

Appendix D

Permafrost and Erosion Management Plan



Edie Lake Quarry Geotechnical Assessment Program

Permafrost and Erosion Management Plan

Government of the Northwest Territories – Department of Infrastructure
January 2021

Plan Maintenance and Control

Table 1 **Spill Contingency Plan Revision History**

Version #	Section(s) Revised	Description of Revision	Prepared by	Issue Date
v. 1.0	Not Applicable	Not applicable	INF	January 2021

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Abbreviations

ENR	Department of Environment and Natural Resources, GNWT
GNWT	Government of the Northwest Territories
INF	Department of Infrastructure, GNWT
km	kilometre
NT	Northwest Territories
SLWB	Sahtu Land and Water Board

1 Introduction

The Government of the Northwest Territories Department of Infrastructure (INF), has prepared the following Permafrost Mitigation and Erosion Control Plan (the Plan) for the Mackenzie Valley Highway – Wrigley to Norman Wells Borrow Source Geotechnical Assessment Program (the Project).

The purpose of the Plan is to provide guidance and mitigation to avoid or prevent erosion, sedimentation and the degradation of permafrost from activities related to the Project. This Plan was developed in accordance with requirements and guidance, the Northern Land Use Guidelines and the INF’s Erosion and Sediment Control Manual. The goal of the Plan is to:

- Ensure that the impact on permafrost by the Project is limited;
- Ensure components of our environment, including the air, water, land, vegetation, wildlife and fish, are not negatively affected by the Project;
- Ensure aesthetic and land use values remain intact; and
- Ensure the Project will comply with all applicable acts and regulations, as well as conditions outlined in the INF’s land use permit.

The Plan will be revised as needed to reflect changes or site-specific conditions. Revisions will be submitted to the Sahtu Land and Water Board (SLWB).

2 Responsible Organization

As the Project Proponent, INF is responsible for preparing and implementing the Plan. INF’s contractor, Kalo Stantec, is responsible for the on-site execution of the Plan.

Table 2-1 Contact Information

GNWT Contact Information	
<p>Primary Contact Seth Bohnet Director Strategic Infrastructure Division Department of Infrastructure Government of the Northwest Territories P.O. Box 1320 Yellowknife, NT X1A 2L9 Telephone: 867.767.9081 x31035 Email: Seth.Bohnet@gov.nt.ca</p>	<p>Alternate Contact Patricia Coyne Senior Environmental Analyst Strategic Infrastructure Division Department of Infrastructure Government of the Northwest Territories P.O. Box 1320 Yellowknife, NT X1A 2L9 Telephone: 867.767.9081 x31033 Email: Patricia.Coyne@gov.nt.ca</p>

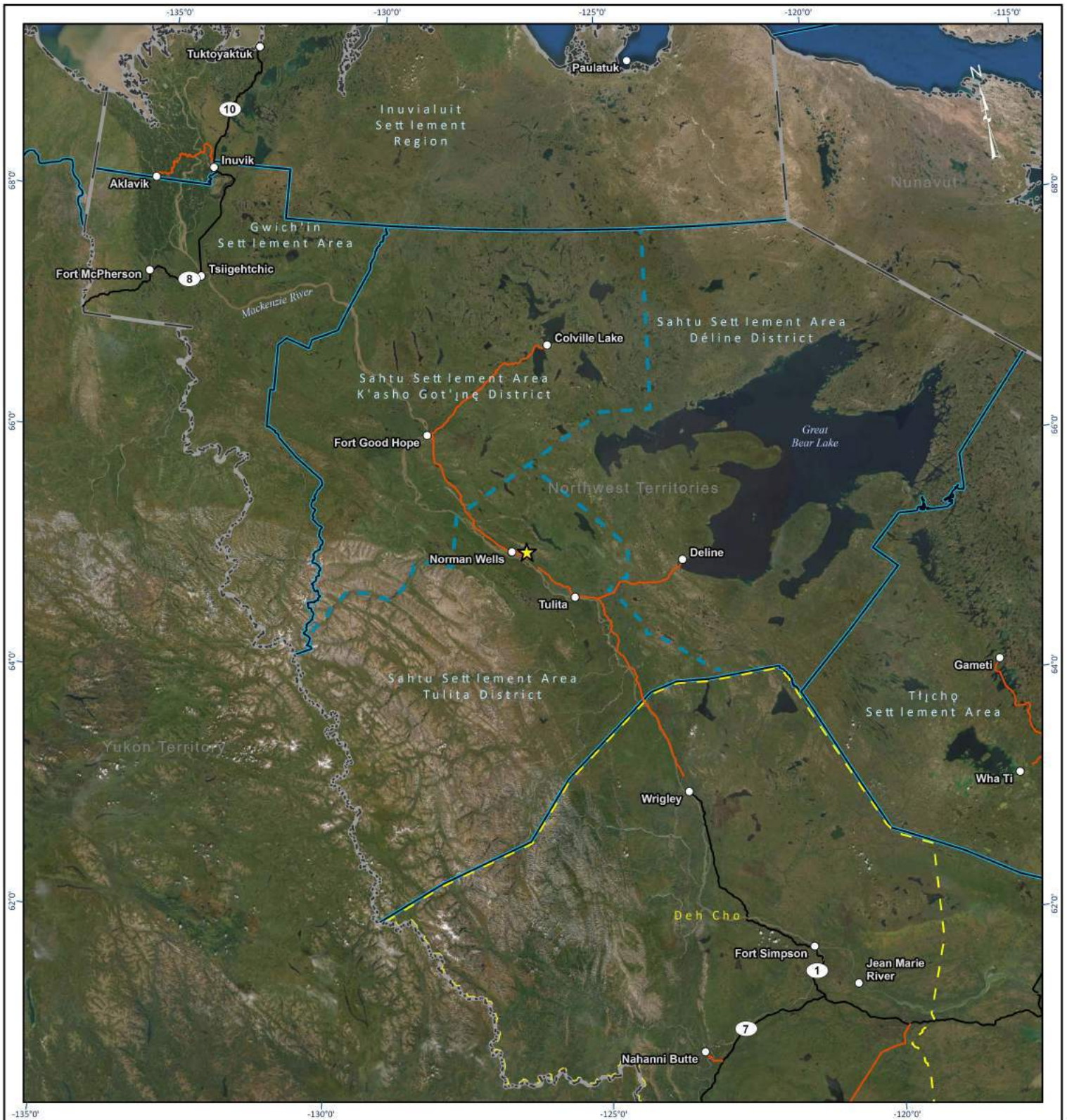
Contractor Contact information	
<p>Primary Contact Warren McLeod Project Manager K'alo Stantec Consulting P.O. Box 1777 Yellowknife, NT X1A 2P4 Telephone: 867.920.2882 x238 Email: Warren.McLeod@stantec.com</p>	<p>Alternate Contact Rob Girvan Manager, Yellowknife Arctic Group Tetrattech Drilling P.O. Box 2244 Yellowknife, NT X1A 2P7 Telephone: 867.444.0657 Email: Rob.Girvan@Tetrattech.com</p>

3 Project Details

INF is planning to construct a 13 kilometer (km) all-season access road between Canyon Creek and Prohibition Creek located southeast of Norman Wells, Northwest Territories (NT). Prior to advancing this work, a geotechnical assessment program is required to be completed at the Edie Lake Quarry to confirm the suitability of the material proposed to be used during the construction program. The assessment program will include the advancement of boreholes using a pad-mounted core drill at five to seven selected sites within the existing quarry. The Project will consist of the following components:

- Mobilizing and demobilizing drilling equipment to and from the Project work sites.
- Drilling of boreholes at the indicated sites.
- Sourcing water from the municipal water system for the completion of the drilling activities.

Upon completion of the Project, recommendations will be provided to inform and support quarry design. A map of the Project area is included in Figure 3-1 below. Proposed borehole locations are shown in Figure 3-2.



- LEGEND**
- Edie Lake Quarry Project Location
 - District Boundary
 - Community
 - Region
 - All-Season Road
 - Settlement Area Boundary
 - Winter Road
 - Territorial Boundary

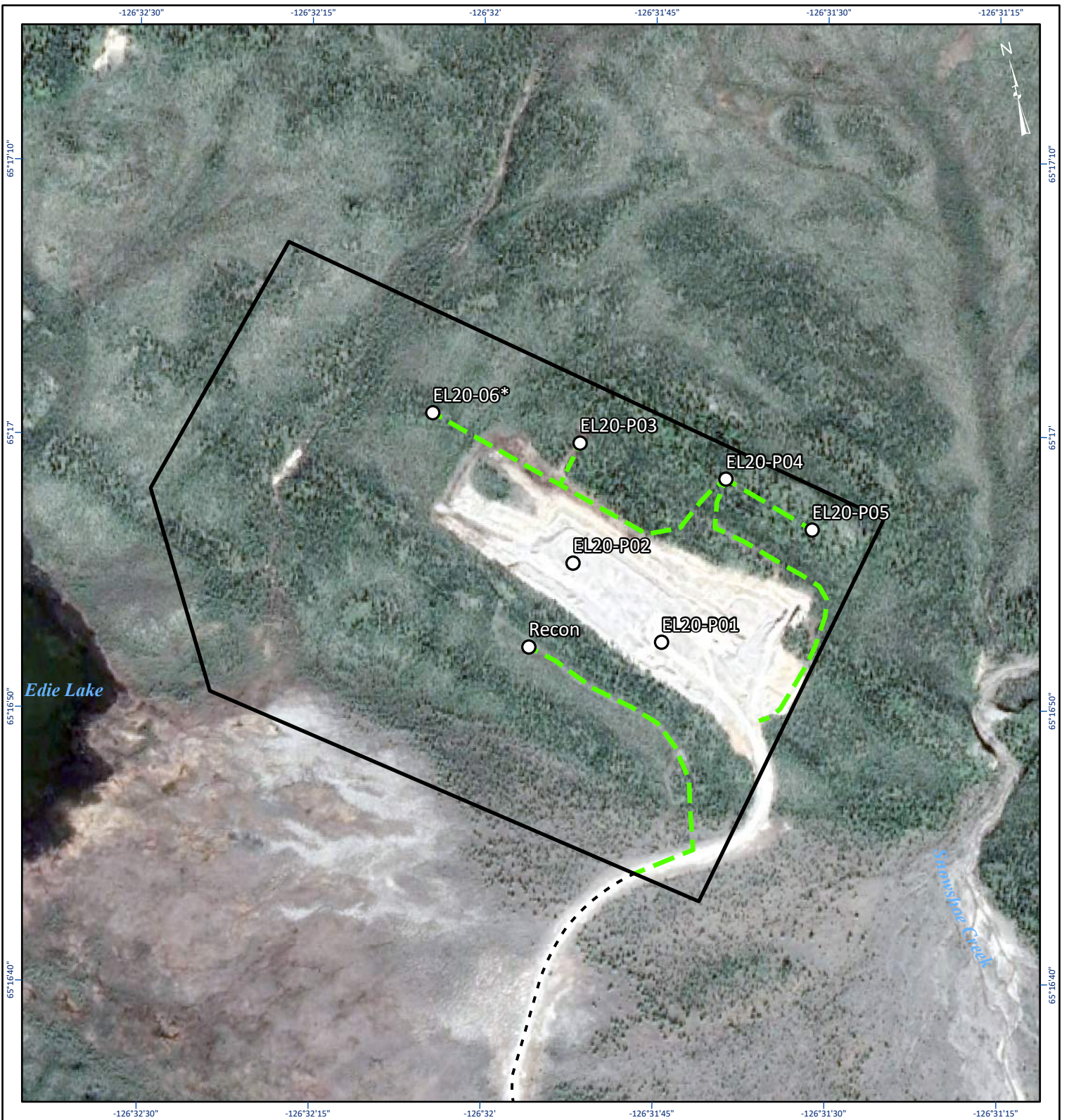


NOTES
 Sources: Project Data: Government of Northwest Territories. Base Data: CanVec, Government of Canada; Government of Northwest Territories; NWT Centre of Geomatics
 Image Earthstar Geographics
 Spatial Reference: NAD 1983 Northwest Territories Lambert

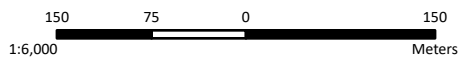
Figure 3-1 - Project Location

GIS	CES	2020-11-10	Doc ID: 144902910-0009 REVA
QA/QC	CS	2020-11-10	Government of the Northwest Territories





- LEGEND**
- Borehole (Proposed)
 - Access Trails to Boreholes
 - - - Haul Road
 - Edie Lake Quarry



NOTES

Sources: Project Data: Government of Northwest Territories; Base Data: CanVec, Government of Canada; Government of Northwest Territories; NWT Centre of Geomatics
 Image Source: Government of Northwest Territories; NWT Centre of Geomatics
 Spatial Reference: NAD 1983 Northwest Territories Lambert

Figure 3-2 - Proposed Borehole Location

GIS	CES	2020-11-10	Doc ID: 144902910-0011 REVA
QA/QC	CS	2020-11-10	Government of the Northwest Territories



4 Action Plan

INF has developed the following action plan to outline measures to be implemented during the Project. Mitigation measures to have been separated into those integrated into the project and post project monitoring. Measures include:

Mitigation During Project	Monitoring Post Project
<ul style="list-style-type: none"> • Complete all drilling activities greater than 30 m from the ordinary high water mark of any water crossing • No stripping of the natural ground surface will occur in an effort to preserve the underlying permafrost • Backfill boreholes with drill cuttings, bentonite or equivalent plug 	<p>If required after consultation with the SLWB and the GNWT Lands Inspector, INF will conduct monitoring during mid- freshet (tentatively late April 2021) to confirm suitability of the applied mitigation measures. During these site visits, the following erosion control measures may be installed, repaired and/or replaced as needed:</p> <ul style="list-style-type: none"> • Snow berms down gradient of the boreholes advanced on slopes. • Silt fencing down gradient of borehole locations in areas that may be susceptible to erosion. • Wattles down gradient of boreholes advanced on slopes (with a slope up to a maximum of 2H:1V) to reduce the potential for runoff. • Coconut matting down gradient of boreholes advanced on steep slopes. The sizing of the coconut matting will be determined in the field. <p>If additional erosion controls are installed, a second mid- freshet monitoring event will occur to confirm the operation of the installed measures.</p>

INF will contact the GNWT Department of Lands Inspector if additional mitigation measures are required to be installed upon closure of the winter road.

5 Resource Inventory

INF has confirmed that the following supplies can be sourced in Norman Wells.

- Coconut matting
- Wattles
- Silt fencing

If required, additional supplies will be sourced from contractors in Yellowknife, NT and transported to Norman Wells via commercial aircraft or barge. Due to the limited size of the areas that will be disturbed during the project, it is not anticipated that heavy equipment will be required. Equipment and/or personnel will be transported to the drill sites via the quarry access road.

6 Emergency Contacts

INF has identified the following emergency contacts for the Project.

Contact	Phone
HRN Contracting	(867) 587-4209
Sahtu Land and Water Board	(867) 496-2778
Environmental Protection Division, Environment and Natural Resources	(867) 873-7654
Fisheries and Oceans Canada (Yellowknife)	(867) 669-4900
Environment and Climate Change Canada	(867) 669-4725
GNWT Lands (Inspector)	(867) 587-7200