Via Email

MAY 14 2022

Mr. Mason Mantla
Chair
Wek'èezhìı Land and Water Board
1-4905 48 STREET
YELLOWKNIFE NT X1A 3S3

Dear Mr. Mantla:

Submission of the Water Licence Annual Report 2021 for the Tłı̨chǫ All-Season Road (Tłı̨chǫ Highway)

The Government of the Northwest Territories' Department of Infrastructure is pleased to submit the attached Type A Water Licence (WL) Annual Report 2021 for WL W2020L8-0001, which was issued by the Wek'èezhìı Land and Water Board on November 19, 2020. The WL Annual Report 2021 was prepared in compliance with Part B, Condition 14 and Schedule 1, Part B, Condition 1 of the WL. This report includes information on construction and related activities from January 1, 2021 to November 20, 2021.

In accordance with Part B, Condition 23 and Schedule 1, Part B, Condition 1, Item P of the Water Licence W2020L8-0001, summaries of activities used as sources of information for Traditional Knowledge have been included in the Annual Report.

Should you have any questions or concerns please contact me at (867) 767-9086 ext. 31117 or by email at Ziaur_Rahman@gov.nt.ca at your earliest convenience.

Sincerely,

Ziaur Rahman
Manager, Surface Design and Construction
Department of Infrastructure

Attachment

c. Ms. Laura Duncan, Tłı̨chǫ Executive Officer
Tłı̨chǫ Government

Document Name: 2021 Annual Environmental Report	0	56
Reporting Period: January 1st to November 20th ,2021	Rev.	Total Pages

Dave Green – Sr. Project Environmental Manager

Signature : _____ Date : 2022-05-13

Table 1-1: Document Revision History

REVISION	REASON FOR ISSUE	REVISION DATE	DESCRIPTION OF REVISION
0	IFR	2022-04-29	Issued for review

Table 1-2: Document Approval

NAME		SIGNATURE	DATE
Prepared by:	Dave Green, R.T.Bio, R.B.Tech		2022-05-13
Reviewed by: **Environmental Manager**	Caroline Walmsley, R.B.Tech		2022-05-13
Project Manager Approval **Approved by:**	Bruno Pigeon		2022-05-13

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GLOSSARY AND ACRONYMS

ASR	All Season Road
CDC	Career Development Coordinator
CCL	Community Coordinator Lead
CWG	Community Working Group
DFO	Department of Fisheries and Ocean Canada
EMPs	Environmental Management Plans
GNWT	Government of Northwest Territories
GNWT	ENR – Government of Northwest Territories – Department of Environmental Natural Resources
GNWT	INF Government of Northwest Territories – Department of Infrastructure
NSMA	North Slave Metis Alliance
RoW	Right-of-way
SAR	Species at Risk
SCP	Spill Contingency Plan
TASR	Tłı̨chǫ All Season Road
TG	Tłı̨chǫ Government
WLWB	Wek'èezhìı Land and Water Board
WMP	Water Monitoring Plan
WMMP	Wildlife Management and Monitoring Plan
WRRB	Wek'èezhìı Renewable Resource Board
YKDFN	Yellowknives Dene First Nation

1. INTRODUCTION

Peter Kiewit Sons (ULC) was retained by the Government of the Northwest Territories (GNWT) to construct the Tłı̨chǫ All Season Road (TASR), also known as the Tłı̨chǫ Highway, which is a 97km long, two-lane gravel road connecting KM 196 along Highway 3 near Behchokǫ̀ to the community government boundary of Whatì in the Northwest Territories (see Figure 1-1).

To satisfy reporting requirements outlined in Water License W2020L8-0001 issued October 5, 2020 (replacing W2016L8-0001) and Water License W2021L9-0001, Schedule 1, Part B, Condition 14 an annual report will include, but not be limited to:

(i) Measuring and Reporting on Water and Waste

(ii) Management Plan Activities

(iii) Spills and Unauthorized Discharges

(iv) Other Reporting Requirements

(v) Wildlife Management and Monitoring

Additionally, in compliance with the Schedule 19 – Environmental Obligations Section 2.4 Environmental Reporting in the TASR Project Agreement, The Project Co shall prepare and submit to the Authority's Representative:

1) Annual environmental reports, which shall summarize environmental conditions and issues with respect to the entire Project throughout the Construction Period and the Operating Period submitted to the Authority no sooner than one month and no later than two weeks prior to the next scheduled Tłı̨chǫ Corridor Working Group meeting.

It should be noted that the installation of the fiber optic line conduit from the Tłı̨chǫ Highway Junction with Highway 3 northward to the Community of Whatì was undertaken concurrently with the completion of the Tłı̨chǫ All Season Road Project under the Type A Land Use Permit W2021X000. The Wildlife Management and Monitoring Plan accepted as a part of the operating conditions of the Land Use Permit acknowledges that the annual reporting requirements outlined in the Water License W2020L8-0001 also satisfies the reporting requirements under Land Use Permit W2021X0001.

This report summarizes the above noted environmental requirements/conditions as well as elements of the Wildlife Management and Monitoring Plan that were conducted during the respect to the Construction Period of the TASR Project and Fiber Optic Installation Project from January 1st to November 20th, 2021.

REV.	DATE	DESCRIPTION / REVISION	AUTH. BY
0	2018.06.25	DRAFT	SJT

Northwest Territories Transportation

NORTH STAR INFRASTRUCTURE

TLICHO ALL SEASON ROAD (TASR)

KEY PLAN

DATE	SCALE (HALF SIZE)	DRAWING No.	SHEET
2019.07.08	N/A	H355788-20-260-SEG0-0101	1 OF 1

DOC: H355788-60-260-SEG0-0101 KEY-101

2. ENVIRONMENTAL REPORTING

In addition to the reporting requirements for all applicable Permits and Licenses, Section 2.4 of Schedule 19 of the Project Agreement also provides a list of reporting requirements that are to be submitted to the Authority's Representative including:

1) Weekly environmental monitoring reports during the Construction Period, which shall include at a minimum, the following information:
    a) Project area
    b) name(s) of environmental monitor(s)
    c) period covered by report
    d) date report submitted
    e) overall weather conditions
    f) report recipient(s)
    g) contractor(s) undertaking work
    h) description of photos and status of Construction by area, including within environmentally sensitive areas (photos will be accompanied by a plan view sketch showing angle and location of photos)
    i) environmental meetings and key issues discussed
    j) key communications with Environmental Authorities, including but not limited to all charges, orders, investigations or notices of violation or non-compliance issued against the Project Co or relating to the performance of the Project Work or Project Site under any Environmental Laws
    k) status of current sediment/erosion and drainage management plans
    l) description of outstanding environmental issues and/or non-compliance and corrective actions required with associated expected timelines; and
    m) water sampling data completed during the reporting period, including but not limited to results of in-situ turbidity, dissolved oxygen and other water quality parameters as required by Environmental Authorities
2) monthly environmental reports in respect of any months during the Term in which Construction is undertaken, which environmental reports shall:
    a) outline the Design and Construction undertaken as part of the Project Work during the period, as well as future activities, key environmental issues, monitoring activities, mitigation measures (successes and failures), resolutions to environmental impacts, and how Project Co intends to comply with all applicable Permits; and
    b) include in an appendix thereto all relevant Project meeting notes, including action items, environmental sub-consultant reports, environmental incident reports, specific mitigation plans and sediment drainage plans for that period.

2.1. WEEKLY REPORTS

Throughout the reporting period for the Schedule 19 Annual Report and Water License #W2020L8-0001 Annual Reporting period (January 1st to November 20, 2021), a total of 46 weekly reports have been prepared and submitted as required in the Project Agreement. Copies of the reports have been circulated to all required parties and remain archived on numerous project file sharing sites and servers. Each of these reports have been made available for public consumption after being posted to the Wek'èezhìi Land and Water Board Public Registry (WLWB) and can be found at the following link.
https://wlwb.ca/registry/W2016E0004

2.2. MONTHLY REPORTS

Throughout the reporting period for the Schedule 19 Annual Report and Water License #W2020L8-0001 Annual Reporting period (January 1st to November 20th, 2021), a total of 11 monthly reports have been prepared and submitted as required in the Project Agreement. Copies of the reports have been circulated to all required parties and remain archived on numerous project file sharing sites and servers.

3. MANAGEMENT PLAN AND ACTIVITIES

3.1. ENGAGEMENT

3.1.1. SUMMARY OF ENGAGEMENT ACTIVITIES

Throughout the reporting period, INF and NSI have conducted engagement on a variety of subjects with affected parties in accordance with the approved Engagement Plan. Engagement efforts have been centered around informing affected parties of construction activities, the review and approval of management plans, collaboration on various plans as required by the Report of Environmental Assessment Measures, and the review of proposed changes to the existing permits. Engagement methods have included written notification, telephone calls, face-to-face meetings, and workshops. Full details of the engagement undertaken can be found in Engagement Record found on the Wek'èezhìi Land and Water Boards website.

Face-to-face or virtual meetings and workshops that have taken place include:

- Due to COVID-19 restrictions, the TASR Corridor Working Group Meeting was held virtually on June 16, 2021, Representatives from organizations, departments and groups that attended the meeting included the YKDFN, NSMA, CGW, CGB, TG, WLWB, WRRB, GNWT-ENR, GNWT-FIN, ECE, DFO ECCC, and the GNWT-INF.
- While outside the construction period for the TASR, a second virtual meeting of the Corridor Working Group was held on December 15, 2021 due to the continued COVID-19 restrictions. Parties that attended included the YKDFN, NSMA, CGW, CGB, TG, WLWB, WRRB, GNWT-ENR, GNWT-INF, GNWT-Lands, PWNHC, DFO, and the ECCC.
- GNWT-ENR Bison Capture Crews mobilized from the TASR between March 8 and March 11, 2021
- On May 27, 2021, representatives from the WRRB toured the TASR project and were generally pleased with the progress made and had no outstanding questions or concerns at the time of the tour or after. Photographs taken and information gathered was to be used to give the full Board a virtual tour of the site.
- Two officers from the Department of Fisheries and Oceans toured the TASR on June 2, 2021
- On June 11, 2021, four representatives from the Department of Fisheries and Oceans toured the TASR and were pleased with the conditions of all the watercrossings.
- On June 23, 2021, two members from the Tłı̨chǫ Government Wildlife Committee toured the TASR
- On June 24, 2021. Four citizens from the Community of Behchokǫ attended an Introduction to the Construction Industry training session.
- Two GNWT-ENR Officers toured the TASR project on July 13, 2021
- On behalf of the Tłı̨chǫ Government, The Firelight Group conducted vegetation transect surveys between August 23 to August 27, 2021.
- GNWT-ENR conducted a bear trapping and radio collaring program along the TASR RoW between September 8 to September 11, 2022.

Photo 1. Diane Archie, Minister of Infrastructure taken at the highway opening ceremony

4. MANAGEMENT PLAN UPDATES AND REVISIONS

During the 2021 construction period updates were required to two (2) of the plans guiding the TASR construction project. The list below details the primary and pertinent management plans for the TASR, and revisions completed and approved in 2021.

- **Engagement Plan** - updates/revisions not required to Revision 1.2 in 2021.
- **Erosion and Sediment Control Plan** – updates/revisions not required to Revision 1.2 in 2021.
- **Waste Management Plan** – Version 1.3 remained unchanged for 2021 but the authorization from the City of Yellowknife to allow for the continuation of solid waste and wastewater to their facilities was extended to December 31, 2021.
- **Spill Contingency Plan** – updates/revisions not required to Revision 1.0 in 2020
- **Water Monitoring Plan** – updates/revisions not required to Revision 1.2 used in concert with the Scientific Research License #16852.
- **Quarry Operations Plan** – Revision 5.0 update to include Quarry Prospect 80 and was approved on July 3, 2021.
- **Permafrost Management Plan** – updates/revisions not required to Revision 2.0 in 2021.
- **Fish and Fish Habitat Management Plan** – updates/revisions not required to Revision 1.1 in 2021
- **Wildlife Management and Monitoring Plan** – Version 5.2 was submitted to the WLWB and ENR on January 28, 2022, respectively following approval of version 5.1 by WRRB on December 9, 2021. Version 5.2 was approved by WLWB on February 9, 2022, while approval was given by ENR on March 21, 2022.
- **Archaeological Chance Find Protocol** - updates/revisions not required to Revision 1.0 in 2021
- **Closure and Reclamation Plan** - updates/revisions not required in 2021

4.1. WMMP UPDATES

For the reporting period and in compliance with EA Measure 10-2, Part 3, the WMMP was revised and updated in collaboration with ENR and submitted to the WLWB and ENR for public review. A 30-day public review period was undertaken, with submissions made to the WLWB's Online Review System by Environment and Climate Change Canada, North Slave Metis Alliance, and WRRB. In consultation with ENR staff, INF developed responses to comments received, revised the WMMP to address the comments.

The WMMP version 5.1 was submitted to the WRRB on November 6, 2021 for review and approval. Following the approval of version 5.1 by the WRRB on December 9, 2021, it was submitted to the WLWB and ENR, respectively for their review and approval. The WLWB approved the version 5.2 on February 09, 2022 while ENR approved its version on March 21, 2022.

4.2. WASTE MANAGEMENT PLAN

The Waste Management Plan (Version 1.3) remained unchanged during the reporting period. Authorization from the City of Yellowknife to continue receiving waste at the Yellowknife Solid Waste Facility was extended until December 31, 2021.

4.3. QUARRY OPERATIONS PLAN

During the reporting period, the Quarry Operations Plan Version 4.0 was updated to Version 5.0. This update was prepared to incorporate Quarry Prospect 80 and included an archaeological assessment overview, and geochemical analysis for Quarry Prospect 80. The project contact information was also updated at this time. As required by WLWB, a Type B Water License (W2021L8-0001) was also acquired to support the development of Quarry Prospect 80.

4.4. PERMAFROST MANAGEMENT PLAN

No update to the Permafrost Management Plan was required during the reporting period.

5. TRADITIONAL KNOWLEDGE

5.1. TŁĮCHǪ HARVESTERS AND METHODS TO MONITOR THE STATE OF BARREN-GROUND CARIBOU WINTER HABITAT

Please refer to Section 13 reporting on Measure 7-1.

5.2. PROVIDED BY TŁĮCHǪ GOVERNMENT

Please refer to Section 13 reporting on Measure 7-1.

5.3. RECREATIONAL, TRADITIONAL, OR NON-TRADITIONAL ACTIVITIES

Observations of recreational, traditional, and non-traditional use of the area surrounding the TASR in the 2021 reporting period were limited due to the access restriction for non-construction users. In the event that people from the communities wanted to access the site, they had to be escorted onsite. The only noted observation was the use of an existing cabin that is in Segment One (1). This land user frequented the cabin throughout the construction season in 2021.

6. WASTE STREAM MANAGEMENT AND QUANTITIES

The Waste Management Plan (Revision 1.3) developed for the TASR project was drafted to guide site personnel on the waste management goals, objectives and procedures to follow during construction and ultimately operation of the road. Adherence to the plan ensures the protection of the environment as well as aesthetic and land use values, ultimately meeting the regulatory requirements for the project. The plan requires the segregation of various waste streams and provides direction on how each of the streams should be managed and ultimately disposed of. As part of the Water License reporting requirements these waste streams are to be segregated and reported. The following sections detail the segregated waste streams (by type) generated during the reporting period. A copy of the monthly quantities tracking spreadsheet for all waste streams is provided in Appendix A.

6.1. SOLID WASTE

Figure 6-1 shows the overall solid waste generated for the year 2021 during the construction of the TASR. The month of October had the maximum of 31.43 metric tonnes (MT), this is primarily due to the start of demobilization activities while operations were at full capacity. A total of 24.23 MT was generated in November which reflects the continuation of construction ramp down and demobilization activities. The graph illustrates the waste generated from all waste streams which are not associated with hazardous waste or sewage. This includes waste such as domestic waste, wood, metal, recyclables, and construction waste. Quantities for each individual waste stream that is classified as solid waste are discussed in more detail below:

Figure 6-1: 2021 Monthly Solid Waste Quantities

6.2. DOMESTIC WASTE

Figure 6-2 illustrates the overall domestic waste generated during the construction of the TASR during the 2021 reporting period. The spike in total volume of waste from June to October was directly associated with the Main Camp occupancy levels during the 2021 construction season. The primary source of domestic waste was from the Main Camp kitchen.

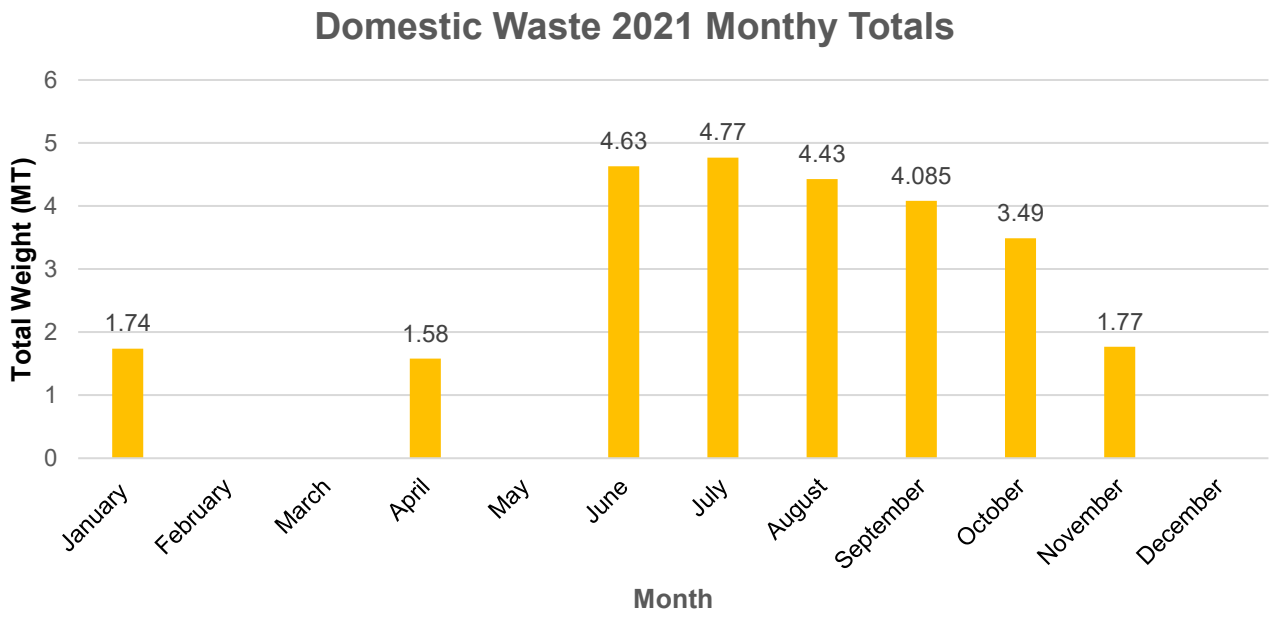


Figure 6-2: 2021 Monthly Domestic Waste Quantities

6.3. CONSTRUCTION WASTE

Figure 6-3 illustrates the overall construction waste generated during the construction of the TASR during the 2021 reporting period. The maximum amount of construction waste, approximately 10.28 MT, was reached in October 2021. During the month of October, the TASR project was preparing for the winter shut down which required the cleaning up of numerous work fronts as well as the maintenance area which likely contributed to the elevated quantity of waste disposal. An additional 7.42 MT were generated in the month of November which coincided with project demobilization.

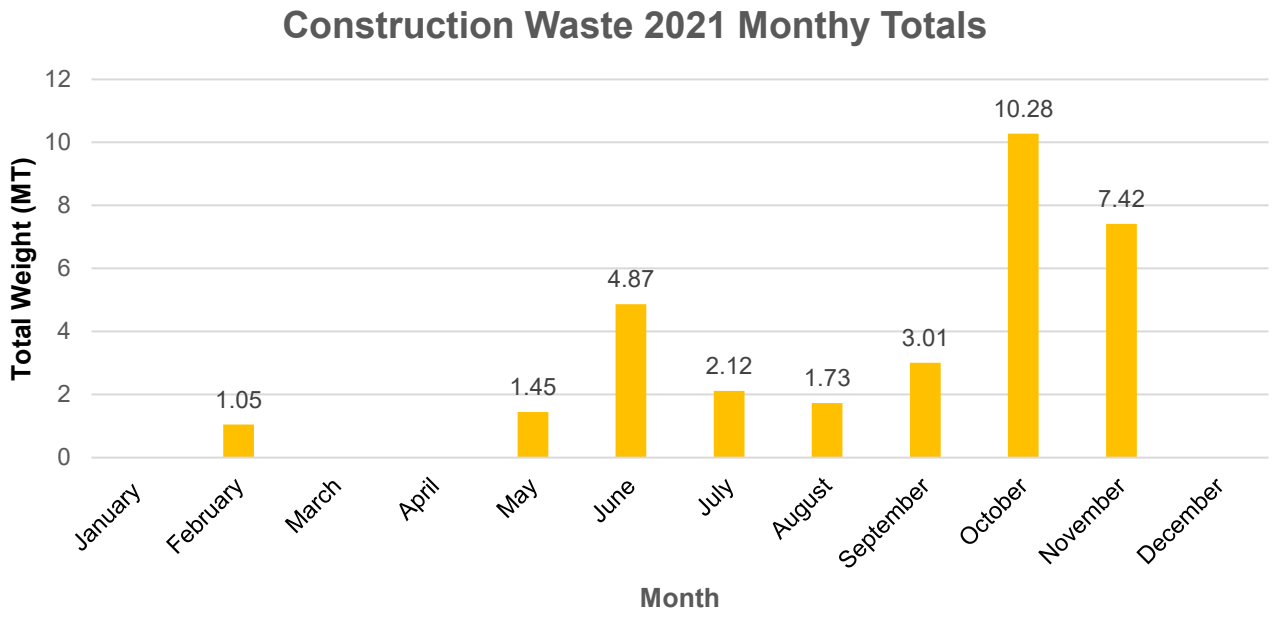


Figure 6-3: 2021 Monthly Construction Waste Quantities

6.4. WOOD WASTE

Figure 6-4 illustrates the overall wood waste generated during the construction of the TASR during the 2021 reporting period. A total of 9.32 MT of wood waste was generated during the 2021 construction season. The maximum of approximately 4.06 MT of wood waste was produced in the month of November which coincided with the project demobilization. Wood waste continued to be actively repurposed whenever possible during the 2021 construction period.

Figure 6-4: 2021 Monthly Wood Waste Quantities

6.5. METAL

Figure 6-5 illustrates the total metal waste generated during the 2021 reporting period. Metal waste was removed from site and taken to a scrap recycling yard in Yellowknife. The peak volume of metal was observed in October with 14.96 metric tonnes. This increase in metal waste was associated with the project demobilization.

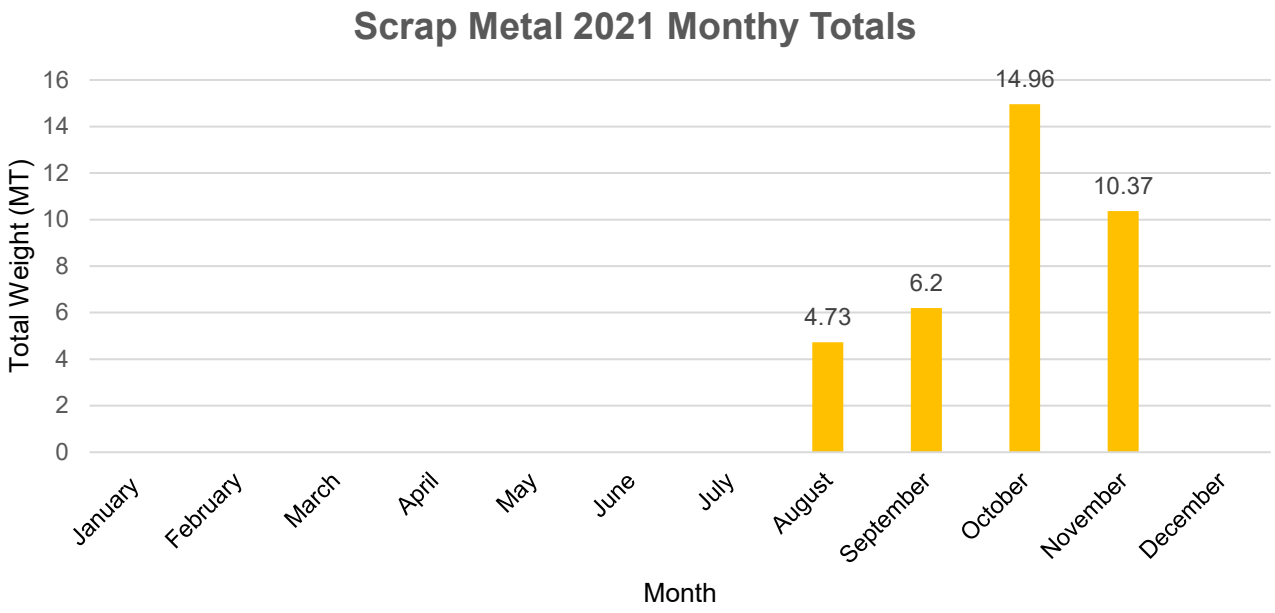


Figure 6-5: 2021 Monthly Metal Waste Quantities

6.6. RECYCLING

Figure 6-6 illustrates the overall cardboard waste generated during the construction of the TASR during the 2021 reporting period. Carboard waste levels varied from 0.6 to 1.1 MT throughout the year with a total volume of 5.7 metric tonnes generated in 2021.

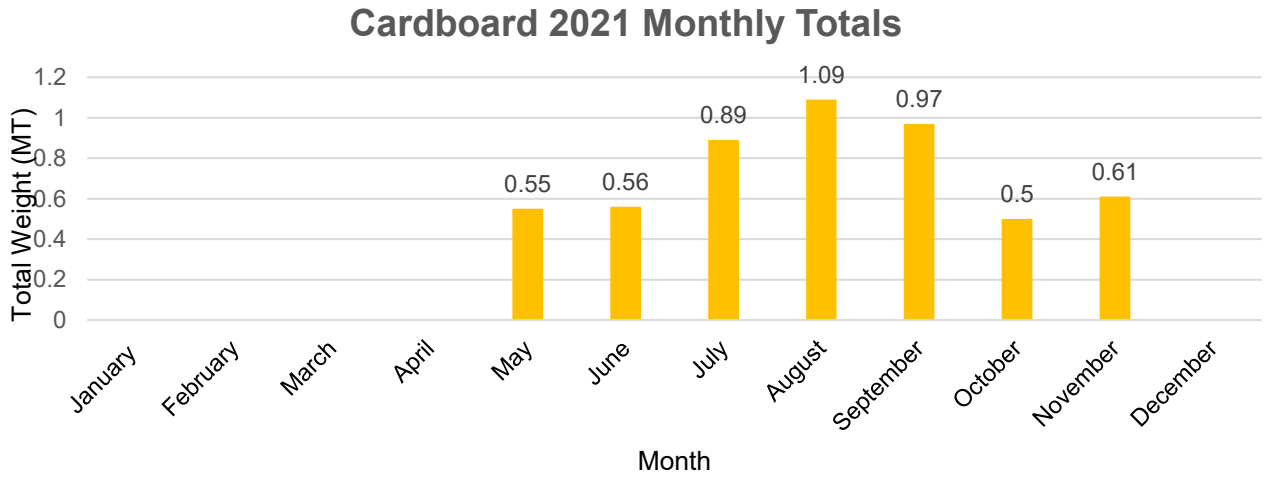


Figure 6-6: 2021 Monthly Cardboard Waste (Recycled) Quantities

6.7. HAZARDOUS WASTE

As seen in Figure 6-1, most of the hazardous waste generated during the reporting period of 2021 primarily consisted of contaminated soil followed by waste oil, contaminated rags and absorbents, and contaminated water. It should be noted that the contaminated soil volumes do not necessarily reflect soils that were impacted by spills. Out of an abundance of caution for the environment, soils that were removed from the Maintenance

shop (that had fallen or been removed from heavy equipment during maintenance and repairs) were always considered contaminated and disposed of accordingly. All hazardous waste generated during the 2021 reporting period was collected by KBL Environmental Ltd, a registered hazardous waste carrier. The waste was transported and disposed at their approved facility for treatment/disposal.

Figure 6-7: 2021 Hazardous Waste Quantities

6.8. SEWAGE

Figure 6-9 shows the sewage generated during the 2021 reporting period. The maximum amount of sewage generated during the reporting period occurred in the month of July amounting to 444.7 cubic meters of sewage waste generated. The increase in sewage waste produced for the summer of 2020 was due to a large labour force that was present on the TASR. Wastewater was collected by Kavanaugh Brothers and hauled to the sewage treatment facility in Yellowknife.

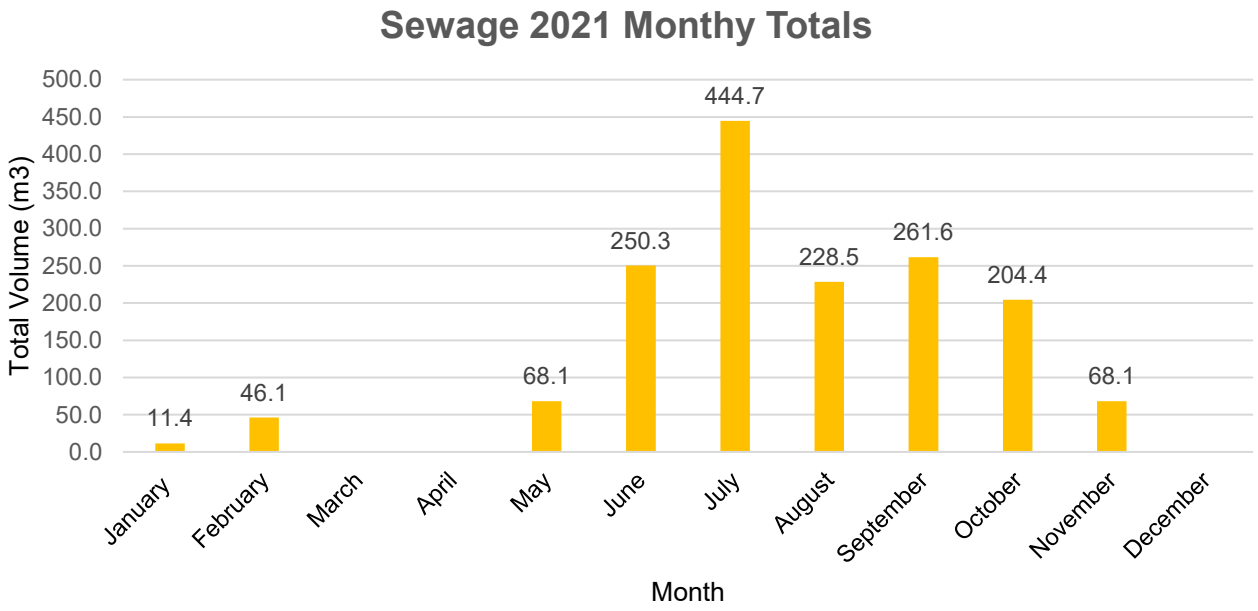


Figure 6-8: 2021 Sewage Monthly Quantities

6.9. WASTE MANAGEMENT METHODS

As noted above, various waste streams are generated on the TASR project. It is essential that the waste is handled, stored and managed in a safe and environmentally responsible manner. The waste management program implemented on the TASR site is utilized to minimize waste production by applying the principles of reducing the use of materials, reusing materials (whenever possible), recycling materials and recovering value from used materials. The management methods for each of the different waste streams that are generated on site are discussed in more detail below:

6.9.1. SOLID WASTE

The solid waste streams that are generated on site consist of:

- domestic waste,
- wood,
- metal,
- recyclables and
- construction waste

All the solid waste streams were stored in a designated location at Kilometer 19+800 (Main Camp Laydown) as outlined in Section 26 (1) Condition 57 of the Land Use Permit. Each waste stream is segregated and stored in 30 yd roll-off bins that are clearly labeled. The waste types are removed from site by Kavanaugh Brothers and offloaded at the City of Yellowknife Landfill or the recycle depot and Precision North Recycling (steel).

6.9.2. HAZARDOUS WASTE

Hazardous waste generated at the site from various waste streams fall under various categories including:

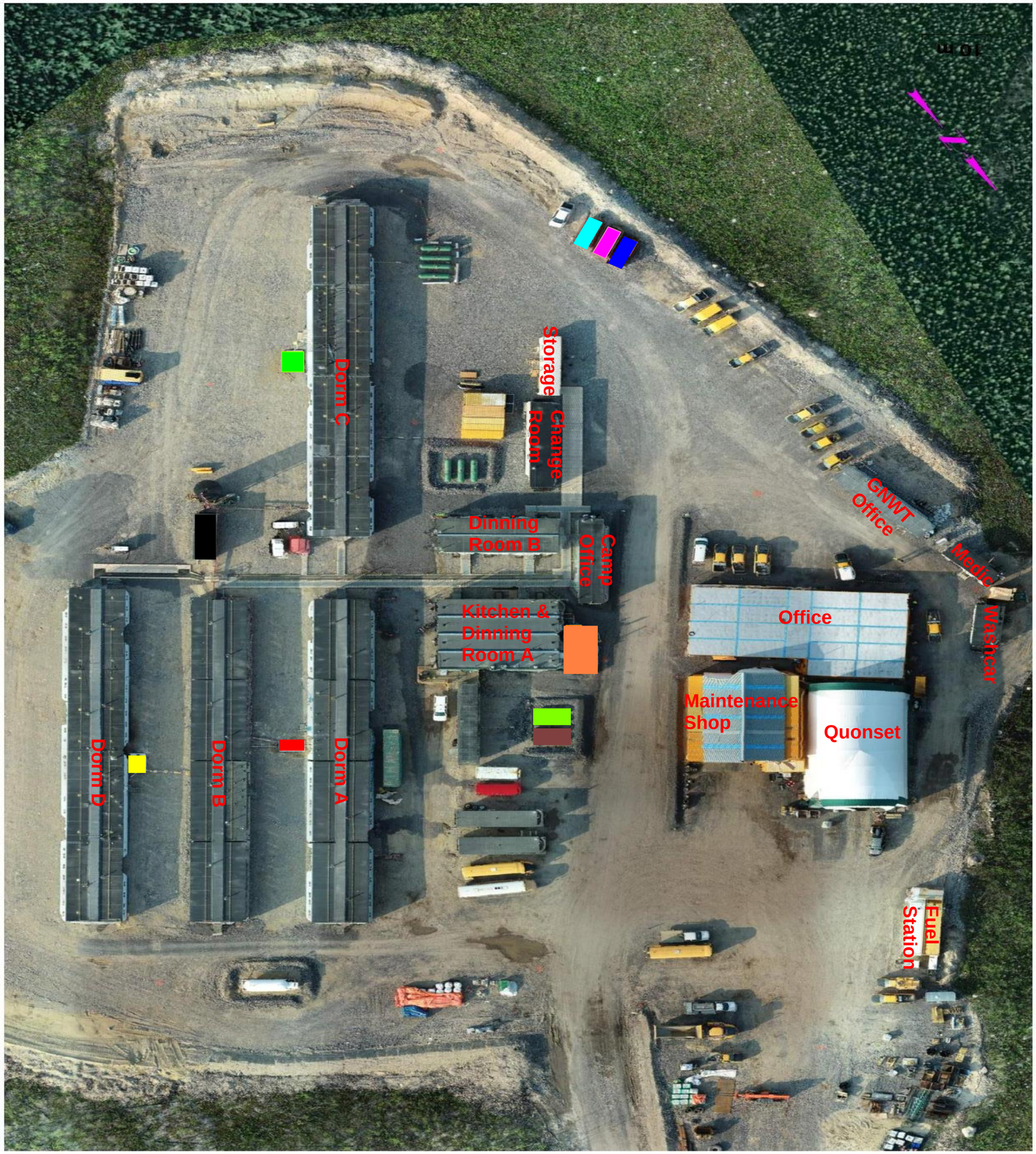
- Contaminated Soils
- Waste Oils
- Used oil Filters
- Contaminated soil from spill cleanup
- Oily absorbent rags
- Contaminated plastic containers
- Antifreeze
- Solvents
- Batteries

These various hazardous waste streams are actively segregated and stored within the maintenance laydown area, shop, and Quonset building (Figure 6.1). All hazardous waste containers are covered from the elements and each container is clearly marked noting content and date of generation. The containers are inspected regularly to ensure waste is properly segregated and no leaks are detected in the containments. Secondary containment for storage containers is either integrated or supplemented externally and are also inspected and maintained to ensure effectiveness and maximum volume is available.

As noted in Section 6.7, the waste is removed from the laydown as requested by site and transported by KBL Environmental Ltd and Kavanaugh Brothers Ltd who are registered hazardous waste carriers. The waste is transported and disposed at their approved facility for treatment/disposal.

Tlicho All Season Road Project

Main Camp
Waste Bin and Sewage Tank Locations



0 3.75 7.5 15 22.5 30
Meters

Legend

Waste Bin Locations

- Cardboard
- Construction Waste
- Domestic Waste
- Scrap Metal
- Wood

Sewage Lift Stations

- Dorm A & B Lift Station
- Dorm C Lift Station
- Dorm D Lift Station
- Kitchen Lift Station
- Waste Water Storage Tank

Data Source: Satillite Image 2020 (NAD83)

Created By:	Date Created:	Revision No:
Kiewit Environmental Dept.	March 16, 2021	0

Figure 6-1

Kiewit

NORTH STAR INFRASTRUCTURE
Tłı̨chǫ All-Season Road

6.9.3. SEWAGE

The storage of sewage at the TASR project is primarily at the main camp or in porta-potties stationed throughout the sites where active work is taking place. Sewage waste is removed by Kavanaugh Brothers twice a week or on an as-needed basis. Sewage was hauled to the City of Yellowknife sewage treatment facility for treatment/disposal.

The Drill Camp at Station 0+000 had a sump constructed as per the Geo-technical Land Use Permit (LUP W2016S0009). When the camp was in use, this sump was monitored daily for proper ground filtration of wastewater. Additionally, the drill camp had a winterized sewage storage tank which was emptied on a regular basis by Kavanaugh Brothers. This camp facility was only in operation during the winter shutdown period.

There are four (4) auxiliary holding tanks (lift stations) at the Main Camp (19+800). One is positioned to service the kitchen, one is in place for Dorm A and B, one for Dorm C, and lastly a holding tank for Dorm D. Heat-traced lines connect these lift stations to the 15,000L heated storage tank on the south side of camp. Kavanaugh Brothers serviced the camp during peak working times typically once a day, and on as-needed basis during off-times with a vacuum truck.

On the TASR alignment and at times in pits/quarries, self-contained and heated portable toilets were stationed in active work fronts for construction personal. These portable toilets were emptied routinely using the same vacuum truck as noted above.

6.9.4. SOLID WASTE ACCEPTED BY LOCAL COMMUNITIES

Currently the solid waste streams generated on the TASR project are not sent to the local communities of Whatì and Behchokǫ̀ for disposal. Kiewit continued to use its established vendors to collect and dispose of the waste generated from the project to the City of Yellowknife.

7. SUMMARY OF CONSTRUCTION ACTIVITIES

Construction on the Tlichǫ All Season Road right-of-way commenced on September 3, 2019 upon receiving approval from the WLWB and GNWT. During the 2021 reporting period (January 1,2021 to November 20, 2021) construction activities on the TASR were conducted between Stations 0+000 up to Station 97+000 and included:

- Vegetation clearing
- Crushing Operations (Station 79+000 road cut and Pit 105)
- Ditch Line and Slope Finishing
- Subgrade Preparation
- Gravel Placement
- Drill and Shoot Operations (ditch lines and quarry expansions)
- Bridge Structures Completion (tensioning, deck panel grouting, approach slab placements and tensioning)
- Removal of Temporary Bridges and Accesses (Duport and Unnamed Rivers)
- Fiber Conduit Installation, Testing and Pull Box Installation
- Signage and Guardrail Installation
- Pit Reclamation
- Deficiency Corrections
- Demobilization

7.1. VEGETATION CLEARING

Limited vegetation clearing was required during the 2021 construction period. Prior to the commencement of any clearing operations, Pre-Clearing Wildlife and Bird surveys were conducted to sweep the area for any large mammals, bird nests, and animal dens. Surveys were completed as per Appendix F of the WMMP (Rev. 3.4) and are discussed in more detail in Section 7.4 of this report. When vegetation clearing occurred during the breeding bird season, Appropriately Qualified Professionals (AQP) were retained to complete the necessary bird sweeps and provide written clearance to proceed. The areas cleared of vegetation during the 2021 construction season included:

- Clearing for the tie in connection with Tłı̨chǫ Highway and Highway 3
- the mechanical clearing (mulching) of the TASR Fiber Optic Line Right-of-Way from Station 97+000 (sections on east, west and both sides) northward to the Community of Whatì
- Pit Widenings/Expansions for Pit 48 (along RoW), Quarry Prospect 80 (RoW Widening) and Pit 105
- Isolated sections of TASR RoW cleared to full width to accommodate slope finishing and excess material management

Specific details and timing of all the clearing activities that occurred during the 2021 construction season were documented in the weekly reports.

Photo 2. Looking north at Brave mulching the TASR Fiber Optic RoW near Station 97+800

Photo 3. Looking north at clearing along RoW for slope finishing and excess material management at Station 51+300

7.2. GRAVEL CRUSHING

Crushing operations occurred at various times throughout the 2021 construction period generating materials required for the construction of the TASR. The crushing that occurred in 2021 generally produced the Des4-20 for road gravel and came mainly from LaPrairie Operations at KM 59, KM 79 and KM 89 (Pit 105). Once the contracted crushing work was concluded at the end of June, LaPrairie demobilized from the TASR. Kiewit began crushing operations at KM 89 (Pit 105) in mid September through till the beginning of November to ensure that sufficient gravel quantities were available to complete the TASR as well as provide stockpiles for future TASR operations.

Pit 105 was utilized as RoW expansions instead of clearing the entire pit limits of vegetation. Systematically and after approval from the GNWT Lands Inspectors, the pit was expanded westward (within the pit boundary) to access the best material for crushing.

All borrow sources that were opened during construction phase of the project were remediated according to the governing pits/quarry permits. This generally involved addressing slope issues and ensuring proper drainage prior to the completion of the project. The progress of borrow source utilization and reclamation during the 2021 construction period were detailed in weekly reports.

Photo 4. Looking south at the LaPrairie crushing operation at KM 79 road cut - Station 78+383

Photo 5. Looking south at the Kiewit crushing operation at Pit 105 on the west side of the TASR - Station 89+500

7.3. DITCH LINE AND SLOPE FINISHING

During the 2021 reporting period, the vast majority of the embanking and subgrade work had been completed. This allowed for all remaining ditch lines and slopes (fore slopes and backslopes) within the TASR RoW to be finished.

Ditch lines were shaped according to design to allow for proper road drainage. This generally involved the forming of smooth fore slopes and backslopes using dozers and excavators as the topography required. The smoothing of the ditch lines was completed to enhance water flow and minimize erosion. Additional ditch treatments were installed as per design and included geotextile and rock lining, ditch plugs, rock check dams, and rock aprons at culvert inlets and outlets. More extensive ditch work was required where temporary accesses around Duport River, James River and Unnamed River crossings were removed. These locations are discussed further in Section 7.8 and Section 10.

Photo 6. Looking southeast at a dozer shaping ditch line at Station 81+144

Photo 7. Looking southeast at the preparation of material at Pit 48

Photo 8. Looking south at the preparation of material at Pit 48

7.4. SUBGRADE PREPARATION

Embanking operations to prepare subgrade were largely completed during the 2020 construction season. However, certain sections of the TASR such as road cuts at Station 35+000, Station 59+000, Station 79+000 and the TASR north of the LaMartre crossing required preparation to design grades before gravel topping could proceed. The progress of road embanking by station including the sections requiring fabric and/or geo-grid was detailed in weekly reports.

Photo 9. Looking southwest at dozer preparing subgrade through the road cut at Station 35+226

7.5. GRAVEL PLACEMENT

The initial placement of gravel road topping began in late July 2020 in Segment 1 and continued until early October ending at the Unnamed Creek (approximately Station 45+000). Gravel topping continued in 2021 from late June and continued until late July 2021. The gravel placement in 2020 was generally placed to 80% of the required design grade so in 2021 gravel was spread on the entire TASR from Station 0+000 to 97+000 to meet final design elevations. The gravel placement approach (gravel source and direction of placement) and progress of gravel topping was reported in the weekly reports.

Photo 10. Looking northwest at grader spreading gravel on a section of the TASR at Station 62+683

7.6. DRILL AND SHOOT OPERATIONS

Focused blasting (drill and shoot) operations took place in Segment 2, 3, and 4 (Figure 1-1) for ditch cuts, and quarrying at Pit 105. The environmental processes in place for blasting follow the protocols that are detailed in the WMMP (Rev 3.4). Pre-blast surveys were conducted for every blast and generally occurred one hour prior to the blast to ensure no large mammals were within the blast radius.

The date and location of the blasts that occurred during the reporting period are provided in Appendix B. Additional details on the blast locations and pre-blast survey results were documented in weekly reports.

Photo 11. Looking northwest at the drilling of blast holes at Pit 105 from Station 89+420

Photo 12. Looking southwest at the loading of holes for a blast at Station 92+634

7.7. BRIDGE STRUCTURES COMPLETION

During the 2020 construction season, the four (4) permanent bridges on the TASR, Duport River, Unnamed Creek, James River, and LaMartre River were erected. This included all the substructures not completed in 2019, girder installations (including tensioning and grouting) and structure guardrails. It should be noted that the tensioning ducts at the James River structure required coring, subsequent tendon tensioning and grouting which was completed in late January and February of 2021 (refer to details provided in Section 7.7.3). No incidents related to the completion of the structures occurred in 2021. The bridge decks of all structures were protected from the impacts by construction traffic with sheets of plywood on the travel surface after the temporary crossings were removed. These protections were removed when construction activities had been completed. er.

Additional details for each of the structure construction activities completed in 2021 have been provided in the sections below.

7.7.1. DUPORT RIVER STRUCTURE

As noted above, the Duport River structure was completed in 2020 leaving only the placement of the approach slabs which was completed in 2021. The work required to complete the Duport structure included the installation of the prefabricated approach slabs, placement of waterproof membranes, epoxy grouting at connection points

with the structure, completion of guardrails extending north and south of the structure and gravel tie in with the TASR surface. The removal of all temporary safety railings and structures was done concurrently with the guardrail installations.

Photo 13. Looking east at the preparation of subgrade prior to the approach slab placement at Duport River (south side)

7.7.2. UNNAMED RIVER STRUCTURE

As noted above the Unnamed River structure was fully completed in 2020 except for the prefabricated approach slabs, the last few rows of concrete facing that covered the GRS wall along with the guard rail extensions north and south. These activities occurred in early August of 2021. Similar to the structures work at the Duport crossing, the subgrade had to be prepared for the approach slab and membrane installation and also included epoxy grouting at connection points with the structure, completion of guardrails extending north and south of the structure and gravel tie in with the TASR surface.

Photo 14. Looking northwest at the completion of the prefabricated concrete facing at the Unnamed River crossing structure.

7.7.3. JAMES RIVER STRUCTURE

Due to some deficiencies in the prefabricated girders for the James River structure, the coring of tensioning ducts was required to complete the structure. The girders previously placed on the geosynthetic reinforced soil (GRS) were lifted individually and cored in late January and early February of 2021. Once the coring was complete, the tendons were installed and tensioned, followed by the grouting of the longitudinal joints and vertical keyways in May of 2021. As was done in 2020, grouting operations included the sealing of all joints and deck panels. Prior to grouting, leak testing with water was done to ensure there was no potential for a grout release to James River. After successful testing, each joint was filled with grouting material from an on-site batch plant that was protected in secondary containment. The precast approach slabs were then installed in August of 2021 which like the other structures, involved the preparation of approach subgrades, membrane installation, epoxy grouting at connection points with the structure, completion of guardrails extending north and south of the structure and gravel tie in with the TASR surface. No environmental incidents occurred during any of the work at James River in 2021.

Photo 15. Looking south at grouting of longitudinal deck joints at the James River structure.

Photo 16. Looking west at the placement of an approach slab at the James River structure

7.7.4. LAMARTRE RIVER STRUCTURE

The LaMartre River structure installation was mostly completed in 2020 leaving only the placement of the approach slabs which was completed in late July and early August 2021. The work required to complete the LaMartre River structure included the installation of the prefabricated approach slabs, placement of waterproof membranes, epoxy grouting at connection points with the structure, completion of guardrails extending north and south of the structure and gravel tie in with the TASR surface.

Photo 17. Looking north at the crane set up for the placement of approach slabs on the south side of the LaMartre River

Photo 18. Looking at the pouring of epoxy grout at the approach slab joint with the LaMartre River structure

7.8. REMOVAL OF TEMPORARY CROSSINGS AND ACCESS

Temporary crossings structures were installed at the crossing locations (except LaMartre River) to allow for continued heavy equipment access during TASR construction while protecting the recently installed permanent bridges. All Land Use Permit conditions were respected in terms of constructing and dismantling the temporary crossings and were routinely inspected by the Department of Lands Inspectors during the construction period. The most significant temporary crossing was at the Duport River which required the placement of fill within the floodplain (approved by DFO, GNWT-ENR Water Officers and GNWT-DOL-Inspectors in 2019). The temporary steel structure was removed in August 2021 along with the controlled removal of all imported fill and the geotextile placed to separate the imported fill from the floodplain soils. This work was done without environmental incident and was documented in more detail in the weekly reports. Erosion and sediment control adjustments at this location are provided in more detail in Section 10.

Photo 19. Looking north at the controlled removal of gravel from the temporary access at Duport River

Photo 20. Overhead view of the Duport River crossing after removal of the temporary crossing and access

The temporary crossing at James River was removed in late August 2021 and followed a similar approach as the temporary bridge and access removal at the Duport River. The temporary steel structure was removed using a crane and the approaches consisting of rock fill and a geotextile layer to protect existing riparian areas were removed in a controlled fashion using an excavator. The ditch lines were reinstated in the location of the temporary crossing footprint and ESC measures on both the north and south sides were adjusted to their final design configuration. Additional details on the erosion and sediment control activities at this location are provided in Section 10.

Photo 21. Looking west at James River at the temporary crossing location after the temporary steel bridge was removed

The temporary crossing at Unnamed River was removed in early September and followed a similar approach as the temporary bridge and access removal at the Duport River. The temporary steel structure was removed using a crane and the approaches consisting of rock fill and a geotextile layer to protect existing riparian areas were removed in a controlled fashion using an excavator. The ditch lines were reinstated in the location of the temporary crossing footprint and ESC measures on both the north and south sides were adjusted to their final design configuration. Additional details on the erosion and sediment control activities at this location are provided in Section 10.

7.9. FIBER OPTIC INSTALLATION

The installation of the 115 km long fiber optic line infrastructure between the Highway 3 junction and the Community of Whatì commenced on August 11, 2021, under Land Use Permit W2021X0001. The fiber optic installation was completed by a subcontractor Innovative Trenching Solutions (ITS) but was supported by Kiewit throughout the work activities. Specific details regarding the construction operation are provided in the sections below.

7.9.1. CONDUIT PLOWING

The fiber conduit was plowed into the ground along the edge of the TASR RoW to the design depth using a GPS enabled, all-terrain plowing machine, supported by a mobile winch vehicle and light duty vehicles and trailer to carry the fiber reels. Additional clean up after the initial plowing of the conduit was provide by a small excavator and D5 dozer to ensure that the soils were properly compacted over the conduit and slopes were stabilized.

Photo 22. Looking south at conduit plowing around an intermittent watercourse crossing at Station 51+451.

7.9.2. DIRECTIONAL DRILLING

Directional drilling operations were required to install the fiber conduit at certain locations under the TASR as required to transition the line from the east to west side as well as all major water crossings. This work was conducted by Spruce Boring and commenced on August 18, 2021 where the conduit was installed under the TASR alignment to connect with the existing junction at Highway 3. The directional drilling progressed from this location northward until the last crossing (LaMartre River) was completed in early October. The setup of the drilling operation required the construction of a sending and receiving pit to contain/recycle drilling fluids and was supported by a vacuum truck as required and tanker truck.

Photo 23. Looking south at the directional drilling operation on the south side of the James River at Station 69+649

Photo 24. Looking northwest at the directional drilling operation on the north side of the LaMartre River at ~ Station 85+500

7.9.3. PULL BOX INSTALLATION

Fiber conduit pull boxes were installed as part of the fiber conduit installation process. These boxes were required at either end of the directional drilled sections as well as where called for in the design. These pull box locations are where the fiber optic lengths jetted into the conduit are spliced into a continuous length and involved small excavation, structure placement and backfill operations.

7.9.4. CONDUIT TESTING

After sections of the conduit were installed, the installation was validated using a vacuum machine. At one end of the conduit, the inside air is vacuumed while the opposite end is verified by hand for suction effect. Where required a pulling string or rope was also introduced during this process.

7.10. SIGNAGE AND GUARDRAIL INSTALLATION

The final design of the TASR included the installation of guardrails and signage including road delineators, speed signs, curve indicators and other signs. Guardrails were installed as designed using machine and hand auguring to excavate the holes to depth where the wood supports were placed and later connected with steel guardrails. These guardrails were predominantly located at culverts and bridge structures as well as sharp curves to prevent vehicles from leaving the road surface and entering the ditches. These construction elements were completed by a subcontractor Checkmark Services and commenced on August 1, 2021 and continued through till mid November 2021.

Photo 25. Looking south at the installation of guardrail sections at approximately Station 18+600

Photo 26. Looking north at the gateway sign for the Tłı̨chǫ Highway Installed near Station 0+100

7.11. DEMOBILIZATION

The systematic demobilization of construction equipment and camp infrastructure commenced in late October and was completed by the end of November 2021. These demobilization efforts coincided with the ramp down of the TASR construction activity but had regard for the upcoming Operations and Maintenance (O&M) phase of the project as well as planned construction activities (jetting of fiber optic line, crushing and the completion of the 13km Whatì Access Road improvement projected scheduled for 2022. The GNWT-DOL inspectors were kept informed of the demobilization status and issued final acceptance of the demobilization prior to the opening of the highway to public traffic.

8. MODIFICATION AND / OR MAJOR MAINTENANCE WORKS

During the reporting period, there was one noted modification related to the control of drainage on the north side of the James River. After consultation with designers, the eastern and western ditch lines that were excavated (as pre original design) in a muskeg section immediately north of the James River crossing were backfilled and remaining surface water flow was directed northward to a balance culvert. This work was intended to address the largest contributing factor to the sediment release that occurred at James River in the spring of 2021 by reducing the surface water flow that was directed south.

It should also be noted that in the spring of 2022, at the direction of the Department of Fisheries and Oceans (DFO), ditch plugs will be installed at the entry to the RoW ditch line on the east side of the TASR and at the connection of the culvert outlet channel and Unnamed Lake as further assurance that minnow species will not be stranded in the event that there is downstream or upstream movement of fish. This work activity will be supported by bi-weekly monitoring during the spring melt period and ongoing communication with DFO representatives.

9. CLOSURE AND RECLAMATION

Throughout the 2020 construction period progressive pit reclamation took place which involved the re-grading of pit floors to ensure positive drainage and the pulling back of stripped topsoil and mulch and spreading over the pit floor. In total, four (4) pits were reclaimed to varying degrees. Pit 13C, Pit 21B, Pit 33A and Pit 48 were partially reclaimed to approximately 90%, 80%, 85% and 95% respectively. In mid to late September 2021 the final reclamation of all pits was completed. This work primarily involved the final grading of the pit floor to ensure positive drainage in problem areas identified during the spring of 2021 as well as the reclamation and blocking of all the pit access roads at the connection points with the TASR. GNWT Department of Lands Inspectors assessed the reclamation efforts and provide written acceptance of the pit reclamations. All active pit and quarry permits under Land Use Permit W2016E0004 were closed out with the GNWT on October 27, 2021.

Photo 27. Looking north at dozer doing final grading of the Pit 13C floor

10. EROSION AND SEDIMENT CONTROL ACTIVITIES

An Erosion and Sediment Control Plan (ESCP) was developed and approved for the TASR project with the intent of providing a guidance document with regards to mitigating erosion during construction. It incorporates and recommends the use of the 2013 GNWT Erosion and Sediment Control Manual as well as other guiding documents and best management practices (BMPs) to prevent the release of sediment into streams during construction activities and to ensure compliance with the Federal Fisheries Act Section 36(3) which prohibits the deposition of deleterious substances into waterbodies frequented by fish. It provides reference to other approvals, relevant standards, control plans and procedures for training, communications, investigations, corrective actions and audits required under the Project Agreement. It also satisfied the requirement of Conditions under Part C of the Water License.

The ESCP was developed with an assumed schedule and approach to construction with some flexibility to adjust based on actual construction progress. To that end, critical areas were identified including 17 key watercrossings that would be subject to the highest degree of risk of sedimentation. Erosion and sediment control risks were routinely evaluated as construction activities advanced. Generally, the flat topography found through the majority of the active construction areas diminished the risk of extensive erosion. Consequently, drainage features identified as key water crossings ESCP became the focus areas of ongoing monitoring. Weekly monitoring of these erosion and sediment control (ESC) measures allowed for adjustments, improvements or to bolster existing measures if stability or functionality concerns were noted.

Prior to the 2020-2021 winter shutdown, all high-risk areas were evaluated and where necessary additional ESC measures were installed including rip rap lining of approach ditches, sediment basins, rock check dams, rock berms and silt fencing. For the most part the TASR ditch lines were established in the final configuration with the exception of the ditch lines at the temporary crossing structures at Duport, Unnamed and James River crossings. In these areas protective measures such as ditch plugs, and sediment basins were cleaned and enhanced as required.

There was only one erosion and sediment control incident that occurred the during the 2021 spring freshet period which is documented in more detail in Section 12.2. While protective measures including rock lined ditches and a large, temporary sediment basin were in place, they were insufficient to contain the amount of water directed in the completed west ditch line on the north side of the structure. This incident resulted in the implementation of a number of ESC measures including the rock lining of the slopes on the north approach, rock lining of the ditch lines on both approaches (east and west sides), cleaning and enlargement of the sediment basing on the north approach (west side), installation of biologs and the installation of ditch plugs at the top of the hill on the north approach. The excessive amount of water which led to the event originated in a section of ditch line excavated as designed but through muskeg. After discussions with the designers, this section of ditch in the muskeg (east and west side) was backfilled to encourage retention in the muskeg and to redirect any surface flow northward to an equalizer culvert. Additionally, erosion control matting was installed on an extensive portion of the bare soil slopes on the south approach to the James River to further minimize the risk of erosion and sedimentation. This location has been flagged for regular observation during the 2022 spring melt period to ensure that there is sufficient time to intervene as required to prevent a sediment release.

Photo 28. Looking south at the rock lined slopes and west ditch on the north approach of the James River

Erosion control measures such as the extension of rock lining of ditches and approach/embankment slopes were installed after the removal of the temporary crossing structures at the Duport and LaMartre River crossings. Additionally, organic material was spread over the exposed soils on the east side south approach of the culvert crossing 10A to protect against erosion and encourage the establishment of vegetation.

Photo 29. Looking east at the south side of the constructed channel at Culvert 10a after the spreading of organic material

11. WATER MONITORING, USAGE AND REPORTING

11.1. WATER QUALITY MONITORING

All watercrossing activities that represented a risk of sedimentation to watercourses were completed during the construction season in 2020. No inwater or near water activities occurred during the reporting period and therefore no further water monitoring was required.

11.2. WATER USAGE

11.2.1. CALIBRATION - WATER METER/SAMPLING DEVICES

As was the case during the 2020 construction season, no flow meters or gauges were utilized to track water quantities in 2021. Rather, truck load counts were used to document consumptive water use. These water withdrawal load count records were provided to the Environmental Department at the end of each shift where they were entered into an Excel spreadsheet for tracking and compliance purposes.

11.2.2. WATER USAGE

As outlined in the Type A Water License W2020L8-0001, the WLWB set various requirements for GNWT-INF to comply with to withdraw water and minimize the impact to the environment. The following Conditions were adhered to when withdrawing water for use during project construction:

- The Licensee may only withdraw up to 900 m3/day of Water for the Project.
- The Licensee shall only obtain water from the approved Water Sources
- In any single year, the Licensee shall not withdraw greater than 10% of the available water volume of any Water Source.
- In any single ice-covered season, the Licensee shall not withdraw greater than 10% of the available water volume of any Water Source, as calculated using the appropriate maximum expected ice thickness.
- The Licensee shall not withdraw greater than 10% of instantaneous flow.
- Prior to locating a water intake in a fish-bearing watercourse, the Licensee shall obtain written authorization for the location from an Inspector.

The monthly and annual quantities of water withdrawn from approved water sources is provided in Table 8-1. The consumptive use of water was primarily for the purposes of dust suppression, grouting, and road compaction. Water volumes extracted from approved sources were tracked and reported (see Appendix E). A breakdown of August daily water withdrawal volumes is detailed below in Figure 11-6 to demonstrate that no exceedance of the allowable limit (900 m^3/per day) occurred during the 2021 reporting period. Detailed, weekly water withdrawals were documented in the weekly reports prepared throughout the reporting period.

It should be noted that water withdrawals required for the various work fronts during each shift were pre-planned to ensure that the amounts taken from the approved sources were not exceeding either the available or cumulative daily allotment of 900m^3/day.

During the 2021 reporting period, standing ditch water continued to be utilized for road construction (dust suppression/compaction) whenever possible to adhere to the Land Use Permit (W2016E0004) condition 26(1)(*f*) to control or prevent ponding of water, flooding, erosion, slides and subsidence of land while simultaneously reducing the volume of water required from natural sources. All extraction locations within the ditch lines were inspected and approved by the Environmental Department to ensure that there were no impacts to adjacent watercourses, lakes or ponds.

Table 11-1: Monthly and Annual Water Quantities extracted from approved water sources

WATER QUANTITIES EXTRACTED FROM APPROVED WATER SOURCES IN METERS CUBED FOR CONSUMPTIVE PURPOSES													
Source	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**Annual Total Volume (m^3)**
LaMartre River	-	-		-	-	-	-	589	285	-	-	-	874
Duport River	-	-	-	-	-	-	-	342	-	-	-	-	342
James River	-	-	-	-	-	-	3597	4464	-	-	-	-	8061
Unnamed Creek	-	-	-	-	-	-	-	-	-	-	-	-	0
Peanut Lake	-	-	-	-	-	-	60	-	-	-	-	-	60
Unnamed Lake 12	-	-	-	-	-	-	-	-	-	-	-	-	0

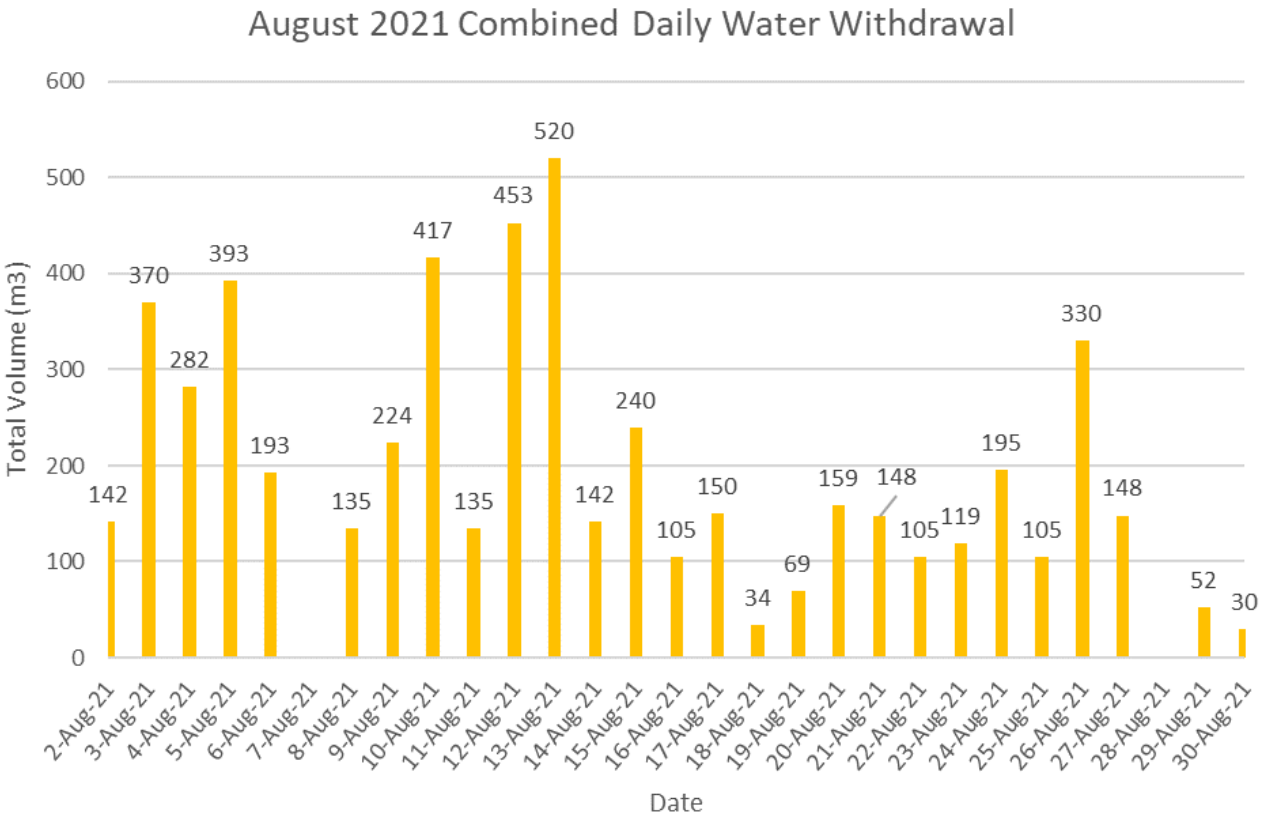


Figure 11-1: August 2021 Duport, James and LaMartre James River Combined Water Withdrawal Volumes

12. SPILLS AND UNAUTHORIZED DISCHARGES

As required in Part 1 of the Water Licence, a Project specific Spill Contingency Plan (SCP) including prevention planning and response of hazardous material spill and unauthorized discharge of waste was developed for the TASR project. The SCP was developed in accordance with the Guidelines for Spill Contingency Planning prepared by Indian and Northern Affairs Canada (INAC 2007) and the Spill Contingency Planning and Reporting Regulations issued under the Environmental Protection Act (EPA).

The purpose of the SCP is to provide a guide to all site personnel in the event of an accidental release of fuel or other materials during the construction of the TASR. All Project personal and contractors are required to read and be familiar with the SCP, which is required to meet the minimum standards set out in the Project specific SCP.

All reporting, remediation and documentation of hazardous material releases and unauthorized discharges of waste is carried out as per the requirements outlined in the Project specific SCP.

12.1. SPILLS

A total of one hundred (100) spills were documented since the start of construction in 2019. A total of ten (10) hazardous material releases occurred between January 1st to November 20th, 2021 (see Figure 12.1). The releases were a result of improper maintenance procedures, human-error, or mechanical failure. All impacted soils resulting from these releases were fully remediated and the contaminated materials were disposed offsite at a licensed facility.

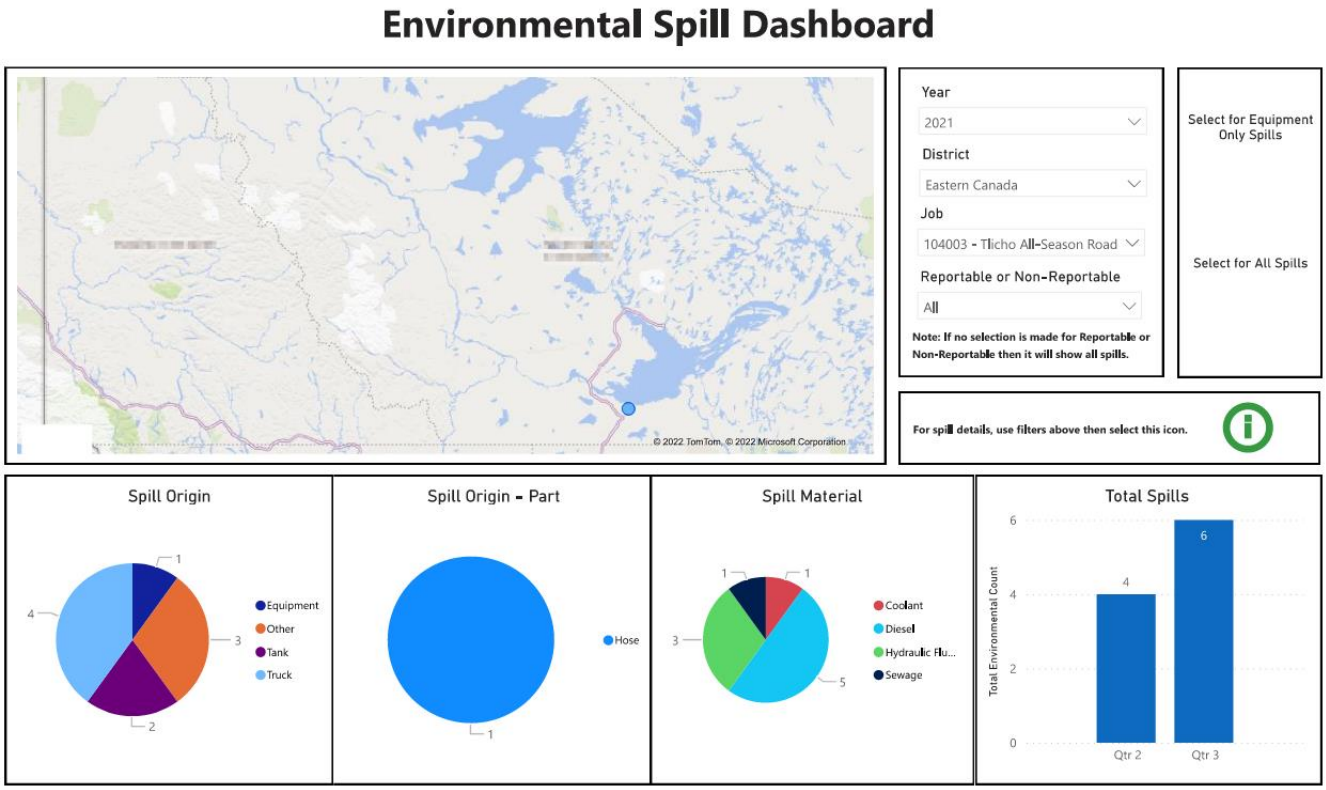


Figure 12-1: Spills Dashboard for the TASR project for 2021

12.2. UNAUTHORIZED DISCHARGES

Included in the spills noted above, there were a total of two (2) unauthorized discharge of materials that were reportable to the 24-Hour NWT – Nunavut Emergency Spill Reporting Line during the reporting period (January

1st – November 20th, 2021). Table 12-1 provides a description, volumes for each unauthorized discharge and a summary of the follow-up actions taken.

Table 12-1: Unauthorized Discharges of Waste

DATE	DISCHARGE ID	DISCHARGE TYPE	VOLUME	DESCRIPTION	CORRECTIVE ACTION
11-May-21	EIR-SP-092	Sediment Release	U/K	On May 11, 2021 at 1:15pm during a routine inspection with GNWT-Department of Lands Inspectors a sediment plume was observed originating from the ditch line at the north approach (west side) at the James River bridge crossing. Early reports from the field at ~ 11:00am indicated that increased flow in the ditch lines due to warming temperatures was threatening to overwhelm the recently bolstered ESC measures. Later, as witnessed by the GNWT-Department of Lands Inspectors and Kiewit Environmental Manager, the Total Suspended Solids criteria (CCME water quality guidelines >25mg/L TSS) would have been exceed in James River based on a visual assessment. The sediment containment basin at the ditch-river confluence had been overwhelmed by the runoff and entered the river turbid. Other measures including sections of rock lined ditch and added rock check dams were not sufficient to reduce sediment loading in the ditch flow.	Pumps were brought to the location (first one arriving at ~2:00pm) and ditch water was pumped to a low-lying area on the east side of the TASR. By approximately 5:15pm three pumps were successfully diverting over 2/3 of the flow away from James River. Full bypass pumping of the western ditch line (north approach to James) was achieved by ~ 7:30am, May 12, 2021 which effectively stopped any remaining (trace) inputs of ditch water to James River. Ditch plugs were installed in both the west and east ditch lines which further limited the water flow directed southward to the James River. An additional 4" diesel pump was brought to the crossing location to ensure that any potential increase in water flow in the associated ditch lines could be managed. Rock armouring of the ditch and surrounding slopes (north approach) proceeded throughout the day (May 12th) starting immediately north of the last sediment basin on the west side and continued northward beyond the highest point in the ditch leading to James River. Rock lining of the eastern ditch and approach slopes were completed on May 13th, 2021. On May 14th, 2021, the furthest downstream sediment basin on the west ditch line (north approach) was cleaned of deposited sediment, deepened and new filter fabric/rock was placed. Additional soft treatments of 12" biologs (straw waddles) were also installed downstream of the rock protections on the west side (north approach) and east side (south approach). Also on May 13th, 2021, a sediment basin was constructed with filter fabric and rock on the east ditch line (south approach) as a precautionary measure. The area was inspected by GNWT-DOL on May 18, 2021, and no further concerns were noted.

DATE	DISCHARGE ID	DISCHARGE TYPE	VOLUME	DESCRIPTION	CORRECTIVE ACTION
05-Jul-21	EIR-SP-096	Wastewater	50L	On July 5, 2021 during the daily inspection of camp infrastructure, Kiewit staff observed wastewater leaking at the connection pipe between the Dorm A lift station and the Dorm B inflow. Upon discovery the Environment Department locked out Dorm B washrooms and laundry and turned off the water effectively stopping the leakage. The Maintenance Department investigated and determined the cause of the leak was the result of a burned-out lift pump and while the tank did not over top, wastewater did leak out of the inflow connection. The failure of the pump also caused the breaker to be thrown which also took the audible and visual alarm offline.	The wiring was checked and adjusted to make sure that if a pump failure occurs the alarms still remain functional. A vacuum truck was immediately dispatched to site to pump the holding tank down and overflow area. Once the area was drained of wastewater a new pipe connection was installed. The Environmental Department assessed the area and applied lime on the impacted soils to neutralize the wastewater and effectively remediate the area.

13. CARIBOU MANAGEMENT AND HABITAT PROTECTION

The following section reports on the GNWT's activities undertaken with respect to Measures 6-1, 6-2, 6-3, 7-1 and 7-2 of the Report of Environmental Assessment (REA).

13.1. MEASURES 6-1, PART 1: DEVELOP AND IMPLEMENT RANGE PLANS

ENR hosted two in-person meetings of the Wek'èezhìi range planning working group in Yellowknife on April 22-23 and May 19-20, 2021. Participants included the Wek'èezhìi Renewable Resources Board (WRRB), Tłı̨chǫ Government (TG), Yellowknives Dene First Nation (YKDFN), North Slave Métis Alliance (NSMA), Environment and Climate Change Canada (ECCC) and the GNWT departments of Industry, Tourism and Investment, Lands and Executive and Indigenous Affairs. ENR provided financial support to the NSMA to to document Traditional Knowledge (TK) about important areas for boreal caribou, which were completed between January-March 2021.
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Measure 6-1, Part 1 called for the Wek'èezhìi boreal caribou range plan to be submitted to the WRRB 90 days before the opening of the TASR. At the time the EA was concluded, and the measures were accepted by responsible ministers, the projected timeline for road construction was four years. Under the original circumstances (four-year construction timeline for the TASR), it would still have been very difficult to meet the timeline in Measure 6-1. With the advanced opening date of November 2021, combined with delays due to COVID-19, ENR proposed that an "interim" boreal caribou range plan be prepared for the Wek'èezhìı region. The Wek'èezhìı boreal caribou range planning working group was notified by letter of this proposed approach on August 07, 2020. ENR received a letter from the WRRB indicating their support for this approach on August 31, 2020. ENR held a virtual working group meeting on September 16, 2020 to discuss the proposed interim range plan with the working group and did not hear any opposition to this approach from the organizations that were in attendance.

A final draft of the interim Wek'èezhìı range plan was completed at the end of June 2021, and was submitted to the WRRB on August 17, 2021. At the same time, ENR initiated a public review period for the interim range plan, with comments accepted until early October 2021. On November 03, 2021, ENR submitted a revised version of the interim range plan to the WRRB along with a summary of how comments from the public review period had been addressed. On December 09, 2021, WRRB notified ENR that they had approved the interim range plan. The final interim Wek'èezhìı range plan is available at:

https://www.enr.gov.nt.ca/en/interim-wekeezhii-boreal-caribou-range-plan-plan-provisoire-pour-laire-de-repartition-du-caribou

13.2. MEASURE 6-1, PART 2: INFORMATION AND ADAPTIVE MANAGEMENT REQUIREMENTS:

a) Monitoring to determine population trends, abundance, and distribution [of boreal caribou]

Boreal Caribou Population Trend

ENR initiated a boreal caribou monitoring program in the North Slave region focused on the TASR corridor in March 2017, with the deployment of 20 GPS collars on adult female caribou. Five more collars were deployed in the TASR study area in March 2018, and seven more collars were deployed in March 2019. No collars were deployed in March 2020. Twenty-three new collars were deployed in March 2021, and 14 collars that were

deployed in 2017 and released on March 01, 2021, were retrieved. Two of the collars deployed in 2017 did not release as scheduled on March 01, 2021. One of these caribou was successfully re-captured and the collar was removed. The other caribou could not be relocated by the capture crew to remove the collar, and this caribou died (likely from predation) on April 27, 2021, and the collar was retrieved on April 30, 2021. There were three additional collared caribou mortalities in 2021, two in May (BWCA18600 – due to predation and BWCA19604 – cause unknown but likely predation) and one in August 2021 (BWCA21601 – cause unknown but likely predation). There were 31 active collars in the TASR study area as of December 31, 2021 (Figure 13-1) Annual survival rates of collared female caribou, as well as spring classification surveys used to estimate calf:cow ratios conducted in February or March each year, are used to estimate annual rates of population trend (λ =adult female survival/[1-female calf recruitment]) following Latham et al.'s (2010) modification of Hatter and Bergerud's (1991) equation. The 2021 spring classification survey took place February 23-24. Table 13-1 below provides the annual adult female survival rate, calf:cow ratios and population trend index for the first 4 years of the monitoring program. To date ENR has observed high annual female survival rates, and an increasing population trend in all three years, but the calf recruitment rate was lower in 2019-20 than the other three years of the program.

Table 13-1: Adult female survival and calf: cow ratios are used together to estimate the annual population growth rate, or lambda (λ). A value of 1.0 indicates a stable population; a value less than 1 indicates a declining growth rate; values higher than 1 indicate an increasing growth rate.

YEAR (APRIL 01-MARCH 31)	ADULT FEMALE SURVIVAL	CALF:COW RATIO	POPULATION TREND (LAMBDA)
2017-18	0.95	32.6 : 100	1.10
2018-19	1.00	37.2 : 100	1.19
2019-20	0.97	26.2 :100	1.09
2020-21	0.96	31.0 : 100	1.11

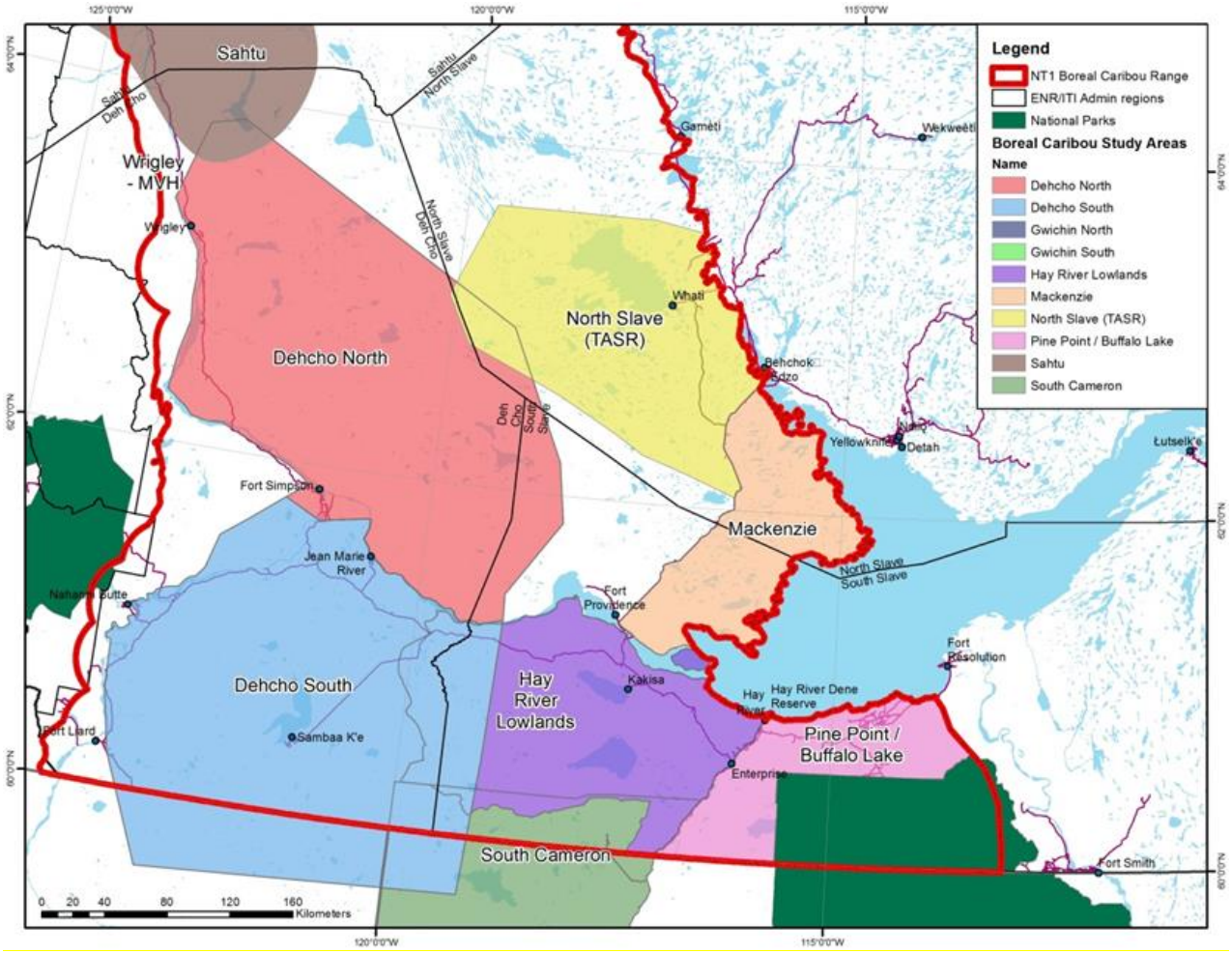

Figure 13-1: Boreal Caribou North Slave (TASR) Study Area, and other adjacent boreal caribou study areas in the southern NWT.

No boreal caribou abundance surveys took place in 2021.

b) Determination of population thresholds and triggers to inform adaptive management.

No updates

c) Harvest monitoring and reporting

The Tłı̨chǫ Government developed a proposal for a monitoring program to address Measures 7-1 and 9-1 of the Report of EA. In August 2020, GNWT-INF committed funds to support the Tłı̨chǫ Government to undertake this program. Measure 9-1 relates to the development of a non-mandatory harvest monitoring and reporting program. The information from this program will provide information that will also support implementation of Measures 6-2 and 7-2, as well as inclusion of traditional knowledge as required by Measures 9-3 and 10-2. Further information on implementation of this program is provided in Section 13.5 of this report.

In addition to the program led by the Tłı̨chǫ Government, Renewable Resources Officers from GNWT-ENR conducted 15 patrols along the TASR between November 30th and December 31st, 2021, following the opening

of the road to public use. No instances of hunting or trapping along the road were observed during this period, but timber harvesters were reported at kilometer 2 on December 13th. No wildlife-vehicle collisions occurred during this period.

d) Determining sustainable harvest levels

See Measure 6-2 regarding activities related to determination of sustainable harvest levels

e) Identifying critical habitat;

GNWT-ENR completed a range-wide (NT1) habitat selection analysis (resource selection functions) project using boreal caribou collar data from across the NWT to model and generate predictive maps of boreal caribou habitat selection during different seasons (NWT CIMP Project #202). The predictive habitat selection maps are being used to assist with identifying important areas for boreal caribou to support range planning and were also used in the draft TASR habitat offset plan for boreal caribou.

f) Ongoing habitat disturbance monitoring

ENR measures and updates fire disturbance on an annual basis and contributes this data to the National Burn Area Composite (NBAC) and Canadian National Fire Database (CNFDB) datasets maintained by Natural Resources Canada (NRCan). ENR uses a combination of the NBAC (1986-2020) and CNFDB (pre-1986) datasets to calculate fire disturbance within the NWT boreal caribou range. As of fall 2020, the Wek'èezhìı portion of the boreal caribou range had 31.9% fire disturbance (≤40 yrs old), 0.8% human disturbance (including 500 m buffer; data current to 2015 [source ECCC]), and 32.3% total combined fire/human disturbance. These regional estimates do not yet include the final footprint of the TASR project (road alignment and borrow sources plus a 500 m buffer); however, based on the proposed alignment and all 21 potential borrow sources, the human disturbance footprint in the region would increase to 0.92%, and the total disturbance footprint (fire/human combined) would remain roughly the same at 32.3%. The NT1 range as a whole had 21.5% fire disturbance, 9.1% human disturbance and 29.0% total disturbance. Fire polygons from 2021 are not yet available to update disturbance estimates current to fall 2021.

g) Setting disturbance thresholds for critical habitat and, to the greatest extent possible, managing habitat towards meeting these disturbance thresholds for each range planning region; and,

Disturbance limits and human disturbance management thresholds have been defined for each boreal caribou range planning region within the NWT Framework for Boreal Caribou Range Planning.

h) Monitoring predator populations including densities, movements and predation rates

As part of the TASR WMMP and research program in partnership with Laval University (funded by the Sentinel North program), ENR deployed 6 culvert traps along Highway 3 between Fort Providence and Behchokǫ̀, and along the TASR corridor, to deploy GPS collars on black bears. Traps were deployed in different locations between September 8th and October 8th, 2021. The purpose of this program is to evaluate the influence of the TASR and Highway 3 on black bear movements and to assess predation rates of black bears on boreal caribou, moose and bison calves. The broader purpose of the Sentinel North project is to study food web dynamics between boreal caribou, moose, bison, wolves and bears and to understand how the food web is influenced by natural and human landscape disturbance as well as climate change. The black bear collars are equipped with a video camera to capture short video clips at regular intervals to document black bear predation events as well as to learn more about their behaviour and food habits. A total of 7 bears were captured and fitted with GPS collars in 2021 – 6 males and 1 female. An additional female black bear was captured and collared in Yellowknife and was released inside the study area. Collared bears entered hibernation between October 15 –

November 04, 2021, collars will exit winter mode on April 15, 2022. ENR plans to deploy additional collars in May 2022 to reach a target sample size of 20 individuals.

No further wolf surveys were conducted in 2021, but ENR obtained permits to deploy collars on up to 5 wolves in the study area in winter 2022.

13.3. MEASURE 6-2: DETERMINE SUSTAINABLE HARVEST LEVELS FOR BOREAL CARIBOU (TǪDZI) AND IMPLEMENT MEASURES TO ENSURE HARVEST IS SUSTAINABLE IF REQUIRED

ENR hired a contractor to conduct population modeling to evaluate sustainable harvest levels using available demographic data from boreal caribou monitoring programs in the Dehcho, South Slave and North Slave regions. The report was completed as of March 31, 2020. On September 27, 2021, GNWT circulated the report to Indigenous Governments and Organizations (IGOs) and released the report on ENR's website. The findings of the report were presented on November 10, 2021 at the *Wildlife Act* Section 15 meeting, as well as at specific meetings with the Tłı̨chǫ Government and North Slave Métis Alliance on October 28, 2021. ENR also held meetings to discuss the report with four other Indigenous Governments and Organizations from the South Slave and Dehcho regions in fall 2021. Engagement on the report will continue in 2022. Copies of the full report, plain language summary and fact sheet can be found at:

https://www.enr.gov.nt.ca/sites/enr/files/resources/gnwt_boreal_caribou_population_model_report_final_bil_1.pdf

https://www.enr.gov.nt.ca/sites/enr/files/resources/plain_lanugage_summary_boreal_caribou_sustainable_harvest_report_sep2021_0.pdf

https://www.enr.gov.nt.ca/sites/enr/files/resources/boreal_caribou_sustainable_harvest_fact_sheet.pdf

13.4. MEASURE 6-3: HABITAT OFFSET AND RESTORATION PLAN

A Draft Caribou Habitat Offset Plan was completed and submitted to the Wek'èezhìı Renewable Resources Board (WRRB) on July 31, 2019 in accordance with Measure 6-3. Employing the services of a consultant [Associated Environmental (AE)], the developer collaborated with the Tłı̨chǫ Government (TG) and WRRB, and consulted with Environment and Climate Change Canada (ECCC), Yellowknives Dene First Nation (YKDFN), and North Slave Métis Alliance (NSMA) to develop a Draft Caribou Habitat Offset Plan.

Following approval of the Draft Caribou Habitat Offset Plan by the WRRB, the consultant continued collaborating with ENR, WRRB and INF until a Final Caribou Habitat Offset Plan (The Final Plan) was completed and submitted to the WRRB on July 16, 2021 prior to opening of the road to the public as directed by Measure 6-3. The WRRB approved the Final Plan on September 2, 2021, paving the way for opening the road to the public on November 30, 2021 after substantial completion of construction.

13.5. MEASURE 7-1: INCORPORATE TRADITIONAL KNOWLEDGE INTO MONITORING OF BARREN-GROUND CARIBOU (ʔEKWǪ̀)

The following update was provided by the Tłı̨chǫ Government:

Regarding the implementation of Measure 7-1 from the Tłı̨chǫ Highway (TH; formerly known as the Tłı̨chǫ All Season Road) EA, incorporating Traditional Knowledge into monitoring of ʔekwǫ̀ (barren-ground caribou), the

following key actions were undertaken by the Tłı̨chǫ Government (TG) in 2021 and are described in greater detail below:

- **Completion of Baseline Conditions Report** – Tłı̨chǫ Tı̨lıì Deè Committee (elders/harvesters committee) provided guidance on interview participants and reviewed draft questions for the baseline conditions report at the January 14-15, 2021 Committee meeting. Thirteen interviews with knowledge holders were completed between February-March 2021, including focus on existing harvest levels prior to the Tłı̨chǫ Highway opening. Baseline analysis was completed including guidance and input from the Tłı̨chǫ Tı̨lıì Deè Committee, knowledge holder interviews, existing information from the K'àgòò Tı̨ lıì Deè: Traditional Knowledge Study for the Proposed All-Season Road to Whatì (2014) and other sources, as well as Tłı̨chǫ Highway track surveys and observations from February 2021. Baseline conditions report was completed in April 2021. The report was verified and revised following the April 14-15, 2021 Tłı̨chǫ Tı̨lıì Deè Committee meeting.
- **Tłı̨chǫ Tı̨lıì Deè Committee Meetings** – Meetings were held on January 14-15, April 14-15, and Nov 24-25, 2021 to provide guidance to the development of the Tłı̨chǫ Highway Wildlife Monitoring Program, including review of key plans, materials and methods.
    - January 14-15 Committee meeting focused on setting the purpose and terms of reference of the Committee, setting the monitoring needs, and working through the methodology to complete the baseline conditions report.
    - April 14-15 Committee meeting focused on work done to date, upcoming plans, issues/concerns, reviewed signage and confirmed finalization of the baseline report.
    - November 24-25 Committee and harvest monitors meeting in Yellowknife, discussed work done to date, upcoming plans, issues/concerns and the harvest monitors working on the highway. Field books were reviewed and edited based on committee/monitor feedback.
- **Tłı̨chǫ Tı̨lıì Deè Committee Site Tour** – Based on the direction from the Tłı̨chǫ Tı̨lıì Deè Committee that they needed to be able to see and experience the road firsthand to guide the program, a Committee trip to the Tłı̨chǫ Highway was completed on June 23, 2022.
- **Program Knowledge Exchange** - In an excellent opportunity for collaboration and learning, Tłı̨chǫ Wildlife Monitors and DCLP staff were invited to travel and join the Imaryuk Community Monitoring Program for the Inuvik-Tuktoyaktuk Highway between August 9-14, 2021. Collaboration between the Tłı̨chǫ Highway Wildlife Monitoring Program and the Imaryuk Community Monitoring Program will continue in 2022, with the Imaryuk Monitors planning to visit the Tłı̨chǫ Highway in August 2022 and learn from the Tłı̨chǫ Highway Monitors.
- **Vegetation Surveys** – Based on direction from the Tłı̨chǫ Tı̨lıì Deè Committee that more baseline habitat information was needed prior to the official opening of the road, vegetation surveys were completed along the Tłı̨chǫ Highway August 23-27, 2021. These vegetation surveys focused primarily on species abundance and composition, as well as ground cover composition, general site health, and arboreal lichen loads. Data analysis for the surveys was completed in a September 2021 report. Comment made by the committee was to involve female elders for the next survey as they are knowledgeable about plants and plant medicine.
- **Monitor Training and Program Launch** – On November 8-12, 2021 wildlife monitor training was held in Behchoko, Whati, and Wekweeti via zoom. From December 1-15, 2021 the wildlife monitoring training consultant worked with the harvest monitors on the TH when the voluntary harvest reporting program launched – information posters were distributed in Behchoko and Whati, and on Facebook. Preparation for fieldwork included purchasing safety equipment - satellite phone, Inreach/GPS. TG has supplied a truck for the ongoing harvest monitoring.

- **Ongoing Monitoring** – From December 1 to present, harvest monitors have been working on the TH every day, using their fieldbooks and taking part in monthly team check ins.
- **Funding** – GNWT ENR was able to supply us with additional funding and TG also supplied funding for the TH Wildlife Monitoring Program.
- **Wildlife Camera Study** – Initial discussions were held with GNWT regarding partnering on a wildlife camera study, possibility to plot cameras where the Tłı̨chǫ Tı̨lıì Deè Committee deems preferable based on knowledge of ʔekwǫ̀ habitat, crossing, and use.

13.6. IN RELATION TO MEASURE 7-1, THE PROJECT WILL FOCUS ON IMPROVING AND INFORMING MITIGATION OF SIGNIFICANT ADVERSE IMPACTS TO ʔEKWǪ̀ THROUGH THE INCLUSION OF TŁı̨CHǪ TRADITIONAL KNOWLEDGE IN TH MONITORING AND MANAGEMENT. MEASURE 7-2: BARREN-GROUND CARIBOU MITIGATION AND POLICY CHANGES

13.6.1. MEASURE 7-2, PART A: COMPLETE THE BATHURST CARIBOU RANGE PLAN

The Bathurst Caribou Range Plan (BCRP) was released on August 21, 2019. The BCRP was developed by a multi-stakeholder working group and will help decision-makers manage activities on the land in a way that supports the recovery of the Bathurst herd, while providing clarity on land use and access for developers, regulators and residents of the Northwest Territories (NWT). It includes guidance for managing the overall amount of disturbance on the land, as well as seven management tools to reduce and manage impacts to caribou and caribou habitat. Actions are currently underway to support implementation of the recommendations contained in the BCRP. The BCRP is available on ENR's website at https://www.enr.gov.nt.ca/sites/enr/files/resources/bathurst_caribou_range_plan_2019_-_plan_pour_laire_de_repartition_des_caribous_de_bathurst_2019.pdf

In 2021, GNWT-ENR, with an Industry partner, has developed two guidance documents for the implementation of Mobile Caribou Conservation Measures (MCCM). A Framework Document describes the intent of MCCM and how they would operate, and an Operational Guidance document provides direction for companies with exploration camps that might need to implement MCCM at their site. GNWT-ENR conducted a desktop pilot project of MCCM in Fall 2020. The pilot project was conducted as a desktop exercise as exploration camps were not operational due to COVID-19. Results of the pilot project are reported in the MCCM Operational Guidance document and show how often caribou interacted with the sites, how long they resided nearby, what type of mitigation measures would have been triggered and for how long. GNWT-ENR plans to work with an Industry partner to test the MCCM and Operational Guidance document at an active exploration camp in 2022.

13.6.2. MEASURE 7-2, PART B: CONSIDER PROTECTING BARREN-GROUND CARIBOU HISTORIC WINTER HABITAT FROM FIRES:

The BCRP contains a recommendation to: "On an annual basis, identify large, strategically-located patches of forest in the central Bathurst winter range for the GNWT fire management "Values at Risk" database. Response to fires in these areas would be based on an analysis of the current fire load, fire environment, resource availability and similar considerations of the management options at the time of the fire event."

ENR has been exploring ways to identify areas as values at risk for boreal and barren-ground caribou based on habitat selection models, areas identified as important habitat by communities, availability and location of fire management resources, and logistical constraints. ENR staff met in summer and fall 2019 to discuss different options and this work is ongoing. The Tłı̨chǫ Government held a workshop to identify areas of critical winter

habitat for boreal and barren-ground caribou and shared the spatial data from the workshop with ENR in late summer 2019.

Priority areas for fire management for boreal caribou were identified in the interim Wek'èezhìı plan in 2021. Priority areas were identified based a late-winter habitat selection model and predictive map to target patches of highly selected habitat >60km^2 in size. These maps of key late-winter habitat patches were provided to GNWT-ENR Forest Management Division, along with the priority areas identified by Tłı̨chǫ Government in 2019 and the map of Basic, Enhanced and Intensive management areas defined in the interim range plan, for incorporation into their fire management decision mapping support tool called "SPARCS" (Spatial Precipitation and Risk Calculation System).

A total of 44 forest fires were reported in the North Slave region in 2021, with a total area burned of 34,865 ha. This was below the 10-year average of 57 fires per year and 287,000 ha burned per year. Several fires around Yellowknife, Behchoko and Whati received fire suppression actions (Figure XX). ENR fought a fire (Zf035-21) that occurred south of Whati and east of the TASR which was within a large patch of high suitability late-winter habitat for boreal caribou identified as Value at Risk in the interim Wek'èezhìı range plan. It took over 10 days to have the fire controlled and the fire burned an area of 2699 ha. Two fires that occurred within the barren-ground caribou winter range (Zf036-21 and Zf037-21) northeast of Whati and southwest of Gameti were suppressed during the same period, but did not coincide with areas identified by the Tłı̨chǫ Government as a priority barren ground caribou habitat. Two fires in the Wekeezhi Management area that were human caused were quickly suppressed and did not reach a significant size.

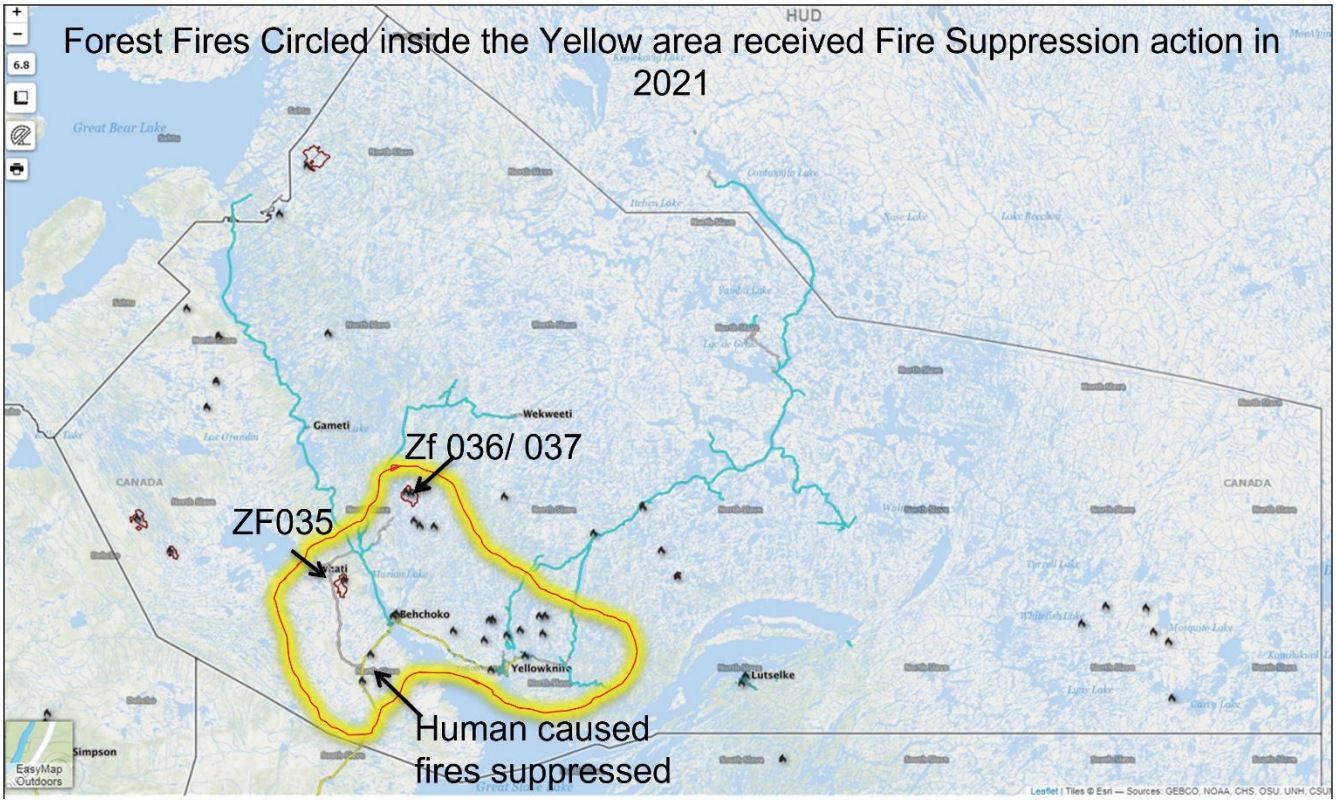

Figure 13-2 Forest fires within the North Slave region that received fire suppression during the 2021 fire season.

14. SUMMARY OF WILDLIFE MONITORING DATA

Environmental monitoring was integrated with the construction operations to maintain compliance with the Water License and Land Use Permit, as well as other regulatory requirements detailed in the Wildlife Management and Monitoring Plan. The surveys conducted during the construction phase documented areas of concern for sensitive wildlife crossing or zones where human-vehicle interference may be increased. This allows for an adaptive management approach to be used and allow for mitigation measures to be implemented during the construction and operational phases of the TASR. Listed below are summaries of all the data collected in 2021.

14.1. WILDLIFE ROAD SURVEYS

Wildlife road surveys are conducted by the environmental monitors that travel the TASR. These road surveys collect invaluable information to determine areas that may be more susceptible to human-wildlife interactions and to inform construction activities where reduced speed areas or potential areas for any wildlife interactions. When species were observed near the RoW call outs over the radio to all staff were implemented to create zones of reduced speed and to inform project personnel on crossing locations.

During this reporting period a total of one-hundred and fifty-seven (157) wildlife road surveys were completed by the Environmental Department. Total observations of mammals are shown in Table 14-1 and total observations of bird species in Table 14-2.

Table 14-1: Mammal Observations by Species for 2021

SPECIES	TOTAL #	SPECIES	TOTAL #
Beaver	2	Moose	23
Black Bear	55	Porcupine	12
Boreal Caribou	24	Wolverine	1
Canada Lynx	4	Wolf	22
Fox	15	Wood Bison	605*
Red Squirrel	1	Snowshoe Hare	7
Pine Marten	1	Cougar	2

Grand Total 774

*the same individual or groups may have been noted by multiple times by different observers and in different locations

Table 144-2; Bird Species Observations for 2021

SPECIES	TOTAL #	SPECIES	TOTAL #
Bald Eagle	1	**Ptarmigan Sp.**	**5**
Common Nighthawk	1	**Duck sp.**	1
Common Loon	2	**Sandhill Crane**	**22**
Owl sp.	3	**Canada Goose**	**2**
Spruce Grouse	71	**Trumpeter Swan**	**2**
Tundra Swan	**2**		
			Grand Total 112

14.2. WILDLIFE SIGHTINGS

Wildlife sighting logs provide a simple means for all Project staff to contribute to tracking wildlife activity at the Project. The value of the data is limited in that it is not systematically collected and contains repeated observations. Nonetheless it can provide an indication of the potential for wildlife incidents or problem wildlife as well as potential areas of concern.

Wildlife sighting logs are completed weekly and document the observations made by field crews. These observations are then uploaded into an Excel Wildlife Tracking spreadsheet (Appendix F). Total observations from all other field surveys (Road Surveys, Pre-Clear Surveys, etc.) are also included in that tracking sheet.

During the 2021 reporting period a total of twenty-five (25) different species of birds and mammals were observed within the TASR footprint. Wood bison (*Bison bison athabascae*) had the highest recorded observations with one hundred-thirteen (112) total observations documenting approximately six hundred and five (605) individuals in 2021, black bear observations was second with forty-six (46) observations and 55 individuals noted.

Spruce Grouse (*Falcipennis canadensis)*, Sandhill Crane (*Cygnus buccinator*), and ptarmigan *(Lagopus* sp.*),* and were the three most observed bird species in 2021 with a total count of 71, 22 and 5 respectively.

14.3. SPECIES AT RISK

Three (3) species at risk (SAR) were observed on the TASR in 2021; they are wood bison and boreal caribou *(Rangifer tarandus) and Common Nighthawk (Chordeiles minor)*. A wolverine *(Gulo gulo)*, a species of Special Concern (SC) was observed crossing the TASR RoW on one (1) occasion. These species were either observed during Wildlife Road Surveys or opportunistically when staff or craft members noted them while travelling the RoW.

14.4. WILDLIFE SURVEILLANCE SURVEY

Wildlife surveillance monitoring is intended to provide systematic and current information of wildlife activity at the Project construction camps and will provide direct feedback regarding the effectiveness of wildlife mitigation. Examples of wildlife activities that were documented through the Wildlife Surveillance monitoring include presence of wildlife within camp areas, any instances where food or domestic waste may be improperly stored and use of buildings by wildlife for shelter or nesting. Environment Monitors undertake systematic tours of the Project construction camps to record all wildlife observations or recent wildlife sign (e.g., tracks and scat). Environmental Monitors then recorded the area that was surveyed and noted all observations.

During the reporting period weekly wildlife surveillance sweeps were conducted around Camp 0+000 and Camp 19+800. These surveys generally patrol the perimeters of camp and make observations on active wildlife within certain areas. All observations were reported in the wildlife tracking spreadsheet. In total, forty-five (45) sweeps were conducted.

14.5. PRE-CLEARING LARGE MAMMAL AND BLAST SURVEYS

Blasting was required both within the TASR RoW and in borrow pits. Blasting was preceded by a scan for large mammals to reduce the risk of injury and the impacts of sensory disturbance. The blast surveys are intended to apply the same standards to large mammals that are used for human safety with regards to proximity to the blast radius. It is noted that it may not be possible to detect all large mammals within the blast radius in dense forest or undulating terrain, but this is partly mitigated by the drilling activity and horn signals that precede the blast, which is likely to deter wildlife from the area.

The Pre-Clearing Large Mammal Survey consisted of a ground-based survey no more than 48 hours prior to clearing activities. Pre-blast Wildlife Surveys were generally timed to visually assess the blast radius no more than one hour prior to the blast ignition.

During the reporting period, pre-clearing and blast surveys were conducted before all operations of vegetation clearing and blasting on the RoW to sweep for bird nests and large mammals including dens sites.

In total fourteen (14) pre-clearing and thirty-four (34) pre-blast surveys were conducted on the TASR in 2021.

During these surveys in 2021, large mammals were never observed around the blasting or clearing activities. With heavy equipment working in the vicinity, the noise levels were elevated which in turn acted as a deterrent. Another factor that affected the success of these surveys was dense forest composition that made viewing or spotting of fauna difficult even with binoculars or infrared scopes. When encountered, recent sign of animals (tracks and scat) were also documented which assisted in focusing sweep efforts.

14.6. MITIGATIONS TRIGGERED BY BOREAL CARIBOU COLLAR DATA MAPS

As per Appendix D - Operating Procedure for Use of Boreal Caribou Collar Data to Mitigate Impacts from Construction of the WMMP, ENR provided NSI with maps of boreal caribou collar locations on a weekly basis during the Summer, Fall, and Early to Mid-Winter periods (16 July – 16 March), and every two days during the Late-Winter and Calving periods (16 March – 15 July). Each collar data map provided displays collar locations from a 1 week period buffered by 3 km, and the most recent collar location for each individual. The collar data maps indicated if there were collared caribou within the 4-6 km cautionary zones along the TASR corridor, and in which segment (1-4) of the TASR corridor they occurred. Project operations were suspended during January 01-April 03, 2021 so no collar data maps were provided during that period. Collar data maps were thereafter provided to NSI from the first week of April until November 30, 2021, after which the road opened for public use. Collared caribou were most frequently reported within the 4-6 km buffer along Segment 1-3 (Km 0-85), and infrequently along Segment 4 (km 85-97) of the road (Table 15-3). Appendix G provides a detailed summary of the weekly environmental reporting periods and whether collared boreal caribou were present within the 4-6 km buffer along any of the 4 road segments, and which mitigation measures were implemented as a result. During 2021, collared boreal caribou occurred within the 4-6 km buffer along at least one of the four segments of the TASR during every weekly reporting period. The general mitigation response was to notify appropriate site personnel about which sections of the road had collared caribou present within the cautionary zones and to reduce traffic speeds. Presence of collared caribou within the 4-6 km buffers did not result in any reported suspensions or delays to vegetation clearing, blasting or other construction activity.

Table 14-3: Number of times collared boreal caribou were reported within the 4-6 km cautionary buffer zones within 4 different segments along the TASR route between April 04, 2021 – November 20, 2021.

	ROAD SEGMENT			
	Segment 1 (km 0 to 24)	**Segment 2 (km 25 to 46)**	**Segment 3 (km 47-85)**	**Segment 4 (km 85-97)**
Number of times collared boreal caribou reported within 4-6 km Cautionary Zone	44	47	47	2

15. HUMAN - WILDLIFE INTERACTIONS

15.1. WILDLIFE INCIDENTS / MORTALITIES

During the annual reporting period a total of one (1) wildlife incidents occurred on the TASR. Details of this incident can be found in the table below. This incident was reported to the appropriate regulatory agency following the established protocol.

Table 15-1: Wildlife Incidents

DATE	INCIDENT ID	DISCHARGE TYPE	DESCRIPTION	ACTION TAKEN
24-Jun-21	EIR-WL-006	Snowshoe Hare Mortality	On June 24, 2021, at 2:40pm a snowshoe hare was collected from the TASR road surface after having been struck by a road user. The Environmental Department was not notified of the incident, but it is possible that the animal was struck without being noticed.	The Environmental Manager removed the snowshoe hare carcass from the active roadway and disposed of it in Pit 33A where scavengers could feed on the carcass in an area removed from any construction traffic. The GNWT-ENR was notified by email on June 25, 2021 of the mortality. A Wildlife Incident Record was completed and was included in the weekly report for the period.

15.2. DISTURBANCE OF WILDLIFE HABITAT

No unanticipated disturbances to wildlife habitat occurred during the 2021 reporting period. All work complied with the WMMP and Land use Permit reference number (geotechnical and operational).

16. SCIENTIFIC STUDY REPORTS

16.1. THERMAL IMAGING DEVICE PILOT STUDY

The thermal imaging pilot study was developed to determine if alternative techniques could be used to detect large mammals during wildlife surveys on the TASR. The procedure behind the study was to observe any large mammal (moose, bison, and caribou) on the RoW and use three methods of detection: naked eye, binoculars, and thermal imaging. This was an opportunistic study that required Environmental monitors to come across these species while traveling the road or during sweeps (pre-blast, pre-clearing). These types of encounters with large animals were rare, and in most cases the observed species would move away from the RoW before the monitors could establish an observation point. Or conversely, with the case of bison, they stayed within the cleared RoW and were visible to the naked eye. There were two opportunities in 2021 that occurred during road surveys and in both cases (as documented in the weekly reporting) as soon as the animals (Boreal Caribou) left the TASR RoW neither the binoculars or thermal imaging device could detect them in the dense vegetation as they moved away from the RoW. The use of thermal imaging devices remains inconclusive as only two opportunities presented themselves in 2021.

16.2. TRAFFIC MONITORING RESULTS

Currently no traffic monitoring is being conducted as the TASR is not in the Operation Phase.

17. MIGRATORY BIRDS AND BIRD SPECIES AT RISK – MANAGEMENT AND PROTECTION

In 2021 only one bird SAR (Common Nighthawk) was observed within the TASR footprint. No nesting activity was observed in vicinity of the camp nor on or in any infrastructure/equipment.

18. TASR CROSSINGS BY COLLARED BOREAL CARIBOU

The 97km Tlicho All-Season Road (TASR), was divided into 1 km segments to help characterize clusters of boreal caribou crossings. Hourly boreal caribou collar locations from April 01, 2017 to December 31, 2021 that occurred within the 10 km "geofence" around the TASR alignment and HWY3 were converted into movement paths, and the intersections between movement paths and the TASR alignment were converted to points to count the number of crossings per 1 km segment (Figure 18-1).

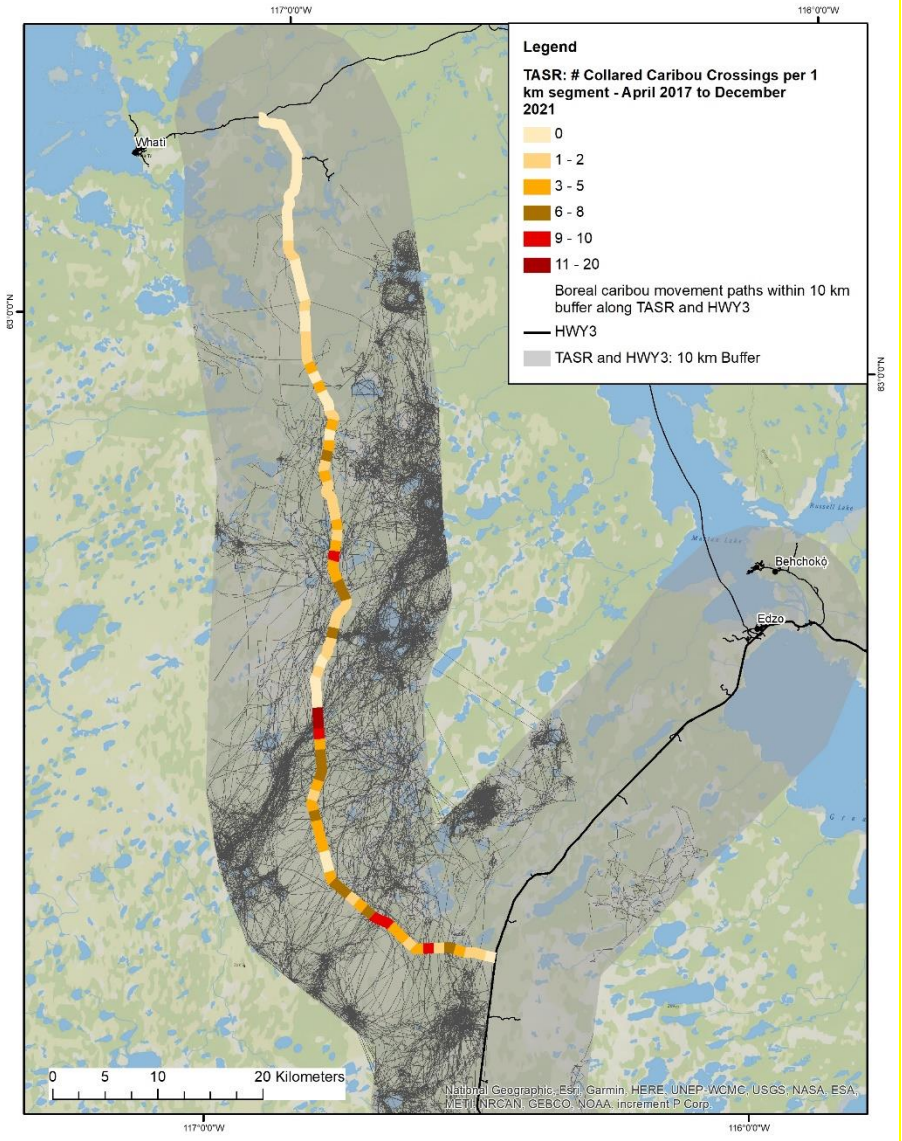

Figure 18-1: Number of collared boreal caribou road crossings along the TASR alignment broken down into 1 km segments, which occurred between April 01, 2017 and December 31, 2021.

The total number of crossings by collared caribou during this time period was 281, with 74 crossing occurring during the 2021 calendar year. No crossings occurred in 32 of the road segments. The maximum number of crossings in a segment was 20. Figure 19-2 shows the number of crossings since March 2017 to December 2021 as a function of month to assess whether there are times of year that boreal caribou cross the road more frequently. Boreal caribou appear to cross the alignment more frequently during the months of April-May and Oct-Dec, and less frequently during March, and June-September.

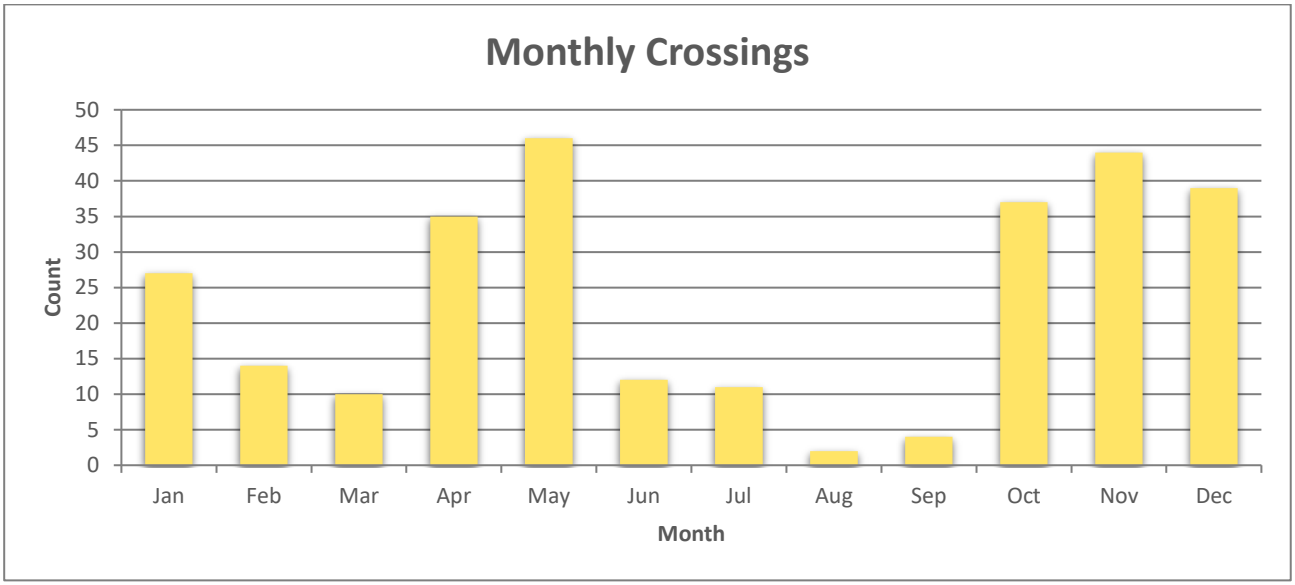

Figure 18-2: Total number of collared boreal caribou TASR crossings during each month, based on movement paths from collar data collected between April 01, 2017 to December 31, 2021.

A total of 27 collared caribou crossed the road at least once between April 01, 2017 and December 31, 2021. Construction of the TASR began in September 2019. Prior to construction there were 101 crossings by 15 collared caribou, and 172 crossings by 24 collared caribou during the construction phase. The Animal ID and crossings counts pre- and during construction can be found in Table 19-1.

Table 18-1: TASR crossings by collared boreal caribou during pre-construction (April 2017-August 2019), during construction (September 2019-November 2021), and after the road opened for public use (December 2021). The first two digits of the Animal ID number denote the year the collar was deployed.

ANIMAL ID	NUMBER OF TASR CROSSINGS		
	PRE-CONSTRUCTION	DURING CONSTRUCTION	ROAD OPEN
BWCA17602		3	
BWCA17605	2		
BWCA17606	21	10	
BWCA17616	3		
BWCA17618	10	9	
BWCA17620	4		

BWCA17622	8	11	
BWCA17623		5	
BWCA18600	8	6	
BWCA18602	22	9	
BWCA18603	7	7	
BWCA18604	4	4	
BWCA19600	2	12	
BWCA19601		6	
BWCA19602	2	17	
BWCA19603	2	7	
BWCA19604		4	
BWCA19605	2	18	1
BWCA19606	4	18	
BWCA21600		2	
BWCA21601		2	
BWCA21604		6	
BWCA21605		5	3
BWCA21606		5	
BWCA21607		3	1
BWCA21610		1	2
BWCA21615		2	1
TOTAL	**101**	**172**	**8**

19. MOOSE ABUNDANCE SURVEY

A moose abundance survey was conducted in March 2021. The survey was flown using tighter transect spacing over the TASR alignment to obtain an estimate of moose density specific to that area (Figure 19-1). Data analysis from the survey is still ongoing and results will be included in the comprehensive WMMP report for the construction phase which will be completed in late fall 2022.

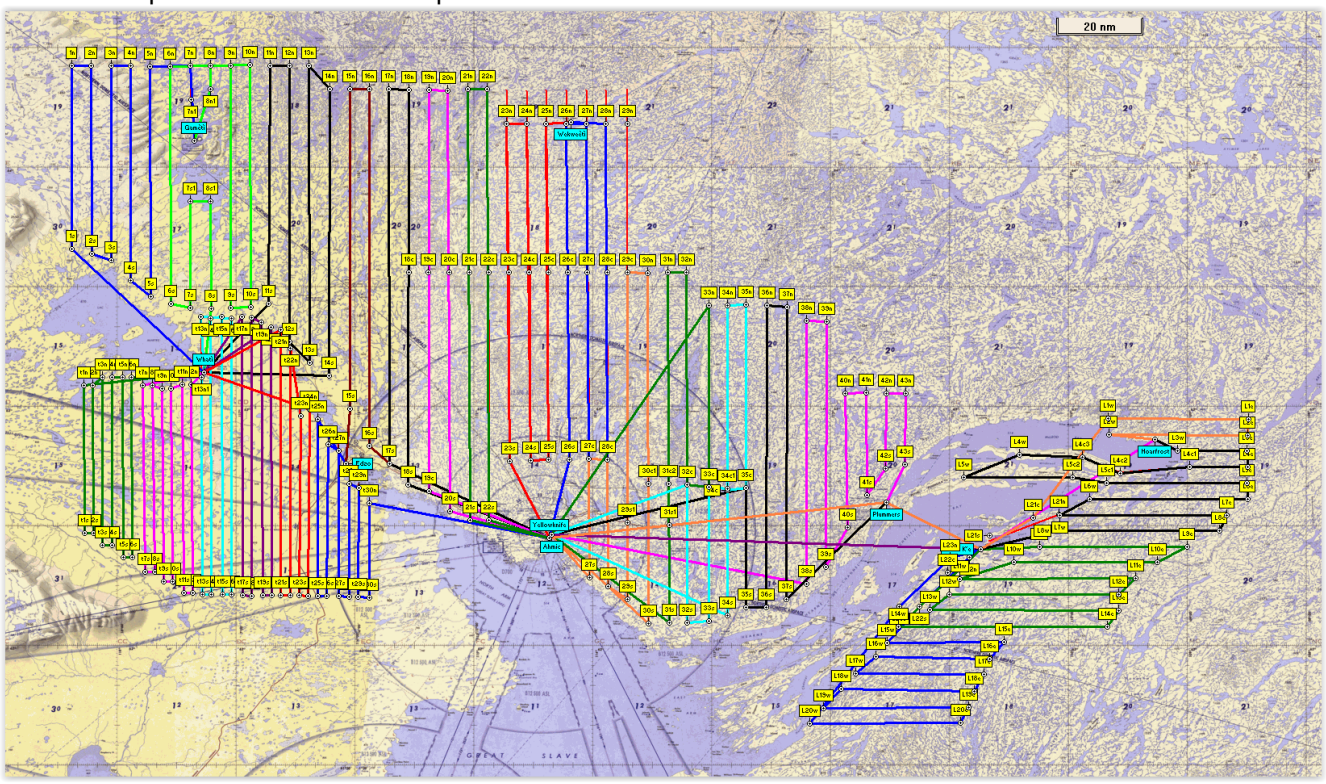

Figure 19-1 Flight lines from the moose abundance survey conducted in March 2021 which include the area encompassing the TASR alignment.

20. EA MONITORING RESULTS

Measure 10-1, Part 2: Use of results from pre-construction bird surveys required under Measure 10-1, Part 1 to inform mitigations

Golder and Associates Ltd provided a technical memo detailing how the results of the bird surveys could inform mitigations for the Tłı̨chǫ All-Season Road. As part of the technical memo, a thorough review of the mitigation measures proposed in the current Wildlife Management and Monitoring Plan (WMMP) was completed. The report concluded that adequate mitigation measures for birds, under GNWT-ENR's authority, have been included in the current WMMP.

One new mitigation measure has been recommended as a result of the information gathered from the bird survey, which is to create a suitable alternative habitat for bank swallows if they are found to be nesting in any Project stockpiles. This recommendation is currently under consideration. Results from the survey also reinforce the importance of the road alignment following the existing Old Airport Road. Finding from the surveys are also discussed in more detailed in Section 5.7.1.

20.1. MEASURE 10-2, PART 2: WILDLIFE MANAGEMENT AND MONITORING PLAN UPDATE DURING PERMITTING

During the permitting, the developer worked collaboratively with Environment and Climate Change Canada, GNWT-ENR, Wek'èezhìı Renewable Resources Board, Tłı̨chǫ Government and Indigenous groups and harvesters to develop an updated WMMP.

Traditional knowledge (TK) was provided by The Tłı̨chǫ Government and the Yellowknives Dene First Nations. The TK was incorporated into the WMMP with respect to caribou and will also be incorporated into a Caribou Habitat Offset Plan.

GNWT-ENR approved version 3.3 of the WMMP on August 30, 2019, following review and approval of the WMMP by the Wek'èezhìı Renewable Resources Board under Section 12.5.1 of the Tłı̨chǫ Agreement which included a period of public review.

The WMMP version 4.1 was submitted to the WRRB on November 6, 2020 for review and approval. Following the approval of version 4.1 by the WRRB, version 4.2 was submitted to the WLWB and ENR, respectively for their review and approval. The WLWB approved the version 4.2 on February 25, 2021 while ENR approved its version on March 1, 2021.

For the reporting period and in compliance with EA Measure 10-2, Part 3, the WMMP was revised and updated in collaboration with ENR and submitted to the Wek'èezhìı Land and Water Board (WLWB). A 30-day public review period was undertaken, with submissions made to the WLWB's Online Review System by Environment and Climate Change Canada, North Slave Metis Alliance and Wek'èezhìı Renewable Resources Board (WRRB). In consultation with ENR staff, INF developed responses to comments received, revised the WMMP to address the comments.

The WMMP version 5.1 was submitted to the WRRB on November 6, 2021 for review and approval. Following the approval of version 5.1 by the WRRB on December 9, 2021, it was submitted to the WLWB and ENR, respectively for their review and approval. The WLWB approved the version 5.2 on February 09, 2022 while ENR approved its version on March 21, 2022.

21. EDUCATION AND TRAINING OF PROJECT WORKERS

21.1. GENERAL

During the reporting period the Environmental Department provided varies types of environmental training to Project site personnel. Training was provided in the form of toolbox talks that were presented at the daily, morning and nightshift Pre-Task Instruction (PTI). Extensive informal training is provided to the various work fronts on a daily/weekly basis during work plan reviews, daily Play of the Day (POD), Frontline Supervisor Training Sessions and in the field where questions arise regarding specific activities and compliance measures required.

All of the formal training topics that were highlighted during the 2021 construction season are provided below and the records of the trainings (including staff signoffs) are maintained on the project SharePoint site for internal compliance requirements. When conducted, training topics are highlighted in the weekly environmental reports that are publicly available through the WLWB website.

- June 20, 2021 – A few Environmental Rules.
- June 27, 2021 – Spill Response Products.
- July 4, 2021 – Equipment Inspections.
- July 25, 2021 – Housekeeping Refresher
- August 22, 2021 – Working Near Water
- August 29, 2021 – Working Near Water

21.2. SPILL TRAINING

The Environmental Department provided spill prevention and response management training to Project site personnel. Training was provided in the form of toolbox talks that were presented at the daily, morning and nightshift, Pre-Task Instruction (PTI) as well as Supervisor Training Sessions. Below is a list of training that was provided:

- May 16, 2021 – Internal Spill Notification Protocol (Supervisor Training Session)
- May 31, 2021 – Internal Spill Notification Protocol (Supervisor Training Session)
- June 27, 2021 – Spill Response Products (Toolbox Talk)
- July 4, 2021 – Equipment Inspections (Toolbox Talk)
- August 8, 2021 – Internal Spill Notification Procedures (Supervisor Training Session)
- August 22, 2021 – Spill Kit Inspection and Re-stock Procedures (Supervisor Training Session)

It should also be noted that the Environmental Department routinely provided varying levels of spill training when responding to incidents in the field. During those events, training included such topics as hazardous product characteristics (density/migration), extent of contamination due to soil/ground conditions, proper spill response products to use, effective clean up/confirming full remediation as well as estimating spill volumes.

22. REFERENCES

Hatter, I.W., and W.A. Bergerud. 1991. Moose recruitment, adult mortality, and rate of change. Alces 27: 65-73.

Latham , A.D.M., Latham, M.C., McCutchen, N.A. and S. Boutin. 2011. Invading white-tailed deer change wolf-caribou dynamics in north-eastern Alberta. Journal of Wildlife Management 75(1):204-212.

Serrouya, R., van Oort, H., DeMars, C., and Boutin, S. 2016. Human footprint, habitat, wolves and boreal caribou population growth rates. https://www.nwt-esrf.org/sites/default/files/2016-10/Human%20Footprint%2C%20Habitat%2C%20Wolves%20and%20Boreal%20Caribou%20Population%20Growth%20Rates_2016.pdf. Accessed December 12, 2018.

APPENDIX A WASTE TRACKING SPREADSHEETS

Kiewit **CONSTRUCTION, CARDBOARD AND SOLID WASTE MANIFEST TRACKING**

Construction Waste System:

Waste is placed into 25yd open top bins on site

Kavenaugh hauls the waste from site to the Yellowknife Landfill where is it disposed off site

Date Shipped	Site	Kavenaugh Invoice #	Weight (MT)	Type of Waste
7-Jul-21	km19	185381	1.30	**Wood**
19-Aug-21	km19	186683	1.05	**Wood**
6-Sep-21	km19	189189	0.71	**Wood**
14-Oct-21	km19	189922	0.93	**Wood**
19-Oct-21	km19	189922	1.27	**Wood**
10-Nov-21	km19	191707	2.15	**Wood**
1-Nov-21	km19	191707	1.91	**Wood**

Kiewit

SEWAGE AND SEPTIC WASTE TRACKING

Tlicho All Season Road				
Date shipped	**Invoice #**	**Waste Source**	**Quantity (gallons)**	**Location**
6-Jan-21	178060	Sewer Pumping and Disposal	3000	km19
1-Feb-21	179246	Porta Potty	60	TASR
3-Feb-21	179246	Sewer Pumping and Disposal	3000	km19
6-Feb-21	179246	Sewer Pumping and Disposal	3000	km19
10-Feb-21	179246	Sewer Pumping and Disposal	3000	km19
14-Feb-21	179256	Sewer Pumping and Disposal	3000	km19
22-Feb-21	181150	Porta Potty	60	TASR
22-Feb-21	179257	Porta Potty	60	TASR
21-May-21	184105	Sewer Pumping and Disposal	3000	km19
23-May-21	184105	Sewer Pumping and Disposal	3000	km19
25-May-21	184105	Sewer Pumping and Disposal	3000	km19
27-May-21	184105	Sewer Pumping and Disposal	3000	km19
29-May-21	184105	Sewer Pumping and Disposal	3000	km19
31-May-21	184105	Sewer Pumping and Disposal	3000	km19
2-Jun-21	184120	Sewer Pumping and Disposal	3000	km19
4-Jun-21	184120	Sewer Pumping and Disposal	3000	km19
4-Jun-21	184120	Sewer Pumping and Disposal	3000	km19
6-Jun-21	184120	Sewer Pumping and Disposal	3000	km19
8-Jun-21	184120	Sewer Pumping and Disposal	3000	km19
10-Jun-21	184120	Sewer Pumping and Disposal	3000	km19
17-Jun-21	184121	Porta Potty	60	TASR
12-Jun-21	184121	Sewer Pumping and Disposal	3000	km19
14-Jun-21	184121	Sewer Pumping and Disposal	3000	km19
15-Jun-21	184121	Sewer Pumping and Disposal	3000	km19
16-Jun-21	184121	Sewer Pumping and Disposal	3000	km19
16-Jun-21	184121	Sewer Pumping and Disposal	3000	km19
17-Jun-21	184121	Sewer Pumping and Disposal	3000	km19
19-Jun-21	184121	Sewer Pumping and Disposal	3000	km19
20-Jun-21	184121	Sewer Pumping and Disposal	3000	km19
26-Jun-21	184129	Porta Potty	60	km19
21-Jun-21	184129	Sewer Pumping and Disposal	3000	km19
22-Jun-21	184129	Sewer Pumping and Disposal	3000	km19
23-Jun-21	184129	Sewer Pumping and Disposal	3000	km19
24-Jun-21	184129	Sewer Pumping and Disposal	3000	km19
26-Jun-21	184129	Sewer Pumping and Disposal	3000	km19
27-Jun-21	184129	Sewer Pumping and Disposal	3000	km19
28-Jun-21	184129	Sewer Pumping and Disposal	3000	km19
30-Jun-21	184129	Sewer Pumping and Disposal	3000	km19
Total				**0**

Approved By: Kerry Pike

Kiewit

SEWAGE AND SEPTIC WASTE TRACKING

Tlicho All Season Road				
Date shipped	**Invoice #**	**Waste Source**	**Quantity (gallons)**	**Location**
5-Jul-21	185381	Porta Potty	60	km19
1-Jul-21	185381	Sewer Pumping and Disposal	3000	km19
2-Jul-21	185381	Sewer Pumping and Disposal	3000	km19
4-Jul-21	185381	Sewer Pumping and Disposal	3000	km19
5-Jul-21	185381	Sewer Pumping and Disposal	3000	km19
6-Jul-21	185381	Sewer Pumping and Disposal	3000	km19
7-Jul-21	185381	Sewer Pumping and Disposal	3000	km19
8-Jul-21	185381	Sewer Pumping and Disposal	3000	km19
10-Jul-21	185381	Sewer Pumping and Disposal	3000	km19
15-Jul-21	185382	Porta Potty	60	km19
11-Jul-21	185382	Sewer Pumping and Disposal	3000	km19
12-Jul-21	185382	Sewer Pumping and Disposal	3000	km19
13-Jul-21	185382	Sewer Pumping and Disposal	3000	km19
14-Jul-21	185382	Sewer Pumping and Disposal	3000	km19
15-Jul-21	185382	Sewer Pumping and Disposal	3000	km19
16-Jul-21	185382	Sewer Pumping and Disposal	3000	km19
17-Jul-21	185382	Sewer Pumping and Disposal	3000	km19
18-Jul-21	185382	Sewer Pumping and Disposal	3000	km19
19-Jul-21	185382	Sewer Pumping and Disposal	3000	km19
20-Jul-21	185382	Sewer Pumping and Disposal	3000	km19
3-Aug-21	186675	Porta Potty	60	km19
6-Aug-21	186675	Porta Potty	60	km19
10-Aug-21	186675	Porta Potty	60	km19
1-Aug-21	186675	Sewer Pumping and Disposal	3000	km19
2-Aug-21	186675	Sewer Pumping and Disposal	3000	km19
3-Aug-21	186675	Sewer Pumping and Disposal	3000	km19
4-Aug-21	186675	Sewer Pumping and Disposal	3000	km19
5-Aug-21	186675	Sewer Pumping and Disposal	3000	km19
6-Aug-21	186675	Sewer Pumping and Disposal	3000	km19
7-Aug-21	186675	Sewer Pumping and Disposal	3000	km19
8-Aug-21	186675	Sewer Pumping and Disposal	3000	km19
9-Aug-21	186675	Sewer Pumping and Disposal	3000	km19
10-Aug-21	186675	Sewer Pumping and Disposal	3000	km19
22-Jul-21	186656	Porta Potty	60	km19
27-Jul-21	186656	Porta Potty	60	km19
30-Jul-21	186656	Porta Potty	60	km19
21-Jul-21	186656	Sewer Pumping and Disposal	3000	km19
22-Jul-21	186656	Sewer Pumping and Disposal	3000	km19
23-Jul-21	186656	Sewer Pumping and Disposal	3000	km19

Kiewit

SEWAGE AND SEPTIC WASTE TRACKING

Tlicho All Season Road				
Date shipped	**Invoice #**	**Waste Source**	**Quantity (gallons)**	**Location**
24-Jul-21	186656	Sewer Pumping and Disposal	3000	km19
25-Jul-21	186656	Sewer Pumping and Disposal	3000	km19
26-Jul-21	186656	Sewer Pumping and Disposal	3000	km19
27-Jul-21	186656	Sewer Pumping and Disposal	3000	km19
28-Jul-21	186656	Sewer Pumping and Disposal	3000	km19
29-Jul-21	186656	Sewer Pumping and Disposal	3000	km19
30-Jul-21	186656	Sewer Pumping and Disposal	3000	km19
31-Jul-21	186656	Sewer Pumping and Disposal	3000	km19
13-Aug-21	186683	Porta Potty	60	km19
17-Aug-21	186683	Porta Potty	60	km19
20-Aug-21	186683	Porta Potty	60	km19
11-Aug-21	186683	Sewer Pumping and Disposal	3000	km19
12-Aug-21	186683	Sewer Pumping and Disposal	3000	km19
13-Aug-21	186683	Sewer Pumping and Disposal	3000	km19
14-Aug-21	186683	Sewer Pumping and Disposal	3000	km19
15-Aug-21	186683	Sewer Pumping and Disposal	3000	km19
16-Aug-21	186683	Sewer Pumping and Disposal	3000	km19
17-Aug-21	186683	Sewer Pumping and Disposal	3000	km19
18-Aug-21	186683	Sewer Pumping and Disposal	3000	km19
19-Aug-21	186683	Sewer Pumping and Disposal	3000	km19
20-Aug-21	186683	Sewer Pumping and Disposal	3000	km19
24-Aug-21	187939	Porta Potty	60	km19
27-Aug-21	187939	Porta Potty	60	km19
31-Aug-21	187939	Porta Potty	60	km19
21-Aug-21	187939	Sewer Pumping and Disposal	3000	km19
22-Aug-21	187939	Sewer Pumping and Disposal	3000	km19
23-Aug-21	187939	Sewer Pumping and Disposal	3000	km19
24-Aug-21	187939	Sewer Pumping and Disposal	3000	km19
25-Aug-21	187939	Sewer Pumping and Disposal	3000	km19
26-Aug-21	187939	Sewer Pumping and Disposal	3000	km19
27-Aug-21	187939	Sewer Pumping and Disposal	3000	km19
28-Aug-21	187939	Sewer Pumping and Disposal	3000	km19
29-Aug-21	187939	Sewer Pumping and Disposal	3000	km19
31-Aug-21	187939	Sewer Pumping and Disposal	3000	km19
6-Sep-21	189189	Porta Potty	60	km19
10-Sep-21	189189	Porta Potty	60	km19
2-Sep-21	189189	Sewer Pumping and Disposal	3000	km19
4-Sep-21	189189	Sewer Pumping and Disposal	3000	km19
5-Sep-21	189189	Sewer Pumping and Disposal	3000	km19

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SEWAGE AND SEPTIC WASTE TRACKING

Tlicho All Season Road				
Date shipped	**Invoice #**	**Waste Source**	**Quantity (gallons)**	**Location**
6-Sep-21	189189	Sewer Pumping and Disposal	3000	km19
6-Sep-21	189189	Sewer Pumping and Disposal	3000	km19
8-Sep-21	189189	Sewer Pumping and Disposal	3000	km19
10-Sep-21	189189	Sewer Pumping and Disposal	3000	km19
10-Sep-21	189189	Sewer Pumping and Disposal	3000	km19
12-Sep-21	189190	Sewer Pumping and Disposal	3000	km19
14-Sep-21	189190	Sewer Pumping and Disposal	3000	km19
16-Sep-21	189190	Sewer Pumping and Disposal	3000	km19
18-Sep-21	189190	Sewer Pumping and Disposal	3000	km19
19-Sep-21	189190	Sewer Pumping and Disposal	3000	km19
20-Sep-21	189190	Sewer Pumping and Disposal	3000	km19
21-Sep-21	189191	Sewer Pumping and Disposal	3000	km19
22-Sep-21	189191	Sewer Pumping and Disposal	3000	km19
24-Sep-21	189191	Sewer Pumping and Disposal	3000	km19
25-Sep-21	189191	Sewer Pumping and Disposal	3000	km19
26-Sep-21	189191	Sewer Pumping and Disposal	3000	km19
28-Sep-21	189191	Sewer Pumping and Disposal	3000	km19
29-Sep-21	189191	Sewer Pumping and Disposal	3000	km19
29-Sep-21	189191	Sewer Pumping and Disposal	3000	km19
30-Sep-21	189191	Sewer Pumping and Disposal	3000	km19
22-Oct-21	189923	Sewer Pumping and Disposal	3000	km19
24-Oct-21	189923	Sewer Pumping and Disposal	3000	km19
26-Oct-21	189923	Sewer Pumping and Disposal	3000	km19
26-Oct-21	189923	Sewer Pumping and Disposal	3000	km19
28-Oct-21	189923	Sewer Pumping and Disposal	3000	km19
31-Oct-21	189923	Sewer Pumping and Disposal	3000	km19
2-Oct-21	189920	Sewer Pumping and Disposal	3000	km19
4-Oct-21	189920	Sewer Pumping and Disposal	3000	km19
5-Oct-21	189920	Sewer Pumping and Disposal	3000	km19
6-Oct-21	189920	Sewer Pumping and Disposal	3000	km19
8-Oct-21	189920	Sewer Pumping and Disposal	3000	km19
9-Oct-21	189920	Sewer Pumping and Disposal	3000	km19
10-Oct-21	189920	Sewer Pumping and Disposal	3000	km19
12-Oct-21	189922	Sewer Pumping and Disposal	3000	km19
14-Oct-21	189922	Sewer Pumping and Disposal	3000	km19
16-Oct-21	189922	Sewer Pumping and Disposal	3000	km19
18-Oct-21	189922	Sewer Pumping and Disposal	3000	km19
20-Oct-21	189922	Sewer Pumping and Disposal	3000	km19
17-Nov-21	191708	Sewer Pumping and Disposal	3000	km19

Kiewit **SEWAGE AND SEPTIC WASTE TRACKING**

Tlicho All Season Road				
Date shipped	**Invoice #**	**Waste Source**	**Quantity (gallons)**	**Location**
1-Nov-21	191707	Sewer Pumping and Disposal	3000	km19
3-Nov-21	191707	Sewer Pumping and Disposal	3000	km19
5-Nov-21	191707	Sewer Pumping and Disposal	3000	km19
8-Nov-21	191707	Sewer Pumping and Disposal	3000	km19
9-Nov-21	191707	Sewer Pumping and Disposal	3000	km19

APPENDIX B 2021 DRILL AND BLAST DETAILS

TABLE B-1 BLAST DATES AND LOCATION ON THE TASR IN 2021

DATE	BLAST #	LOCATION
7-Apr-21	Pit Blast #2021-001	Pit 105
07-Jul-21	Ditch Blast #2021-001	Station 48+640
08-Jul-21	Ditch Blast #2021-002	Station 49+000 (east)
09-Jul-21	Ditch Blast #2021-003	Station 49+000 (west)
15-Jul-21	Ditch Blast #2021-004	Station 49+500 (east) and Station 50+050 (west)
16-Jul-21	Ditch Blast #2021-005	Station 51+064 (east)
17-Jul-21	Ditch Blast #2021-006	Station 51+064 (west)
21-Jul-21	Ditch Blast #2021-007	Station 52+700 (east and west)
23-Jul-21	Ditch Blast #2021-008	Station 88+890 (east and west)
24-Jul-21	Ditch Blast #2021-009	Station 88+520 (east and west)
25-Jul-21	Ditch Blast #2021-010	Station 87+630 (east and west)
26-Jul-21	Ditch Blast #2021-011	Station 78+800 (east and west)
27-Jul-21	Ditch Blast #2021-012	Station 87+000
29-Jul-21	Ditch Blast #2021-013	Station 82+200 (east and west)
30-Jul-21	Ditch Blast #2021-014	Station 78+540 (east)
19-Aug-21	Ditch Blast #2021-015	Station 30+150
20-Aug-21	Ditch Blast #2021-016	Station 78+600 (east and west)
21-Aug-21	Ditch Blast #2021-017	Station 34+350 (east and west)
22-Aug-21	Ditch Blast #2021-018	Station 35+224 (east and west)
23-Aug-21	Ditch Blast #2021-019	Station 37+946 (east and west)
24-Aug-21	Ditch Blast #2021-020	Station 40+100 (west)
24-Aug-21	Ditch Blast #2021-021	Station 49+200 (east)
24-Aug-21	Ditch Blast #2021-022	Station 59+350 (east and west)
25-Aug-21	Ditch Blast #2021-023	Station 59+790 (east and west)
25-Aug-21	Ditch Blast #2021-024	Station 59+800 (east and west)
25-Aug-21	Ditch Blast #2021-025	Station 76+100 (east)
25-Aug-21	Ditch Blast #2021-026	Station 76+674 to 78+676 (east and west)
25-Aug-21	Ditch Blast #2021-027	Station 82+100
26-Aug-21	Ditch Blast #2021-028	Station 82+130
30-Aug-21	Pit Blast #2021-002	Pit 105
20-Sep-21	Ditch Blast #2021-029	Station 93+100 (east)
20-Sep-21	Ditch Blast #2021-030	Station 92+600 (east and west)
20-Sep-21	Ditch Blast #2021-031	Station 16+545 (east)
19-Oct-21	Pit Blast #2021-003	Pit 105

APPENDIX C 2021 WILDLIFE TRACKING SPREADSHEET

TASR Wildlife Sightings Log

Year	Date of Sighting	Time	Species	Number	Age	Injured	Location/GPS Coordinates			Survey Type	Sighting By	Company	Notes
2021	28-Mar-21	11:00AM	Moose	1	Adult	No	11V	521606.77	6928609.18	Wildlife Sightings Log	Ken Feng	Kiewit	west of RoW
2021	29-Mar-21	10:00AM	Wolf	4	Adult	No	11V	508178.35	6947359.27	Wildlife Sightings Log	Ken Feng	Kiewit	west of RoW
2021	29-Mar-21	10:15Am	Bison	3	Adult	No	11V	508693.73	6958026.18	Wildlife Sightings Log	Ken Feng	Kiewit	west of RoW
2021	4-May-21	12:00 PM	Bison	3	Adult	No	11V	508417.68	6943430.01	Wildlife Sightings Log	Ken Feng	Kiewit	west of RoW
2021	5-May-21	12:00 PM	Bison	1	Adult	No	11V	521613.06	6928530.79	Wildlife Sightings Log	Ken Feng	Kiewit	west of RoW
2021	14-May-21	5:45 PM	Black Bear	1	Adult	No	11V	507930	6941495	Wildlife Sightings Log	Joe E.	LaFarge	crossing through RoW
2021	15-May-21	4:18 PM	Black Bear	1	Adult	No	11V	508276	6955948	Wildlife Sightings Log	Shane M.	Kiewit	along edge of RoW
2021	21-May-21	8:15 AM	Black Bear	1	Adult	No	11V	509769	6935531	Wildlife Sightings Log	Chris R.	Kiewit	edge of the maintance yard perimeter
2021	22-May-21	7:20 AM	Sandhill Crane	1	Adult	No	11V	508602	6944733	Wildlife Sightings Log	Cristian P	Kiewit	Within RoW
2021	22-May-21	7:30 AM	Sandhill Crane	4	Adult	No	11V	509279	6961429	Wildlife Sightings Log	Cristian P	Kiewit	Within RoW
2021	22-May-21	7:40 AM	Sandhill Crane	3	Adult	No	11V	509216	6961596	Wildlife Sightings Log	Cristian P	Kiewit	Within RoW
2021	23-May-21	7:30 AM	Moose	1	Adult	No	11V	508779.64	6938760.35	Wildlife Sightings Log	Maxime Benoit	Kiewit	Within RoW
2021	23-May-21	8:00 AM	Black Bear	1	Adult	No	11V	522121.07	6928458.84	Wildlife Sightings Log	Maxime Benoit	Kiewit	Within RoW
2021	24-May-21	7:35 AM	Caribou	2	Adult	No	11V	507581.24	6970052.13	Wildlife Sightings Log	Maxime Benoit	Kiewit	Within RoW
2021	24-May-21	9:40 AM	Caribou	1	Adult	No	11V	507551.88	6951355.23	Wildlife Sightings Log	Maxime Benoit	Kiewit	Within RoW
2021	25-May-21	5:30 PM	Black Bear	1	Adult / Cub	No	11V	522121.07	6928458.84	Wildlife Sightings Log	Maxime Benoit	Kiewit	Within RoW
2021	26-May-21	9:15 AM	Porcupine	1	Adult	No	11V	509140.11	6937700.42	Wildlife Sightings Log	Maxime Benoit	Kiewit	Within RoW
2021	26-May-21	11:50 AM	Pine Marten		Adult	No	11V	507551.88	6951355.23	Wildlife Sightings Log	Maxime Benoit	Kiewit	Within RoW
2021	29-May-21	7:20AM	Bison	1	Adult	No	11V	526538.41	6927937.29	Wildlife Sightings Log	Ken Feng	Kiewit	Along Hwy 3
2021	29-May-21	9:30AM	Moose	1	Adult	No	11V	526593.08	6928011.8	Wildlife Sightings Log	James Duffy	Kiewit	Along Hwy 3
2021	29-May-21	10:00AM	Black Bear	1	Adult	No	11V	508236.81	6955475.21	Wildlife Sightings Log	Maxime Benoit	Kiewit	Near Duport Bridge
2021	31-May-21	2:00 PM	Black Bear	1	Adult	No	11V	508176	6940525	Wildlife Sightings Log	Maxime Benoit	Kiewit	along edge of RoW
2021	31-May-21	11:00 PM	Caribou	1	Adult	No	11V	524251	6928249	Wildlife Sightings Log	Ralph T	Kiewit	along edge of RoW
2021	3-Jun-21	10:00 AM	Red Fox	1	Adult	No	11V	508438.71	6939698.52	Wildlife Sightings Log	Tyler I	Kiewit	along edge of RoW
2021	3-Jun-21	8:00 PM	Caribou	1	Adult	No	11V	524251	6928249	Wildlife Sightings Log	Ralph T	Kiewit	along edge of RoW
2021	4-Jun-21	4:00 AM	Porcupine	1	Adult	No	11V	503511.99	6987890.96	Wildlife Sightings Log	Aiden W	Kiewit	along edge of RoW
2021	4-Jun-21	12:30 PM	Canada Lynx	1	Adult	No	11V	507389	6953267	Wildlife Sightings Log	Maxime Benoit	Kiewit	along edge of RoW
2021	5-Jun-21	8:00 AM	Black Bear	1	Adult	No	11V	508193.59	6955481.11	Wildlife Sightings Log	Bruno P	Kiewit	along edge of RoW
2021	5-Jun-21	9:00 AM	Beaver	1	Adult	No	11V	511346	6933348	Wildlife Sightings Log	Maxime Benoit	Kiewit	along edge of RoW
2021	6-Jun-21	9:10 AM	Canada Goose	2	Adult	No	11V	508287.24	6966017.39	Widlife Road Survey	Dave G	Kiewit	along edge of RoW
2021	7-Jun-21	10:00 PM	Black Bear	1	Adult	No	11V	508191.97	6964380.25	Wildlife Sightings Log	Ralph T	Kiewit	along edge of RoW
2021	7-Jun-21	11:00 PM	Beaver	1	Adult	No	11V	506557.26	697911.35	Wildlife Sightings Log	Rick H	Kiewit	along edge of RoW
2021	9-Jun-21	9:51 AM	Sandhill Crane	1	Adult	No	11V	509480.09	6961170.54	Widlife Road Survey	Dave G	Kiewit	along edge of RoW
2021	10-Jun-21	11:55 AM	Red Squirrel	1	Adult	No	11V	502762.42	6990903.27	Widlife Road Survey	Dave G	Kiewit	along edge of RoW
2021	10-Jun-21	12:03 PM	Canada Lynx	1	Adult	No	11V	501231.41	6996098.41	Widlife Road Survey	Dave G	Kiewit	along edge of RoW
2021	10-Jun-21	12:08 PM	Bald Eagle	1	Adult	No	11V	501183.24	6997645.58	Widlife Road Survey	Dave G	Kiewit	along edge of RoW
2021	10-Jun-21	11:00 PM	Porcupine	1	Adult	No	11V	503124.38	6989825.72	Wildlife Sightings Log	Robin E	Kiewit	along edge of RoW
2021	11-Jun-21	6:36 AM	Bison	7	Adult	No	11V	512147.15	6932806.17	Wildlife Sightings Log	Robin E	Kiewit	along edge of RoW
2021	11-Jun-21	11:30 AM	Black Bear	1	Adult	No	11V	513742.69	6931612.37	Wildlife Sightings Log	Ken F	Kiewit	Crossing RoW
2021	13-Jun-21	9:15 AM	Bison	1	Adult	No	11V	508842.74	6938664.09	Wildlife Sightings Log	Ken F	Kiewit	along edge of RoW

TASR Wildlife Sightings Log

Year	Date of Sighting	Time	Species	Number	Age	Injured	Location/GPS Coordinates			Survey Type	Sighting By	Company	Notes
2021	14-Jun-21	7:20 AM	Bison	15	2 Adult, 3 calv	No	11V	511712.57	6933099.97	Wildlife Sightings Log	Ken F	Kiewit	along edge of RoW
2021	14-Jun-21	7:23 AM	Wolf	1	Adult	No	11V	510922.41	6933695.67	Wildlife Sightings Log	Ken F	Kiewit	along edge of RoW
2021	14-Jun-21	7:32 AM	Bison	6	Adult	No	11V	509143.01	6937706.78	Wildlife Sightings Log	Ken F	Kiewit	Crossing RoW
2021	14-Jun-21	7:35 AM	Bison	9	Adult	No	11V	508813.6	6938648.89	Wildlife Sightings Log	Ken F	Kiewit	Crossing RoW
2021	15-Jun-21	6:10AM	Bison	1	Adult	No	11V	519622.35	6928307.28	Wildlife Sightings Log	Ken F	Kiewit	along edge of RoW
2021	15-Jun-21	6:20AM	Bison	10	Adult	No	11V	513756.22	6931630.39	Wildlife Sightings Log	Ken F	Kiewit	along edge of RoW
2021	15-Jun-21	6:24AM	Bison	1	Adult	No	11V	510922.53	6933612.46	Wildlife Sightings Log	Ken F	Kiewit	along edge of RoW
2021	15-Jun-21	6:50AM	Bison	16	4 Adult 2 calv	No	11V	508483.17	6945377.23	Wildlife Sightings Log	Ken F	Kiewit	Crossing RoW
2021	16-Jun-21	6:15 AM	Bison	8	Adult	No	11V	507440.07	6953277.18	Wildlife Sightings Log	Ken F	Kiewit	along edge of RoW
2021	16-Jun-21	6:25 AM	Moose	1	Adult	No	11V	508230.35	6966333.85	Wildlife Sightings Log	Ken F	Kiewit	along edge of RoW
2021	20-Jun-21	6:30 AM	Black Bear	1	Adult	No	11V	506689	6978610	Wildlife Sightings Log	Charlie M	Kiewit	along edge of RoW
2021	20-Jun-21	8:24 AM	Porcupine	2	Adult	No	11V	504130	6983322	Widlife Road Survey	Dave G	Kiewit	along edge of RoW
2021	20-Jun-21	4:10 AM	Bison	22	Mixed	No	11V	517510	6929252	Wildlife Road Survey	Dave G	Kiewit	along edge of RoW
2021	21-Jun-21	6:16 AM	Bison	9	Mixed	No	11V	509465	6935288	Wildlife Road Survey	Dave G	Kiewit	along edge of RoW
2021	22-Jun-21	8:59 AM	Trumpeter Swan	2	Adult	No	11V	501294	6997897	Wildlife Road Survey	Dave G	Kiewit	on Lamartre River
2021	23-Jun-21	7:45 AM	Caribou	1	Adult	No	11V	508264	6967409	Wildlife Sightings Log	Danny H	Kiewit	crossing TASR
2021	23-Jun-21	8:30 AM	Caribou	1	Adult	No	11V	508544	6966854	Wildlife Sightings Log	Chris R	Kiewit	inside the Pit
2021	24-Jun-21	4:10 PM	Bison	2	Adult	No	11V	507850	6949694	Wildlife Sightings Log	Cristian P	Kiewit	resting off RoW
2021	25-Jun-21	2:00 AM	Wolf	1	Adult	No	11V	508272	6963410	Wildlife Sightings Log	Joe E	Kiewit	Crosing RoW
2021	25-Jun-21	11:35 AM	Caribou	2	Adult	No	11V	508107	6964377	Wildlife Sightings Log	Joe E	Kiewit	along edge of RoW
2021	25-Jun-21	4:00 PM	Bison	2	Adults	No	11V	507852	6949525	Wildlife Road Survey	Dave G	Kiewit	on TASR platform moving north
2021	25-Jun-21	6:00 PM	Bison	5	Mixed	No	11V	521611	6928506	Wildlife Sightings Log	Remi D	Kiewit	edge of RoW
2021	25-Jun-21	6:10 AM	Bison	5	Mixed	No	11V	515454	6930611	Wildlife Sightings Log	Remi D	Kiewit	edge of RoW
2021	26-Jun-21	11:20 AM	Fox	1	Adult	No	11V	500285	7004774	Wildlife Sightings Log	Remi D	Kiewit	crossing road
2021	26-Jun-21	2:00 PM	Caribou	1	Adult	No	11V	508064	6968299	Wildlife Sightings Log	Chris R	Kiewit	inside the Pit
2021	26-Jun-21	11:20 AM	Fox	1	Adult	No	11V	500285	7004774	Wildlife Sightings Log	Remi D	Kiewit	crossing road
2021	27-Jun-21	10:16 AM	Black Bear	1	Adult	No	11V	520629	6928374	Wildlife Sightings Log	Robin E	Kiewit	Edge of R.O.W
2021	27-Jun-21	5:10 PM	Bison	12	Mixed	No	11V	510124	6934856	Wildlife Sightings Log	Robin E	Kiewit	Edge of R.O.W
2021	27-Jun-21	5:27 AM	Bison	15	Mixed	No	11V	508962	6938202	Wildlife Road Survey	Dave G	Kiewit	Edge of R.O.W
2021	27-Jun-21	5:30 AM	Bison	2	Adult	No	11V	508106	6940712	Wildlife Road Survey	Dave G	Kiewit	Edge of R.O.W
2021	27-Jun-21	11:01 AM	Bison	2	Adult	No	11V	524979	6928195	Wildlife Road Survey	Dave G	Kiewit	Edge of R.O.W
2021	27-Jun-21	11:03 AM	Bison	1	Adult	No	11V	522437	6928481	Wildlife Road Survey	Dave G	Kiewit	Edge of R.O.W
2021	27-Jun-21	11:05 AM	Bison	5	Mixed	No	11V	521804	6928538	Wildlife Road Survey	Dave G	Kiewit	Edge of R.O.W
2021	27-Jun-21	11:09 AM	Bison	1	Adult	No	11V	520531	6928382	Wildlife Road Survey	Dave G	Kiewit	Edge of R.O.W
2021	27-Jun-21	11:12 AM	Bison	1	Adult	No	11V	519417	6928246	Wildlife Road Survey	Dave G	Kiewit	Edge of R.O.W
2021	27-Jun-21	11:16 AM	Bison	2	Adult	No	11V	514058	6931376	Wildlife Road Survey	Dave G	Kiewit	Edge of R.O.W
2021	27-Jun-21	11:21 AM	Bison	18	Mixed	No	11V	513636	6931682	Wildlife Road Survey	Dave G	Kiewit	crossing through RoW
2021	27-Jun-21	11:30 AM	Bison	25	Mixed	No	11V	509899	6935492	Wildlife Road Survey	Dave G	Kiewit	crossing through RoW
2021	28-Jun-21	1:00 AM	Moose	1	Adult	No	11V	504029	6983921	Wildlife Sightings Log	U/K	J&S	edge of RoW
2021	28-Jun-21	3:59 AM	Caribou	1	Adult	No	11V	506531	6972814	Wildlife Sightings Log	Joe E	Kiewit	crossing through RoW

TASR Wildlife Sightings Log

Year	Date of Sighting	Time	Species	Number	Age	Injured	Location/GPS Coordinates			Survey Type	Sighting By	Company	Notes
2021	28-Jun-21	6:30 AM	Bison	1	Adult	No	11V	508595	6939212	Wildlife Road Survey	Dave G	Kiewit	Edge of R.O.W
2021	28-Jun-21	6:32 AM	Bison	1	Adult	No	11V	507966	6941115	Wildlife Road Survey	Dave G	Kiewit	Edge of R.O.W
2021	28-Jun-21	6:38 AM	Caribou	1	Adult	No	11V	507922	6941261	Wildlife Road Survey	Dave G	Kiewit	crossing through RoW
2021	28-Jun-21	7:33 AM	Common Loon	1	Adult	No	11V	501269	6997839	Wildlife Road Survey	Dave G	Kiewit	on Lamartre River
2021	28-Jun-21	2:20 PM	Fox	1	Adult	No	11V	501409	7003114	Wildlife Sightings Log	Xavier	Kiewit	crossing road
2021	29-Jun-21	7:00 AM	Black Bear	1	Adult	No	11V	508180	6947360	Wildlife Sightings Log	U/K	J&S	edge of RoW
2021	1-Jul-21	7:04 AM	Bison	4	Adult	No	11V	509684	6936067	Wildlife Road Survey	Dave G	Kiewit	Edge of R.O.W
2021	1-Jul-21	7:05 AM	Bison	1	Adult	No	11V	509221	6937469	Wildlife Road Survey	Dave G	Kiewit	Edge of R.O.W
2021	1-Jul-21	7:11 AM	Bison	1	Adult	No	11V	508507	6945364	Wildlife Road Survey	Dave G	Kiewit	Edge of R.O.W
2021	1-Jul-21	8:40 AM	Common Loon	1	Adult	No	11V	501319	6997777	Wildlife Road Survey	Dave G	Kiewit	on Lamartre River
2021	2-Jul-21	5:33 AM	Bison	1	Adult	No	11V	507958	6941136	Wildlife Road Survey	Dave G	Kiewit	Edge of R.O.W
2021	2-Jul-21	6:42 AM	Caribou	1	Adult	No	11V	508669	6967498	Wildlife Road Survey	Dave G	Kiewit	crossing road and RoW
2021	2-Jul-21	2:30 PM	Snowshoe Hare	1	Adult	No	11V			Wildlife Surveillance Mor	Dave G	Kiewit	
2021	3-Jul-21	6:08 AM	Bison	4	Adult	No	11V	509502	6935300	Wildlife Road Survey	Dave G	Kiewit	Edge of R.O.W
2021	3-Jul-21	6:10 AM	Snowshoe Hare	1	Adult	No	11V	508280	6940214	Wildlife Road Survey	Dave G	Kiewit	flushed off road into trees east side
2021	3-Jul-21	7:10 AM	Wolf	1	Adult	No	11V	501520	6993572	Wildlife Road Survey	Dave G	Kiewit	resting on road until truck approached
2021	3-Jul-21	7:30 AM	Bison	2	Adult	No	11V	508174	6947360	Wildlife Sightings Log	Joe E	Kiewit	edge of RoW
2021	3-Jul-21	9:11 AM	Caribou	1	Adult	No	11V	508270	6963407	Wildlife Sightings Log	Bruno P	Kiewit	walking along edge of RoW
2021	4-Jul-21	7:30 AM	Caribou	1	Adult	No	11V	505278	6981234	Wildlife Sightings Log	U/K	Kiewit	edge of RoW
2021	4-Jul-21	9:00 AM	Caribou	1	Adult	No	11V	503646	6986901	Wildlife Sightings Log	U/K	Kiewit	edge of RoW
2021	5-Jul-21	9:17 AM	Wolf	2	Adult	No	11V	505278	6981234	Wildlife Sightings Log	U/K	Kiewit	edge of RoW
2021	5-Jul-21	10:35 AM	Caribou	1	Adult	No	11V	505767	6980356	Wildlife Sightings Log	U/K	Kiewit	edge of RoW
2021	5-Jul-21	11:00 AM	Wolf	2	Adult	No	11V	503505	6987897	Wildlife Sightings Log	Rick H	Kiewit	crossing RoW
2021	5-Jul-21	3:25 PM	Wolf	2	Adult	No	11V	504300	6982980	Wildlife Sightings Log	U/K	Kiewit	edge of RoW
2021	5-Jul-21	4:45 PM	Moose	1	Adult	No	11V	502189	6992667	Wildlife Sightings Log	U/K	Kiewit	crossing RoW
2021	5-Jul-21	5:41 PM	Moose	2	Adult	No	11V	506919	6971912	Wildlife Sightings Log	U/K	Kiewit	edge of RoW
2021	6-Jul-21	10:00 PM	Black Bear	1	Adult	No	11V	500788	7004024	Wildlife Sightings Log	Joe E	Kiewit	crossing R.O.W
2021	6-Jul-21	10:30 PM	Fox	1	Adult	No	11V	500942	7003805	Wildlife Sightings Log	Joe E	Kiewit	edge of RoW
2021	7-Jul-21	3:30 AM	Caribou	1	Adult	No	11V	508269	6966327	Wildlife Sightings Log	Joe E.	Kiewit	along edge of RoW
2021	7-Jul-21	8:49 AM	Bison	1	Adult	No	11V	508530	6939409	Wildlife Road Survey	Dave G	Kiewit	edge of RoW
2021	7-Jul-21	11:42 AM	Bison	1	Adult	No	11V	522872	6928386	Wildlife Road Survey	Dave G	Kiewit	edge of RoW
2021	7-Jul-21	11:28 AM	Bison	1	Adult	No	11V	508429	6963116	Wildlife Road Survey	Dave G	Kiewit	edge of RoW
2021	8-Jul-21	11:10 PM	Owl Sp.	1	Adult	No	11V	503098	6989809	Wildlife Sightings Log	Joe E	Kiewit	edge of RoW
2021	8-Jul-21	6:36 PM	Caribou	1	Adult	No	11V	508276	6967327	Wildlife Sightings Log	Ila L	Kiewit	inside the Pit (48)
2021	9-Jul-21	9:15 AM	Bison	1	Adult	No	11V	511713	6933438	Wildlife Road Survey	Ken F	Kiewit	edge of RoW
2021	9-Jul-21	9:30 AM	Bison	10	Mixed	No	11V	505029	6944773	Wildlife Road Survey	Ken F	Kiewit	edge of RoW
2021	9-Jul-21	5:14 PM	Duck sp.	1	U/K	No	11V	508228	6965328	Wildlife Sightings Log	Ila L	Kiewit	wet pocket outside RoW
2021	11-Jul-21	5:00 AM	Black Bear	2	Adults	No	11V	506841	6975947	Wildlife Sightings Log	Shane M	Kiewit	edge of RoW
2021	11-Jul-21	8:16 AM	Bison	1	Adult	No	11V	507897	6941535	Wildlife Road Survey	Ken F	Kiewit	walking along west ditch
2021	11-Jul-21	9:00 AM	Black Bear	1	Adult	No	11V	506846	6975797	Wildlife Sightings Log	Bruno P	Kiewit	edge of RoW

TASR Wildlife Sightings Log

Year	Date of Sighting	Time	Species	Number	Age	Injured	Location/GPS Coordinates			Survey Type	Sighting By	Company	Notes
2021	11-Jul-21	10:24 AM	Bison	1	Adult	No	11V	507397	6952734	Wildlife Road Survey	Ken F	Kiewit	walking along east ditch
2021	13-Jul-21	6:10 AM	Bison	38	Mixed	No	11V	508557	6943986	Wildlife Road Survey	Ken F	Kiewit	resting in ditch
2021	13-Jul-21	7:15 AM	Snowshoe Hare	1	Adult	No	11V	503934	6984757	Wildlife Road Survey	Ken F	Kiewit	ran across road
2021	13-Jul-21	1:50 PM	Bison	38	Mixed	No	11V	507910	6941303	Wildlife Road Survey	Ken F	Kiewit	same herd as morning
2021	13-Jul-21	2:10 PM	Bison	30	Mixed	No	11V	518662	6928291	Wildlife Road Survey	Ken F	Kiewit	resting in ditch
2021	14-Jul-21	10:00 AM	Wolf	1	Adult	No	11V	506873	6976800	Wildlife Sightings Log	Ryan P	Kiewit	along edge of RoW
2021	16-Jul-21	8:15 AM	Bison	1	Adult	No	11V	518662	6928291	Wildlife Road Survey	Ken F	Kiewit	walking in RoW
2021	16-Jul-21	8:18 AM	Bison	1	Adult	No	11V	517631	6929145	Wildlife Road Survey	Ken F	Kiewit	walking in RoW
2021	16-Jul-21	8:50 AM	Black Bear	1	Adult	No	11V	509315	6959728	Wildlife Road Survey	Ken F	Kiewit	crossed the RoW
2021	16-Jul-21	7:00 PM	Black Bear	1	Adult	No	11V	509819	6935717	Wildlife Sightings Log	Rick H	Kiewit	crossing RoW
2021	19-Jul-21	5:30 AM	Owl Sp.	1	Adult	No	11V	503781	6985905	Wildlife Sightings Log	Ryan P	Kiewit	flying across RoW
2021	19-Jul-21	7:30 AM	Moose	1	Adult	No	11V	511312	6933375	Wildlife Sightings Log	Danny H	Kiewit	edge of RoW
2021	19-Jul-21	11:15 AM	Moose	1	Adult	No	11V	508073	6968297	Wildlife Sightings Log	Danny H	Kiewit	edge of RoW
2021	21-Jul-21	7:18 AM	Bison	1	Adult	No	11V	508611	6944653	Wildlife Road Survey	Dave G	Kiewit	resting in RoW
2021	21-Jul-21	9:15 AM	Porcupine	1	Adult	No	11V	508223	6940341	Wildlife Sightings Log	Cristian P	Kiewit	in RoW
2021	21-Jul-21	3:00 PM	Wolf	1	Adult	No	11V	507235	6970625	Wildlife Sightings Log	Cristian P	Kiewit	crossing RoW
2021	22-Jul-21	8:30 AM	Bison	2	Adult	No	11V	509713	6936001	Wildlife Road Survey	Dave G	Kiewit	along edge of RoW
2021	22-Jul-21	9:11 AM	Snowshoe Hare	1	Adult	No	11V	503570	6987500	Wildlife Road Survey	Dave G	Kiewit	edge of road
2021	22-Jul-21	12:42 PM	Caribou	1	Adult	No	11V	512118	6932770	Wildlife Sightings Log	Ron H	Kiewit	crossing RoW
2021	22-Jul-21	4:22 PM	Bison	1	Adult	No	11V	514041	6931386	Wildlife Road Survey	Dave G	Kiewit	resting in RoW
2021	23-Jul-21	7:13 AM	Snowshoe Hare	2	Adult	No	11V	507627	6951092	Wildlife Road Survey	Dave G	Kiewit	flushed in RoW
2021	23-Jul-21	12:04 PM	Bison	2	Adult	No	11V	508418	6939799	Wildlife Road Survey	Dave G	Kiewit	feeding in RoW
2021	26-Jul-21	12:47 PM	Bison	1	Adult	No	11V	509588	6936353	Wildlife Road Survey	Dave G	Kiewit	resting in RoW
2021	26-Jul-21	1:10 PM	Bison	1	Adult	No	11V	507746	6954565	Wildlife Road Survey	Dave G	Kiewit	resting in RoW
2021	28-Jul-21	9:06 AM	Bison	1	Adult	No	11V	508556	6939339	Wildlife Road Survey	Dave G	Kiewit	edge of RoW
2021	28-Jul-21	9:40 AM	Sandhill Crane	2	Adult	No	11V	509547	6960953	Wildlife Road Survey	Dave G	Kiewit	flushed off road
2021	29-Jul-21	9:43 AM	Bison	1	Adult	No	11V	509193	6937585	Wildlife Road Survey	Dave G	Kiewit	edge of RoW
2021	29-Jul-21	10:00 AM	Bison	1	Adult	No	11V	507735	6950534	Wildlife Road Survey	Dave G	Kiewit	resting in RoW
2021	29-Jul-21	10:10 AM	Black Bear	1	Adult	No	11V	501225	6997759	Wildlife Road Survey	Dave G	Kiewit	running across RoW
2021	30-Jul-21	6:30 AM	Moose	1	Adult	No	11V	507879	6949333	Wildlife Sightings Log	Gary R	Kiewit	edge of RoW
2021	30-Jul-21	8:52 AM	Bison	1	Adult	No	11V	507994	6948544	Wildlife Road Survey	Dave G	Kiewit	feeding in RoW
2021	30-Jul-21	9:10 AM	Sandhill Crane	4	Adult	No	11V	508109	6964776	Wildlife Road Survey	Dave G	Kiewit	flushed off road into wet pocket
2021	31-Jul-21	6:45 AM	Porcupine	1	Adult	No	11V	507936	6941475	Wildlife Sightings Log	Charlie R	Kiewit	edge of RoW
2021	31-Jul-21	7:30 AM	Sandhill Crane	2	Adult	No	11V	507098	6977774	Wildlife Sightings Log	Frank R	Kiewit	flew off road into wet pocket
2021	31-Jul-21	8:44 AM	Bison	1	Adult	No	11V	508427	6943473	Wildlife Road Survey	Dave G	Kiewit	resting in RoW
2021	31-Jul-21	8:45 AM	Bison	20	Mixed	No	11V	508618	6944211	Wildlife Road Survey	Dave G	Kiewit	crossing through RoW
2021	1-Aug-21	7:45 AM	Black Bear	1	Adult	No	11V	509143	6937696	Wildlife Sightings Log	Ila L	Kiewit	edge of RoW
2021	2-Aug-21	8:10 AM	Caribou	1	Adult	No	11V	508721	6962522	Wildlife Sightings Log	Ila L	Kiewit	crossing RoW
2021	3-Aug-21	6:15 AM	Bison	2	Adult	No	11V	508402	6943438	Wildlife Sightings Log	Ken F	Kiewit	edge of RoW
2021	3-Aug-21	8:10 AM	Black Bear	1	Adult	No	11V	506670	6978462	Wildlife Sightings Log	Ken F	Kiewit	edge of RoW

TASR Wildlife Sightings Log

Year	Date of Sighting	Time	Species	Number	Age	Injured	Location/GPS Coordinates			Survey Type	Sighting By	Company	Notes
2021	3-Aug-21	9:10 AM	Porcupine	1	Adult	No	11V	509385	6959845	Wildlife Sightings Log	Ila L	Kiewit	crossing TASR
2021	3-Aug-21	3:10 PM	Sandhill Crane	1	Adult	No	11V	507325	6953072	Wildlife Road Survey	Dave G	Kiewit	flushed off road
2021	3-Aug-21	3:20 PM	Bison	2	Adult	No	11V	507316	6953037	Wildlife Road Survey	Dave G	Kiewit	resting in RoW
2021	3-Aug-21	3:28 PM	Bison	16	Mixed	No	11V	508336	6940065	Wildlife Road Survey	Dave G	Kiewit	walking in RoW
2021	3-Aug-21	4:40 PM	Bison	1	Adult	No	11V	523574	6928241	Wildlife Sightings Log	Ken F	Kiewit	edge of RoW
2021	4-Aug-21	7:05 AM	Moose	1	Adult	No	11V	506629	6978592	Wildlife Sightings Log	Charlie M	Kiewit	crossing RoW
2021	4-Aug-21	7:28 AM	Bison	1	Adult	No	11V	50819	6945834	Wildlife Road Survey	Dave G	Kiewit	feeding in RoW
2021	4-Aug-21	7:37 AM	Bison	2	Adult	No	11V	507483	6953617	Wildlife Road Survey	Dave G	Kiewit	resting in RoW
2021	5-Aug-21	8:45 AM	Black Bear	2	Adult	No	11V	507383	6953277	Wildlife Sightings Log	Ila L	Kiewit	edge of RoW
2021	6-Aug-21	8:38 AM	Moose	1	Adult	No	11V	506830	6976065	Wildlife Road Survey	Dave G	Kiewit	walking across lake off RoW
2021	6-Aug-21	8:42 AM	Sandhill Crane	2	Adult	No	11V	506959	6977228	Wildlife Road Survey	Dave G	Kiewit	flushed off edge of RoW
2021	6-Aug-21	8:52 AM	Porcupine	1	Adult	No	11V	505639	6980588	Wildlife Road Survey	Dave G	Kiewit	crossing RoW
2021	6-Aug-21	9:39 AM	Black Bear	1	Adult	No	11V	518277	6928605	Wildlife Sightings Log	Remi D	Kiewit	Crossing RoW
2021	6-Aug-21	11:49 AM	Bison	1	Adult	No	11V	512864	6932246	Wildlife Road Survey	Dave G	Kiewit	resting in RoW
2021	6-Aug-21	11:53 AM	Bison	1	Adult	No	11V	514058	6931372	Wildlife Road Survey	Dave G	Kiewit	walking in RoW
2021	8-Aug-21	8:35 AM	Bison	1	Adult	No	11V	508496	6945389	Wildlife Road Survey	Ken F	Kiewit	walking in RoW
2021	8-Aug-21	8:45 AM	Bison	1	Adult	No	11V	507364	6952708	Wildlife Road Survey	Ken F	Kiewit	drinking water at culvert
2021	8-Aug-21	10:00 AM	Black Bear	1	Adult	No	11V	497938	7005927	Wildlife Road Survey	Ken F	Kiewit	crossing RoW
2021	8-Aug-21	7:00 PM	Owl Sp.	1	Adult	No	11V	508020	6948345	Wildlife Sightings Log	Ron H	Kiewit	along edge of RoW
2021	9-Aug-21	10:05 AM	Bison	4	Adult	No	11V	509299	6937229	Wildlife Road Survey	Ken F	Kiewit	feeding in RoW
2021	9-Aug-21	10:16 AM	Bison	1	Adult	No	11V	508402	6943438	Wildlife Road Survey	Ken F	Kiewit	walking in RoW
2021	10-Aug-21	10:00 AM	Black Bear	1	Adult	No	11V	508496	6945389	Wildlife Sightings Log	Jeff J	Kiewit	crossing ROW and TASR
2021	10-Aug-21	10:15 AM	Bison	1	Adult	No	11V	508579	6944888	Wildlife Road Survey	Ken F	Kiewit	walking in RoW
2021	10-Aug-21	10:20 AM	Bison	1	Adult	No	11V	508169	6947363	Wildlife Road Survey	Ken F	Kiewit	resting in RoW
2021	10-Aug-21	10:39 AM	Bison	1	Adult	No	11V	507331	6952788	Wildlife Road Survey	Ken F	Kiewit	walking in RoW
2021	11-Aug-21	4:20 PM	Black Bear	1	Adult	No	11V	507383	6953277	Wildlife Sightings Log	Ron H	Kiewit	crossing ROW and TASR
2021	12-Aug-21	9:25 AM	Bison	4	Mixed	No	11V	508050	6941970	Wildlife Road Survey	Ken F	Kiewit	walking in RoW
2021	12-Aug-21	9:40 AM	Bison	10	Mixed	No	11V	507364	6952708	Wildlife Road Survey	Ken F	Kiewit	resting in RoW
2021	13-Aug-21	7:20 AM	Black Bear	1	Adult	No	11V	518662	6928291	Wildlife Sightings Log	Remi D	Kiewit	crossing ROW and TASR
2021	13-Aug-21	9:10 AM	Red Fox	1	Adult	No	11V	508163	6942464	Wildlife Sightings Log	Remi D	Kiewit	along edge of RoW
2021	13-Aug-21	9:10 AM	Black Bear	1	Adult	No	11V	508331	6946372	Wildlife Sightings Log	Remi D	Kiewit	crossing RoW
2021	13-Aug-21	10:24 AM	Bison	5	Adult	No	11V	510998	6933595	Wildlife Road Survey	Ken F	Kiewit	resting in RoW
2021	13-Aug-21	10:40 AM	Bison	10	Adult	No	11V	507787	6954728	Wildlife Sightings Log	Cristian P	Kiewit	along edge of RoW
2021	13-Aug-21	10:49 AM	Bison	10	Adult	No	11V	508016	6955166	Wildlife Road Survey	Ken F	Kiewit	resting in RoW
2021	14-Aug-21	10:16 AM	Bison	1	Adult	No	11V	514217	6931251	Wildlife Road Survey	Ken F	Kiewit	walking in RoW
2021	14-Aug-21	10:27 AM	Bison	1	Adult	No	11V	508480	6939579	Wildlife Road Survey	Ken F	Kiewit	feeding in RoW
2021	15-Aug-21	3:25 PM	Bison	1	Adult	No	11V	509299	6937229	Wildlife Road Survey	Ken F	Kiewit	resting in RoW
2021	15-Aug-21	3:29 AM	Bison	10	Adult	No	11V	508200	6940415	Wildlife Road Survey	Ken F	Kiewit	resting in RoW
2021	17-Aug-21	7:15 AM	Bison	1	Adult	No	11V	507811	6949830	Wildlife Sightings Log	Shane M	Kiewit	edge of RoW
2021	18-Aug-21	7:20 AM	Bison	2	Adult	No	11V	508018	6955164	Wildlife Sightings Log	James Duffy	Kiewit	edge of RoW

TASR Wildlife Sightings Log

Year	Date of Sighting	Time	Species	Number	Age	Injured	Location/GPS Coordinates			Survey Type	Sighting By	Company	Notes
2021	19-Aug-21	1:30 AM	Canada Lynx	1	Adult	No	11V	503903	6984917	Wildlife Sightings Log	U/K	Kiewit	crossing RoW
2021	20-Aug-21	8:25 AM	Bison	1	Adult	No	11V	509001	6938090	Wildlife Road Survey	Dave G	Kiewit	feeding in RoW
2021	20-Aug-21	8:38 AM	Bison	14	Mixed	No	11V	508098	6947797	Wildlife Road Survey	Dave G	Kiewit	resting in RoW
2021	20-Aug-21	6:30 PM	Black Bear	4	Mixed	No	11V	506649	6973817	Wildlife Sightings Log	Rick H	Kiewit	edge of RoW
2021	21-Aug-21	3:26 AM	Red Fox	1	Adult	No	11V	507483	6952068	Wildlife Sightings Log	Rick H	Kiewit	crossing RoW
2021	21-Aug-21	7:30 AM	Bison	2	Adult	No	11V	508263	6956052	Wildlife Road Survey	Dave G	Kiewit	feeding in RoW
2021	21-Aug-21	2:00 PM	Black Bear	1	Adult	No	11V	506629	6978592	Wildlife Sightings Log	Cristian P	Kiewit	edge of RoW
2021	22-Aug-21	11:45 AM	Cougar	1	Adult	No	11V	506836	6975042	Wildlife Sightings Log	John T	Kiewit	edge of RoW
2021	24-Aug-21	11:20 PM	Porcupine	1	Adult	No	11V	503903	6984917	Wildlife Sightings Log	Rick H	Kiewit	crossing RoW
2021	25-Aug-21	7:08 AM	Sandhill Crane	2	Adult	No	11V	511964	6932903	Wildlife Road Survey	Dave G	Kiewit	flying along RoW
2021	25-Aug-21	8:26 AM	Wolf	1	Adult	No	11V	508691	6958027	Wildlife Sightings Log	Shane M	Kiewit	edge of RoW
2021	25-Aug-21	8:15 PM	Bison	1	Adult	No	11V	509668	6960753	Wildlife Sightings Log	Rick H	Kiewit	edge of RoW
2021	26-Aug-21	2:15 PM	Moose	2	Mixed	No	11V	507879	6949333	Wildlife Sightings Log	Vanessa	Kiewit	edge of RoW
2021	27-Aug-21	11:00 AM	Caribou	1	Adult	No	11V	508658	6957791	Wildlife Road Survey	Dave G	Kiewit	on Road
2021	27-Aug-21	11:04 AM	Caribou	2	Mixed	No	11V	508160	6964633	Wildlife Road Survey	Dave G	Kiewit	crossed through RoW
2021	27-Aug-21	2:30 PM	Black Bear	1	Adult	No	11V	504435	6982721	Wildlife Sightings Log	Ken F	Kiewit	edge of RoW
2021	27-Aug-21	1:15 PM	Cougar	1	Adult	No	11V	501582	6999198	Wildlife Sightings Log	Ryan P	Kiewit	edge of RoW
2021	28-Aug-21	11:29 AM	Bison	2	Adult	No	11V	520276	6928348	Wildlife Road Survey	Dave G	Kiewit	feeding in RoW
2021	28-Aug-21	4:00 PM	Moose	1	Adult	No	11V	503098	6989801	Wildlife Sightings Log	Roger	Kiewit	edge of RoW
2021	29-Aug-21	6:43 AM	Black Bear	1	Adult	No	11V	508543	6957036	Wildlife Sightings Log	Vanessa	Kiewit	walking across bridge
2021	29-Aug-21	8:25 AM	Bison	2	Adult	No	11V	508220	6955503	Wildlife Sightings Log	John T	Kiewit	edge of RoW
2021	30-Aug-21	7:03 AM	Bison	8	Adult	No	11V	508363	6939964	Wildlife Road Survey	Dave G	Kiewit	feeding in RoW
2021	30-Aug-21	7:08 AM	Bison	9	Adult	No	11V	508362	6946206	Wildlife Road Survey	Dave G	Kiewit	walking in RoW
2021	31-Aug-21	6:30 AM	Black Bear	1	Adult	No	11V	509143	6937696	Wildlife Sightings Log	Ralph T	Kiewit	crossing ROW and TASR
2021	31-Aug-21	7:03 AM	Bison	1	Adult	No	11V	508971	6938193	Wildlife Road Survey	Dave G	Kiewit	feeding in RoW
2021	1-Sep-21	11:25 AM	Black Bear	1	Adult	No	11V	508073	6968297	Wildlife Sightings Log	Rodney D	Kiewit	crossing ROW and TASR
2021	2-Sep-21	8:00 AM	Wolf	1	Adult	No	11V	501413	7003113	Wildlife Sightings Log	Ralph T	Kiewit	edge of RoW
2021	2-Sep-21	11:18 AM	Bison	1	Adult	No	11V	507787	6954728	Wildlife Road Survey	Ken F	Kiewit	resting in RoW
2021	3-Sep-21	8:00 AM	Black Bear	1	Adult	No	11V	523991	6928226	Wildlife Road Survey	Ken F	Kiewit	crossing RoW
2021	3-Sep-21	8:20 AM	Bison	6	Adult	No	11V	508823	6938629	Wildlife Road Survey	Ken F	Kiewit	feeding in RoW
2021	3-Sep-21	8:23 AM	Bison	1	Adult	No	11V	508009	6940999	Wildlife Road Survey	Ken F	Kiewit	walking in the RoW
2021	5-Sep-21	2:00 PM	Black Bear	3	Adult	No	11V	501287	6998034	Wildlife Sightings Log	Elvis J	Kiewit	crossed RoW
2021	6-Sep-21	11:00 AM	Black Bear	1	Cub	No	11V	508169	6947363	Wildlife Sightings Log	Jeff J	Kiewit	crossed RoW
2021	6-Sep-21	5:00 PM	Black Bear	1	Cub	No	11V	511717	6933067	Wildlife Sightings Log	Cristian P	Kiewit	crossed RoW
2021	7-Sep-21	8:15 AM	Bison	15	Adult	No	11V	508329	6940061	Wildlife Sightings Log	Cristian P	Kiewit	walking in RoW
2021	7-Sep-21	8:25 AM	Bison	2	Adult	No	11V	508163	6942464	Wildlife Sightings Log	Cristian P	Kiewit	walking in RoW
2021	8-Sep-21	10:00 AM	Black Bear	2	Adult	No	11V	508498	6962956	Wildlife Sightings Log	Remi D	Kiewit	crossed RoW
2021	8-Sep-21	11:00 AM	Red Fox	1	Adult	No	11V			Wildlife Sightings Log	Remi D	Kiewit	outside of RoW
2021	9-Sep-21	8:20 AM	Bison	32	Adult	No	No	508223	6940347	Wildlife Road Survey	Ken F	Kiewit	feeding in RoW
2021	11-Sep-21	10:15 AM	Bison	3	Adult	No	No	505768	6980354	Wildlife Road Survey	Ken F	Kiewit	walking in RoW

TASR Wildlife Sightings Log

Year	Date of Sighting	Time	Species	Number	Age	Injured	Location/GPS Coordinates		Survey Type	Sighting By	Company	Notes
2021	11-Sep-21	11:00 AM	Black Bear	1	Adult	No	11V	506302 6979517	Wildlife Sightings Log	Charlie M	Kiewit	crossed RoW
2021	11-Sep-21	11:10 AM	Black Bear	1	Adult	No	11V	514406 6931124	Wildlife Road Survey	Ken F	Kiewit	crossed RoW
2021	11-Sep-21	11:15 AM	Moose	1	Adult	No	11V	503390 6986368	Wildlife Sightings Log	Keith	Kiewit	crossed RoW
2021	11-Sep-21	11:50 AM	Wolf	1	Adult	No	11V	499444 7005389	Wildlife Road Survey	Ken F	Kiewit	walking in RoW
2021	11-Sep-21	7:45PM	Moose	1	Adult	No	11V	503098 6989801	Wildlife Sightings Log	Ryan P	Kiewit	edge of RoW
2021	12-Sep-21	10:20 AM	Bison	1	Adult	No	11V	508496 6945389	Wildlife Road Survey	Ken F	Kiewit	
2021	12-Sep-21	2:30 PM	Wolverine	1	Adult	No	11V	501161 6998377	Wildlife Sightings Log	Ryan P	Kiewit	edge of RoW
2021	15-Sep-21	10:00 AM	Black Bear	1	Adult	No	11V	503281 6989338	Wildlife Road Survey	Cristian P	Kiewit	crossing the TASR
2021	15-Sep-21	12:00 PM	Red Fox	1	Adult	No	11V	509588 6935642	Wildlife Road Survey	Cristian P	Kiewit	in camp
2021	17-Sep-21	6:45 AM	Porcupine	1	Adult	No	11V	508850 6959017	Wildlife Sightings Log	Ryan P	Kiewit	crossing through RoW
2021	17-Sep-21	6:30 AM	Red Fox	1	Adult	No	11V	509588 6935642	Wildlife Sightings Log	Loretta	Kiewit	Under Dorm C
2021	18-Sep-21	9:20 AM	Spruce Grouse	18	Mixed	No	11V	508445 6945700	Wildlife Road Survey	Cristian P	Kiewit	flushed off road to edge of RoW
2021	20-Sep-21	8:00 AM	Red Fox	1	Adult	No	11V	510116 6934865	Wildlife Sightings Log	JF M.	Kiewit	edge of RoW
2021	20-Sep-21	9:30 AM	Black Bear	2	Mixed	No	11V	501223 6997882	Wildlife Sightings Log	Rick B	Kiewit	crossing through RoW
2021	20-Sep-21	11:45 AM	Black Bear	1	Adult	No	11V	504584 6982471	Wildlife Sightings Log	David L	Kiewit	edge of RoW
2021	20-Sep-21	1:00 PM	Moose	1	Adult	No	11V	502811 6990764	Wildlife Sightings Log	Remi D	Kiewit	edge of RoW
2021	20-Sep-21	1:30 PM	Moose	2	Mixed	No	11V	508617 6944210	Wildlife Sightings Log	John T	Kiewit	edge of RoW
2021	20-Sep-21	3:00 PM	Red Fox	1	Adult	No	11V	496420 7005772	Wildlife Sightings Log	Remi D	Kiewit	crossing through RoW
2021	20-Sep-21	3:07 PM	Porcupine	1	Adult	No	11V	49503 7005547	Wildlife Sightings Log	Remi D	Kiewit	edge of road
2021	20-Sep-21	8:40 AM	Bison	4	Mixed	No	11V	507878 6949362	Wildlife Road Survey	Dave G	Kiewit	feeding in RoW
2021	20-Sep-21	9:02 AM	Spruce Grouse	6	Adult	No	11V	508131 6963992	Wildlife Road Survey	Dave G	Kiewit	gathering gravel
2021	21-Sep-21	1:45 PM	Bison	2	Adult	No	11V	503475 698886	Wildlife Sightings Log	Danny H	Kiewit	crossing through RoW
2021	26-Sep-21	9:10 AM	Bison	3	Adult	No	11V	508635 6939116	Wildlife Road Survey	Ken F	Kiewit	resting in RoW
2021	29-Sep-21	6:00 PM	Black Bear	1	Adult	No	11V	509588 6935642	Wildlife Sightings Log	Jeff J	Kiewit	camp perimeter
2021	30-Sep-21	10:16 AM	Snowshoe Hare	1	Adult	No	11V	506795 6974809	Wildlife Road Survey	Ken F	Kiewit	flushed from road
2021	30-Sep-21	10:20 AM	Squirrel	1	Adult	No	11V	506831 6975018	Wildlife Road Survey	Ken F	Kiewit	flushed from road
2021	4-Oct-21	9:15 AM	Bison	8	Adult	No	11V	508660 6939055	Wildlife Road Survey	Ken F	Kiewit	crossed the RoW
2021	4-Oct-21	11:52 AM	Wolf	1	Adult	No	11V	501312 7003269	Wildlife Road Survey	Ken F	Kiewit	walking along edge of RoW
2021	5-Oct-21	12:30 PM	Black Bear	1	Adult	No	11V	522378 6928489	Wildlife Road Survey	Ken F	Kiewit	crossed the RoW
2021	7-Oct-21	10:00 AM	Tundra Swan	1	Adult	No	11V	503098 6989801	Wildlife Sightings Log	Nick	Kiewit	injured in ditch
2021	8-Oct-21	10:30 AM	Tundra Swan	1	Adult	No	11V	503098 6989801	Wildlife Sightings Log	Ralph T	Kiewit	dead in ditch
2021	8-Oct-21	1:00 PM	Moose	2	Adult	No	11V	501186 6997650	Wildlife Sightings Log	Danny D	Kiewit	crossed the RoW
2021	17-Oct-21	9:20 AM	Bison	12	Mixed	No	11V	509054 6937945	Wildlife Sightings Log	Cristian P	Kiewit	crossed through the RoW
2021	30-Oct-21	3:30 PM	Wolf	1	Adult	No	11V	507444 6952399	Wildlife Sightings Log	Nick	Kiewit	crossed throgh the RoW
2021	7-Nov-21	3:00 PM	Wolf	2	Adult	No	11V	508261 6956088	Wildlife Road Survey	Ralph T	Kiewit	crossed the Row
2021	10-Nov-21	10:30 AM	Ptarmigan	5	U/K	No	11V	503098 6989801	Wildlife Sightings Log	Ralph T	Kiewit	flushed off road
2021	11-Nov-21	3:15 PM	Canada Lynx	1	Adult	No	11V	508496 6945389	Wildlife Sightings Log	Ralph T	Kiewit	flushed off road
2021	12-Nov-21	7:15 AM	Common Nighthawk	1	U/K	No	11V	510501 6933958	Wildlife Sightings Log	Ralph T	Kiewit	on shoulder or road
2021	13-Nov-21	4:10 PM	Red Fox	1	Adult	No	11V	517888 6928930	Wildlife Sightings Log	Ralph T	Kiewit	edge of RoW
2021	15-Nov-21	9:15 AM	Red Fox	1	Adult	No	11V	522595 6928444	Wildlife Sightings Log	Danny H	Kiewit	walking in RoW

TASR Wildlife Sightings Log

Year	Date of Sighting	Time	Species	Number	Age	Injured	Location/GPS Coordinates			Survey Type	Sighting By	Company	Notes
2021	16-Nov-21	11:00 AM	Spruce Grouse	25	Mixed	No	11V	503475	6988866	Wildlife Sightings Log	Danny H	Kiewit	gathering gravel
2021	17-Nov-21	11:00 AM	Spruce Grouse	12	Mixed	No	11V	506535	6972836	Wildlife Sightings Log	Danny H	Kiewit	gathering gravel
2021	18-Nov-21	1:00 PM	Bison	1	Adult	No	11V	522595	6928444	Wildlife Sightings Log	Danny H	Kiewit	walking on roadway
2021	19-Nov-21	12:30 PM	Spruce Grouse	7	Adult	No	11V	508721	6962522	Wildlife Sightings Log	Danny H	Kiewit	gathering gravel
2021	19-Nov-21	1:00 PM	Spruce Grouse	3	Adult	No	11V	506919	6970967	Wildlife Sightings Log	Danny H	Kiewit	gathering gravel
2021	20-Nov-21	10:00 AM	Red Fox	1	Adult	No	11V	511312	6933375	Wildlife Sightings Log	Danny H	Kiewit	edge of RoW

APPENDIX D PRESENCE OF COLLARED BOREAL CARIBOU WITHIN 4-6KM CAUTIONARY BUFFER ZONES ALONG THE TASR ROUTE

WEEKLY REPORT (PROVIDED BY KIEWIT)	TIME PERIOD OF COLLAR DATA COVERED BY MAPS PROVIDED BY ENR	SEGMENT 1 (KM 0 TO 24)	SEGMENT 2 (KM 25 TO 46)	SEGMENT 3 (KM 47-85)	SEGMENT 4 (KM 85-97)	MITIGATION IMPLEMENTED (AS INDICATED IN WEEKLY REPORT)
Dec 27-Jan 2						*Operations suspended during winter*
Jan 3-9						*Operations suspended during winter*
Jan 10-16						*Operations suspended during winter*
Jan 17-23						*Operations suspended during winter*
Jan 31-Feb 6						*Operations suspended during winter*
Feb 7-13						*Operations suspended during winter*
Feb 14-20						*Operations suspended during winter*
Feb 21-27						*Operations suspended during winter*
Feb 28-Mar 6						*Operations suspended during winter*
Mar 7-13						*Operations suspended during winter*
Mar 14-20						*Operations suspended during winter*
Mar 21-27						*Operations suspended during winter*
Mar 28- Apr 3						*Operations suspended during winter*
Apr 4-10, Apr 11-17	Apr 7-14			4		No Mitigation Measures were Triggered
Apr 11-17, Apr 18-24	Apr 12-19	4		4		No Mitigation Measures were Triggered
Apr 11-17, Apr 18-24	Apr 14-21	4	4	4		No Mitigation Measures were Triggered
Apr 18-24, Apr 25- May 1	Apr 19-26	4	4	4		No Mitigation Measures were Triggered
Apr 18-24, Apr 25- May 1	Apr 21-28	4	4	4		No Mitigation Measures were Triggered
Apr 25-May 1, May 2-8	Apr 28 - May 5	4	4	4		No Mitigation Measures were Triggered
May 2-8, May 9-15	May 3- 10	4	4	4		No Mitigation Measures were Triggered
May 2-8, May 9-15	May 5-12	4	4	4		No Mitigation Measures were Triggered
May 9-15, May 16-22	May 10-17	4	4	4		No Mitigation Measures were Triggered

WEEKLY REPORT (PROVIDED BY KIEWIT)	TIME PERIOD OF COLLAR DATA COVERED BY MAPS PROVIDED BY ENR	SEGMENT 1 (KM 0 TO 24)	SEGMENT 2 (KM 25 TO 46)	SEGMENT 3 (KM 47-85)	SEGMENT 4 (KM 85-97)	MITIGATION IMPLEMENTED (AS INDICATED IN WEEKLY REPORT)
May 9-15, May 16-22	May 12- 19	4	4	4		No Mitigation Measures were Triggered
May 16-22, May 23- 29	May 19-26		4	4	4	No Mitigation Measures were Triggered
May 16-22 , May 23- 29	May 21-28		4	4	4	No Mitigation Measures were Triggered
May 23-29, May 30- June 5	May 24-31		4	4		Reduced traffic speeds
May 23-29, May 30- June 5	May 26-June 2			4		Reduced traffic speeds
May 23-29, May 30- June 5	May 28-June 4	4	4	4		Reduced traffic speeds
May 30- June 5, June 6-12	May 31-June 7	4	4	4		Reduced traffic speeds
May 30- June 5, June 6-12	June 2-9	4	4	4		Reduced traffic speeds
May 30- June 5, June 6-12	June 4-11	4	4	4		Reduced traffic speeds
June 6-12, June 13-19	June 7-14	4	4	4		Reduced traffic speeds
June 6-12, June 13-19	June 9-16	4	4	4		Reduced traffic speeds
June 6-12, June 13-19	June 11-18	4	4	4		Reduced traffic speeds
June 13- 19, June 20-26	June 16-23	4	4	4		Reduced traffic speeds
June 13- 19, June 20-26	June 18-25	4	4	4		Reduced traffic speeds
June 20- 26, June 27- July 3	June 21-28	4	4	4		Reduced traffic speeds
June 20- 26, June 27- July 3	June 25-July 2	4	4	6		Reduced traffic speeds
June 20- 26, June 27- July 3, July 4-10	June 28- July 5	4	4	4		Reduced traffic speeds
June 27- July 3, July 4-10	July 1-8	4	4	4		Reduced traffic speeds
June 27- July 3, July 4-10	July 2-9	4	4	4		Reduced traffic speeds
July 4-10, July 11- 17	July 5-12	4	4	4		Reduced Traffic Speeds

WEEKLY REPORT (PROVIDED BY KIEWIT)	TIME PERIOD OF COLLAR DATA COVERED BY MAPS PROVIDED BY ENR	SEGMENT 1 (KM 0 TO 24)	SEGMENT 2 (KM 25 TO 46)	SEGMENT 3 (KM 47-85)	SEGMENT 4 (KM 85-97)	MITIGATION IMPLEMENTED (AS INDICATED IN WEEKLY REPORT)
July 4-10, July 11- 17	July 7-14	4	4	4		Reduced traffic speeds
July 4-10, July 11- 17	July 9-16	4	4	4		Reduced traffic speeds
July 11- 17, July 18- 24	July 12-19	6	4	4		Reduced Traffic Speeds
July 11- 17, July 18- 24	July 19-26	4	4	4		Reduced Traffic Speeds
July 25-31,Aug 1-7	July 27-Aug 2	4	4	4		Reduced Traffic Speeds
Aug 1-7, Aug 8-14	Aug 2-9	4	4	4		Reduced Traffic speeds
Aug 8-14, Aug 15-21	Aug 9-16	4	4	4		Reduced traffic speeds
Aug 15-21, Aug 22-28	Aug 16- 23	4	4	4		Reduced traffic speeds
Aug 22-28, Aug 29- Sept 4	Aug 23- 30	4	4	4		Reduced traffic speeds
Aug 29-Sept 4, Sept 5-11	Aug 31-Sept 7		6	6		Reduced traffic speeds
Sept 5-11, Sept 12-18	Sept 6- 12	4	4	4		Reduced traffic speeds
Sept 12-18, Sept 19-25	Sept 13-20	4	4	6		Reduced traffic speeds
Sept 19-25, Sept 26- Oct 2	Sept 20-27			6		Reduced traffic speeds
Sept 26- Oct 2, Oct 3-9	Sept 27- Oct 4		4	4		Reduced traffic speeds
Oct 3-9, Oct 10-16	Oct 5-12	4	4	4		Reduced traffic speeds
Oct 10-16, Oct 17-23	Oct 11- 18	4	4	4		Reduced traffic speeds
Oct 10-16, Oct 24-30	Oct 18-25	4	4	4		Reduced traffic speeds
Oct 24-30, Oct 31- Nov 4	Oct 26- Nov 2	4	4	4		Reduced traffic speeds
Oct 31- Nov 6, Nov 7-13	Nov 1- 8	4	4			Site Wide Notification of Animals Present
Nov 7-13, Nov 14-20	Nov 8-15	4	4			Reduced traffic speeds
Nov 14-20	Nov 15-21	4				Reduced traffic speeds

WEEKLY REPORT (PROVIDED BY KIEWIT)	TIME PERIOD OF COLLAR DATA COVERED BY MAPS PROVIDED BY ENR	SEGMENT 1 (KM 0 TO 24)	SEGMENT 2 (KM 25 TO 46)	SEGMENT 3 (KM 47-85)	SEGMENT 4 (KM 85-97)	MITIGATION IMPLEMENTED (AS INDICATED IN WEEKLY REPORT)
No Weekly Report	Nov 26-Dec 3	4	4			
No Weekly Report	Dec 3- 10	4	4			