NORTHWEST TERRITORIES POWER CORPORATION

Empowering Communities

SNARE HYDROELECTRIC FACILITY
LAND USE OPERATIONS AND MAINTENANCE PLAN

SNARE HYDROELECTRIC FACILITY
SANRE RIVER, NORTHWEST TERRITORIES

October 2021

DOCUMENT MAINTENANCE AND CONTROL

The Chief Operations Officer Hydro Operations is responsible for the distribution, maintenance and updating of the Land Use Operations & Maintenance Plan (OMP). This document will be reviewed annually and updated as required, taking into account changes in the law, environmental factors, NTPC policies, Snare Falls Winter Road Characteristics. Changes in phone numbers, names of individuals, etc. that do not affect the intent of the plan are to be made as required. Additional copies can be provided by individuals referenced above.

DOCUMENT HISTORY				
Revision #	**Revised Section(s)**	**Description of Revision**	**Prepared by**	**Issue Date**
0	All	First Version	NTPC	October 2021

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1 INTRODUCTION

The Northwest Territories Power Corporation (NTPC) owns and operates the Snare Hydroelectric Facility (Snare Hydro) located on the Snare River, approximately 145 km northwest of Yellowknife, NT (Figure 1). The facility includes four hydro generation stations that provide power to the North Slave communities of Yellowknife, Behchokǫ̀, Dettah and N'Dilo along with the power generated by the Bluefish Hydroelectric Facility.

Snare Hydroelectric Facility (Snare Hydro) currently operates under three Type A Land Use Permits (LUP) from the Wek' èezhìi Land and Water Board (WLWB) for the construction and operation of the winter roads (WR's) and quarry and borrow sites. In the fall of 2021 NTPC intends to apply for a site-wide Type A LUP that will consolidate the current LUP's for Snare Hydro under one permit. This consolidated LUP will increase efficiencies for all regulatory undertakings related to land use at Snare Hydro, improving processes and interactions for the WLWB, GNWT Lands Inspectors, NTPC and all Snare Hydro stakeholders moving forward.

Snare Hydro operates under two Type A Water Licenses (WL) from the WLWB. These WL regulate the storage and use of water to generate power for the hydro generation units contained within the 4 powerhouses that make up the facility. WLWB Type A WL N1L4-0150 regulates Snare Rapids, Snare Falls and Snare Forks. WLWB Type A WL W2014L4-0001 regulates Snare Cascades which is owned by Dogrib Power Corp and operated by NTPC.

NTPC has prepared this Operations and Maintenance Plan (OMP) for the upcoming land use activities to be regulated under the site-wide Type A LUP. This plan does not apply to the hydro generation facilities regulated by the two Type A WL's. The Snare Hydro Operation, Maintenance and Surveillance Manual applies to the operations of the 4 different hydroelectric facilities. This plan only applies to the undertakings at Snare Hydro which require a WLWB LUP and/or Tlicho Quarry Permit and/or Access Agreement which includes:

- Operation and maintenance of winter roads
- Operation and maintenance of quarries and borrow locations
- Operation of temporary camps and fuel storage
- Construction projects involving clearing of vegetation and/or major earthworks.

The effective date of this OMP will be upon the Government of the Northwest Territories Department of Lands (GNWT-Lands) approval of the final version prior to any of the proposed land use activities as outlined in this plan.

1.1 PURPOSE AND OBJECTIVES

NTPC has prepared this OMP to describe the operations and maintenance procedures for the upcoming land use activities at Snare Hydro, including the Winter Roads (WR), quarrying activities, use of temporary camps and fuel storage, and other construction activities involving vegetation

clearing and earthworks. All NTPC staff, contractors, sub-contractors, and individuals are required to comply with the rules outlined in the OMP. The main objectives of the OMP are described below:

- To describe the operations, and maintenance of the Snare Hydro WR system and to provide the general WR policies to help guide decision making and establish the baseline philosophy for the WR rules which will be implemented in addition to the robust contractor safety management and project safety planning programs that NTPC has in place.
- To provide an overall operation plan for the effective management of all borrow sites and quarries used in construction and maintenance activities at Snare Hydro.
- To provide references to other approvals, relevant standards, control plans and procedures for training, communications, investigation and corrective action, and audits.
- To meet commitments made during the WLWB preliminary screening process for the Land Use Activities Application.

1.2 RELEVANT ENVIRONMENTAL MANAGEMENT PLANS AND OPERATING PROCEDURES

This plan is to be used in conjunction the following reference plans for Snare Hydro which apply under the WL and LUP for the facility:

- Snare Hydroelectric Facility– Waste Management Plan (WMP)
- Snare Hydroelectric Facility– Spill Contingency Plan (SCP)
- Snare Hydroelectric Facility – Quarry and Winter Roads Closure and Reclamation Plan (CRP)
- Snare Hydroelectric Facility – Vegetation and Wildlife Management and Monitoring Plan (WMMP)
- Snare Hydroelectric Facility – Erosion and Sediment Control Plan (ESCP)

1.3 REGULATORY REQUIREMENTS AND GUIDELINES

This OMP has been developed for the upcoming Snare Hydro land use activities and regulatory approvals in accordance with the applicable Federal and Territorial legislation and guidelines, described below:

- WLWB Land Use Permit (to be issued) including approved management plans
- Tlicho Quarry Permit (to be issued) including approved management plans
- MVLWB Method for Determining Available Winter Water Use Capacity for Small-Scale Projects
- Federal Fisheries Act

  - DFO Protocol for Winter Water Withdrawal from Ice-covered Waterbodies in the Northwest Territories and Nunavut
  - Fish Screen Design Criteria for Flood and Water Truck Pumps- Fisheries and Oceans Canada 2011

- NWT Forest Management Act
- NWT Wildlife Act
- Mackenzie Valley Resource Management Act
- Northwest Territories Waters Act
- Transportation of Dangerous Goods Act
- Canadian Environmental Protection Act
- Canadian Water Quality Guidelines for the Protection of Aquatic Life: Site-Specific Guidance (2003).
- Northwest Territories Lands Act (Northwest Territories)
- Explosives Use Act (Northwest Territories)
- Guideline for Safe Ice Construction (GNWT, 2015)
- Northern Land Use Guidelines: Pits and Quarries (, GNWT, 2015)
- Guideline for Hazardous Waste Management (GNWT, 2017)

1.4 COMPANY AND PROJECT CONTACTS

Contact information for the Facility owner is as follows:

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Figure 1 Snare Hydroelectric System

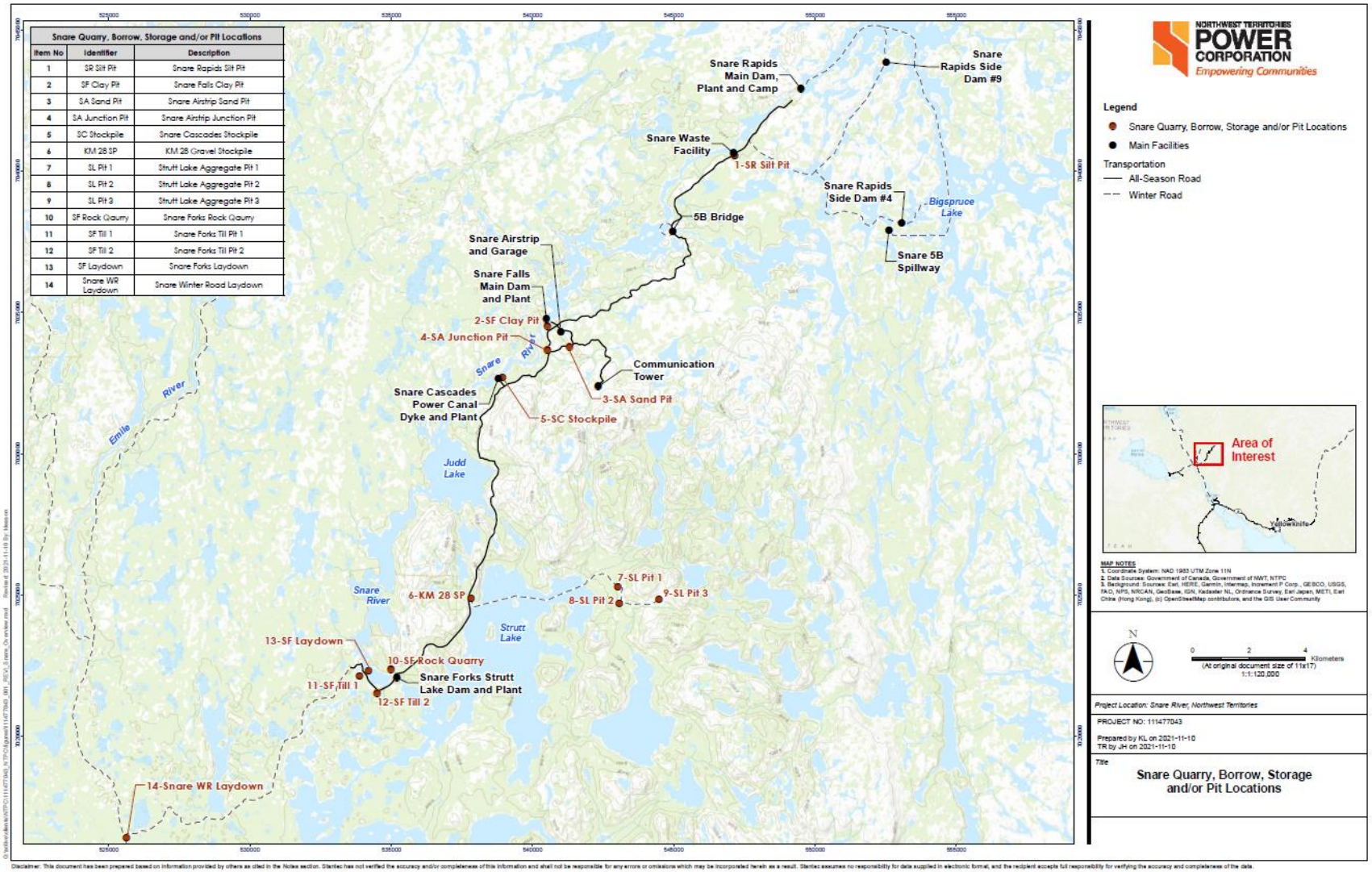


Figure 2 Snare Hydro Quarries, Winter Roads and Transmission Lines

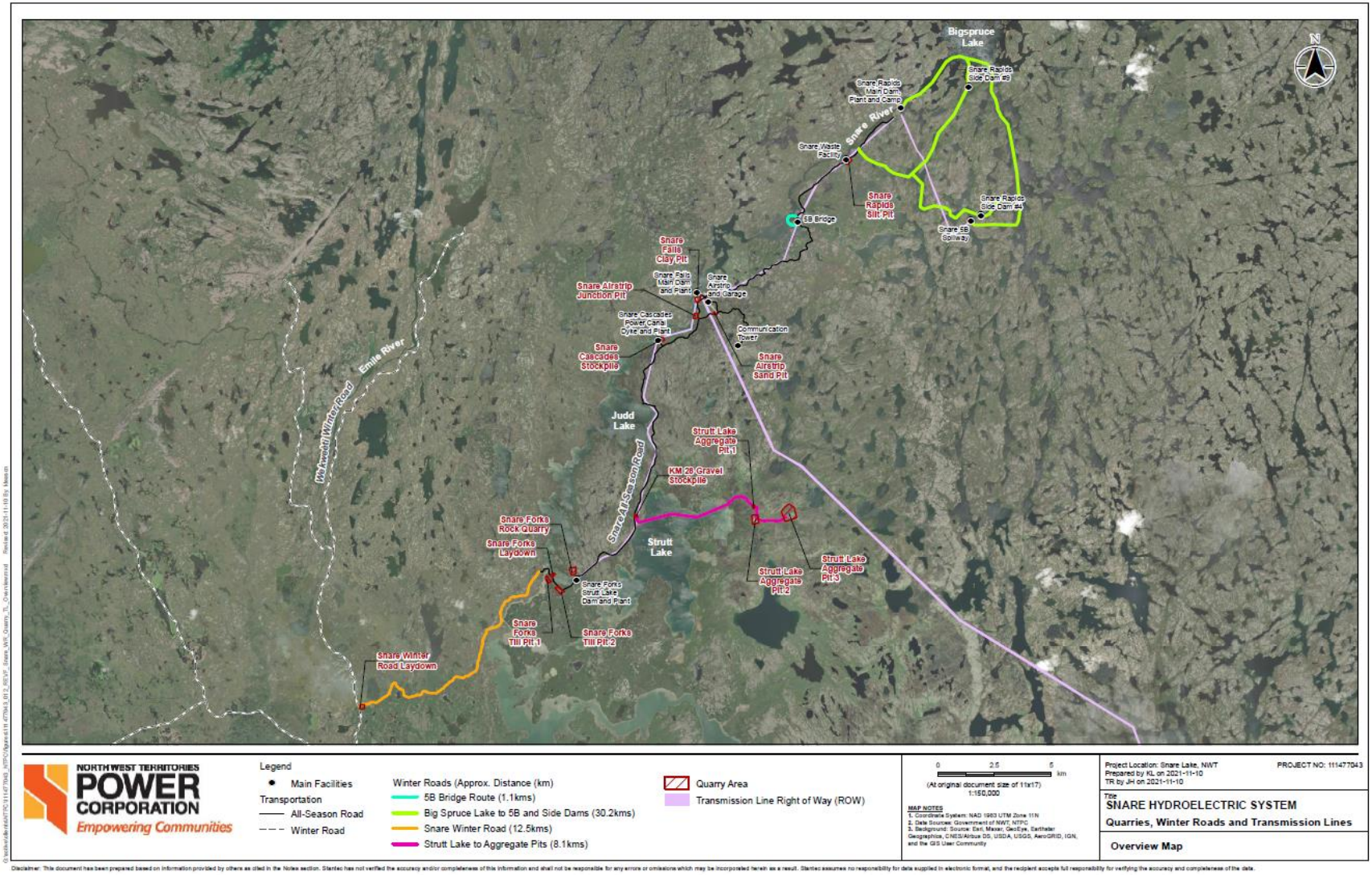
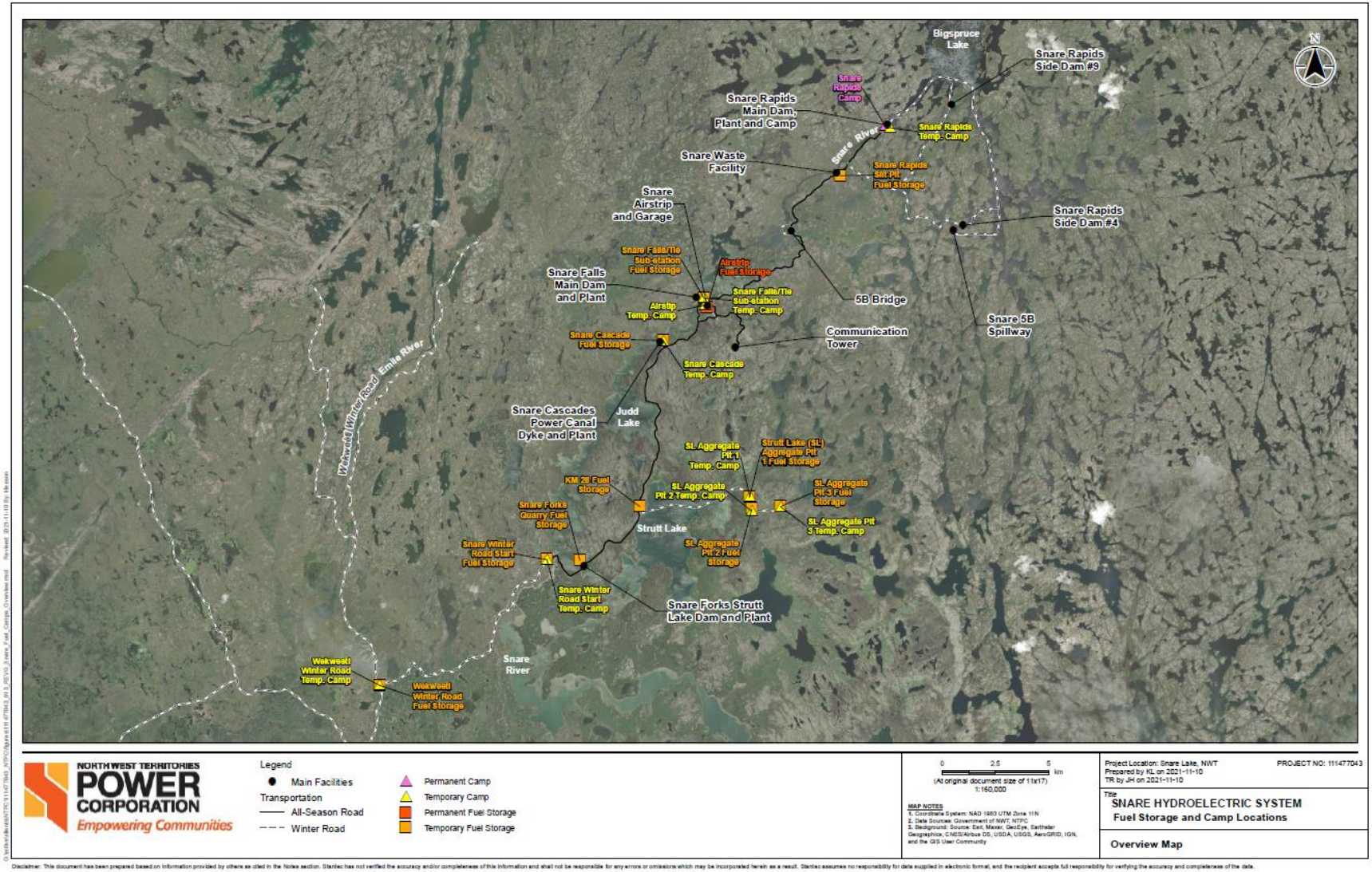


Figure 3 Snare Hydro Quarries, Winter Roads and Transmission Lines



2 ANTICIPATED EQUIPMENT FOR LAND USE ACTIVITIES

A variety of equipment will be used as part of the upcoming land use activities outlined in this plan. Operation of any vehicle and/or equipment must be in accordance with the NTPC Safe Work Practices (SWP) including, but not limited to, the following:

- Safe Driving SWP 1.01
- Winter Driving SWP 1.02
- ATV & Snowmobile Safety SWP 1.10
- Boat Safety SWP 1.11
- Vehicle Reversing SWP 1.15
- Heavy Equipment SWP 1.18
- Brush Chipper Operation SWP 3.04

In addition, vehicle and/or equipment use must follow the practices and standard procedures outlined in the management plans for the the Snare Land Use Permit including the WMMP, SCP, WMP and ESCP. The following table represents the minimum requirement for the land use activities outlined in this plan. The equipment listed in this Table 1 may vary as a result of availability, scheduling of activities; however, this list is provided to indicate the typical equipment and sizes.

Table 1: Anticipated Equipment Required for Land Use Activities

Item	Recommended Equipment	Approximate Weight (kg)
1	Ford F150, F250 and F350 pickup trucks	4,000
2	Tracked dozers including: D6 Cat Bulldozer	10,000
3	Loaders including: Cat 930 Loader, CAT IT38 Loader	8500
4	Graders including: 140H Cat Grader	11,000
5	Water trucks including: F800 Water Truck	11000 loaded
6	Prinoth Snowcat BR350	This unit is a GT1600AER @ 16000

Item	Recommended Equipment	Approximate Weight (kg)
7	All-terrain vehicles: ATV, CAN-AM, 2012,	500
8	Snowmobiles	400
9	Dump trucks: LT7500 Sterling W900 Kenworth	20,000 loaded
10	5600 Bobcat	2000
11	Compaction Equipment including: AC70 compactor	9000
12	PVG C120 Aggregate Screener,	1000
13	Brush Chipper	500
14	E1250 Ground Thaw Unit	2000
15	Winter Road Service trucks and pickup trucks	4000
16	Prinoth Snowcat	4000
17	Hagglund Amphibious Vehicle (to support GPR operations)	7000 two cars total
18	Sherp	3500
19	Ground Penetrating Radar	80
20	Tandem Wheel Plow Truck	10,000
21	Tandem Wheel Water Truck w/ heated water tank	12,000
22	Nodwell, with heated water tank	6000
23	CAT 323-07 Track Excavator	25000
24	CAT 160M AWD Motorgrader	16000

Item	Recommended Equipment	Approximate Weight (kg)
25	CAT 938K Wheel Loader	16000
26	1000XL Aggregate Screener	500

3 OPERATION AND MAINTENANCE OF WINTER ROADS

3.1 WR CONSTRUCTION

NTPC annually constructs the historical Snare Winter Road (WR) from Snare Forks to the Wekweètì Winter Road, NT linking the facility to Yellowknife via NWT Highway #3, allowing access for resupply fuel, oversized equipment, and freight to be delivered to site. The Snare WR follows the same historical alignment of previous years, so relatively little brushing is required. The road does not cross any water courses and is 12.5 km of portage winter road. The start point of the WR is a temporary laydown/marshalling area located at the southwest corner of Snare Forks, and the end point is a temporary laydown area located at the Wekweètì winter road junction.

Three additional winter roads that have been used intermittently throughout the operation of the facility as required and will be included in the scope of the LUP include:

- Strutt Lake WR (8.1 km) connecting to three borrow locations on the east side of Strutt Lake. This winter road is currently authorized under Land Use Permit W2019Q0003, which expires on December 18, 2024 and is constructed when crushing is completed at Strutt Lake Pits every 4-8 years.
- The Big Spruce Lake WR (17.8 km) connecting Snare rapids to the Side Dams, and Snare 5B Spillway. This route is entirely on Big Spruce Lake and is constructed every 10-20 years when major maintenance work is required at 5B or Side Dams. There is also a Big Spruce Lake WR 2 route that connects the side dams on Big Spruce Lake to the Snare site road using a couple portages and local inland lakes. The Big Spruce Lake WR 2 route would be used if ice conditions on Big Spruce Lake were not sufficient for WR construction.
- The 5B Bridge route (1.1 km) allowing for continued movement of equipment over the winter months if the 5B bridge every had any issues which impeded travel over the bridge in winter months. This is a contingency route only and would only be used in emergency situations.

The Snare winter roads are presented in Figure 2.

The overland portion of the proposed WRs follows previously constructed WR alignments (Strutt Lake WR, Snare WR), with an average width of the portages (overland) right-of-way of 8 to 10 metres (m), and a minimum ice thickness of 10 cm over the native muskeg and soil. Widening of

the existing portages is not expected, and only minimal brushing of the portages is be required for the Snare WR and the Strutt Lake WR. If ice and/or environmental conditions are not sufficient on the existing alignments minor changes may be required to ensure the safety of the route.

Roads over ice will be constructed in accordance with the GNWT Guidelines for Safe Ice Construction (2015) which presents current industry best practices for the construction of ice roads and pads. Ground penetration radar (GPR) profiling will be used to determine the ice thickness to confirm that there is sufficient minimum ice thickness to support the construction equipment that will be used to build the WR.

Snow/ice ramps are to be constructed as transitions between the lakes and portages. These ramps will be constructed to a minimum width of 10 m and will be constructed to provide a smooth transition for road traffic to/from ice cover and portages.

No soil stripping, removal of overburden, or draining of waterbodies/wetlands is expected during WR construction. However, small amounts of vegetation present on the portages and surface of the borrow sources will be removed. Vegetation clearing will be minimized to danger tree removal only. These activities will occur during winter months only. Any bushes or trees that are cleared will be moved to the edge of the WR corridor and left to naturally decompose.

3.2 SINGAGE

Road maintenance personnel are responsible for all WR signage. All traffic signs are to be of a size and construction so as to be clearly visible to all road users in daylight and darkness. Traffic signs will be posted along the WR to clearly show current speed limits, restricted travel lanes, road maintenance areas, road hazards and other information as required to ensure the safe flow of traffic. Signage may also include an emergency phone number or contact information. Details are outlined in the Public Safety and Awareness Plan in Appendix B.

3.3 EROSION CONTROL MEASURES DURING CONSTRUCTION

Erosion and Sediment Controls are presented in detail in the *Snare Hydroelectric Facility – Erosion and Sediment Control Plan*. Erosion is not expected to be an issue during construction of the WRs, as all works will occur in freezing conditions and the methods of construction and maintenance are intended to prevent erosion. Construction will not obstruct any natural drainage or cut stream banks. The site will be prepared so as to prevent rutting of the ground surface. The following measures will be taken during demobilisation and road closure to minimise the risk of erosion during spring break-up:

- V-notch all snowfills from stream crossings and ice bridges to avoid flooding at crossing sites and reduce the risk of bank erosion.
- Where areas have been improved with heavy equipment and/or granular fill, adequate cross drainage will be installed and directed into vegetation and away from surface water.

- Vehicles used during reclamation will carry erosion control materials (i.e., silt fencing, hay bales, polyethylene sheeting). Progressive erosion control will be achieved by installing erosion control structures, as required, between each winter road season. Erosion control measures will be located and maintained to the satisfaction of an Inspector.

3.4 WR OPERATIONS

3.4.1 General

Operation of the WRs will include use of the road for routine maintenance of the hydro facilities, and for transportation of materials and fuel for the planned upcoming construction activities. For the Snare WR the road may be used for personnel transportation until the end of March or until the road is closed due to weather.

The following general WR policies are intended to help guide decision making and establish the baseline philosophy for the WR rules. The WR rules outlined in Section X will be implemented in addition to the robust contractor safety management and project safety planning programs that NTPC has in place. The WR rules are intended to ensure the safety of all users while protecting the environment. NTPC reserves the right to amend the WR rules at any time.

3.4.2 NTPC Safety Management System

NTPC has a robust Health & Safety Management System applies to all NTPC workers, contractors, and visitors. The Health & Safety Management System is comprised of various policies, elements, forms safe work practices, safe job procedures, contractor safety management procedures, emergency response plans, project safety planning procedures and work protection policies. The Snare Hydro WR rules will be applied in addition to the existing Health & Safety Management System.

3.4.3 Rule Enforcement

NTPC employees, third-party road contractors (both construction and hauling) as well as any other agency or organization involved with and/or using the Snare WR are expected to know and follow the WR rules and NTPC policies. Compliance with the rules will be enforced by NTPC management, their delegates, and safety personnel on the WR.

3.4.4 Winter Road Maintenance

Road maintenance personnel are responsible for WR construction and maintenance during the operating season. To the maximum extent possible, major WR maintenance initiatives will be scheduled to minimize interference with road traffic. Road maintenance personnel are responsible for the provision of adequate traffic control for all work areas.

In addition, road maintenance personnel are responsible for monitoring and ensuring the safety of all their team members and equipment on the WRs. Road maintenance personnel must be familiar with the WR rules and NTPC policies and employ them properly. Road maintenance personnel are responsible to ensure that the WR rules and current speed/load restrictions for all WR maintenance vehicles/equipment are posted in a clear, concise and consistent manner at all construction camps for the information of their personnel and other vehicle operators that they employ. Road maintenance personnel are responsible for reporting all required information to NTPC and regulators regarding the Snare Hydro WR system.

3.4.5 Load Weight and Size Restrictions

NTPC will publish, and update as required, the loading weight and size restrictions for operations along the WR. The weights in effect will provided to drivers prior to their departure. Loaded haul trucks must have payload weights certified by Dispatch personnel and drivers must be in possession of all payload documentation indicating the weight when travelling on the WR. Loads more than 4.3 m (14 ft) wide will be identified to the Dispatch Points and communicated by respective Dispatch Points to all road users. Communication will include a description of the load, as well as the departure time of the load.

3.4.6 Orientation

All personnel working on and travelling the WR are required to successfully complete the NTPC orientation session. NTPC, or a designate, may provide this orientation. Upon completion of the orientation, each traveller signs a “Road User Declaration” (Appendix A), certifying that he/she has read and understands the current WR rules. NTPC Life-Saving Rules Contract must be signed as well.

3.4.7 Rules of the Road

The WR rules of the road ensure the safety of road users and the environment while assisting with the smooth execution of WR operations. The following WR rules of the road are enforced in addition to the existing safety management system that NTPC employs for all of its projects and operations:

- Speed restrictions will be clearly posted through signage along the WR. Unless otherwise posted, the following speed limits will apply:
    - Driving on lakes: loaded 25 kph and empty 30 kph.
    - Driving on portages: loaded and empty 40 kph.
    - All trucks must slow to 10 kph when travelling on/off lakes.
    - When two loaded trucks meet on a lake, travelling in opposite directions, both must slow to 15 kph when passing.

  - Trucks must slow to 10 kph while passing other loaded trucks stopped on lakes.
  - Maximum speed for construction equipment will be 40 kph while clearing snow.
  - The maximum speed limit for pick-up trucks (one-ton rating or less) is 60 kph.

- Operating a vehicle without due care and attention, or in a dangerous and unsafe manner is prohibited.
- It will be the responsibility of hauling companies to remove any disabled or otherwise stranded trucks and/or equipment, operating under their authority, from the WR or WR access area or camp as soon as possible.
- Stopping a loaded truck on lakes is prohibited unless unavoidable and authorized by NTPC or their delegate. Should a truck/trailer be required to remain parked on a lake for any reason, the driver must park in the centered in the driving land and ensure the truck/trailer is clearly marked so as not to present a safety hazard to other traffic. For vehicle recovery, ONE HAUL TRUCK ONLY will be permitted to be closer than 300 metres from the immobilized vehicle.
- Should any truck/trailer be required to remain parked on land or other WR access area for mechanical or other reason, the driver must ensure the truck/trailer is parked and clearly marked so as not to present a safety hazard to other traffic; obtain authority from safety or dispatch personnel as soon as possible; and, make arrangements to have the truck/trailer recovered as soon as possible.
- Drivers must always carry garbage bags in their trucks for the purpose of storing their refuse for proper disposal at WR camps. Littering on or near the WR is prohibited.
- While operating a vehicle on the WR, all drivers must be in possession of survival equipment suitable for arctic climates including but not restricted to a parka, wind pants, winter footwear, headwear, and mitts. All haul truck drivers are responsible for ensuring their truck is equipped with tire chains, wheel chock blocks, flashlight, reflective traffic triangles, a tool kit, methyl hydrate, a roll of heavy mil poly plastic, and spill pads.
- In the event of an accident, spill, or dangerous emergency situation, the incident will be reported to safety and/or dispatch personnel by the most expeditious means available. NTPC and/or their safety delegate will respond to all spills, motor vehicle accidents, and dangerous/emergency situations. Anything that results in a contamination/spill will be reported in accordance with Appendix K of the SCP including notification of the NWT Spill Report Line at (867) 920-8130.
- Changing motor oil along the WR's or in general locations at the Snare Facility is not permitted. Oil changes and any other maintenance must be completed at appropriate maintenance facilities, prior to travel on the WR's.
- There is strict no chase policy for any wildlife encounter along the WR and all traffic must yield to any wildlife till it is clear of the WR. Feeding wildlife while operating/travelling on or near the WR is strictly prohibited.

- All drivers must report concerns or activity involving wildlife including but not limited to abandoned carcasses, injured wildlife and incidents of wildlife harassment. Please refer to *Snare Hydroelectric Facility Vegetation and Wildlife Management and Monitoring Plan* for further details on reporting.

The rules of the road are also outlined in the road user declaration included in Appendix A.

4 OPERATION AND MAINTENANCE QUARRIES AND BORROWS

This section outlines the quarry operation and maintenance processes that will be undertaken to obtain fill as required from various quarry and borrow locations at the Snare Hydro Facility to support construction, resurfacing, upgrades and maintenance. The methods employed in the operation of the borrow pits and quarries will be based on the following applicable Federal and Territorial legislation and guidelines:

- Northern Land Use Guidelines: Pits and Quarries (Canadian Environmental Protection Act, 2015)
- Quarrying Regulations (Northwest Territories Lands Act)
- Explosives Regulations (Explosives Use Act, Northwest Territories)

4.1 PROPOSED QUARRY/BORROW LOCATIONS

Materials from 10 existing historical quarries and/or borrow locations across Snare Hydro will be excavated as required for future construction, resurfacing, upgrades and maintenance at the Snare Hydro Facility. 9 of the sources are located on Tłı̨chǫ lands, while 1 is located on private land. All locations are existing historical borrow locations used intermittently since 1948 throughout the operation of the facility. Blasting would only occur at Snare Forks Rocks Quarry. Excavated aggregate will be stockpiled as needed at quarry and/or borrow locations, or alongside roadways or constructions sites for blending and utilizing. In addition, there will be 3 designated stockpile locations at KM 28 and Snare Forks Laydown area.

Minimal vegetation clearing, overburden removal and/or disturbance to wildlife is expected throughout the quarrying, as all borrow locations have minimal overburden and vegetation present as they are historical borrow locations that have been used throughout the operation of the facility. Minor vegetation and overburden removal will be completed around the edges of the existing borrow locations when required. The existing historical quarries and/or borrow locations across Snare Hydro are presented in Figure 2. A close-up view for each pit with dimensions for the full extents of the pit area Appendix C. It is important to note that the area of extents is not the active area of quarrying just the square that bounds the area.

Table 2 presents the coordinates of the four corners for each quarry/borrow location extents, Table 3 presents the coordinates of the center for each quarry and borrow location and the area for each of the proposed locations.

Table 2: Co-ordinates for Quarry and Borrow Location Extents (UTM)

ID	Quarry Site	Corner	Easting	Northing
1	Snare Rapids Silt Pit	N	547270.0801	7040644.08
		E	547348.1996	7040592.171
		S	547169.0298	7040388.646
		W	547092.3016	7040443.474
2	Snare Falls Clay Pit	S	540470.9198	7034311.013
		W	540424.2208	7034486.962
		N	540527.0116	7034608.406
		E	540681.6609	7034574.539
3	Snare Airstrip Sand Pit	S	541322.2408	7033773.518
		W	541234.2666	7033794.552
		N	541277.5922	7033892.448
		E	541374.8268	7033783.969
4	Snare Airstrip Junction Pit	NE	540562.8939	7033805.88
		SE	540562.8085	7033624.321
		SW	540350.2852	7033606.268
		NW	540385.292	7033806.872
5	Snare Cascades Stockpile	S	538878.6125	7032576.755
		W	538826.2249	7032734.116
		N	539010.3753	7032787.893
		E	539070.7004	7032633.111
6	KM 28 Gravel Stockpile	N	537769.3865	7024948.808
		E	537899.0326	7024932.933
		S	537853.5242	7024835.566
		W	537750.8656	7024847.737
7	Strutt Lake Aggregate Pit 1	NE	543053.1334	7025374.623
		SE	543054.2596	7025229.294
		SW	542948.6906	7025293.588
		NW	542963.375	7025376.535
8	Strutt Lake Aggregate Pit 2	W	542923.3087	7024894.656
		N	543207.7363	7024932.359
		E	543251.3927	7024559.296
		S	542974.9025	7024512.994
9	Strutt Lake Aggregate Pit 3	E	544918.4762	7024794.866
		S	544411.7981	7024622.886
		W	544235.8499	7025077.97
		N	544570.5485	7025404.731
10	Snare Forks Rock Quarry	S	534962.8389	7022263.854
		W	534854.6808	7022540.603
		N	535157.8939	7022617.597
		E	535140.6959	7022293.747

ID	Quarry Site	Corner	Easting	Northing
11	Snare Forks Till Pit 1	N	533875.7476	7022230.301
		E	534074.7807	7021982.651
		S	533932.9638	7021903.276
		W	533818.9943	7022067.185
12	Snare Forks Till Pit 2	N	534354.3366	7021778.082
		E	534648.134	7021535.769
		S	534468.7461	7021423.85
		W	534232.2081	7021694.519
13	Snare Forks Laydown	N	534190.4944	7022366.476
		E	534258.6247	7022295.699
		S	534113.3682	7022157.322
		W	534043.2534	7022240.666
14	Snare Winter Road Laydown	W	525594.3604	7016400.397
		N	525734.0144	7016545.607
		E	525803.1369	7016544.945
		S	525605.6912	7016333.609

Table 3: Co-ordinates for Center of each Quarry and Borrow Location (Lat, Long)

ID	Latitude	Longitude	Total Area of Pit Extents ($m^{2)}$
SR Silt Pit	63° 29' 21.64"N	116° 3' 11.15"W	25170
SF Clay Pit	63°26'10.80"N	116°11'17.51"W	44947
SA Sand Pit	63°25'48.79"N	116°10'20.17"W	8122
SA Junction Pit	63° 25'45.14"N	116° 11' 16.50"W	35398
SC Stockpile	63° 25'14.75"N	116° 13' 11.50"W	32463
KM 28 SP	63° 21' 2.95"N	116° 14' 39.65"W	13150
SL Pit 1	63°21'13.07"N	116° 8'25.99"W	13714
SL Pit 2	63°20'53.74"N	116° 8'20.52"W	107542
SL Pit 3	63°20'57.87"N	116° 6'40.41"W	339599
SF Rock Quarry	63° 19' 41.31"N	116° 18' 4.52"W	80495
SF Till 1	63°19'35.19"N	116°19'24.42"W	39304
SF Till 2	63°19'16.02"N	116°18'40.22"W	62431
SF Laydown	63° 19' 38.67"N	116° 19' 4.31"W	21903

Snare Winter Road Laydown			36122

4.2 BRUSH REMOVAL

Details for brush removal are presented in detail in the *Snare Hydroelectric Facility – Vegetation and Wildlife Management and Monitoring Plan.* Minimal vegetation clearing, overburden removal and/or disturbance to wildlife is expected throughout the development/operation as all borrow and quarry locations have minimal overburden and vegetation present as they are historical borrow locations that have been used at some point throughout the operation of the facility. Minor vegetation and overburden removal will be completed around the edges of the existing borrow locations when required and to construct the aggregate stockpiling area if it is required.

Any stripped materials will be stockpiled at either side of the quarry footprint for future pit restoration. Upon closure of the quarry, these materials can be used to contour the open cut side slopes of the quarried area.

4.3 EROSION AND CONTROL MEASURES

Erosion and Sediment Controls are presented in detail in the *Snare Hydroelectric Facility – Erosion and Sediment Control Plan*. Borrow sites and quarries will have sloped ridges, and walls will be benched to minimize erosion potential. Slope grades around the perimeter of the excavations will be lowered, and appropriate quarry rock materials may be used to stabilize to further limit erosion as required. Except in solid rock locations, slopes of the excavations will have a minimum ratio of 2:1 vertical, unless authorized in writing by an Inspector.

Quarry operation will not occur within 100 m of the Ordinary High-Water Mark of any water body, unless otherwise authorized by the Lands Inspector. The ESCP provides further measures on limiting erosion.

4.4 POSITIVE DRAINAGE

Quarry floors will be graded to allow for positive drainage and to minimize ponding effects. Grades will not exceed 4 percent (%) to avoid adverse flow and erosion, and the final borrow site/quarry configurations should have surfaces graded at approximately 1% in the down slope direction. Storm and snow melt water will be diverted away from the quarry by berms on the edges of the excavation, and directed to natural ground elevations at or near the entrance of the sites. Check dams will be installed at downstream ends of borrow pits and quarries where required.

4.5 PERMAFROST DEGREDATION

Should permafrost be detected during quarry operations, options include removal and avoidance. If ice-rich permafrost is encountered, the primary concern will be erosion management. This will be achieved through the proposed quarry floor grades (Section 4.5) and the ESCP.

When possible, quarry activities will commence when ground conditions exist (frozen or dry season) to support the equipment and resources to be used. Clearing equipment will be tracked or wide, low pressure tire mounted to distribute weight and prevent rutting. Care will be undertaken not to denude the terrain in sensitive areas prone to permafrost conditions.

4.6 STOCKPILES

It is expected that stockpiling of material may be required at the borrow pit sites and quarries site. All quarries and borrows will be operated in accordance with the mitigation described in the Wildlife Management and Monitoring Plan, requiring that quarry stockpiles be maintained with slopes of less than 70 degrees to prevent bank swallow nesting. Refer to Appendix D- Bank Swallow Information Sheet.

4.7 GEOCHEMICAL ANALYSIS

In late 2021 GNWT will release the Quarry Sampling and Testing Guidance for the identification of Acid Rock Drainage and metal leaching potential guidelines which NTPC will reference to complete a geochemical analysis plan that will be incorporated to mitigate the potential risk of acid rock drainage (ARD) and/or metal leaching (ML) from borrow and quarry materials excavated from all of the existing quarries and/or borrow locations sites at Snare Hydro. Only material that has been cleared through a geochemical verification process will be utilized in construction and maintenance activities to avoid moderate to high ARD or ML.

4.8 BLASTING

Blasting will only be occurring at Snare Forks Rocks Quarry if this site is chosen for a project. All blasting operations will follow the NNWT/Nunavut *Mine Health and Safety Act* and Regulations, and explosive material will only be handled and maintained by a licensed explosives contractor. All employees or contractors involved with the handling, preparation, use or transportation of explosives must be trained in the safe methods of handling explosives and the emergency procedures in the event of a fire or unplanned explosion. Wildlife surveys will be carried out prior to a blast to confirm that caribou are not present in the area.

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5 OPERATION AND MAINTENANCE OF TEMPORARY CAMPS

To accommodate additional personnel, 10 potential locations for temporary camps have been identified within quarry/borrow locations and at the start and end of the Snare WR. These proposed locations are presented in Figure 3. Temporary camps will be project specific and used as contingency only if resourcing levels exceed the capacity of the main camp. These camps may include accommodations, offices, washroom facilities, fuel and waste storage. Details of the temporary camp that would be set up are outlined below:

- Capacity:
  - Maximum capacity of 20 people.
  - Capacity will vary from 4- to 20 people based on the capacity of the main camp. The full site capacity will never exceed 49 people.
- Water Usage:
  - Camp operations will require water for kitchen use, cleaning, washroom servicing. Approximately 250 L/p/day x 20 p= 5000L/day or 5m^3/day will be required for the temporary camp operations.
  - This water system would be a temporary self-sustaining water system in which water would be manually drawn from the forebay and stored in a water tank for use at the camp
- Sewage:
  - Sewage would be discharged into temporary sewage pit similar to a winter road camp
  - Maximum sewage waste would be 5m3/day but given that water would not be potable and main camp would do cooking this would likely be much less.
- Management Plans:
  - All management plans and standard procedures for the Snare Land Use Permit would also apply to the temporary camp.

The management of wastes and fuels, chemical storage areas will be completed in accordance with the requirements detailed within the WMP and SCP.

6 OPERATION AND MAINTENANCE OF TEMPORARY FUEL STORAGE LOCATIONS

Additional fuel will be required to support the temporary camp facilities, aggregate crushing, and WR construction and operation activities. There will be one 60,000 L double-walled diesel tank and one 10,000 L gasoline tank located at all temporary camp locations or where crushing would be taking place. These temporary fuel storage locations are presented in Figure 3.

The storage of fuel and any hazardous materials will be in accordance with the SPC and WMP, which conforms with the Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products (CCME 2003), and the Northern Land Use Guidelines: Camp and Support Facilities (GNWT-Lands 2014a). All personnel will be familiar with the SPC and WMP and a copy of shall be maintained in field office(s) and is also available on NTPC Intranet PowerLine (the Powerline) under Divisions> Health, Safety & Environment> Spill Response Plans

Secondary Containment must be utilized to help prevent hazardous materials from entering the local environment. Secondary Containment or an adequate spill collection system will be installed to allow at fuel storage locations for the containment of at least 110% of the largest container or tank volume within the contained storage area, plus 10% of the aggregate capacity of all other containers or tanks for single walled taks. Double walled storage tanks will be used whenever possible at the seconardy containment is built into the tank. Temporary fuel dispensing areas will be established a minimum of 30 m away from any water body, to avoid impacts to fish and fish habitat. All dispensing and fuel transfer points will be equipped with spill response materials and/or containment pads.

Temporary fuel storage locations, dispensing areas and fuel transfer points will be regularly inspected to check for leaks or damage to the fuel storage containers, as well as for stained or discoloured soils around the fuel and chemical storage areas. Spill kits will be provided wherever fuel is stored, used and transferred. The spill kits and their contents will be regularly inspected to ensure that adequate supplies are available.

Once quarrying activities are complete, and temporary camps are no longer required, the temporary fuel storage will be dismantled and tanks/drums will be removed to an approved facility, or reused at another location on the Snare Hydro site. The fuel tanks will be removed from site via the winter road.

7 TRANSMISSION LINE, ACCESS ROUTE MAINTENANCE AND MAJOR EARTHWORKS

In addition to the WR construction, quarrying activities and installation of temporary facilities, there will be minor vegetation clearing activities for transmission line access, access route maintenance, and other activities involving the use of heavy equipment not within the existing Right-of-Way. The Inspector will be kept informed of the activities and scheduling of anyclearing operations.

During transmission line and access route clearing activities, only the minimum amount of soil and vegetation necessary for the construction/reconstruction, and maintenance of the access routes and the transmission line will be disturbed. Existing roads will be used to the extent possible and use of new roads will be minimized unless environmental considerations dictate otherwise. Where possible, topsoil will be segregated from sub-soils and returned to cover disturbed areas to facilitate re-growth of vegetation. Vegetation will only be cleared from those areas necessary to obtain adequate working width and turning radius space for maintenance equipment. Any vegetation clearing relating to the transmission line and access route clearing will occur a minimum of 100 m from the ordinary high-water mark unless a provision is granted by the Lands Inspector.

The following procedures will be followed in clearing vegetation:

- Encroaching vegetation will be cut off at the base by either a mower or chainsaw,
- Space sparse vegetation perpendicular into forest edge for proper decomposition when not stacking for burning
- Felled trees and brush will not be felled or placed in such a way as to obstruct ditches, culverts or watercourses,
- Vegetation will be stockpiled for burning during the winter months and when possible merchantable timber (=> 5” in diameter) that is removed will be stacked for salvage/use.
- Whenever possible, vegetation should be removed by using cutting methods rather than clearing methods, without disturbing the ground, and leaving roots intact.
- Material not utilized by the end of the construction period will be mulched onsite and incorporated into site reclamation as cover material (Please refer to CRP).

Dust will be controlled during access route improvements by watering disturbed surfaces if necessary. The mulch/stabilization will be implemented as soon as possible after completion of project activities to minimize potential fugitive dust generation as revegetation occurs.

Major earthworks consisting of cut and fill will be undertaken as required for the upcoming projects yet to be determined. Use of heavy equipment during earthwork activities will be in accordance with the Safe Work Practice for Heavy Equipment (SWP #1.18). Wildlife surveys will be completed before any major earthworks and submitted to Lands and ENR to ensure there are no adverse effects on local wildlife habitat.

Clearing equipment will be tracked or wide, low pressure tire mounted to distribute weight and prevent rutting. During machine clearing operations, great care will be undertaken not to denude the terrain particularly in sensitive areas prone to permafrost conditions.

In addition, existing substation at the Snare Falls Generating Station will be relocated approximately 70 m southeast of its current location and a new access road, 50 m in length and 6 m wide, will be constructed to link the existing road to the new substation (Figure 1). Pole structures will be relocated and/or replaced to accommodate the new location.

8 POTENTIAL EFFECTS OF LAND USE ACTIVITIES AND MITIGATION MEASURES

Construction and operation activities undertaken by NTPC have the potential to adversely impact vegetation, wildlife and wildlife habitat at varying scales, including direct habitat loss, habitat degradation, and functional habitat loss due to noise, dust, spills of toxic or hazardous substances. In addition, injury or mortality resulting from: vehicle collisions; increased harvesting due to improved access; wildlife-human interactions; increased ease of predation and wildlife attraction. Table 3 outlines the potential effects and proposed mitigation measures related to the land use activities outlined in this OMP. For additional mitigation measures please refer to the Snare Hydroelectric Facility Vegetation and Wildlife Management and Monitoring Plan.

Table 4: Potential Effects and Proposed Mitigation Measures

Potential Effect	Project-related Mechanism of Effect	Mitigation
Vegetation loss, and loss of habitat availability and connectivity. Can open up niches for invasive plant species to colonise and influence wildlife abundance and distribution.	Site clearing (maintenance access and construction)	• Minimize amount of vegetation cleared by using areas that are already cleared from historic use when possible. • Limit WR corridors widths. • Mulch and chip when possible and stockpile for burning during the winter months. When possible merchantable timber (=> 5" in diameter) that is removed will be stacked for salvage/use. • Minimize vegetation clearing to brushing and danger tree removal only. • Conduct site clearing during winter months only. • Leave removed vegetation onsite, adjacent to the alignments. • Construct vehicle pullouts in non-vegetated locations.
	Construction including: WR, Camp, New Substation	• Train all staff on Standard Operating Procedures for Vegetation Removal (Appendix E).
Overburden loss, leading to erosion, sedimentation, water pollution.	Site clearing and excavation	• Minimize amount of overburden removal by using areas that are already cleared from historic use when possible. • Ensure proper removal of vegetation down to ground, without disturbing ground. • Maintain quarry stockpiles, overburden or exposed soils banks at a slope less than 70° to deter bird nesting, erosion, sedimentation and surface water runoff. • Overburden removed will be stored in a pile in the storage area. • Use the *Snare Erosion and Sediment Control'* manual to apply suitable erosion control measures and slope stabilisation to avoid sedimentation and erosion and avoid adverse effects to waterbodies, as well as pollution to surface water.
Habitat alteration and loss to roosting/hibernating bats, migratory birds (and their nests/eggs), bears (destruction/disturbance to dens)	Site clearing	• Before major vegetation clearing and/or quarrying activities begin, a wildlife survey will be completed to verify the absence of migratory bird nests, bear dens and other wildlife. Result will be submitted to the WLWB and ENR. • Avoid disturbance of nests and eggs by completing work outside breeding bird season (Early May – late August), when migratory birds are present. • Birds are to be deterred from nesting on infrastructure by using covers/screens on vents, holes and crevices where birds are likely to nest. Where necessary, active disturbance of birds (non-lethal) on infrastructure is permitted to discourage them from establishing nests. No physical deterrents to be applied during nesting season. Where birds do construct a nest, they are not to be disturbed until birds have left the area. • Minimize vegetation clearing to brushing and danger tree removal only. • Leave removed vegetation onsite, adjacent to the alignment.

Potential Effect	Project-related Mechanism of Effect	Mitigation
	Spills, emissions, and deleterious substances	• Follow the approved SCP and WP • Use industry standards for fuel containment, storage, handling, and transport to avoid contamination to workers and the environment. • Equip all equipment and trucks with industry-standard emission control systems and spill kits. • Ensure staff are trained in the Workplace Hazardous Materials Information System and the Transportation of Dangerous Goods to avoid accidental spills. • Train all staff in spill response procedures and use of emergency spill kits to minimise adverse effects to vegetation and wildlife habitat. • Regularly maintain all equipment and trucks to ensure all are in good working order and free of leaks. • Prohibit idling except where necessary for construction. • Refuel equipment and vehicles with appropriate spill containment in place, and mitigation measures at hand in case of accidental spill (see SCP). Report all spills in a timely manner. Refuel at least 30 m away from water bodies. • Large fuel tanks (2000 to less than 80,000 litres) need to be double walled as per regulations.
	Construction of WR, Camp, New Substation	• Construction activities to consider sensitive periods for wildlife (please refer to the Vegetation and Wildlife Management and Monitoring Plan). • If an active mammal den, bird nest (active or inactive) or young are discovered during construction, disruptive construction activities are to be stopped and GNWT-ENR and ECCC (for migratory birds) are to be contacted for advice and to form an appropriate strategy.
Alteration of surface water quality, soils and vegetation, altering availability and distribution of wildlife habitat	Spills, erosion, and deleterious substances	• Follow the approved SCP developed for the Snare Hydroelectric Facilities. • Follow the approved WMP. • Fuel/diesel transporters will review the requirements of the Spill Management Plan. • Diesel will be transported using appropriate containment. • Ice Quality supporting vehicles or WRs will be monitored. • Use industry standards for fuel containment, storage, handling, and transport to avoid contamination to workers and the environment. • Equip all equipment and trucks with industry-standard emission control systems and spill kits. • Ensure staff are trained in the Workplace Hazardous Materials Information System and the Transportation of Dangerous Goods to avoid accidental spills. • Train all staff in spill response procedures and use of emergency spill kits to minimise adverse effects to vegetation and wildlife habitat. • Regularly maintain all equipment and trucks to ensure all are in good working order and free of leaks. • Prohibit idling except where necessary for construction.

Potential Effect	Project-related Mechanism of Effect	Mitigation
		• Refuel equipment and vehicles with appropriate spill containment in place, and mitigation measures at hand in case of accidental spill (see SCP). Report all spills in a timely manner. Refuel at least 30 m away from water bodies. • Large fuel tanks (2000 to less than 80,000 litres) need to be double walled as per regulations. • Use the ESCP to apply suitable erosion control measures and slope stabilisation to avoid sedimentation and erosion and avoid adverse effects to waterbodies, as well as pollution to surface water.
	Dust and air emissions, subsequent deposition	• Apply dust suppression techniques using the GNWT Guideline for Dust Suppression and the ESCP to minimise dust emissions on vegetation and habitat outside of right of way. • Visual cues (such as low visibility while driving, observed dust on vegetation outside of work area limits) should trigger dust suppression. • Dust suppression measures include the application of water and/or Inspector-approved chemicals such as calcium chloride, using tanker trucks. • Trucks will only apply water/Inspector-approved chemicals as needed to active work areas. Apply only water when within 100 m of a water body.
	Construction and operation of Camps, WR and New Substation	• Avoid operation of machinery when soils are highly saturated (primarily during freshet) will be avoided where possible. Where unavoidable, suitable ground equipment will be used to prevent unnecessary soil damage.

Potential Effect	Project-related Mechanism of Effect	Mitigation
Attraction of wildlife to the Project (food waste, petroleum-based products, salt), increasing human-wildlife interactions, changing predator-prey relationships, altering wildlife population dynamics	Construction and operation of Camps, WR and New Substation	• Complete the work in winter when possible when most migratory birds are not present and bears are denning. • Follow the WMP. All waste products to be stored in secured containers and transported to approved facilities to avoid access by wildlife. • Collect and store all food and food waste in a manner inaccessible to furbearers. Incinerate waste locally or take off site to an approved facility. • All staff to be educated in proper waste management practices for the Project to avoid wildlife attraction. • Prohibit littering. • Prohibit approaching, harassing and feeding/ interacting with wildlife. • Staff to communicate wildlife sightings via radio to the NTPC Project Monitor, who will relay observations to Site Supervisors and equipment operators working in the area. Record all wildlife observations in the Wildlife Monitoring Form (see Section **Error! Reference source not found.**). • Stop work temporarily, as suspended by the NTPC Project Monitor where wildlife may be at imminent risk of injury or mortality or are close to the construction site. Record any incidents in the Wildlife Monitoring Form (Section **Error! Reference source not found.**). • Bear-banger deterrents only to be used if there is an immediate risk to life to personnel or wildlife safety. • Camps will be designed to prevent human-wildlife interactions, including appropriate storage of non-waste wildlife attractants (e.g. food, petroleum products, salt). Essential lighting will be used to detect bears or other large mammals in the vicinity. • Exposure of wildlife to contaminants will be avoided by use of appropriate deterrents (e.g. temporary fencing and noise makers) to discourage wildlife to an affected area.

9 REFERENCES

GNWT (Government of the Northwest Territories). 2015. Northern Land Use Guidelines – Access: Roads and Trails.

GNWT-Lands (Government of the Northwest Territories Department of Lands). 2015. Northern Land Use Guidelines: Pits and Quarries.

TAC (Transportation Association of Canada). 2011. Guidelines for the Construction and Operation of Winter Roads.

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ECCC (Environment and Climate Change Canada). 2019. Amended recovery strategy for the woodland caribou (Rangifer tarandus caribou), Boreal population, in Canada [proposed]. Species at Risk Act Recovery Strategy Series, Ottawa. xiii + 143 pp.

ENR (Environmental and Natural Resources, Government of Northwest Territories). 2018. Wildlife Management and Monitoring Plan Guidelines 2: Content Requirements.

GNWT. Wildlife Act. S.N.W.T. 2013, c.30. Amended October 31, 2017.

Tłı̨chǫ Government, 2013. Tłı̨chǫ Land Use Plan. Available at https://research.tlicho.ca/sites/default/files/105-landuseplan_final_version2_0_1_0.pdf. Accessed August 2021.

APPENDIX A

SNARE WINTER ROAD OPERATING RULES AND ROAD USER DECLARATION

SNARE WINTER ROAD OPERATING RULES

1. Twenty-four hour notification to the WR Maintenance Supervisor is required for all loads entering Snare Winter Road.
2. GNWT North Slave winter roads are controlled on the “LADD 1” radio channel. Vehicles must call in location using KM markers and direction when travelling on the North Slave winter roads to get to the Snare WR junction.
3. Snare winter and site roads are controlled on the NTPC “Snare” radio channel. All vehicles must call in location using KM markers and direction when travelling on the Snare winter and site roads.
4. Loaded trucks MAXIMUM speed is 40KM/hour on portages
5. Loaded trucks MAXIMUM speed is 25km/hour on lakes/ice bridges
6. Pick-up trucks MAXIMUM speed is 60KM/hour on portages
7. Pick-up trucks MAXIMUM speed is 35KM/hour on lakes/ice bridges
8. When two loaded trucks meet on a lake, travelling in opposite directions, both must slow to 15 kph when passing.
9. Trucks must slow to 10 kph while passing other loaded trucks stopped on lakes.
10. Maximum speed for construction equipment will be 40 kph while clearing snow
11. Loaded trucks must maintain minimum 350m separation between each vehicle
12. All axle weights must be communicated to Field Supervisor twelve hours prior to loads arriving at site. Axle weights will be verified by government scale tickets.
13. Stopping a loaded truck on a lake in prohibited unless authorized by unless unavoidable and authorized by NTPC.
14. It will be the responsibility of hauling companies to remove any disabled or otherwise stranded trucks and/or equipment, operating under their authority, from the WR or WR access area or camp as soon as possible
15. White-out conditions may occur on the Snare WR; in such conditions turn on emergency flashers, beacon lights, stop driving, stay in your vehicle and wait for white-out condition to subside before proceeding.
16. Vehicles should have Emergency kit, First Aid kit, cold weather clothing and fire extinguisher on board.
17. Drivers should have good winter driving experience.
18. The possession of drugs, alcohol or firearms on the WR and at all camps is strictly prohibited as per NTPC standard policy.
19. Vehicles should have full tank of fuel, well serviced and have good winter tires.
20. Directions of Winter Road Maintenance Supervisor and Snare Operator must be followed.

21. If drivers see traffic signs or markers damaged or missing please notify Winter Road Maintenance Supervisor.
22. If drivers see any abnormality with winter road condition wet or dry cracks in ice, depressed ice, heaving/hanging ice, trees down or interfering with safe passage on winter road; please notify Winter Road Maintenance Supervisor and Snare Operator.
23. All drivers operating on the WR shall report any spill, property damage/injury accident or other dangerous/emergency situation to the Winter Road Maintenance Supervisor.
24. If a spill occurs on the WR the Pilot Truck operator will implement the Taltson WR Spill Response protocols presented in Appendix J of the Taltson Facility Spill Contingency Plan
25. As per the Snare WR Wildlife Management and Monitoring Plan there is strict no chase policy for any wildlife encounter along the WR and all traffic must yield to any wildlife till it is clear of the WR. Feeding wildlife while operating/travelling on or near the WR is strictly prohibited.
26. All drivers must report concerns or activity involving wildlife including but not limited to abandoned carcasses, injured wildlife and incidents of wildlife harassment as per the Snare WR Wildlife Management and Monitoring Plan.
27. The Snare Winter Road Rules will be applied in addition to the existing Health & Safety Management System and NTPC standard policies

I have read, fully understand and agree to comply with the WR rules.

Driver's or Road Contractor Employee's Name (PRINT): _____

Driver's or Road Contractor Employee's Signature: _____

Driver's or Road Contractor Employee's Company _____

Note: A copy of this declaration, duly signed by the trucking company or Road Contractor's representative who conducted the orientation, and a copy of the competency quiz must be filed at the Trucking or Road Contractor Company's office upon completion of the orientation and prior to a driver/contractor being dispatched for their first WR trip. As a Driver on the WR, you may be required to provide a second signed copy of this document at Dispatch for the purpose of authorizing and identifying your assigned Road Number (if applicable).

APPENDIX C

QUARRY MAPS

Legend

- Snare Quarry, Borrow, Storage and/or Pit Locations
- All-Season Road
- Winter Road
- Proposed Quarry Area

0 20 40 metres
(At original document size of 8.5x11)
1:2,000

Notes

1. Coordinate System: NAD 1983 UTM Zone 11N
2. Data Sources: Base features produced under license with the Government of Saskatchewan and the Government of Canada.
3. Background: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

NORTHWEST TERRITORIES POWER CORPORATION
Empowering Communities

Project Location: Snare River, Northwest Territories

PROJECT NO: 111477043
Prepared by KL on 2021-11-10
TR by JH on 2021-11-10

Title

SNARE HYDROELECTRIC SYSTEM
Snare Rapids Silt Pit

Quarry Detail Map

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Legend

- Snare Quarry, Borrow, Storage and/or Pit Locations
- All-Season Road
- Winter Road
- Proposed Quarry Area

0 25 50 metres
(At original document size of 8.5x11)
1:2,500

Notes

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Empowering Communities

Project Location: Snare River, Northwest Territories

PROJECT NO: 111477043
Prepared by KL on 2021-11-10
TR by JH on 2021-11-10

Title

SNARE HYDROELECTRIC SYSTEM
Snare Falls Clay Pit

Quarry Detail Map

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Legend

- Snare Quarry, Borrow, Storage and/or Pit Locations
- All-Season Road
- Winter Road
- Proposed Quarry Area

0 10 20 metres
(At original document size of 8.5x11)
1:1,000

Notes

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Empowering Communities

Project Location: Snare River, Northwest Territories

PROJECT NO: 111477043
Prepared by KL on 2021-11-10
TR by JH on 2021-11-10

Title

SNARE HYDROELECTRIC SYSTEM
Snare Airstrip Sand Pit

Quarry Detail Map

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Legend

- Snare Quarry, Borrow, Storage and/or Pit Locations
- All-Season Road
- Winter Road
- Proposed Quarry Area

0 20 40 metres
(At original document size of 8.5x11)
1:2,000

Notes

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NORTHWEST TERRITORIES POWER CORPORATION
Empowering Communities

Project Location: Snare River, Northwest Territories

PROJECT NO: 111477043
Prepared by KL on 2021-11-10
TR by JH on 2021-11-10

Title

SNARE HYDROELECTRIC SYSTEM
Snare Airstrip Junction Pit

Quarry Detail Map

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Legend

- Snare Quarry, Borrow, Storage and/or Pit Locations
- All-Season Road
- Winter Road
- Proposed Quarry Area

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(At original document size of 8.5x11)
1:2,000

Notes

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3. Background: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

NORTHWEST TERRITORIES POWER CORPORATION
Empowering Communities

Project Location: Snare River, Northwest Territories

PROJECT NO: 111477043
Prepared by KL on 2021-11-10
TR by JH on 2021-11-10

Title

SNARE HYDROELECTRIC SYSTEM
Snare Cascades Stockpile

Quarry Detail Map

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Legend

- Snare Quarry, Borrow, Storage and/or Pit Locations
- All-Season Road
- Winter Road
- Proposed Quarry Area

0 10 20
metres
(At original document size of 8.5x11)
1:1,000

Notes

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2. Data Sources: Base features produced under license with the Government of Saskatchewan and the Government of Canada.
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NORTHWEST TERRITORIES POWER CORPORATION
Empowering Communities

Project Location: Snare River, Northwest Territories

PROJECT NO: 111477043
Prepared by KL on 2021-11-10
TR by JH on 2021-11-10

Title

SNARE HYDROELECTRIC SYSTEM
KM 28 Gravel Stockpile

Quarry Detail Map

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Legend

- Snare Quarry, Borrow, Storage and/or Pit Locations
- All-Season Road
- Winter Road
- Proposed Quarry Area

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metres
(At original document size of 8.5x11)
1:1,500

Notes

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NORTHWEST TERRITORIES POWER CORPORATION
Empowering Communities

Project Location: Snare River, Northwest Territories

PROJECT NO: 111477043
Prepared by KL on 2021-11-10
TR by JH on 2021-11-10

Title

SNARE HYDROELECTRIC SYSTEM
Strutt Lake Aggregate Pit 1

Quarry Detail Map

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Legend

- Snare Quarry, Borrow, Storage and/or Pit Locations
- All-Season Road
- Winter Road
- Proposed Quarry Area

0 30 60 metres
(At original document size of 8.5x11)
1:3,500

Notes

1. Coordinate System: NAD 1983 UTM Zone 11N
2. Data Sources: Base features produced under license with the Government of Saskatchewan and the Government of Canada.
3. Background: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

NORTHWEST TERRITORIES POWER CORPORATION
Empowering Communities

Project Location: Snare River, Northwest Territories

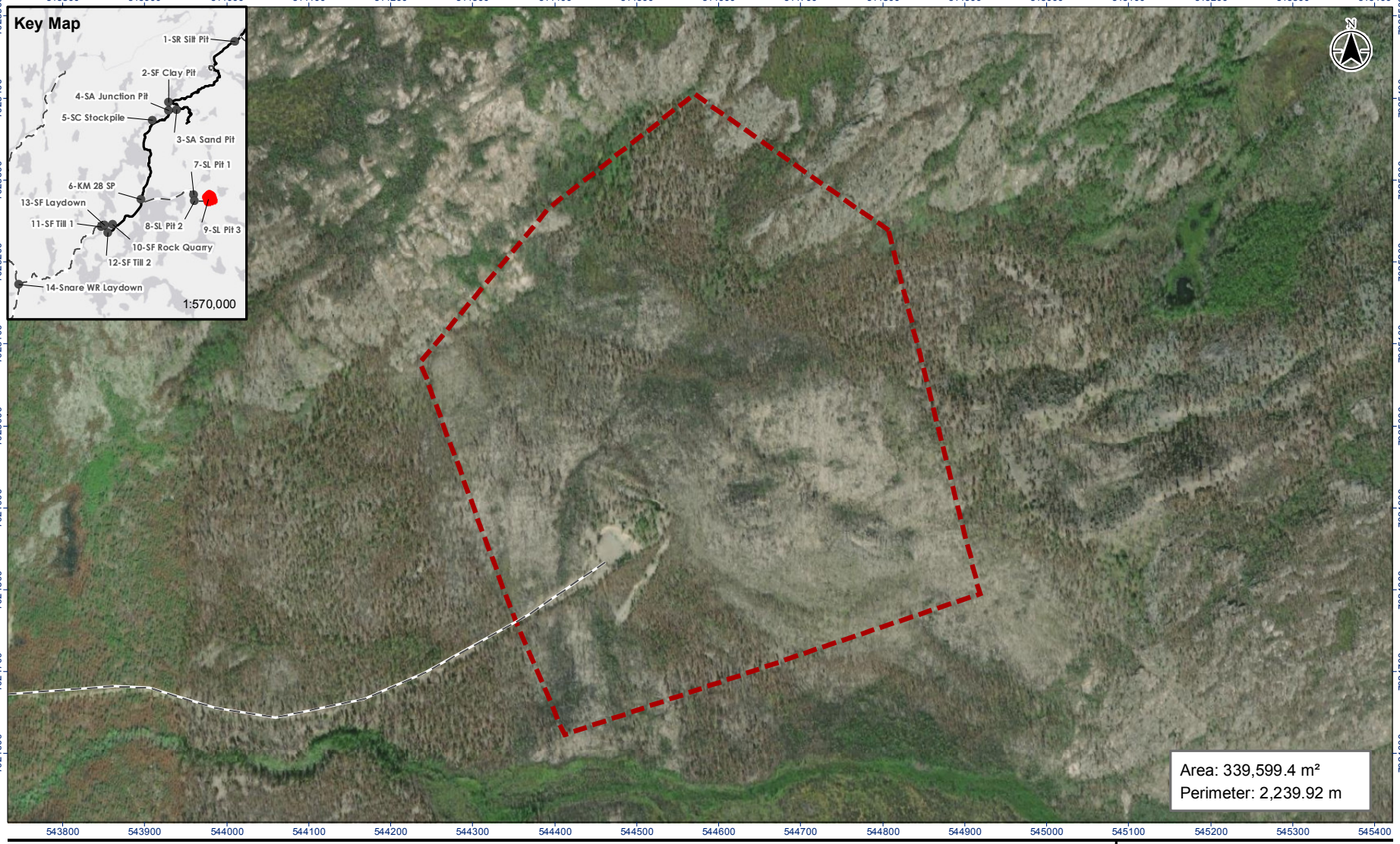
PROJECT NO: 111477043
Prepared by KL on 2021-11-10
TR by JH on 2021-11-10

Title

SNARE HYDROELECTRIC SYSTEM
Strutt Lake Aggregate Pit 2

Quarry Detail Map

G:\active\clients\NTPC\111477043_NTPC\figures\111477043_006_REVG_Snare_QuarryMaps.mxd Revised: 2021-11-10 By: kleason



Legend

- Snare Quarry, Borrow, Storage and/or Pit Locations
- All-Season Road
- Winter Road
- Proposed Quarry Area

0 75 150 metres
(At original document size of 8.5x11)
1:7,000

Notes

1. Coordinate System: NAD 1983 UTM Zone 11N
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NORTHWEST TERRITORIES POWER CORPORATION
Empowering Communities

Project Location: Snare River, Northwest Territories

PROJECT NO: 111477043
Prepared by KL on 2021-11-10
TR by JH on 2021-11-10

Title

SNARE HYDROELECTRIC SYSTEM
Strutt Lake Aggregate Pit 3

Quarry Detail Map

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Legend

- Snare Quarry, Borrow, Storage and/or Pit Locations
- All-Season Road
- Winter Road
- Proposed Quarry Area

0 30 60 metres
(At original document size of 8.5x11)
1:3,000

Notes

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Empowering Communities

Project Location: Snare River, Northwest Territories

PROJECT NO: 111477043
Prepared by KL on 2021-11-10
TR by JH on 2021-11-10

Title

SNARE HYDROELECTRIC SYSTEM
Snare Forks Rock Quarry

Quarry Detail Map

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Legend

- Snare Quarry, Borrow, Storage and/or Pit Locations
- All-Season Road
- Winter Road
- Proposed Quarry Area

0 30 60 metres
(At original document size of 8.5x11)
1:3,000

Notes

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Title

SNARE HYDROELECTRIC SYSTEM
Snare Forks Till Pit 1

Quarry Detail Map

G:\active\clients\NTPC\111477043_NTPC\figures\111477043_006_REVG_Snare_QuarryMaps.mxd Revised: 2021-11-10 By: kleason

Legend

- Snare Quarry, Borrow, Storage and/or Pit Locations
- All-Season Road
- Winter Road
- Proposed Quarry Area

0 30 60 metres
(At original document size of 8.5x11)
1:3,000

Notes

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Title

SNARE HYDROELECTRIC SYSTEM
Snare Forks Till Pit 2

Quarry Detail Map

G:\active\clients\NTPC\111477043_NTPC\figures\111477043_006_REVG_Snare_QuarryMaps.mxd Revised: 2021-11-10 By: kleason

Legend

- Snare Quarry, Borrow, Storage and/or Pit Locations
- All-Season Road
- Winter Road
- Proposed Quarry Area

0 20 40 metres
(At original document size of 8.5x11)
1:2,000

Notes

1. Coordinate System: NAD 1983 UTM Zone 11N
2. Data Sources: Base features produced under license with the Government of Saskatchewan and the Government of Canada.
3. Background: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

NORTHWEST TERRITORIES POWER CORPORATION
Empowering Communities

Project Location: Snare River, Northwest Territories

PROJECT NO: 111477043
Prepared by KL on 2021-11-10
TR by JH on 2021-11-10

Title

SNARE HYDROELECTRIC SYSTEM
Snare Forks Laydown

Quarry Detail Map

G:\active\clients\NTPC\111477043_NTPC\figures\111477043_006_REVG_Snare_QuarryMaps.mxd Revised: 2021-11-10 By: kleason

Legend

- Snare Quarry, Borrow, Storage and/or Pit Locations
- All-Season Road
- Winter Road
- Proposed Quarry Area

0 20 40 metres
(At original document size of 8.5x11)
1:2,000

Notes

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TR by JH on 2021-11-10

Title

SNARE HYDROELECTRIC SYSTEM
Snare Winter Road Laydown

Quarry Detail Map

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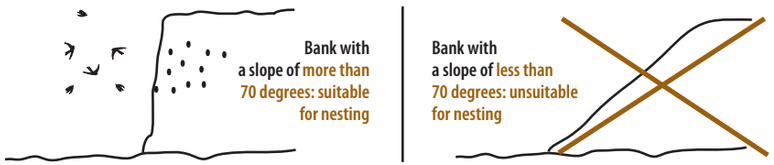
APPENDIX D

BANK SWALLOW INFORMATION SHEET

Did you know?

The Bank Swallow is a declining migratory bird species that has lost 98% of its Canadian population over the last 40 years.

This insectivorous bird is particularly drawn to sandpits, quarries, stock piles of sand and soil, and sandy banks along water bodies and roads. **Bank Swallows generally dig their burrows in near-vertical banks (slopes of at least 70 degrees) that are more than 2 metres high.** In Quebec, Bank Swallows typically use their nesting sites from mid-April to late August. This is the sensitive period during which the risk of harming the birds is especially high. The absence of the birds in August is a good indicator that the breeding season is over.



The best way to minimize the possibility of contravening the *Migratory Birds Convention Act, 1994* and its regulations is to fully understand the impact that your activities could have on migratory birds and their nests and eggs and to take reasonable precautions and appropriate avoidance measures. In fact, under the Act and its regulations, it is an offence for anyone to kill, hunt, capture, injure or harass a migratory bird or to damage, destroy, remove or disturb its nest or eggs without a permit.

The sand and gravel industry can play a major role in the conservation of Bank Swallows by adopting operating practices that do not harm the species.

www.ec.gc.ca/paom-itmb

Cat. No.: CW66-522/2015E-PDF
ISBN 978-1-100-25722-8

Aussi disponible en français

What you can do

Before the breeding season
(generally before mid-April)

- Prevent Bank Swallows from nesting in areas where operations will be carried out during the breeding season by contouring your piles to have a slope of less than 70 degrees and by creating suitable nesting habitat in inactive areas with vertical faces of at least 70 degrees.
- Install scaring devices to deter Bank Swallows from establishing colonies in active areas.

During the breeding season
(generally from mid-April to late August)

- Avoid intense activity near the colony. You can prevent disturbance by marking off a protective buffer zone around the colony and notifying all employees of its existence.
- Generally speaking, there is a particularly high risk of disturbing nesting when noisy activities or vibrations occur within 50 metres of the bird colony. This protective radius is only a rough guideline and must be adjusted after an assessment of the risk factors. In some cases, where operating activities are intense, a larger protective radius may be needed to minimize the risk of disturbance.
- Spend a few minutes flattening vertical faces in active areas at the end of the day to prevent Bank Swallows from digging burrows in them overnight or on weekends.
- Stop excavation work if Bank Swallows colonize a bank in an active area. Activities cannot resume until the birds leave at the end of the breeding period.
- Do not use scaring devices once the colony is established as they may interfere with ongoing Bank Swallow breeding activities.

After the breeding season
(generally after late August)

- If a nesting site needs to be excavated after the birds leave, compensate by providing an alternate site that can support nesting in the following year. To be suitable for nesting, the bank must have a slope of at least 70 degrees.

Notify your employees of the restrictions and techniques that can be implemented to prevent detrimental effects on the species.

Thank you for participating in the conservation of Bank Swallows.

Environnement Canada Environment Canada

L'HIRONDELLE DE RIVAGE

(Riparia riparia)

dans les sablières et les gravières

Canada

Le saviez-vous ?

L'Hirondelle de rivage est un oiseau migrateur en déclin dont la population canadienne a chuté de 98 % au cours des 40 dernières années.

Cet oiseau insectivore est très attiré par les sablières et les gravières, les amas de sable et de terre, et les talus sablonneux en bordure des plans d'eau et des chemins. **En général, les Hirondelles de rivage creusent leur terrier dans des fronts de talus presque verticaux (pente d'au moins 70 degrés) à plus de 2 m de hauteur**. Au Québec, les Hirondelles de rivage utilisent généralement les sites de nidification de la mi-avril à la fin d'août. Il s'agit de la période sensible durant laquelle le risque de nuire aux oiseaux est particulièrement élevé. L'absence des oiseaux en août est un bon indicateur de la fin de la nidification.

La meilleure approche afin de réduire au minimum la possibilité d'enfreindre la *Loi de 1994 sur la convention concernant les oiseaux migrateurs* et ses règlements consiste à bien comprendre le risque d'incidence potentiel de vos activités sur les oiseaux migrateurs, leurs nids et leurs œufs, et à prendre des précautions raisonnables et des mesures d'évitement appropriées. En effet, selon la Loi et ses règlements, quiconque tue, chasse, capture, blesse ou harcèle un oiseau migrateur ou endommage, détruit, enlève ou dérange leurs nids ou leurs œufs sans permis commet un délit.

L'industrie des sablières et des gravières peut jouer un rôle important dans la conservation de l'Hirondelle de rivage en adoptant des pratiques d'exploitation qui ne nuisent pas à l'espèce.

www.ec.gc.ca/paom-itmb

N° de cat. : CW66-522/2015F-PDF
ISBN 978-0-660-23303-1

Also available in English

Ce que vous pouvez faire

Avant la période de nidification
(en général avant la mi-avril)

- Évitez que des Hirondelles de rivage nichent dans les zones qui seront exploitées durant la période de nidification en profilant vos talus avec une pente inférieure à 70 degrés, et en créant des zones propices à la nidification dans des zones non exploitées, avec des talus dont la pente est d'au moins 70 degrés.
- Installez des dispositifs d'effarouchement pour dissuader les Hirondelles de rivage d'établir une colonie dans les zones exploitées.

Pendant la période de nidification
(en général de la mi-avril à la fin d'août)

- Évitez les activités intenses à proximité de la colonie. Vous pouvez empêcher le dérangement en délimitant une zone de protection autour de la colonie et en informant tous les employés de l'existence de cette zone.
- En général, le risque de déranger la nidification est particulièrement élevé si des activités bruyantes ou des vibrations ont lieu à moins de 50 m de la colonie d'oiseaux. Cette distance de protection ne constitue qu'un ordre de grandeur et doit être ajustée après évaluation des facteurs de risque. Dans certains cas, lorsque les activités d'exploitation sont intenses, une plus grande distance de protection peut être nécessaire afin de réduire au minimum le risque de dérangement.
- Prendre quelques minutes à la fin de la journée pour supprimer les talus verticaux afin d'éviter que des Hirondelles de rivage ne commencent à creuser des nids durant la nuit ou durant les fins de semaine.
- Cessez toute activité d'excavation si des Hirondelles de rivage colonisent un talus dans une zone exploitée, et ce jusqu'au départ des hirondelles à la fin de la période de nidification.
- N'utilisez pas de dispositifs d'effarouchement une fois la colonie établie, tant et aussi longtemps que cela peut interférer avec les activités courantes de nidification des Hirondelles de rivage.

Après la période de nidification
(en général après la fin d'août)

- Si un site de nidification doit être exploité après le départ des oiseaux, en guise de compensation, voyez à fournir un site de remplacement pouvant soutenir la nidification l'année suivante. Pour être propice à la nidification, le talus doit avoir une pente d'au moins 70 degrés.

Informez vos employés des interdictions et des techniques qui peuvent être mises en œuvre pour éviter les effets néfastes sur l'espèce.

Merci de participer à la conservation de l'Hirondelle de rivage.

Environment Canada Environnement Canada

BANK SWALLOW

(Riparia riparia)

in sandpits and quarries

Canada

APPENDIX E

STANDARD OPERATING PROCEDURES FOR VEGETATION REMOVAL

NORTHWEST TERRITORIES POWER CORPORATION
Empowering Communities

October, 2020

Snare Hydro Vegetation Removal Standard Operating Procedure

This Standard Operating Procedure (SOP) applies to all project personnel, and contractors. Its purpose is to minimize the impacts to vegetation and wildlife habitat in areas where earthworks and site clearing may take place at the Snare Hydro Facilities, including, but not limited to the winter roads, quarry and borrow sites, temporary camp and fuel storage areas, and major construction projects at Snare Hydro.. **This SOP provides the following mitigation measures to be used during all vegetation removal, site clearing and earthwork activities at the Snare Hydro Facilities**:

- This Standard Operating Procedure is to be used in conjunction with the mitigation measures as outlined in the *Snare Hydroelectric Facility Vegetation and Wildlife Management Plan*, the *Snare Winter Roads and Quarries – Operations & Maintenance and Reclatmenation Plan,* and the *Snare Hydro Facility Erosion and Sediment Control Plan*
- Locations for temporary clearings for laydowns and other temporary facilities will be located on previously impacted areas as much as possible.
- Before major vegetation clearing and/or quarrying projects are completed a wildlife survey must be completed by an environmental professional to identify wildlife features and submitted to ENR and the WLWB for approval.
- Prior to any clearing/grubbing or stripping, limits shall be marked in the field using fencing, stakes, or flagging to ensure vegetation in adjoining areas are not disturbed, and to mitigate against over clearing. 30m Buffer zones will be implemented around sensitive areas such as wetlands and water courses where possible.
- Where possible, vegetation should be removed by using cutting methods rather than clearing methods, avoiding ground disturbance, and leaving roots intact to encourage natural re-growth following construction activities.
- During winter road construction, vehicle pullouts are to be constructed in non-vegetated locations along the alignment, and vegetation clearing will be minimized to brushing and danger tree removal only, unless absolutely necessary to do so.
- When removing vegetation there are few key principles that must be followed to meet GNWT requirements
    - **Vegetation must be kept separate from overburden**
        - **Vegetation should be piled and disposed using approved techniques below**
        - **Overburden should not be disturbed when possible. If quarrying or completing earthworks overburden should be stored in a designated pile for reclamation when work is complete**
    - **Edge of clearing should be debris free**
        - **Vegetation should not be pushed and piled around edges of clearing**

Example of Proper Vegetation Removal with minimal removal of overburden, clean vegetation perimeter with no debris and overburden stockpiled for reclamation once scope of work is completed.

NORTHWEST TERRITORIES POWER CORPORATION
Empowering Communities

October, 2020

Snare Hydro Vegetation Removal Standard Operating Procedure

- Approved techniques for disposing of vegetation as per meet GNWT requirements include:
    - For minor spot clearing vegetation can be placed particular into forest edge and allowed to naturally decompose. Vegetation should not be piled and evenly spaced to avoid fuel loading for fire.
    - Removed vegetation can be piled and burned.
        - Piles should not include any soil
        - Piles should only be burned in the winter months when no risk of forest fire is present
    - When possible merchantable timber (=>5" diameter) that is removed will be stacked for salvage/use.
    - **For large clearing work chipping and/or mulching is the preferred method of vegetation disposal as this is the safest and most efficient way to dispose of large amounts of vegetation at Snare**

Example of vegetation removal and chipping along powerline ROW (http://yukontreeservices.ca/photo-gallery/chipping-hydro-line-right-of-way-mt-mac-whitehorse-yt/).

- Grading and major earthworks is guided by the *Snare Winter Roads and Quarries – Operations & Maintenance and Reclatmenation Plan* but a few key principles that apply to vegetation clearing with equipment are:
    - All slopes from any excavations will be graded to ensure stability to avoid failure and erosion.
        - **Slopes must be less than 70 degrees to prevent nesting.**
    - If drainage issues occur (ponding water or washout areas) re-grading will be completed to ensure proper drainage is present to minimize erosion.