0.025	3800216
Toluene	mg/kg	ND	ND	ND	ND	0.025	3800216
Ethylbenzene	mg/kg	ND	ND	ND	ND	0.025	3800216
Xylene (Total)	mg/kg	ND	ND	ND	ND	0.050	3800216
C6 - C10 (less BTEX)	mg/kg	ND	ND	ND	ND	2.5	3800216
>C10-C16 Hydrocarbons	mg/kg	25	19	73	30	10	3800218
>C16-C21 Hydrocarbons	mg/kg	24	21	30	30	10	3800218
>C21-<C32 Hydrocarbons	mg/kg	140	110	120	150	15	3800218
Modified TPH (Tier1)	mg/kg	190	150	220	210	15	3799774
Reached Baseline at C32	mg/kg	Yes	Yes	Yes	Yes	N/A	3800218
Hydrocarbon Resemblance	mg/kg	SEECOMMENT (1)	SEECOMMENT (2)	SEECOMMENT (1)	SEECOMMENT (1)	N/A	3800218
Surrogate Recovery (%)							
Isobutylbenzene - Extractable	%	104	104	107	104		3800218
n-Dotriacontane - Extractable	%	108	108	103	108		3800218
Isobutylbenzene - Volatile	%	99	107	111	110		3800216

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
(1) One product in fuel oil range. No resemblance to petroleum products in lube oil range.
(2) No resemblance to petroleum products in fuel oil /lube oil range.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4K0438
Report Date: 2014/10/28

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE-BMEWS
Your P.O. #: 16300R-20
Sampler Initials: AR

RBCA HYDROCARBONS IN SOIL (SOIL)

Maxxam ID		YE0584	YE0585		
Sampling Date		2014/10/22	2014/10/22		
COC Number		N/A	N/A		
	Units	**14-FIELD DUP 4**	**14-FIELD DUP 5**	**RDL**	**QC Batch**
Inorganics					
Moisture	%	22	21	1.0	3799973
Petroleum Hydrocarbons					
Benzene	mg/kg	ND	ND	0.025	3800216
Toluene	mg/kg	ND	ND	0.025	3800216
Ethylbenzene	mg/kg	ND	ND	0.025	3800216
Xylene (Total)	mg/kg	ND	ND	0.050	3800216
C6 - C10 (less BTEX)	mg/kg	ND	ND	2.5	3800216
>C10-C16 Hydrocarbons	mg/kg	18	17	10	3800218
>C16-C21 Hydrocarbons	mg/kg	21	22	10	3800218
>C21-<C32 Hydrocarbons	mg/kg	99	95	15	3800218
Modified TPH (Tier1)	mg/kg	140	130	15	3799774
Reached Baseline at C32	mg/kg	Yes	Yes	N/A	3800218
Hydrocarbon Resemblance	mg/kg	SEECOMMENT (1)	SEECOMMENT (2)	N/A	3800218
Surrogate Recovery (%)					
Isobutylbenzene - Extractable	%	103	105		3800218
n-Dotriacontane - Extractable	%	106	111		3800218
Isobutylbenzene - Volatile	%	100	109		3800216

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
(1) No resemblance to petroleum products in fuel oil /lube oil range.
(2) One product in fuel oil range. No resemblance to petroleum products in lube oil range.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4K0438
Report Date: 2014/10/28

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE-BMEWS
Your P.O. #: 16300R-20
Sampler Initials: AR

GENERAL COMMENTS

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4K0438
Report Date: 2014/10/28

QUALITY ASSURANCE REPORT

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE-BMEWS
Your P.O. #: 16300R-20
Sampler Initials: AR

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
3800216	Isobutylbenzene - Volatile	2014/10/28			101	60 - 140	104	%		
3800218	Isobutylbenzene - Extractable	2014/10/28	109	30 - 130	105	30 - 130	100	%		
3800218	n-Dotriacontane - Extractable	2014/10/28	133 (1)	30 - 130	110	30 - 130	100	%		
3799973	Moisture	2014/10/28							12	25
3800216	Benzene	2014/10/28			102	60 - 140	ND ,RDL=0.025	mg/kg	NC	50
3800216	C6 - C10 (less BTEX)	2014/10/28					ND ,RDL=2.5	mg/kg	NC	50
3800216	Ethylbenzene	2014/10/28			89	60 - 140	ND ,RDL=0.025	mg/kg	NC	50
3800216	Toluene	2014/10/28			96	60 - 140	ND ,RDL=0.025	mg/kg	NC	50
3800216	Xylene (Total)	2014/10/28			93	60 - 140	ND ,RDL=0.050	mg/kg	NC	50
3800218	>C10-C16 Hydrocarbons	2014/10/28	108	30 - 130	91	30 - 130	ND ,RDL=10	mg/kg	NC	50
3800218	>C16-C21 Hydrocarbons	2014/10/28	103	30 - 130	89	30 - 130	ND ,RDL=10	mg/kg	NC	50
3800218	>C21-<C32 Hydrocarbons	2014/10/28	95	30 - 130	81	30 - 130	ND ,RDL=15	mg/kg	NC	50

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

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.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4K0438
Report Date: 2014/10/28

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE-BMEWS
Your P.O. #: 16300R-20
Sampler Initials: AR

VALIDATION SIGNATURE PAGE

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

Paula Chaplin, Project Manager

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.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam
A Bureau Veritas Group Company

Success Through Science®

Your P.O. #: 16300R-20
Your Project #: 121413099.200
Site Location: HOPEDALE-METAL, CABLE
Your C.O.C. #: ES888714

Attention:Anna Roy

Stantec Consulting Ltd
St. John's - Standing Offer
141 Kelsey Drive
St. John's, NL
A1B 0L2

Report Date: 2014/11/06
Report #: R3213139
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B4K4914
Received: 2014/10/31, 10:13

Sample Matrix: Soil
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
PCBs in Solid by GC/ECD (1, 2)	1	2014/11/05	2014/11/06	ATL SOP 00105	EPA 8082 m
PCB Aroclor sum (solid) (1)	1	N/A	2014/11/06		Auto Calc.

Sample Matrix: Swab
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
PCBs on swabs by GC/ECD (1)	5	2014/11/05	2014/11/06	ATL SOP 00109	EPA 8082 m
PCB Aroclor sum (swabs) (1)	5	N/A	2014/11/06		Auto Calc.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Maxxam Bedford
(2) Results reported on an as received basis. This data was generated using accepted laboratory practices and standard Quality Control procedures. However, due to the absence of a recognized reference method for PCBs in Solid Matrix, an in-house method was used. Quality control samples were analyzed, however certain QC elements may be unavailable.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Michelle Hill, Project Manager
Email: MHill@maxxam.ca
Phone# (902)420-0203 Ext:289

==========

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.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4K4914
Report Date: 2014/11/06

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE-METAL, CABLE
Your P.O. #: 16300R-20
Sampler Initials: AR

POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

Maxxam ID		YG3423	YG3423		
Sampling Date		2014/10/27	2014/10/27		
COC Number		ES888714	ES888714		
	Units	**14-CABLE1**	**14-CABLE1 Lab-Dup**	**RDL**	**QC Batch**
PCBs					
Aroclor 1016	mg/kg	ND	ND	0.50	3812117
Aroclor 1221	mg/kg	ND	ND	0.50	3812117
Aroclor 1232	mg/kg	ND	ND	0.50	3812117
Aroclor 1248	mg/kg	ND	ND	0.50	3812117
Aroclor 1242	mg/kg	ND	ND	0.50	3812117
Aroclor 1254	mg/kg	ND	ND	0.50	3812117
Aroclor 1260	mg/kg	ND	ND	0.50	3812117
Calculated Total PCB	mg/kg	ND		0.50	3807113
Surrogate Recovery (%)					
Decachlorobiphenyl	%	85	87		3812117

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
ND = Not detected

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4K4914
Report Date: 2014/11/06

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE-METAL, CABLE
Your P.O. #: 16300R-20
Sampler Initials: AR

POLYCHLORINATED BIPHENYLS BY GC-ECD (SWAB)

Maxxam ID		YG3418	YG3419	YG3420	YG3421	YG3422		
Sampling Date		2014/10/27	2014/10/27	2014/10/27	2014/10/27	2014/10/27		
COC Number		ES888714	ES888714	ES888714	ES888714	ES888714		
	Units	**14-SWAB1**	**14-SWAB2**	**14-SWAB3**	**14-SWAB4**	**14-SWAB5**	**RDL**	**QC Batch**
PCBs								
Aroclor 1016	ug	ND	ND	ND	ND	ND	5.0	3811736
Aroclor 1221	ug	ND	ND	ND	ND	ND	5.0	3811736
Aroclor 1232	ug	ND	ND	ND	ND	ND	5.0	3811736
Aroclor 1248	ug	ND	ND	ND	ND	ND	5.0	3811736
Aroclor 1242	ug	ND	ND	ND	ND	ND	5.0	3811736
Aroclor 1254	ug	ND	ND	ND	ND	ND	5.0	3811736
Aroclor 1260	ug	17	14	ND	ND	ND	5.0	3811736
Calculated Total PCB	ug	17	14	ND	ND	ND	5.0	3807112
Surrogate Recovery (%)								
Decachlorobiphenyl	%	92	97	85	90	93		3811736

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4K4914
Report Date: 2014/11/06

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE-METAL, CABLE
Your P.O. #: 16300R-20
Sampler Initials: AR

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	8.1°C

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4K4914
Report Date: 2014/11/06

QUALITY ASSURANCE REPORT

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE-METAL, CABLE
Your P.O. #: 16300R-20
Sampler Initials: AR

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
3811736	Decachlorobiphenyl	2014/11/06			82	30 - 130	70 (1)			
3812117	Decachlorobiphenyl	2014/11/06	112	30 - 130	114	30 - 130	119	%		
3811736	Aroclor 1016	2014/11/06					ND, RDL=5.0	ug		
3811736	Aroclor 1221	2014/11/06					ND, RDL=5.0	ug		
3811736	Aroclor 1232	2014/11/06					ND, RDL=5.0	ug		
3811736	Aroclor 1242	2014/11/06					ND, RDL=5.0	ug		
3811736	Aroclor 1248	2014/11/06					ND, RDL=5.0	ug		
3811736	Aroclor 1254	2014/11/06					ND, RDL=5.0	ug		
3811736	Aroclor 1260	2014/11/06			92	N/A	ND, RDL=5.0	ug		
3812117	Aroclor 1016	2014/11/06					ND, RDL=0.50	mg/kg	NC	50
3812117	Aroclor 1221	2014/11/06					ND, RDL=0.50	mg/kg	NC	50
3812117	Aroclor 1232	2014/11/06					ND, RDL=0.50	mg/kg	NC	50
3812117	Aroclor 1242	2014/11/06					ND, RDL=0.50	mg/kg	NC	50
3812117	Aroclor 1248	2014/11/06					ND, RDL=0.50	mg/kg	NC	50
3812117	Aroclor 1254	2014/11/06	102	30 - 130	120	30 - 130	ND, RDL=0.50	mg/kg	NC	50
3812117	Aroclor 1260	2014/11/06					ND, RDL=0.50	mg/kg	NC	50

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

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.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) PCB surrogate not within acceptance limits. Associated samples have insufficient sample to repeat.

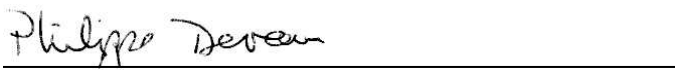
Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B4K4914
Report Date: 2014/11/06

Stantec Consulting Ltd
Client Project #: 121413099.200
Site Location: HOPEDALE-METAL, CABLE
Your P.O. #: 16300R-20
Sampler Initials: AR

VALIDATION SIGNATURE PAGE

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



Phil Deveau

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.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

APPENDIX E

PCB Destruction Certificates

RECUPERE SOL

Certificate of Destruction

Saint-Ambroise November 30, 2014

Generator :

Government of NL

P.O. Box 8700
St. JonhNL A1B 6J6

Advisor :

Sanexen Services Environnementaux In

9935, Avenue Catania, Entrée 1 - Bureau 2
Brossard (Québec J4Z 3V4

Contact : Christa Curnew

Contact : Mario Leathead

We confirm treatment of your soils at our plant located in the industrial park of Saint-Ambroise. The soils were managed and treated in compliance with our Certificate of Authorization delivered by the Quebec Ministry of Sustainable Development, Environment and Parks :

Permit : **Thermal treatment of PCB and other organochloride impacted soils, issued on October 27, 1997**

Permit Ref. No. : **7610-02-01-0603816**
1142129

Treatment service : Thermal
Soils impacted with : PCB
Treatment criteria : <A In reference to the standards set by the Ministry of the Sustainable Development, Environment and Parks of the Province of Quebec, Canada (<0.05 mg/kg)

Récupère Sol File No. : **120595.2**

Destruction Certificate No. : **120595.2-d2**

Volume of Soil Treated (kg) : **709320**

Yours truly,

Éloi Côté, Eng
Process Engineer

80 des Mélèzes St., St. Ambroise, Quebec, Canada, G7P 2N4
Tel.: (418) 695-3302 Fax : (418) 695-3303

Trucks summary

02-déc.-14

File No.	Arrival Time	Generator	Contamination	Weight ticket No.	Manifest No.	Carrier	License No.	Driver	Net weight (kg)
07-nov.-14									
120595.2	10:35	HopeDale (Sanexen)	BPC	32549	PC55227-5	Transport Jules Savard	L525941	Etienne Girard	40740
120595.2	10:41	HopeDale (Sanexen)	BPC	32550	PC55228-3	Transport Jules Savard	jbkj	Jean-Francois Lavoie	37730
120595.2	10:43	HopeDale (Sanexen)	BPC	32551	PC55229-1	Transport Jules Savard	HVGV	Eloi Lachance	38240
120595.2	12:49	HopeDale (Sanexen)	BPC	32557	PC55230-9	Transport Jules Savard	L400102	Marc-André Bouchard	38200
120595.2	15:01	HopeDale (Sanexen)	BPC	32563	PC55231-7	Transport Jules Savard	L525941	Etienne Girard	38800
120595.2	15:22	HopeDale (Sanexen)	BPC	32565	PC55232-5	Transport Jules Savard	LFBV	Jean-Francois Lavoie	39090
120595.2	16:26	HopeDale (Sanexen)	BPC	32568	PC55234-1	Transport Jules Savard	n mcgxhx	Eloi Lachance	38590
120595.2	17:29	HopeDale (Sanexen)	BPC	32571	PC55233-3	Transport Jules Savard	hbjb ,	Marc-Andre Bouchard	39080
									310470
10-nov.-14									
120595.2	09:38	HopeDale (Sanexen)	BPC	32575	PC55236-6	Transport Jules Savard	575	Jean-Francois Lavoie	39160
120595.2	10:11	HopeDale (Sanexen)	BPC	32579	PC55237-4	Transport Jules Savard	552	Claude Breton	38690
120595.2	10:24	HopeDale (Sanexen)	BPC	32580	PC55248-1	Transport Jules Savard	606	Marc-André Bouchard	38360
120595.2	11:03	HopeDale (Sanexen)	BPC	32583	PC55249-9	Transport Jules Savard	036	Steve Tremblay	37220
120595.2	11:44	HopeDale (Sanexen)	BPC	32584	PC55250-7	Transport Jules Savard	4006	Tony Perron	43300
120595.2	14:19	HopeDale (Sanexen)	BPC	32592	PC55251-5	Transport Jules Savard	575	Jean-Francois Lavoie	38820
120595.2	14:44	HopeDale (Sanexen)	BPC	32595	PC55238-2	Transport Jules Savard	552	Claude Breton	38180
120595.2	15:16	HopeDale (Sanexen)	BPC	32597	PC55239-0	Transport Jules Savard	606	Marc-André Bouchard	38200
120595.2	17:02	HopeDale (Sanexen)	BPC	32598	PC55240-8	Transport Jules Savard	4006	Tony Perron	40460
120595.2	18:27	HopeDale (Sanexen)	BPC	32599	PC55241-6	Transport Jules Savard	602	Eloi Lachance	37390
									389780
11-nov.-14									

File No.	Arrival Time	Generator	Contamination	Weight ticket No.	Manifest No.	Carrier	License No.	Driver	Net weight (kg)
120595.2	11:12	HopeDale (Sanexen)	BPC	32612	PC55247-3	Transport Jules Savard	607	Eloi Lachance	9070
									9070
								Total général:	**709320**

RECUPERE SOL

Certificate of Destruction

Saint-Ambroise November 13, 2014

Generator :

Government of NL

P.O. Box 8700
St. JonhNL A1B 6J6

Advisor :

Sanexen Services Environnementaux In

9935, Avenue Catania, Entrée 1 - Bureau 2
Brossard (Québec J4Z 3V4

Contact : Christa Curnew

Contact : Mario Leathead

We confirm treatment of your soils at our plant located in the industrial park of Saint-Ambroise. The soils were managed and treated in compliance with our Certificate of Authorization delivered by the Quebec Ministry of Sustainable Development, Environment and Parks :

Permit : **Thermal treatment of PCB and other organochloride impacted soils, issued on October 27, 1997**

Permit Ref. No. : **7610-02-01-0603816**
1142129

Treatment service : Thermal
Soils impacted with : PCB
Treatment criteria : <A In reference to the standards set by the Ministry of the Sustainable Development, Environment and Parks of the Province of Quebec, Canada (<0.05 mg/kg)

Récupère Sol File No. : **120595.2**

Destruction Certificate No. : **120595.2-d1**

Volume of Soil Treated (kg) : **804300**

Yours truly,

Éloi Côté, Eng
Process Engineer

80 des Mélèzes St., St. Ambroise, Quebec, Canada, G7P 2N4
Tel.: (418) 695-3302 Fax : (418) 695-3303

Trucks summary

13-nov.-14

File No.	Arrival Time	Generator	Contamination	Weight ticket No.	Manifest No.	Carrier	License No.	Driver	Net weight (kg)
16-oct.-14									
120595.2	12:27	HopeDale (Sanexen)	BPC	32095	PC55102-0	Transport Serro	L612882	Patrick turgeon	36510
120595.2	12:30	HopeDale (Sanexen)	BPC	32096	PC55104-6	Transport Serro	L612883	Francis landry	36720
120595.2	12:55	HopeDale (Sanexen)	BPC	32099	PC55105-3	Transport Serro	L584350	Claude Demers	37240
120595.2	13:10	HopeDale (Sanexen)	BPC	32100	PC55106-1	Transport Serro	L447888	Nicolas Boutin	33910
120595.2	14:34	HopeDale (Sanexen)	BPC	32105	PC55119-4	Transport Serro	L361910	Bruno Halle	35010
120595.2	15:19	HopeDale (Sanexen)	BPC	32106	PC55120-2	Transport Serro	L466437	Robert Maltais	36310
120595.2	15:22	HopeDale (Sanexen)	BPC	32107	PC55121-0	Transport Serro	L612882	Patrick turgeon	37310
120595.2	15:48	HopeDale (Sanexen)	BPC	32110	PC55158-2	Transport Serro	L612883	Francis landry	38020
120595.2	16:28	HopeDale (Sanexen)	BPC	32112	PC55159-0	Transport Serro	L584350	Claude Demers	34800
120595.2	16:56	HopeDale (Sanexen)	BPC	32116	PC55160-8	Transport Serro	L447888	Nicolas Boutin	36850
									362680
17-oct.-14									
120595.2	07:11	HopeDale	BPC	32119	PC55162-4	Serro	L466437	Robert Maltais	38400
120595.2	07:15	HopeDale	BPC	32120	PC55161-6	Serro	L361910	Bruno Halle	37380
120595.2	10:02	HopeDale (Sanexen)	BPC	32128	PC55108-7	Transport Serro	L584350	Claude Demers	36730
120595.2	10:06	HopeDale (Sanexen)	BPC	32129	PC55109-5	Transport Serro	L612883	Francis landry	37730
120595.2	10:30	HopeDale (Sanexen)	BPC	32130	PC55110-3	Transport Serro	L612882	Patrick turgeon	38660
120595.2	10:33	HopeDale (Sanexen)	BPC	32131	PC55111-1	Transport Serro	L447888	Nicolas Boutin	35730
120595.2	11:01	HopeDale (Sanexen)	BPC	32132	PC55115-2	Transport Serro	L466437	Robert Maltais	37600
120595.2	11:04	HopeDale (Sanexen)	BPC	32133	PC55116-0	Transport Serro	L36190	Bruno Halle	36950
120595.2	13:04	HopeDale	BPC	32139	PC55117-8	Transport Serro	L584350	Claude Demers	37440

File No.	Arrival Time	Generator	Contamination	Weight ticket No.	Manifest No.	Carrier	License No.	Driver	Net weight (kg)
120595.2	13:18	HopeDale	BPC	32140	PC55118-6	Transport Serro	L612883	Francis landry	36970
120595.2	14:35	HopeDale	BPC	32142	PC55112-9	Transport Serro	L612882	Patrick turgeon	37860
120595.2	14:37	HopeDale	BPC	32143	PC55113-7	Transport Serro	L447888	Nicolas Boutin	30170
									441620
								Total général:	**804300**