CLEAN-UP AND RESTORATION OF THE MID-CANADA LINE SITE AT BEAR ISLAND

Bear Island, Nunavut

DETAILS OF HAZARDOUS WASTE MATERIALS PROCESSING AREA

Final Version

(O/Ref.: TP0654) (Y/Ref.: EW699-09-1300/C)

PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

June 2010

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1 INTRODUCTION

As part of the remediation project on Bear Island, some of the work activities, such as the excavation of contaminated soil, landfill excavation, and the demolition of the various facilities involve working with hazardous wastes. As per the specifications, hazardous waste materials are those that are designated as "hazardous" under Territorial or Federal legislation or guidelines, or as "dangerous goods" under the *Transportation of Dangerous Goods Act*.

On site hazardous wastes can take the form of: asbestos, batteries, solvents, soils, paint chips, waste oils, electrical equipment, tank sludge, and water. Most of the work with these materials on site is to be performed in a Hazardous Waste Material Processing Area (MPA) where tasks include sorting, sampling, packaging, and processing. The consolidation of compatible liquids and sediments, as well as the cleaning of barrels must also be done in the Hazardous Waste MPA.

The following document outlines the site, design, and construction of the Hazardous Waste MPA.

2 HAZARDOUS MATERIALS ON SITE

A number of different hazardous wastes on Bear Island require shipment off site for disposal. The Remedial Action Plan (RAP) prepared in March 2008 outlines the environmental issues identified on site and the proposed actions for remediation. Table I, on the next page, summarizes the findings of the RAP and highlights the hazardous wastes which will be encountered on Bear Island, including other wastes which could be considered hazardous, depending on chemical analysis results.

Table I : Summary of Hazardous Wastes and Possible Hazardous Wastes at Bear Island (Earth Tech Inc, March 2008)

Environmental Concern	Site Assessment Findings	Recommended Remediation Method
Existing Landfills	Landfill North of Site 413 is considered a Class A landfill and was found to contain hazardous materials. Also, the surrounding soils are being impacted from contaminants located within the landfill. North Landfill is considered to be a Class C landfill and there is no evidence that the surrounding soils are being impacted.	Consolidate and dispose waste debris (14.7 m3) accordingly. Remediate PHC contaminated soils as described above. Consolidate surface debris, as well as the partially buried debris located on the exposed southwest toe of the landfill, (approx 41.7 m3 total) and dispose accordingly.
POL Fluids	There are approximately 1.05 m^3 (1,050 L) of Petroleum, Oil and Lubricant fluids.	Incinerate POL fluids that meet incineration criteria (< 2 ppm PCBs and Cd and < 10 ppm Cr and <100 ppm lead and <1000 ppm Chlorine), otherwise treat as Hazardous Waste.
Water in Barrels	With the exception of five barrels, all barrels inspected were found to be empty or rusted through. This fact does not ensure that all barrels on site are empty or contain just rusty water as all (approximately 4300 barrels) were not inspected.	During clean-up, all barrels must be approached using the DLCU barrel protocol.
Lead Painted Products	Approximately 27.0 m^3 of lead amended paint materials were discovered on site.	Dismantle lead painted items and ship off site to an appropriate disposal facility.
PCB Painted Products	If the orange and white painted antennas are found to contain PCB contaminated paint, there is potentially an additional 75 m^3 of hazardous material on site.	Dismantle contaminated paint items and ship off site to an appropriate disposal facility.
Hazardous Materials	Approximately 18.0 m^3 of hazardous materials were identified at the site. These materials consisted of lead acid batteries (3 m^3), asbestos containing materials (12.5 m^3), and lead cable and zinc conduit (2.5 m^3).	Asbestos waste to be collected, bagged and disposed of in an on-site landfill. All hazardous materials (such as batteries and hazardous cable/conduit) will be containerized, labeled and shipped to be disposed at a licensed southern facility.

3 HAZARDOUS MATERIAL PROCESSING AREA (MPA)

The Hazardous MPA on Bear Island is required to successfully complete the remediation work, and will be sized large enough to handle the volume of the hazardous materials that are to be contained at any one time. Consideration must also be given to spacing of materials, as the sampling, testing, and packaging of the waste materials will be done in this area.

Consideration is to be given to the location of this MPA as well, as minimizing the handling of hazardous waste materials and isolating them from other operations is desired to decrease the chances of accidental spills or prolonged exposure to workers on site.

The MPA should also be leak-proof, such that all runoff water, spills, and leaks are contained and can be easily collected to prevent contamination to the surrounding environment.

3.1 SOUTH DOPPLER AREA

The Hazardous MPA is to be constructed approximately 135 m north of the Non-Hazardous Waste Landfill, and directly west of Site Debris Area 8. This area was chosen as it is in a central location on the island and close to many of the work areas where materials in need of processing are likely to be encountered. There is also easy access to this area with the existing Beach road, facilitating the ease of transport to and from the MPA. The location of the Hazardous MPA is shown in Appendix A as Figure 1.

3.1.1 Natural Pad

This option is intended to use the ground at the proposed location as the base of the MPA, with some work to ensure the pad is well compacted and sloped properly. It is to be sized at approximately 10 m by 10 m, which should give ample room for all processes which need to take place within this facility. The base will be sloped and lined with geotextile and a PVC Oil resistant membrane, which will act as a barrier to any liquids encountered or generated by the washing of materials in this area.

A washing grid will be installed where the barrels will be washed, with the barrels to be treated as outlined by the DEW Line Barrel Protocol, included as Appendix C in the Detailed Work Plan. Furthermore, the MPA will be bermed on all sides, with the up gradient berms being 0.3 m wide at the top and 0.3 m high, while the down gradient side will have berms which are 0.6 m high and 0.6 m wide at the top. Details of the Hazardous MPA are shown in Appendix A as Figure 2.

A water collection sump will be installed in the lowest corner of the MPA, where a pump will be installed to collect any water which may come in contact with the materials in the MPA. Within the MPA, slightly up gradient of the pump, a sorbent boom will be installed to remove any free phase products in the MPA. This boom will be removed when it is saturated with hydrocarbons and will be replaced accordingly.

3.2 HANDLING AND DISPOSAL OF CONTACT WATER

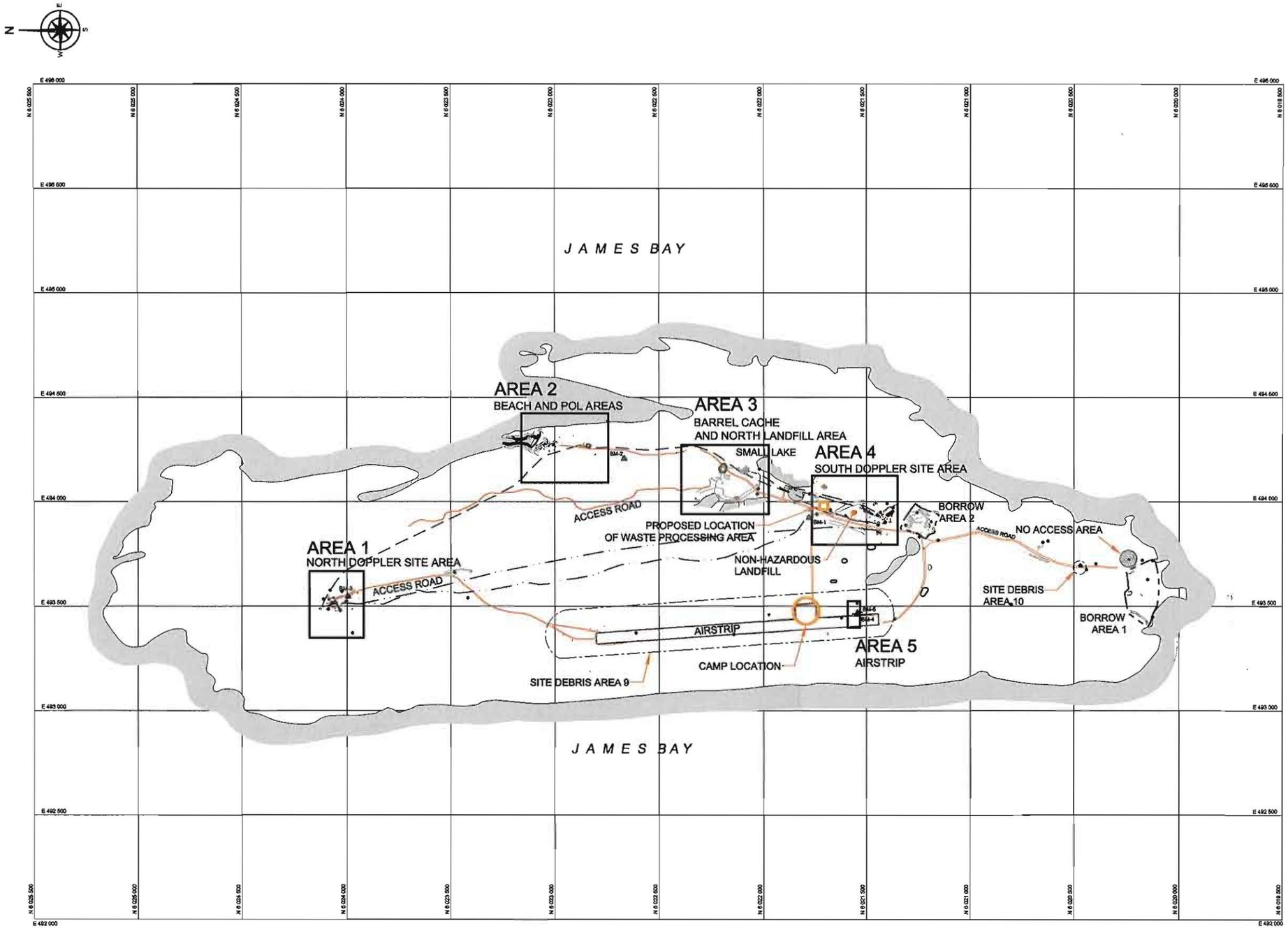
The containment, treatment, sampling, and discharge of liquids which come into contact with the materials stored in the Hazardous MPA will also be required. A mobile water treatment unit will be used to treat any contact water prior to discharge. Water will be treated by bag filters and activated carbon filters. Should any free-phase petroleum products be found in the retention tank, they will be containerized in drums.

The water treatment unit to be brought to site has a 25 – 30 gpm treatment capacity. The system is contained on two mobile skids, which allow it to be moved on site to the most appropriate location, and uses two bag filters in series followed by treatment by activated carbon. There are six carbon filters in the treatment unit and they operate in parallel with two lines of three filters. The bag filters act to remove sediment and other suspended particulates from the water entering treatment, and each will have a different micron rating, with the first filter having the larger micron rating. The activated carbon filters will act to remove organics and other finer particles from the water by adsorption.

The contact water will be stored in lagoons (or pools) to be built adjacent to the MPA. The water will be processed in batches. One lagoon will be used to accumulate water to be treated and two additional cells will be used to store treated water. Once the first cell is full, treated water will be analyzed to confirm attainment of the treatment objectives; in the meantime, the second cell will be used, and so on. Each sample will be analyzed for applicable chemical parameters in a Standards Council of Canada approved laboratory. Should the results comply with the discharge criteria and upon approval by the Engineer, the water will be discharged. Otherwise, the water will be re-circulated through the system and re-sampled until below criteria results are obtained.

Replacement bag filters and activated carbon will be provided with the treatment unit. Used bag filters will be containerized to be sent south for proper disposal with the rest of the hazardous material from the site and used active carbon will be containerized and returned to the supplier for recycling.

APPENDIX A
Figures



LEGEND

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A	PRELIMINARY VERSION	10-06-09	P.L	M.B.	J.P.P.

Public Works and Government Services Canada

CLEANUP AND RESTAURATION OF THE MID-CANADA LINE SITE

BEAR ISLAND, NUNAVUT

LOCATION OF WASTE PROCESSING AREA

SITE REMEDIATION SOLUTIONS

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FIGURE 1

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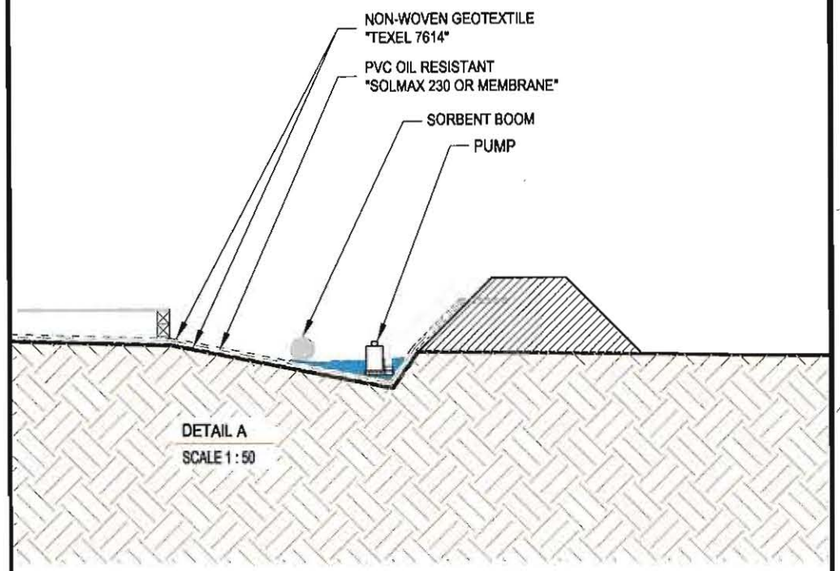
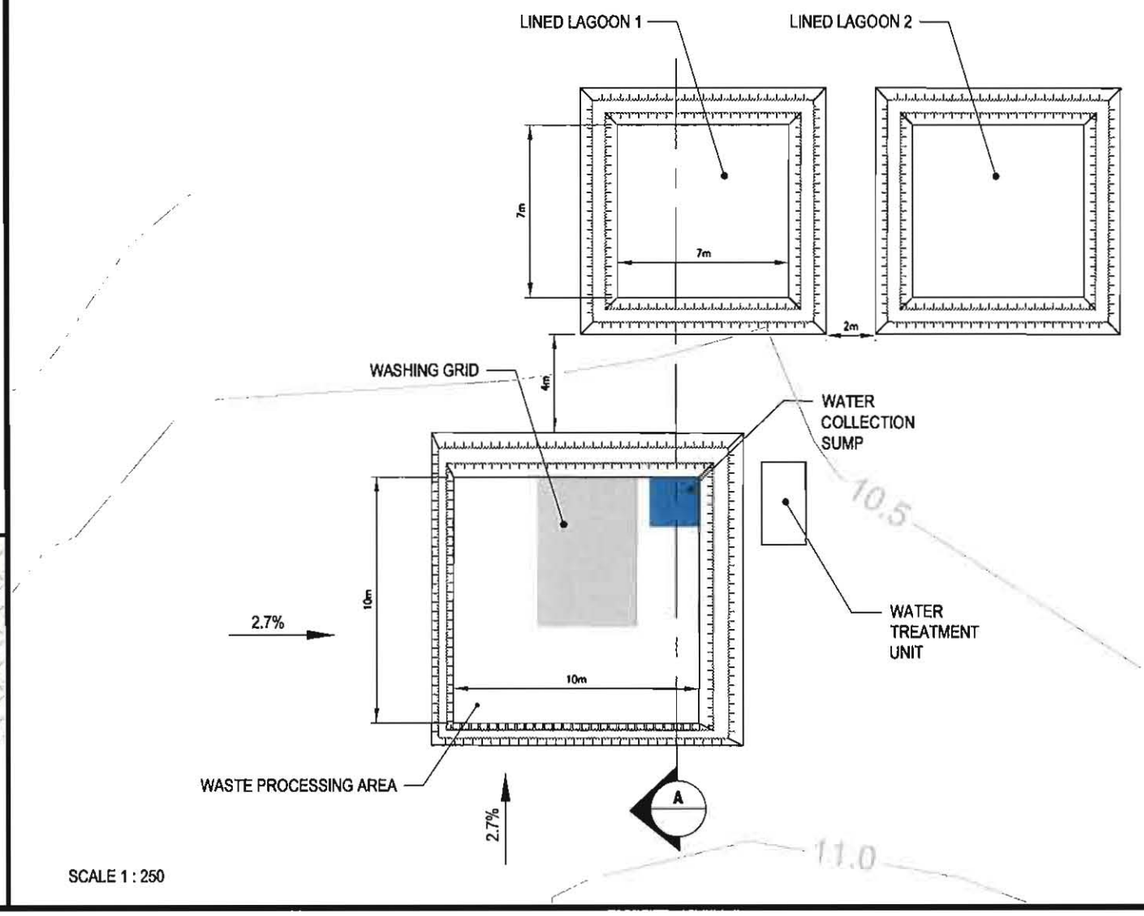
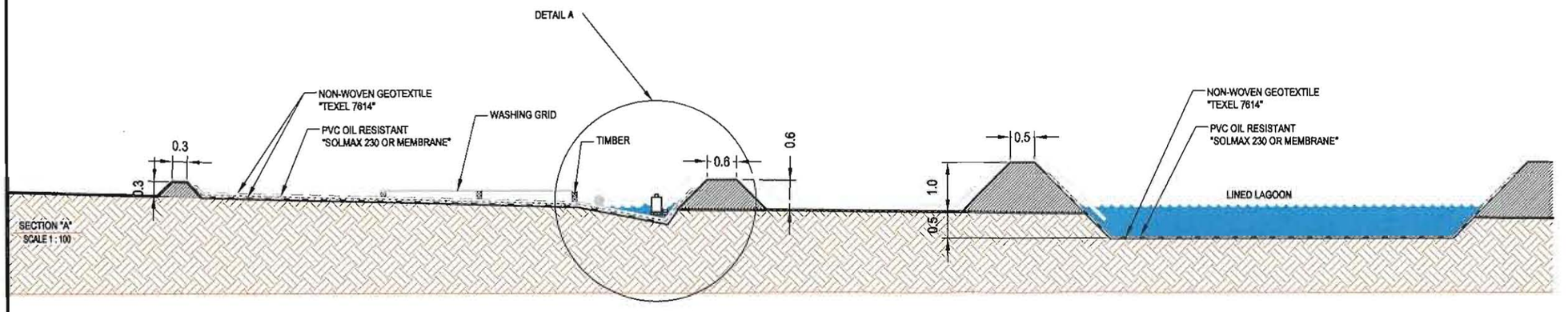




NOTE:

- WATER COLLECTED IN WASTE PROCESSING AREA TO BE MANAGED ACCORDING TO SECTION 1.5.5 OF THE WORK PLAN
- REFER TO APPENDIX E OF THE WORK PLAN FOR DETAILS ON MOBILE WATER TREATMENT UNIT



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Public Works and Government Services Canada

BEAR ISLAND
REMEDIATION PROJECT
BEAR ISLAND, NUNAVUT

WASTE PROCESSING AREA

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FIGURE 2