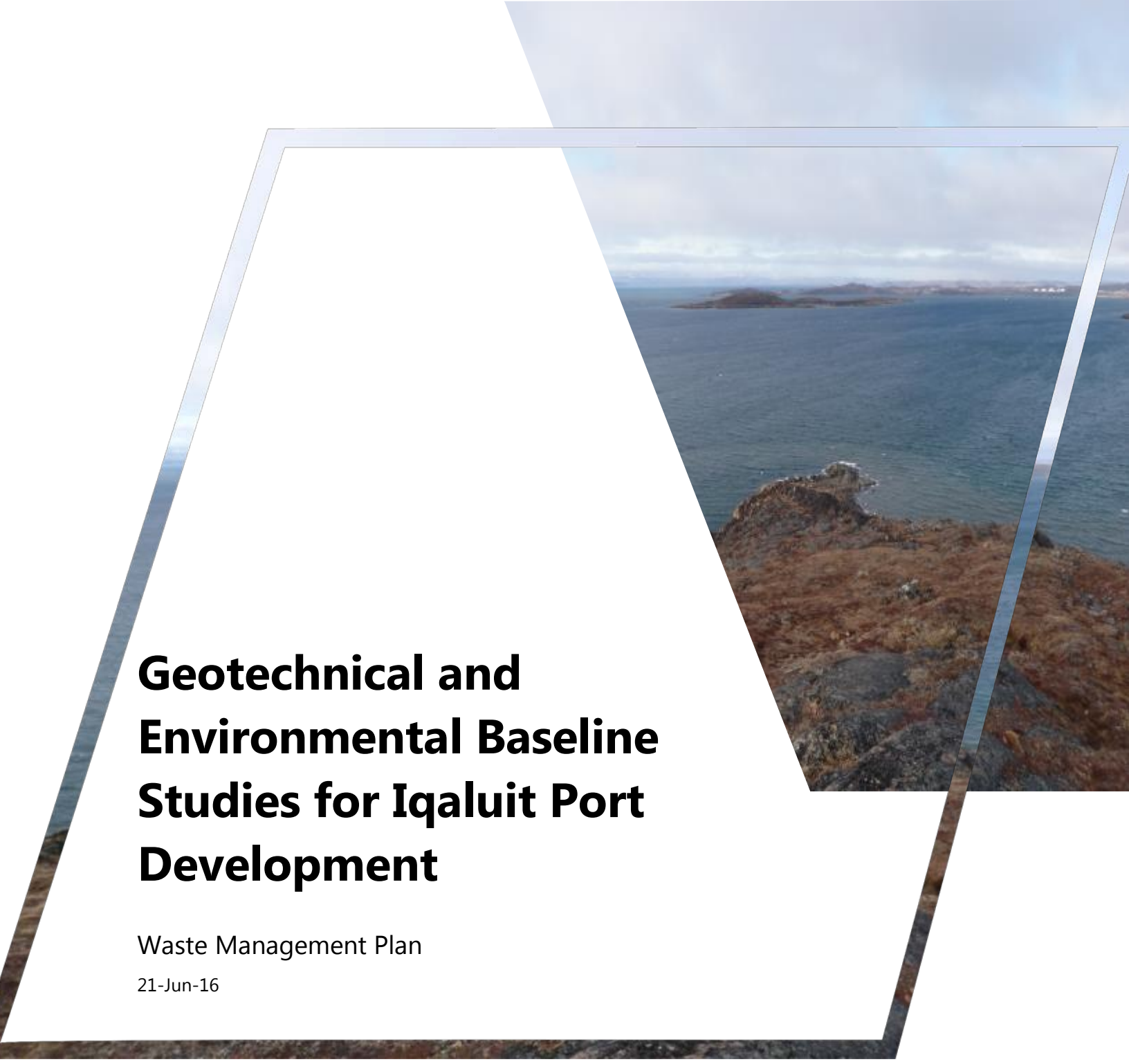

Geotechnical and Environmental Baseline Studies for Iqaluit Port Development

Waste Management Plan

21-Jun-16

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Project No: 307071-01123-00-PM-PLN-0003 – Geotechnical and Environmental Baseline Studies for Iqaluit Port Development: Waste Management Plan

Rev	Description	Author	Review	Advisian Approval	Date
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1 Introduction

1.1 Purpose and Scope

The purpose of this Waste Management Plan (WMP) is to define procedures to manage and minimize waste generated during field-based geotechnical and environmental baseline studies. This plan is a working document that specifically deals with the generation, transport, management and disposal of waste that will be generated during the studies (the Project).

The primary objectives of this WMP are the following:

- Identify the wastes that will be generated during the geotechnical and environmental baseline studies
- Identify the potential effects related to waste management of geotechnical and environmental baseline studies
- Describe waste management procedures that will avoid or minimize potential effects
- Reduce waste generated during the studies as well as eliminate the introduction of waste materials into the environment

The WMP is organized as follows:

- Section 1 – outlines the purpose, scope, and objectives of the WMP, and presents an overview of the Project, including the environmental setting
- Section 2 – presents summaries of environmental management plans related to the WMP
- Section 3 – outlines regulatory requirements and best management practices relevant to waste management
- Section 4 – describes potential environmental impacts from waste and procedures to mitigate such impacts
- Section 5 – outlines monitoring, reporting and record keeping procedures to be implemented
- Section 6 – presents training procedures and communication protocols to be implemented

Project field staff will be required to review this WMP during the course of site orientation in order to inform staff of expectations and waste management requirements. This WMP does not include the management of waste after disposal.

1.2 Project Overview

Geotechnical and environmental baseline studies are required to support the design of a proposed deep water port and upgrades to a municipal breakwater and boat ramp in Iqaluit, Nunavut. These studies will support engineering design, future preparation of an Environmental Assessment (EA), as per Article 12, Part 4 of the Nunavut Land Claims Agreement, and post-EA permitting.

Site coordinates for the municipal breakwater and boat ramp are approximately 68°30'41.45" W and 63°44'24.67" N (Appendix 1). The site coordinates for the deepwater port are approximately 68°31'29.07" W and 63°43'26.82" N.

Geotechnical and environmental baseline studies to be conducted include the following:

- Water and sediment quality
- Oceanography
- Fish and fish habitat
- Migratory and marine birds
- Terrestrial vegetation and rare plants
- Terrestrial landforms, soil and permafrost
- Traditional Knowledge (Inuit Qaujimajatuqangit)
- Geotechnical investigations

The geotechnical and environmental baseline studies will focus on the areas surrounding the proposed deep water port site, municipal breakwater and boat ramp. These field studies will be conducted on federal Crown land, Municipal land, and Commissioner's land.

The proponent's contact information is as follows:

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1.3 Existing Site Conditions

The project site consists of the marine environment, natural tundra habitat, and rocky shoreline.

2 Related Environmental Management Plans

This WMP is one of four environmental management plans (EMPs) to be referred to during the geotechnical and environmental baseline studies. The other EMPs include a Spill Prevention Plan, Wildlife Mitigation and Monitoring Plan, and Abandonment and Restoration Plan. These plans should be read in conjunction with the WMP.

2.1 Spill Prevention Plan

A Spill Prevention Plan (SPP) has been prepared to document and describe the systems and procedures for handling, storing, and disposing of hazardous materials generated during the geotechnical and environmental baseline studies. This plan also presents procedures for managing spills of hazardous materials. Spills can result in harm to the field personnel and to the local environment.

2.2 Wildlife Mitigation and Monitoring Plan

A Wildlife Mitigation and Monitoring Plan has been prepared to describe management requirements regarding both terrestrial and marine wildlife during field-based geotechnical and environmental baseline investigations. Inefficient management of waste can attract, harm, or impact wildlife and wildlife habitat.

2.3 Abandonment and Restoration Plan

An Abandonment and Restoration Plan has been prepared to describe the procedures to restore the Project site on completion of the geotechnical and environmental baseline studies.

3 Regulatory Requirements and Best Management Practices

3.1 Federal Legislation

The federal government of Canada, through Environment and Climate Change Canada, manages waste disposal and discharge in the natural environment. In Canada, the powers to classify, manage, and regulate waste are provided by the *Canadian Environmental Protection Act*. Indigenous and Northern Affairs Canada, through the Territorial Lands Act, is responsible for the management of activities on federal Crown land in Nunavut. Additional federal acts that apply to waste management in Nunavut include:

- *Fisheries Act*
- *Transportation of Dangerous Goods Act*
- *Nunavut Waters and Surface Rights Tribunal Act*

3.2 Territorial Legislation

Jurisdiction over several territorial matters including wildlife management, land use planning and development, and natural resource management were granted to the territory by the Canadian government under the *Nunavut Land Claims Agreement* of 1993. Under this agreement, Institutions of Public Government (IPGs), including the Nunavut Impact Review Board (NIRB) and Nunavut Water Board (NWB) were created, both of which review and regulate activities pertaining to use or disturbance of the natural environment. This includes the use of water and collection of sediment, water, and biological samples. In addition, various territorial agencies, including the Department of Environment and the Department of Health, and the municipalities, have responsibilities for the management of waste.

Key pieces of territorial legislation also exist that provide the framework for the handling and management of waste in Nunavut. These include the following:

- *Environmental Protection Act*
- *Wildlife Act*
- *Public Health Act*
- *Safety Act*
- *Fire Prevention Act*

3.3 Best Management Practices and Guidelines

Relevant Best Management Practices (BMPs) for waste management include:

- A Best Practices Guide to Solid Waste Reduction – Canadian Construction Association 2001
- Environmental Guideline for General Management of Hazardous Waste – Nunavut Department of Sustainable Development 2002

3.4 Permits and Authorizations

The geotechnical and environmental baseline studies will require several permits and/or authorizations before proceeding. These include a variety of federal and territorial permits to allow for the collection of sediments, deployment of instruments, and land access.

A list of applicable federal permits/approvals is provided below:

- *Fisheries Act* Self-Assessment and, if required, a Request for Review (geotechnical drilling)
- *Fisheries Act* Licence to Fish for Scientific Purposes (invertebrate collection and retention)
- *Navigation Protection Act* Notice of Works (if required; barge placement during open water period)
- Indigenous and Northern Affairs Canada Class A land use permit (land use of Crown Land)

A list of applicable territorial and IPG permits/approvals is provided below:

- Nunavut Research Institute project registration
- Nunavut Planning Commission Review/Determination
- NIRB Screening/Decision
- NWB Type B Water Licence or Authorization (water use and waste disposal for geotechnical drilling program)

4 Potential Environmental Impacts and Mitigation Measures

4.1 Environmental Impacts

The studies will generate waste, thus requiring its storage and appropriate handling and disposal. However, if not managed appropriately, potential environmental impacts could occur, including:

- Pollution of the local terrestrial and marine environments
- Production of odours that may attract wildlife

A description of waste to be generated, potential impacts and mitigation measures is provided below.

4.2 Mitigation Measures

4.2.1 General

During execution of the studies, domestic waste (i.e. food waste, packaging, consumable supplies such as plastics and paper) will be generated. The following measures will be implemented by all field personnel to manage domestic waste:

- Where possible, materials will be re-used, reduced and/or recycled to minimize waste generated by the Project
- Non-hazardous waste or domestic garbage will be disposed of at the end of each day at the municipal disposal facility
- Waste will be segregated and stored in appropriate containers
- Sealed leak proof containers will be used for any liquid waste
- Housekeeping practices will be implemented to minimize accumulation of waste materials at the worksite where possible
- Portable toilets will be used for field personnel. Human waste will be disposed of at the municipal facility

4.2.2 Geotechnical Studies

Geotechnical studies will include vibrocore and borehole drilling. Drilling activities will be conducted from an operational platform that will be placed over top of the selected sampling location. Drilling is planned to occur on land (quarry) and, depending on season, on ice and / or on a barge (subtidal sites). Vibrocores will be undertaken in intertidal areas.

Potential non-hazardous associated with the geotechnical studies include:

- Drilling fluids used to stabilize sediments during borehole drilling
- Plastic liners (single use) for each vibrocore drilling

The only potential hazardous wastes that will be generated are lubricants and hydraulic fluids from the geotechnical drilling equipment or contaminated materials in the event of a spill or leak.

The following mitigation measures will be implemented during the geotechnical investigation:

- All fluids used for drilling activities will be properly contained and labelled. Secondary containment will be provided
- Waste will be stored in labelled containers and appropriately segregated based on material

Potential environmental effects and mitigation measures for accidental release of hydrocarbons are further addressed in the SPP.

4.2.3 Environmental Baseline Studies

Environmental baseline studies will occur largely on foot in both terrestrial and the intertidal marine environments. Bulk waste is not anticipated for the environmental field studies. The marine water quality and sediment baseline study will require the collection of water and sediment samples from a vessel. Water samples will be collected using a grab sample (i.e. Niskin or Van Dorn bottle) and sediment samples will be collected using a clamshell grab (i.e. Ponar or Van Veen).

Potential non-hazardous waste associated with the environmental baseline studies includes packaging for baseline study materials.

The only potential hazardous wastes that will be generated are contaminated materials in the event of a spill or leak of fuel or preservatives contained in the sample bottles/containers or field equipment decontamination agents.

The following mitigation measures will be implemented during the environmental baseline studies:

- Solid waste from sampling equipment (boxes and wrappers) will be stored in appropriate containers (i.e. garbage bags or boxes)
- Sampling equipment will be decontaminated before travelling to study sites to eliminate the need for cleaning at site. Cleaning will only involve phosphate-free laboratory detergent
- Water quality sample preservatives (nitric acid, sulphuric acid) will be added to samples from pre-measured containers, minimizing the risk of spillage. Formalin may be used and will be poured into wide-mouth sample jars in secondary containment (i.e. Rubbermaid tote) to minimize risk of release into the marine environment. Any excess preservatives will be packed and shipped out with the samples from site upon completion of sampling

5 Monitoring, Reporting, and Record Keeping

5.1 Monitoring

During the geotechnical and environmental baseline studies, all field personnel will monitor the effectiveness of the WMP. This will include regular checks of waste containers to ensure proper segregation and disposal and routine inspection of equipment and for leaks or improper sealing. Proper monitoring of waste will reduce the risk of adverse effects to the local terrestrial and marine environment.

5.2 Reporting

Incidents regarding waste creation, accumulation, or accidental release/loss will be reported to the Project Manager and a determination of corrective actions will be conducted.

5.3 Record Keeping

Field notes and inspection reports, including any management of hazardous waste, non-conformances and corrective action plans are to be maintained. Records shall be legible, identifiable, and traceable. Records may be recorded in hard copy as long as an electronic copy is also kept.

6 Training, Competency, and Communications

6.1 Training and Competency

Prior to the commencement of field activities, site personnel will attend a site orientation. Specific training in waste management will be required for the identification, management and appropriate disposal of various waste types. Such training will provide:

- Knowledge about the different types of wastes generated by the studies and their interaction with the local environment
- Knowledge about local waste management issues and the available disposal facilities
- Background on the relevant legislations and regulations that govern waste management and disposal
- Knowledge about basic waste reduction and management practices

Additional environmental and/or safety training will be provided depending on the requirements of the individual's specific assignment and the work to be performed. Environmental and safety topics, including waste generation and handling, will be discussed regularly at Health, Safety and Environment meetings, tailgate meetings, kick-off meetings, and work plan development. It is the responsibility of the field supervisor to provide the field team with this information for waste management matters. All records of personnel training will be maintained.

6.2 Communications

Field personnel will communicate directly with the field supervisor who in-turn will communicate with the Project Manager. If required, the Project Manager will communicate incidents/issues/concerns to the relevant regulatory bodies.

Appendix 1: Study Area

521500 522000 522500 523000 523500 524000 524500 525000 525500 526000 526500 527000

7068500 7068000 7067500 7067000 7066500 7066000

63°44'30"N 63°43'30"N

IQALUIT

Small Craft Harbour

Koojesse Inlet

Deep Water Port

68°34'0"W 68°33'30"W 68°33'0"W 68°32'30"W 68°32'0"W 68°31'30"W 68°31'0"W 68°30'30"W 68°30'0"W 68°29'30"W 68°29'0"W 68°28'30"W 68°28'0"W 68°27'30"W 68°27'0"W

bing™

Legend

- Study Area
- Property Lot
- Road
- Creek
- Shoreline

0 125 250 500
Metres

N

Note:
Coordinate System: NAD 1983 UTM Zone 19N
Vertical Elevation Refers to Chart Datum

B SHEET SCALE: 1:15000

OneWay™ to zero harm

DATE: 15/06/2016
DRAWN: YM
EDITED: KR
APPROVED: MC

CUSTOMER: Nunavut

WorleyParsons resources & energy

IQALUIT PORT DEVELOPMENT
STUDY AREA

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