Appendix I

CIRNAC Quarry Permit Application & Revised Quarry Operations Plan

QUARRYING PERMIT APPLICATION

***Privacy Act* Statement**

The information you provide in this document is collected under the authority of the *Territorial Quarrying Regulations* for the purpose of applying for a quarrying permit. Information on individuals is used by Aboriginal Affairs and Northern Development Canada Mineral and Petroleum Resources Branch employees who need to know the information in order to respond to the program requirements. We do not share the personal information with other government departments. The personal information will be retained for 5 years after the last administrative use and then transferred to Library and Archives Canada. Individuals have the right to the protection of and access to their personal information under the *Privacy Act* http://lois.justice.gc.ca/en/P-21/index.html.

Applicant Name	Company Name
Asif Mohammed	Environment and Climate Change Canada (ECCC)

Address

Eureka High Arctic Weather Station

Telephone Number	Facsimile Number	Cellular Number
905-336-4725	905-336-6003	905-630-9774

Sub-Contractor or Pit Operator ☐ Same as above	Name/Company
	Nuna East Ltd.

Address

Unit 14, 6194 – 50 Street NW, Edmonton, AB, Canada, T6B 2N7

Telephone Number	Facsimile Number	Cellular Number
780-434-9114	780-434-7758	

I hereby apply for a Quarrying Permit for the purpose of taking:

Amount of Cubic Metres	Sand	Gravel	Stone	Loam	Other (please specify)
499,800 ▶	○	●	○	○	○
▶	○	○	○	○	○
▶	○	○	○	○	○

Location of Pit	NTS Map Sheet No.	Co-Ordinates
West Remus Creek, Eureka, Nunavut	049G15	79.941495, -85.295796

Land Use Permit

● Existing	Land Use Permit No.	Expiry Date	○ New Application	Application Date
	N2017N0017 (Amended June 18, 2018)	(2022-07-03)		(YYYYMMDD)

Quarry Site

● Existing ○ New | Application made to: ○ MVLWB ○ WLWB ○ SLWB ○ GLWB

1. A Quarry Operations Plan is required with this application and must be approved by a Land Use Inspector prior to approval and issuance of the quarry permit if:

   (A) The volume being applied for is greater than 1,000 m3 and/or
   (B) The quarry site is being operated by multiple users

   The Quarry Operations Plan includes the following mandatory information:
   - -North Arrow
   - -Map Scale at 1:5000
   - -NTS Map Sheet or acceptable alternate at 1:50,000
   - -Coordinates of quarry site - 4 corners (NE, NW, SE, SW)
   - -Total area of the identified quarry resource
   - -Area of existing clearing
   - -Area of proposed quarrying
   - -Topsoil/overburden storage area
   - -Access roads/trails
   - -Camp locations identifying all infrastructure to be established on the site
   - -When applicable, blast pattern details must be indicated
   - -Closure and Reclamation Plan including:
     - -Camp reclamation, if applicable
     - -Abandonment of active quarry face
     - -Waste disposal
     - -Stockpile removal
     - -Road closure
     - -Soil remediation for contaminated soils

Failure to submit an acceptable Quarry Operations plan (when required) will result in rejection of the Quarry Permit Application.
Complete 2 - 7 below only if a Quarry Operations Plan is not required.

2. Is any part of the land occupied? And if so, by whom and for what purpose?
Not Applicable. Quarry Operations Plan provided.

3. The only buildings or other improvements on the said lands are as follows:

Nature of Improvements
Not Applicable. Quarry Operations Plan provided.

Value of Improvements
Not Applicable. Quarry Operations Plan provided.

Owner of Improvements
Not Applicable. Quarry Operations Plan provided.

4. The land is/is not wooded. If yes, describe species of trees and approximate size:

◯ No ◯ Yes ▶

5. Please describe the proposed methods of brush and or timber disposal to be used on the site (if required).
Not applicable. There is no brush or timber on the project site. Quarry Operations Plan provided.

6. If a camp is to be utilized please describe the proposed methods for:

Combustible Garbage Not Applicable. Quarry Operations Plan provided.	Non-combustible Garbage
Food Wastes	Grey Water
Black Water	Potable Water Supply

7. Please describe the proposed reclamation techniques that will be applied to the quarry site upon or prior to termination of the Quarry Permit:
Not Applicable. Quarry Operations Plan provided.

I enclose the required fees as indicated below:	Total $
Quarrying Permit Fee: ($150.00)	150.00
Royalties on sand, gravel, loam per cubic metre: ($1.50)	
Royalties on other building materials per cubic metre: ($1.25)	
Total Fees ▶	**150.00**

1. The attached plan is a sketch plan of the land as required by the Territorial Quarrying Regulations (Sketch should include an indication of the area to be worked).

   ☑ See Quarry Management Plan

2. Sketch Plan:

Use Additional sheets if required.

3. Co-ordinates of Site (Latitude and Longitude):

NW Point	NE Point	SW Point	SE Point
79.950001, -85.332144	79.944130, -85.222559	79.943183, -85.364783	79.932021, -85.296099

Signature of Applicant	Date (YYYYMMDD)

Note to Client: Alteration to base form will not be accepted.

For Internal Use Only

Reviewing Officer (Print Name)		Signature
Date Application Deemed Complete (YYYYMMDD)	Date Application Faxed (YYYYMMDD)	Sent to: ◯ Yellowknife ◯ Inuvik ◯ Nunavut

Revised Quarry Operations Plan

WEST REMUS CREEK, EUREKA, NUNAVUT

NUNA EAST LTD.

Date: May 2021

Revision: 2

Table of Contents

1.0 INTRODUCTION

Nuna East Ltd. (“Nuna East”), is an aboriginally owned contracting firm with resources of heavy equipment and personnel, involved in heavy construction, mining, winter road construction, site service and maintenance activities. Nuna has worked in the North for 25 years and is well versed in northern environments.

Nuna East was awarded the Eureka Recapitalization Runway Project in Nunavut, NT. The intent of this project is to rehabilitate the existing runway airside apron, as well as construct a new airside apron and upgrade the local access road. Mobilization for this work took place in late August 2015 however the project has been unable to proceed due to insufficient borrow material at the planned borrow site.

A Quarry Operations plan was previously submitted in September 2015 for this project naming Blacktop Creek as the primary borrow source and quarry location. Subsequent to additional sampling and testing at this location it was determined that Blacktop Creek was not a viable source of granular material for the project.

The Remus Creek West quarry site has since been identified and qualified as a suitable quarry source to produce the aggregate material required for the recapitalization of the runway. Although the runway rehabilitation phase of the work may not progress immediately, access to the Remus Creek West source requires construction of a road to access the source.

In the short term, this Quarry Development Plan will be utilized by Nuna during initial quarry development and construction of the access road. The requirements for material extraction from Remus Creek West borrow source have increased since the initial application to include volumes necessary for runway rehabilitation and planned water and sewer upgrade projects at Eureka.

The Quarry Development Plan will commit to the best management practices of the quarry resource development at the Remus Creek West. Nuna East will work in tandem with the Northern Development regulatory AANDC Land Resources Office to ensure these objectives are met during the initial start-up of the quarry operation and through to the completion of the access road scope of work.

2.0 DESCRIPTION OF THE DEPOSIT

2.1 TOPOGRAPHIC MAPS

Two maps captured from the National Topographic System Index Maps website included in the attachments to show the location of the quarry site relative to the High Arctic Weather Station at Eureka, both from high and low level. The proposed access road route, quarry location and temporary camp and fuel storage area are shown on Figures 1 and 2 below, along with a recent photograph of the area in Figure 3.

FIGURE 1 – ACCESS ROAD AND BORROW LOCATION

FIGURE 2 – CURRENT BORROW LOCATION

The estimated total surface area of the proposed borrow area at Remus Creek West as shown above is estimated to be 360,000 m2 and is expected to yield more than 325,000 m3 of raw granular material. The application for extension to the borrow area limits will add another 88,000 square meters of surface area for an increase of approximately 80,000 m3 of potential extraction volume.

The current program is expected to require extraction of approximately 325,000 m3 of material from within the full permitted area. The area for extraction will be determined on site based on visual assessment of the materials but will be within the approved boundaries only.

The proposed boundary extension is shown on the drawing on the following page.

FIGURE 3 – PROPOSED QUARRY BOUNDARY EXTENSION

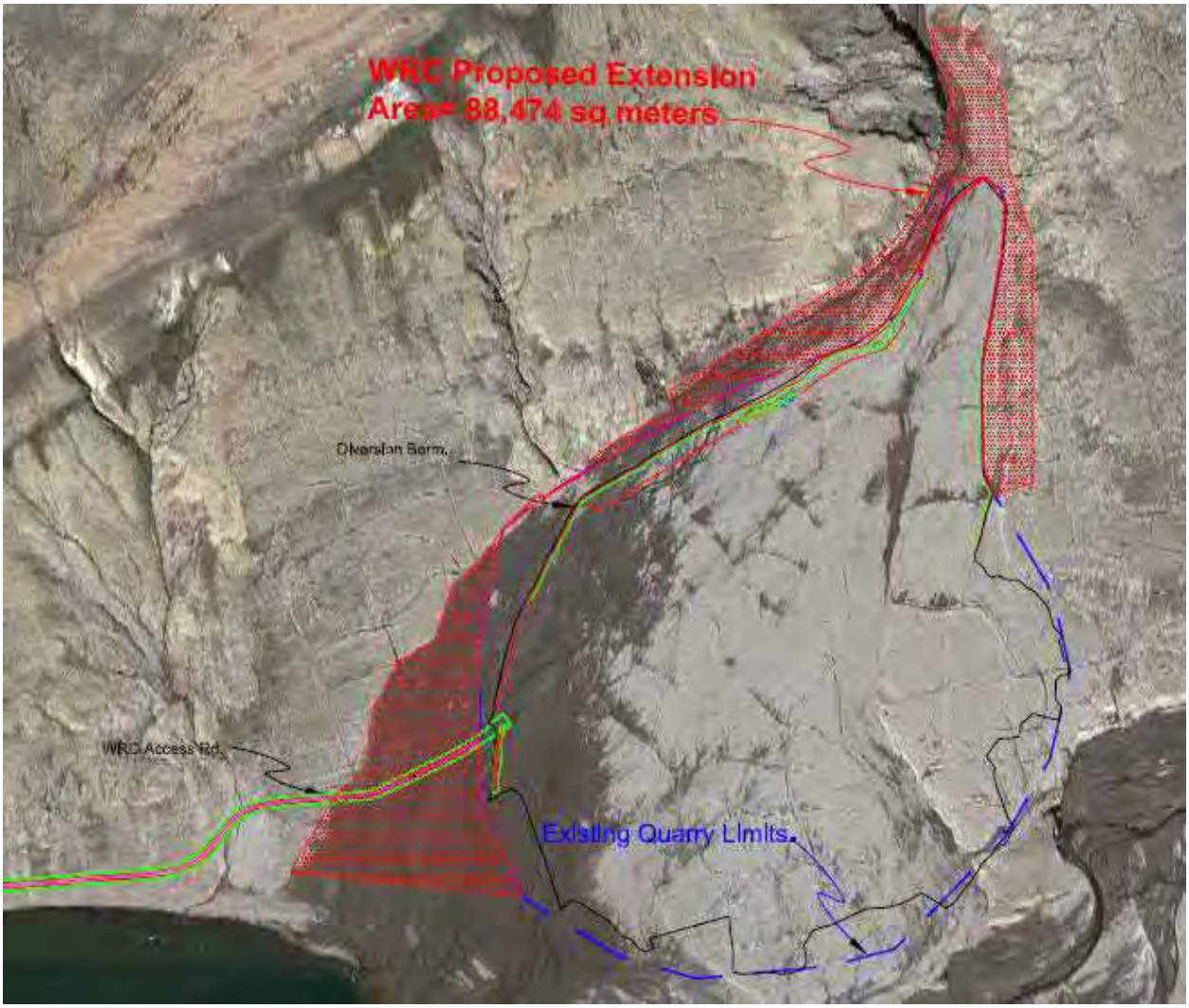
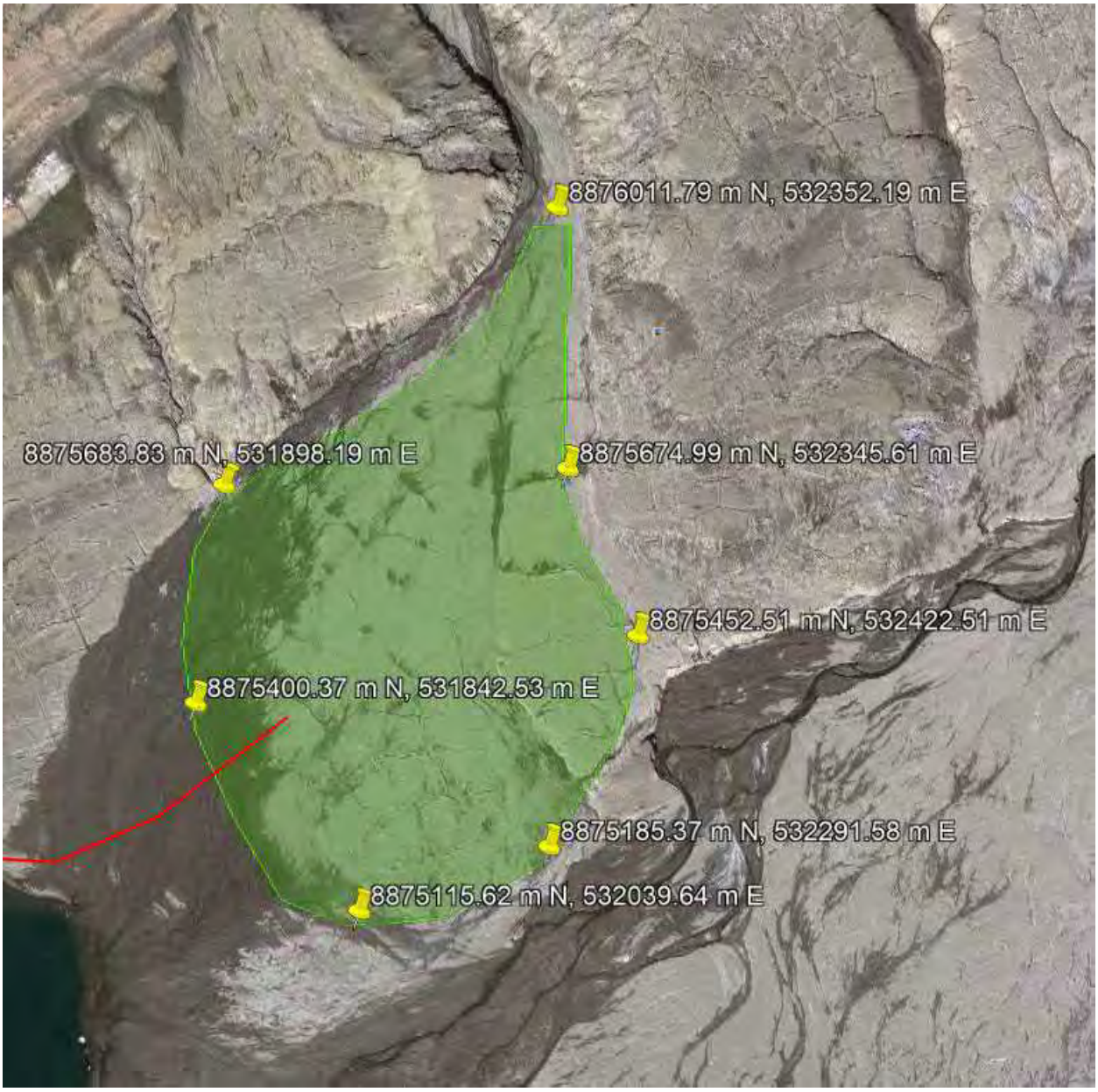


FIGURE 4 – QUARRY LOCATION COORDINATES



2.2 TEST PIT PROGRAM RESULTS

According to Golder Associates Geotechnical Report and visual observations made during the 2016 and 2017 geotechnical investigations, the surficial soils at Remus Creek West consist of sand, gravel and cobbles. A summary of the laboratory test results is presented in Figure 4.

FIGURE 4 – LABORATORY TEST SUMMARY RESULTS

Table 4: Summary of Laboratory Testing Results from West Remus Creek

Test	Test Pit ID									
	RC TP02	RC TP03	RC TP04	RC TP06	RC TP07	RC TP09	RC TP11	RC TP15	RC TP16	RC TP25
Dry Rodded Bulk Density (kg/m^3)	1,328	1,427	1,456	1,456	1,456	1,512	1,470	1498	1,526	1470
Freeze/Thaw Average Loss (%)	12.3	9.2	6.6	11.8	9.8	8.8	8.0	8.6	10.9	8.6
LA Abrasion (%)	34.6	42.0	48.1	40.6	36.5	46.4	39.1	33.8	35.7	42.1
Micro-Deval (%)	33.6	37.6	35.8	35.0	33.1	37.4	35.5	35.1	40.2	35.1
Petrographic Number	148	140.8	145.6	145.4	127.8	142.6	122.6	135.4	144.2	127.4
Primary Rock, %	Diabese, 38.7	Sandstone, 29.3	Sandstone, 36.7	Diabese, 28.2	Diabese, 23.7	Carbonate, 28.3	Sandstone, 31.1	Diabase, 30,1	Carbonate, 32.4	Sandstone, 26.3
Secondary Rock, %	Sandstone, 12.2	Diabese, 26.9	Carbonate, 16.8	Carbonate, 18.6	Carbonate, 23.6	Diabase, 23.6	Diabase, 23.7	Quartzite, 19.1	Sandstone, 15.3	Diabae, 23.5
					Quartzite, 21.1					

3.0 SITE PREPARATION

3.1 ACCESS

Upgrading of an existing trail that extends from the current Eureka runway to the Remus Creek West borrow area will be required. The trail is currently a light vehicle road only without a permanent crossing at Blacktop Creek. The length of the access road is approximately 12 km south east from the airstrip and generally follows the shoreline of Slidre Fjord. Nuna East will construct this road upgrade using the proposed Remus Creek West quarry as a borrow source, including an all-season crossing at the Blacktop Creek location.

A temporary culvert crossing will also be required at the eastern limit of the proposed quarry area to cross West Remus Creek. Suitably sized culverts will be installed at an optimum location to provide minimum disturbance to the natural flow. The crossing will be observed frequently during operations and maintained as required at the beginning and end of each construction season.

The upgraded road will then provide year-round access to the Remus Creek West borrow area and provide a primary haul route from the quarry to the runway at some future date.

The proposed road alignment and general location of the borrow source is shown in Figure 1 above.

Access within the borrow area is generally unrestricted and requires little to no preparation. The entire area is comprised of exposed sand and gravel with negligible vegetation or other organic material. Traffic patterns within the quarry will be determined to limit traffic to those specific areas required for quarry operations and to limit unnecessary travel in areas that will not be disturbed at this time.

3.2 SITE CLEARING

There will be no requirement for site clearing, vegetation removal or topsoil salvage at the proposed quarry location. Observations at the site indicate the site to be clear of vegetation and organic surficial soils.

3.3 BUILDINGS OR OTHER FACILITIES

2020 Revision: The construction camp has not been set up at Remus Creek West as previously proposed. All camp facilities are installed near the Eureka runway.

One mobile washcar has been positioned at Remus Creek West to provide washroom facilities and small lunchroom for the construction crew. Potable water is delivered to the washcar by truck and sewage is removed by vacuum truck and disposed of at the HAWS facilities.

Fuel will be stored in 4,995 liters double wall containment capsules at a designated laydown area near the crusher location. Fuel will then be distributed using a fuel lube truck with no greater than 4,995 liters on board at any time.

3.4 TOPOGRAPHIC SURVEY FOR FUTURE VOLUME CHECKS

A private legal surveying company will be contracted to perform all of the survey requirements for the project including the quarry site development. They will use up to date technology of satellite surveying/imagery, AutoCAD and end area method for calculation of the volumes.

The estimated quantities for extraction is 325,000 m3 of raw granular material, as required for access road construction ~~only~~, runway rehabilitation and production of crushed products for future HAWS projects.

An original ground topographic survey will be completed prior to quarry activities and repeated upon completion of quarrying to obtain a final measurement of the materials excavated from the quarry source. The final quantities used will be submitted to INAC, Lands Resources Officer on a required monthly reporting form.

4.0 QUARRYING OPERATION

4.1 QUARRY DEVELOPMENT

The quarry site development will use conventional stripping methods with progressive excavation in thawed material. Additional depth of cut will be achieved after removal of the initial layer and subsequent thawing of freshly exposed material.

The quarry will be developed using a D8 Dozer, 980 loader and a 320 excavator. The dozer will cut and push material into stockpiles and windrows as appropriate such that the loader and/or excavator can more readily load the material into haul trucks.

There are no drill & blast requirements.

The total area that will be developed to meet the project's needs is approximately 448,000 m2. To the extent possible the excavations will be of uniform depth over a wide area to maintain positive surface drainage.

Reclamation procedures/methods will be in place to ensure cleanup, trimming and tidiness of the quarry.

4.2 EQUIPMENT

The equipment proposed for the access road construction and quarry development will be as follows:

Description	Weight (Kg)
Pick-up F350	3,636
Pick-up F350	3,636
Pick-up F350 w/ Truck Cap	3,636
Flatdeck F550	3,359
Mechanic Truck F550	5,456
Lube / Fuel Truck	13,100
Roll-off / Vac Truck	11,340
Spare components for vac truck (flatdeck, potable water tank)	9,071
Winch Tractor	13,640
Scissor deck trailer	8,000
Packer CS563	11,818
Skid Steer 257B c/w forks, bucket bound on top	4,091
Dozer D6	21,047
Dozer D7	24,600
Dozer D8T	42,573
Excavator 320EL	24,730
Loader 980 H	39,909
Loader 980 G c/w forks & bucket	39,909
Loader 966	25,000
Grader 14H	20,454

Rock Truck 730	25,550
Rock Truck 730	25,550
Rock Truck 730	25,550
Jaw Plant 25" x 42"	57,240
Power Tower 6' X 8'	24,690
Stacking Conveyor with Hopper36" x 50"	18,200
Screen Plant 6" x 20"	45,068
Cone Plant 40"	29,563
Bin wall, cross conveyor	18,000
Screen Plant (new)	44,000
20' Sea Can - hose press	9,890
Washroom / Lunchroom (Wheeled) (survival shack)	10,000
Washroom / Lunchroom (Wheeled) (survival shack)	10,000
QA/QC Trailer	8,145
Office Trailer	9,000
30 man tent camp	155,273
Duel Burner Incinerator	27,500
Generator 275kw	9,000

4.3 EROSION PROTECTION

Regular inspection and remedial action will be in place to capture any erosion problems that may arise during the quarry development such as ditching and maintaining proper drainage.

Silt fence will be on hand and installed as necessary to mitigate silt transport from the quarry operation into nearby waterways.

4.4 SETBACKS

The quarry site has a natural sloping terrain and therefore a 100 m setback will be established between the quarry development and the existing water courses. Setbacks will be surveyed and staked before any construction can proceed. Positive drainage will be a natural progression in the quarry design and stripping/farming approach. Since these activities will be surveyed by grade calculation, slope values and positive drainage will be maintained. The pit floor will also have a positive grade applied for drainage to flow and will not create a ‘ponding effect’. Grades will not exceed 4% in value to avoid any adverse flow and erosion problems.

Temporary diversion of the natural flow paths may be required in order to access the granular materials near the western perimeter of the proposed quarry. If necessary, this will only be done during the low flow season, after freshet has subsided. The flow path will be returned to its original location after removal of granular material is completed at the end of the season.

5.0 AGGREGATE PROCESSING

5.1 CRUSHING

It is anticipated that the crushing plant will produce approximately 200,000 m3 of aggregate Crushing will proceed throughout the 2019, 2020 and 2021 construction seasons. Work is expected to commence annually in early July and shut down in late September.

5.2 STORAGE AREA OVERSIZE MATERIAL

It is not expected to encounter oversized cobles that cannot be processed during the development of the quarry. No other reject material is anticipated during the quarrying operation.

5.3 STORAGE AREA FOR FINISHED PRODUCTS

It is expected that all the processed quarry material will be consumed and hauled to the project location. All products will be consumed and hauled away, no stockpiles of produced aggregate materials will remain at the quarry locations when the work is complete. A detailed and final quantity list of the quarry materials consumed will be provided at the end of the project.

6.0 RECLAMATION

6.1 DESIRED FUTURE CONDITION OF THE SITE & ENVIRONMENTAL PROTECTION

Nuna East will have an ongoing cleanup plan in order to keep up with the required progression of the work. The quarry site will be kept level and tidy on completion of the quarry activities. In the event that the quarry floor soil is contaminated. The remediation plan will be to immediately clean up the area and place the contaminated soils into drums and keep stored on to a lined pad in preparation for transporting off site to a certified land fill. All contaminated drums will be labeled as such with TDG and DFO requirements.

At the completion of the quarry development, the typical cut depth is expected to be no more than about 1 m deep. Trimming of the slopes will be completed with to 3H to 1V grades.

The pit floor will be graded with a dozer to promote free drainage. Baselines and survey elevations will be set into place in order to ensure proper drainage. This will remain consistent through the quarry development.

6.2 WATER DIVERSION AND PROTECTION

As described previously, the quarry development will ensure positive drainage for the quarry floor. On completion of the operations and final clean-up of the quarry, the positive drainage course will be improved to enhance drainage requirements. Based on the initial development of the quarry, no disruption to drainage courses will be encountered. No ‘man made materials’ will be placed i.e. culverts, drainage structures, etc. into the quarry development. Upon completion of the project, the culvert described in Section 3.1 above will be removed and the creek bed restored to natural condition.

6.3 SLOPING/BENCHING

Nuna East will maintain a progressive maintenance program ensuring that the quarry is kept sloped and contoured throughout the project. Experienced operators will adhere to the Northern Land Use Guidelines for the reclamation of the quarry.

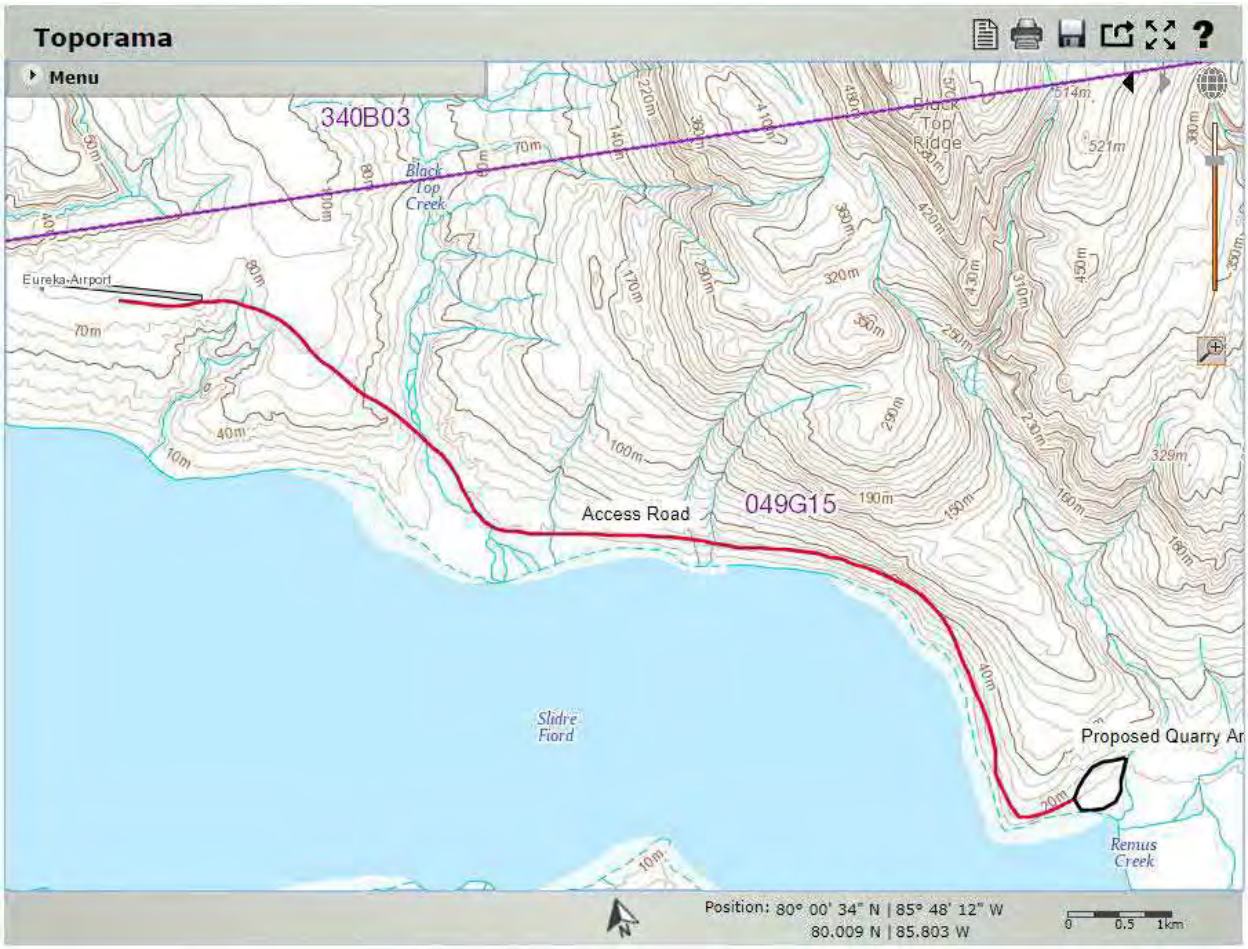
6.4 CAMP RECLAMATION AND WASTE DISPOSAL

Camp facilities will not be installed or operated at the quarry site.

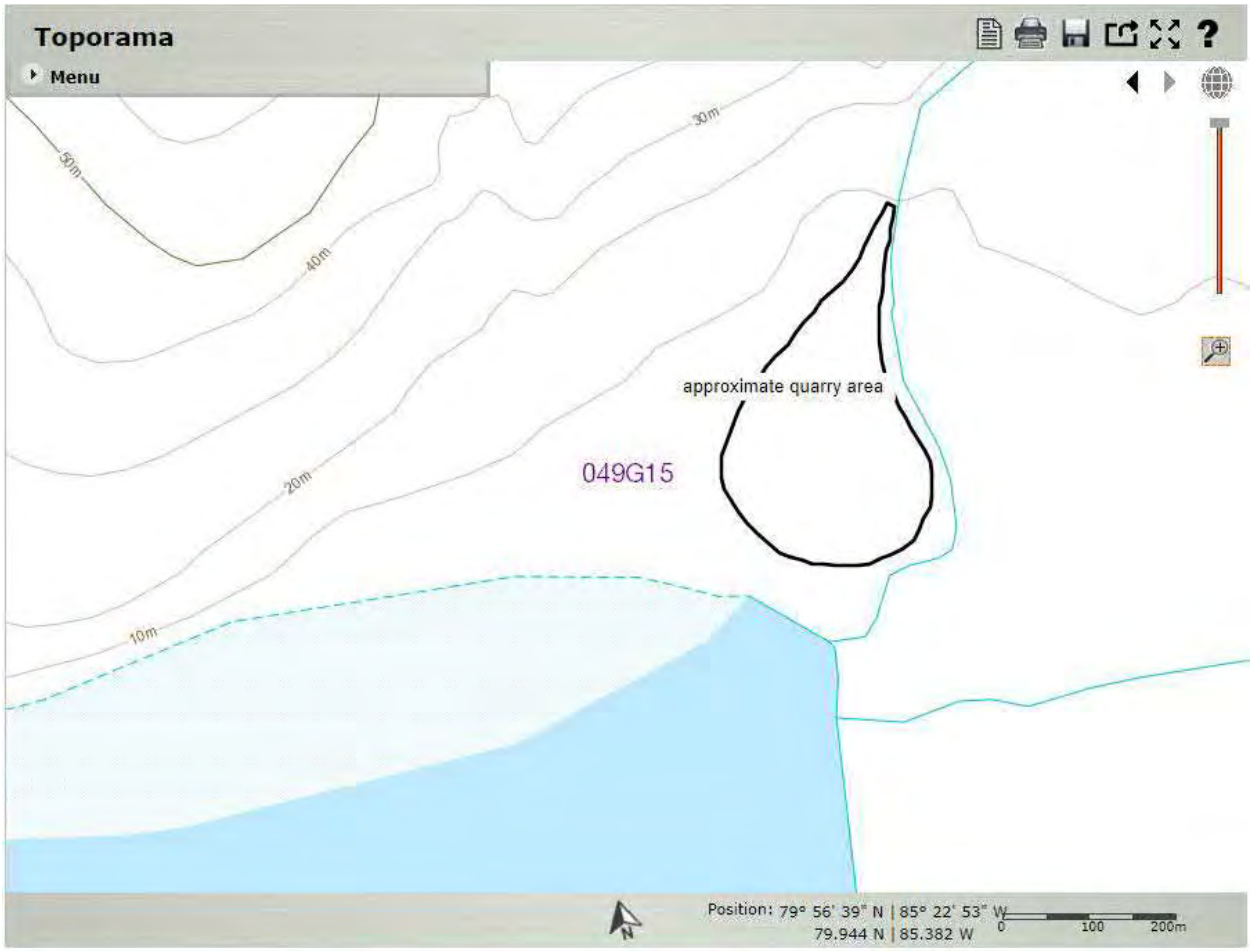
6.5 ROAD CLOSURE

The upgraded haul road from the airstrip to the quarry site will be handed over to the ECCC site manager upon completion.

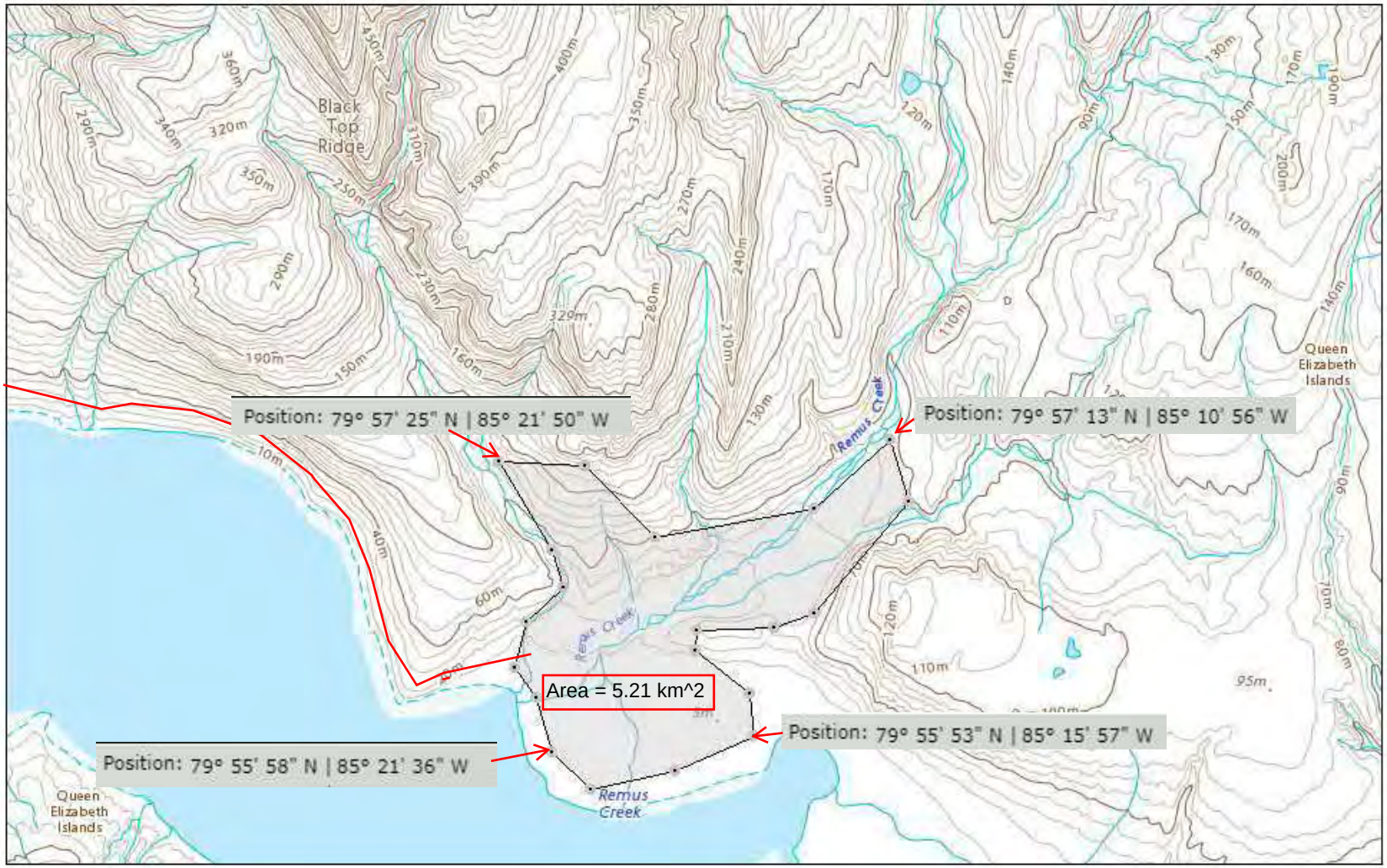
NRC Map at 1:50,000



NRC Map at 1:5000



Toporama



May 4, 2021

1:50,000

0 0.425 0.85 1.7 mi

0 0.5 1 2 km

pointLayer

Override 1

Natural Resources Canada

polygonLayer

Override 1

Ressources naturelles Canada

Access Road

Canada