Project Screening Document

Submission to the Wek'èezhìi Land and Water Board (WLWB) for Preliminary Screening
related to applications for
a Water Licence and a Land Use Permit

Prepared for:
Government of the Northwest Territories
Department of Infrastructure (GNWT-INF)

Prepared by:
Tłı̨chǫ-Kiewit General Partnership (TKGP)

May 1st, 2025

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TABLE OF CONTENTS

1. INTRODUCTION 1.1
1.1. APPLICANTS NAME AND CONTACT INFORMATION 1.1
1.2. CONTRACTOR AND SUB-CONTRACTORS 1.1

2. DEVELOPMENT OVERVIEW 2.1
2.1. SCOPE AND PURPOSE OF DEVELOPMENT 2.1
2.2. DEVELOPMENT LOCATION 2.3
2.3. CURRENT LAND OWNERSHIP AND PROPOSED RIGHT-OF-WAY 2.10
2.4. CONFORMITY WITH LAND USE PLAN 2.10

3. AUTHORIZATIONS AND APPROVALS 3.1
3.1. ELIGIBILITY 3.1
3.2. APPLICATIONS NEEDED ACCORDING TO LEGISLATION AND REGULATIONS 3.1

4. DETAILED DESCRIPTION OF THE PROJECT 4.1
4.1. PERMANENT STRUCTURES 4.1
4.1.1. New Bridge 4.1
4.1.2. Roadway Approaches 4.2
4.1.3. Stormwater Management 4.3
4.2. TEMPORARY WORKS, STRUCTURES, INSTALLATIONS AND FACILITIES 4.4
4.2.1. Access roads 4.4
4.2.2. Causeways 4.6
4.2.3. Ice Bridges and Flexifloat Modular Barges 4.8
4.2.4. Additional Information for The Construction Activities 4.9
4.2.5. Additional Information for The Deconstruction-Demolition activities 4.10
4.2.6. Proposed Construction Camp, Laydown and Electrical Facilities 4.11
4.2.7. Wastes and Waste Management 4.14
4.2.8. Closure and Reclamation: Restoration Activities 4.14
4.2.9. Monitoring 4.14
4.3. WATER USE AND LAND USE 4.15
4.3.1. Summary of Water Uses 4.15
4.3.2. Summary of Land Use and In-Water Work / Water Crossing 4.16
4.4. OPERATIONS ACTIVITIES 4.17

5. PROJECT SCHEDULE 5.1

6. COMMUNITY ENGAGEMENT 6.1
6.1. SUMMARY OF COMMUNITY MEETINGS IN 2018 ..... 6.1
6.2. SUMMARY OF PUBLIC INVOLVEMENT SINCE 2021 ..... 6.2
6.2.1. Engagement Sessions of February 2025 ..... 6.3
6.2.2. Meetings with the residents of the Frank Channel Community 6.4
6.2.3. Engagement Sessions of April 2025 ..... 6.5

7. DESCRIPTION OF THE BIOPHYSICAL ENVIRONMENT 7.1
7.1. STUDY AREAS 7.1
7.2. CLIMATE 7.1
7.3. AIR QUALITY 7.2
7.4. NOISE 7.2
7.5. WATER QUANTITY AND QUALITY 7.3
7.6. FISH AND FISH HABITAT 7.3
7.7. TERRAIN, SOILS AND PERMAFROST 7.6
7.8. VEGETATION 7.7

7.8.1. Methods 7.7
7.8.2. Results 7.7
7.9. WILDLIFE 7.10
7.9.1. Mammals 7.10
7.9.2. Birds 7.10

8. DESCRIPTION OF THE HUMAN ENVIRONMENT 8.1

8.1. PROJECT DESCRIPTION AND STUDY AREAS 8.1
8.2. COMMUNITY DESCRIPTIONS 8.1
8.3. ECONOMY, EMPLOYMENT AND BUSINESS 8.2
8.4. LAND AND RESOURCE USE 8.3
8.4.1. Existing Traditional Land and Resource Use 8.3
8.4.2. Availability of traditional And Other Land and Resource Uses 8.3
8.4.3. Access to Traditional and Other Land Resource Uses 8.3
8.4.4. Cultural and Spiritual Sites for Traditional Land and Resources Uses 8.3
8.5. HERITAGE AND ARCHAEOLOGICAL RESOURCES 8.4
8.5.1. Baseline Site Data 8.4
8.5.2. Previous Assessments 8.5

9. SCREENING OF POTENTIAL EFFECTS 9.1

9.1. METHODS 9.1
9.1.1. Project Interactions with the Environment 9.1
9.1.2. Potential Effects and Mitigations 9.5
9.1.3. Characterization of Residual Effects for Screening 9.6
9.2. POTENTIAL EFFECTS ON AIR QUALITY, NOISE AND VIBRATION 9.6
9.2.1. Change in Air Quality 9.7
9.2.2. Potential Effects on Noise and Vibration 9.7
9.2.3. Summary of Potential Residual Effects on Air Quality and Noise 9.7
9.3. POTENTIAL EFFECTS ON WATER QUALITY AND QUANTITY 9.7
9.3.1. Change in Water Quality 9.7
9.3.2. Change in Water Quantity 9.8
9.3.3. Summary of Potential Residual Effects on Water Quality and Quantity 9.8
9.4. POTENTIAL EFFECTS ON FISH AND FISH HABITAT 9.8
9.4.1. Change in Fish Habitat 9.9
9.4.2. Change in Fish Health 9.10
9.4.3. Summary of Potential Residual Effects on Fish and Fish Habitat 9.11
9.5. POTENTIAL EFFECTS ON WILDLIFE, INCLUDING SPECIES AT RISK 9.11
9.5.1. Change in Habitat 9.11
9.5.2. Change in Movement 9.12
9.5.3. Change in Mortality Risk 9.12
9.5.4. Summary of Potential Residual Effects on Wildlife 9.13
9.6. POTENTIAL EFFECTS ON TERRAIN, SOILS, GROUNDWATER AND PERMAFROST 9.13
9.6.1. Change to Terrain, Soils, and Permafrost 9.13
9.6.2. Change to Groundwater 9.14
9.6.3. Soil Contamination 9.15
9.6.4. Summary of Potential Residual Effects on Terrain, Soils, Groundwater, Permafrost 9.16
9.7. POTENTIAL EFFECTS ON VEGETATION 9.16
9.7.1. Change in Vegetation Community and Species Diversity 9.16
9.7.2. Increased Risk of Fire 9.17
9.7.3. Summary of Potential Residual Effects on Vegetation 9.18
9.8. POTENTIAL EFFECTS ON TRADITIONAL AND OTHER LAND AND RESOURCE USES 9.18
9.8.1. Screening of Potential Residual Effects on Traditional and Other Land and Resource Uses..... ..... 9.18
9.8.2. Change in Availability of Resources for Traditional and Other Land and Resources Uses 9.18
9.8.3. Change in Access of Traditional and Other Land and Resources Uses 9.19
9.8.4. Changes to Cultural and Spiritual Sites for Traditional and Other Land and Resources

Uses…… 9.20
9.8.5. Summary of Potential Residual Effects on Traditional and Other Land and Resource Uses 9.21
9.9. POTENTIAL EFFECTS ON HERITAGE AND ARCHAEOLOGICAL RESOURCES 9.21
9.9.1. Screening of Potential Residual Effects on Heritage and Archaeological Resources 9.21
9.9.2. Changes to Archaeological and Historical Sites, Contents, and Contexts 9.22
9.9.3. Summary or Potential Residual Effects on Archaeological and Historical Sites 9.23
9.10. POTENTIAL EFFECTS ON COMMUNITIES 9.23
9.11. POTENTIAL CUMULATIVE EFFECTS 9.24
9.12. POTENTIAL EFFECTS OF CLIMATE ON THE PROJECT 9.24
10. SUMMARY OF EFFECTS SCREENING 10.1
11. CLOSURE 11.1
12. REFERENCES 12.1
12.1. LITERATURE CONSULTED OTHER THAN THAT APPEARING IN APPENDICES B AND C 12.1
12.2. CODES, STANDARDS AND MANUALS RELATED TO DESIGN 12.7

LIST OF TABLES

Table 1-1 Contact Information 1.1
Table 1-2 Contractor Information 1.1
Table 2-1 Proposed Right-of-Way Areas 2.10
Table 3-1 Approvals/Authorizations Applicable to the Project 3.1
Table 4-1 Main quantities for the causeways during construction of the new bridge 4.7
Table 4-2 Main quantities for the temporary causeways during the deconstruction of the existing bridge 4.8
Table 4-3 Proposed quantity of water use 4.15
Table 4-4 Comparison of proposed water use to available capacity 4.16
Table 4-5 Surfaces areas for land-based work (permanent – temporary) 4.16
Table 4-6 Surfaces affected by work in, on or over water 4.17
Table 5-1 Timeline for the Project Realization 5.1
Table 7-1 Known and Potential Fish Species Present in Frank Channel 7.5
Table 7-2 Ecological Land Classifications Identified within the Study Area 7.8
Table 7-3 Wildlife Species at Risk and Conservation Concern with Potential to Occur in the RSA 7.11
Table 8-1 Archaeological Sites Recorded near the Project Area of the AOA 8.6
Table 9-1 Project Activity Interaction Matrix 9.2
Table 9-2 Characterization of Residual Effects used in Screening 9.6
Table 9-3 Summary of Potential Residual Effects on Air Quality and Noise 9.7
Table 9-4 Summary of Potential Residual Effects on Water Quality and Quantity 9.8
Table 9-5 Summary of Potential Residual Effects on Fish and Fish Habitat 9.11
Table 9-6 Summary of Potential Residual Effects on Wildlife 9.13
Table 9-7 Summary of Potential Residual Effects on the Terrain, Soils, Groundwater, Permafrost 9.16
Table 9-8 Summary of Potential Residual Effects on Vegetation 9.18
Table 9-9 Summary of Potential Residual Effects on Traditional and Other Land Uses 9.21
Table 9-10 Summary of Potential Residual Effects on Archaeological and Historic Sites 9.23
Table 10-1 Summary of Magnitude of Potential Adverse Residual Effects of the Project 10.1

LIST OF MAPS

Map 2-1 Regional Map 2.4
Map 2-2 Local Map – Sheet 1 ..... 2.5
Map 2-3 Local Map – Sheet 2 ..... 2.6
Map 2-4 Local Map – Sheet 3 ..... 2.7
Map 2-5 Local Map – Sheet 4 ..... 2.8
Map 2-6 Local Map – Sheet 5 ..... 2.9
Map 4-1 Causeways and Blasting Areas 4.5

LIST OF FIGURES

Figure 4-1 Cross-Section of the New Bridge 4.1
Figure 4-2 Typical cross-section for the causeways 4.7
Figure 4-3 Example of Flexifloat Temporary Bridge 4.9
Figure 4-4 Example of removal activities on Watino Bridge Project 4.10
Figure 4-5 Example of dry wheel washing station 4.12
Figure 4-6 Example of a preliminary schematic the camp and laydown area for the Project 4.13

LIST OF APPENDICES

Appendix A Design Drawings

- A.1 Structure Drawings
- A.2 Roadway Drawings
- A.3 Environmental Drawings

Appendix B Management Plans

- B.1 Spill Prevention and Contingency Plan
- B.2 Erosion and Sediment Control Plan
- B.3 Waste Management Plan
- B.4 Wildlife Management and Monitoring Plan
- B.5 Water Quality Monitoring Plan
- B.6 Closure and Reclamation Plan

Appendix C Reports and Studies

- C.1 Stormwater Management Report
- C.2 Two-Dimensional Hydraulic Modelling of Frank Channel
- C.3 Geotechnical Design Report
- C.4 Pre-Development Natural Overview
- C.5 Fish Habitat Assessment
- C.6 Archaeological Overview Assessment
- C.7 Hydrotechnical Analysis – Climate Change
- C.8 Frank Channel Multibeam Bathymetric Survey 2018

Appendix D Engagement Plan and Records

- D.1 Engagement Plan
- D.2 What We Heard Report

ACRONYMS / ABBREVIATIONS

AANDC	Aboriginal Affairs and Northern Development Canada
AAQS	Ambient Air Quality Standards
AIA	Archaeological Impact Assessment
ANFO	Ammonium Nitrate Fuel Oil
ANTH	Anthropogenic Disturbance
AOA	Archaeological Overview Assessment
BMPs	Best Management Practices
BOG-F	Bog Forest
BOG-W	Bog Woodland
CAC	Criteria Air Contaminants
CCME	Canadian Council of Ministers of the Environment
CGB	Community Government of Behchokǫ̀
CO	Carbon Monoxide
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
DFCB	Dehk'è Frank Channel Bridge
DFO	Fisheries and Oceans Canada
ECC	Environment and Climate Change
ECCC	Environment and Climate Change Canada
ECLs	Ecological Land Classifications
ECG	Ecosystem Classification Group
EMP	Environmental Management Plan
ENR	Environment and Natural Resources
EP	Engagement Plan
ESCP	Erosion and Sedimentation Control Plan
EOSD-NWT	Earth Observation of Sustainable Development of Forests Northwest Territories

FAL	Freshwater Aquatic Life
GNWT	Government of Northwest Territories
GNWT-ECC	Government of Northwest Territories, Department of Environment and Climate Change
GNWT-ECE	Government of Northwest Territories, Department of Education, Culture & Employment
GNWT-ENR	Government of Northwest Territories, Department of Environment and Natural Resources
GNWT-INF	Government of Northwest Territories, Department of Infrastructure
GSL	Great Slave Lake
HWY-3	Highway 3
FAL	Freshwater Aquatic Life
FEN-G	Sedge Fen
HELI-W	Heath Lichen Woodland
LSA	Local Study Area
LUP	Land Use Permit
MARSH-S	Marsh
MDL	Method Detection Limits
MOT	Maintenance of Traffic
MSE	Mechanically Stabilized Earth (MSE) Retaining Walls
MUP	Multi-User Pathway
MVLWB	Mackenzie Valley Land and Water Boards
MVRMA	Mackenzie Valley Resource Management Act
NA	Not Available
NAPS	National Air Pollution Surveillance
NPP	Navigation Protection Program
NPRI	National Pollutant Release Inventory
NRSI	Natural Resource Solutions Inc.
NSMA	North Slave Métis Alliance’s

NWT	Northwest Territories
NWT AAQS	Northwest Territories Ambient Air Quality Standards
O3	Ground Level Ozone
OHWM	Ordinary Highwater Mark
PA	Project Area
PM2.5	Fine Particulate Matter
PM10	Coarse Particulate Matter
PSD	Project Screening Document
PWNHC	Prince of Wales Northern Heritage Centre
RfR	Request for Review
ROLI-W	Rock Lichen Woodland
RoW	Right-of-Way
RRC	Renewable Resource Council
RSA	Regional Study Area
SAR	Species at Risk
SARC	Species at Risk Committee
SARA	Species at Risk Act
SHHE-F	Shrub-Herb Forest
SHOP-W	Shallow Open Water
SHTH	Shrub Ticket
SLWB	Sahtu Land and Water Board
SPCP	Spill Prevention and Contingency Plan
TAC	Transportation Association of Canada
TAEM(P)	Tłı̨chǫ Aquatic Ecosystem Monitoring (Program)
TASR	Tłı̨chǫ All Season Road
TC	Transport Canada
TDS	Total Dissolved Solids

TG	Tłı̨chǫ Government
TK	Traditional Knowledge
TKGP	Tłı̨chǫ-Kiewit General Partnership
TLRU	Traditional Land and Resource Use
TSS	Total Suspended Solids
UK	Unknown
VCs	Valued Components
WL	Water Licence
WLWB	Wek'èezhìi Land and Water Board
WMP	Waste Management Plan
WMMP	Wildlife Management and Monitoring Plan
WRRB	Wek'èezhìi Renewable Resources Board
WQMP	Water Quality Monitoring Plan

1. Introduction

This Project Screening Document (PSD) for the Dehk'è Frank Channel Bridge Replacement Project (the "Project") is intended to provide a screening of the potential impacts to the environment of the Project to support the Preliminary Screening by the Wek'eezhii Land and Water Board (WLWB).

1.1. Applicants Name and Contact Information

The Government of Northwest Territories Department of Infrastructure (GNWT-INF) is applying to undertake the Project. Table 1-1 outlines the contact names and addresses for the Project.

Table 1-1 Contact Information

Project Contacts	Role	Contact Information
Main		
GNWT-INF – Chaudary Murtaza	Owner Representative, Manager, Structures and Bridges	(867) 767-9086 Ext. 31127 PO BOX 1320, 5015 49th Street Yellowknife, NT X1A 2L9
Alternate		
GNWT-INF – Benjamin Bey	Environmental Analyst, Design & Technical Services	(867) 767-9083 Ext. 31058 PO BOX 1320, 5015 49th Street Yellowknife, NT X1A 2L9

1.2. Contractor and Sub-Contractors

The contractor for the construction phase has not yet been determined, but a contractor is currently responsible for developing the project in a collaborative manner through construction.

This contractor is TŁĮCHǪ-KIEWIT GENERAL PARTNERSHIP (TKGP) whose coordinates are given below in the Table 1-2.

Table 1-2 Contractor Information

Project Contact	Role	Contact Information
TKGP – Robert Cornell	Contractor Representative, Project Director	(514-609-9965) 100 Borden Drive, Bay 25, Stanton Plaza Yellowknife, NT X1A 2P2

2. Development Overview

2.1. Scope and Purpose of Development

The purpose of the Project is to replace the Dehk'è Frank Channel Bridge in the Highway-3 (HWY-3) corridor. This replacement includes firstly the construction of a new bridge just to the north of the existing one, and secondly the deconstruction of the existing bridge. This also involves re-alignment of the road approaches on either side of the bridge (approximately 460 m on the west side and 775 m on the east side). The Project location is shown on Map 2-1 and the main components of the project are illustrated on five sheets of the Map 2-2.

Construction of a new bridge is required because the existing bridge is reaching the end of its useful life, and traffic must be maintained on the HWY-3 throughout the construction period. The bridge is part of a critical transportation corridor that connects Yellowknife and surrounding communities, mines, and developments to the broader Canadian highway system. The existing Dehk'è Frank Channel Bridge was constructed in 1960, is 200 m long and has a through-truss overhead structure that limits commercial carriers to freight less than 7.3 m wide and 5.8 m high. The horizontal and vertical alignments at the bridge are poor, with a steep blind vertical and horizontal curve on the west approach. This vertical alignment is attributable to the fact that the bridge was originally designed to allow for a 9.14 m shipping clearance in the east part of the channel; however, the waters upstream are too shallow for actual commercial navigation purposes. Also, the bridge is not safe for alternative modes of travel (e.g., bicycle) or pedestrians who must travel on the narrow shoulder. For local context regarding these active transportation modes, the bridge connects the community of Frank Channel to the communities of Rae and Edzo which are located on either side of a channel. So, in addition to having surpassed its design lifespan, the existing bridge poses other safety and functional problems, which can be resolved with the construction of a new bridge.

The Project includes the following physical works and activities, scheduled to begin in fall 2025 and end in fall 2028:

- Mobilization and demobilization of equipment and materials.
- Construction and operation of a temporary camp and a laydown area.
- Tree clearing and grubbing along a new alignment of HWY-3 and bridge approaches.
- Construction of temporary accesses to build the new bridge and deconstruct the existing one.
- Rock blasting to construct these accesses.
- Construction of temporary ice bridges for the work during the winter seasons (for the new bridge and the deconstruction of the existing one).
- Installation of temporary Flexifloat Modular Barges for the work during summer seasons (new bridge).
- Construction of temporary causeways (for the new bridge and the deconstruction of the existing one).
- Construction of new abutments (2) and piers (3) with drilled shaft foundations (10) for the new bridge.
- Completion of the new bridge sub-structure, girders erection and concrete precast panels installation.
- Completion of the new bridge superstructure, deck and pavement.
- Construction of the new roadway approaches to the future bridge, including excavation, backfilling, paving, marking and signage.
- Implementation of various measures for the maintenance of traffic (MOT) during construction.
- Reconfiguration of the new intersection of Frank Channel Tili to accommodate the eastern approach.
- Construction of a multi-user path across the new bridge, linking both sides of the channel.
- Installation of a temporary drainage system and construction of a permanent drainage system with new culverts (6).
- Removal of structural elements from existing bridge for deconstruction.
- Dismantling of the existing concrete substructure piers.
- Removal of surplus material from temporary causeways.
- Demolition of roadway elements is no longer required (pavement, culverts, guardrails, etc.).
- Water use and waste management associated with all activities.

2.2. Development Location

The project is located at km 243.8 on Yellowknife HWY-3, approximately 100 km west of Yellowknife (see Map 2-1), within the territorial limits of the Community Government of Behchokǫ̀ (CGB), established in 2005 under the Community Government Act. More precisely, the project is in the Frank Channel neighborhood community of the CGB. The other two neighborhood communities within the municipal boundaries of the CGB are Edzo and Rae (Map 2-1).

The Project is also within the Tłı̨chǫ Final Agreement area and the asserted territory of the Northwest Territory Métis.

Frank Channel is located on the North Arm of Great Slave Lake and connects Great Slave Lake, Marian Lake, and Russell Lake. In general, the water of this channel flows south towards Great Slave Lake; however, flows can reverse depending on lake inflow, outflow, and wind in the area.

116°30'30"W 116°10'27"W 115°50'24"W 115°30'21"W 115°10'18"W 114°50'15"W 114°30'12"W 114°10'9"W 113°50'6"W

62°55'50"N 62°45'45"N 62°35'40"N 62°25'35"N 116°30'30"W

63°5'5"N 62°55'50"N 62°45'45"N 62°35'40"N 62°25'35"N 62°15'30"N

N

Russell Lake

Marian Lake

Rea

Frank Channel

Project Location

Quarry

Edzo

Great
Slave Lake

Access to
Tłı̨chǫ All Season Road

Yellowknife

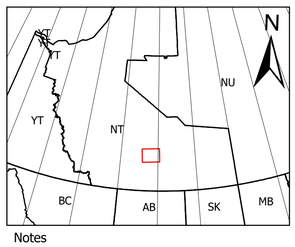
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Legend

- Project Location
- Quarry used for the Project
- Community Government of Behchokǫ̀
- Transmission Line
- Highway
- Watercouse
- Waterbody
- Wooded area
- Tłı̨chǫ Land
- Municipal Land
- Commissioner's Land
- Federal Land
- Territorial Land

116°10'27"W 115°50'24"W 115°30'21"W 115°10'18"W 114°50'15"W 114°30'12"W 114°10'9"W 113°50'6"W



Regional Map
Scale:1:250,000

0 5 10 20 30 40 Km

Notes
1. Coordinate System: NAD 1983 Northwest Territories Lambert UTM Zone 11N. EPSG: 3580
2. Data Sources: Base Data;Esri Canada, Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, USDA, NRCan, Parks Canada, Esri, USGS, NWT Centre for Geomatics, ENR-ITI Shared Services, Government of the Northwest Territories, 2015-2016.

Government of Northwest Territories

Consultant Logo

TŁı̨CHǪ-KIEWIT PARTNERSHIP

Rev	Date	Description	Init
B	2025-04-04	ISSUED FOR PERMITS	H.R.-M.
A	2025-03-13	ISSUED FOR DISCUSSION	H.R.-M.

REVISIONS

GOVERNMENT OF NORTHWEST TERRITORIES

HIGHWAY NO. 3, Km 243.8

DEHK'È FRANK CHANNEL BRIDGE REPLACEMENT PROJECT

PERMIT APPLICATION – REGIONAL MAP

MAP 2-1

DESIGNED	H.ROY-MARTEL	DATE	2025-04-04
CHECKED	A.FOSSEY	DATE	2025-04-04
DRAWN	D.CORREA	DATE	2025-04-04

SCALE 1:250.000

Government of Northwest Territories

Transportation Division Infrastructure
Government of the Northwest Territories

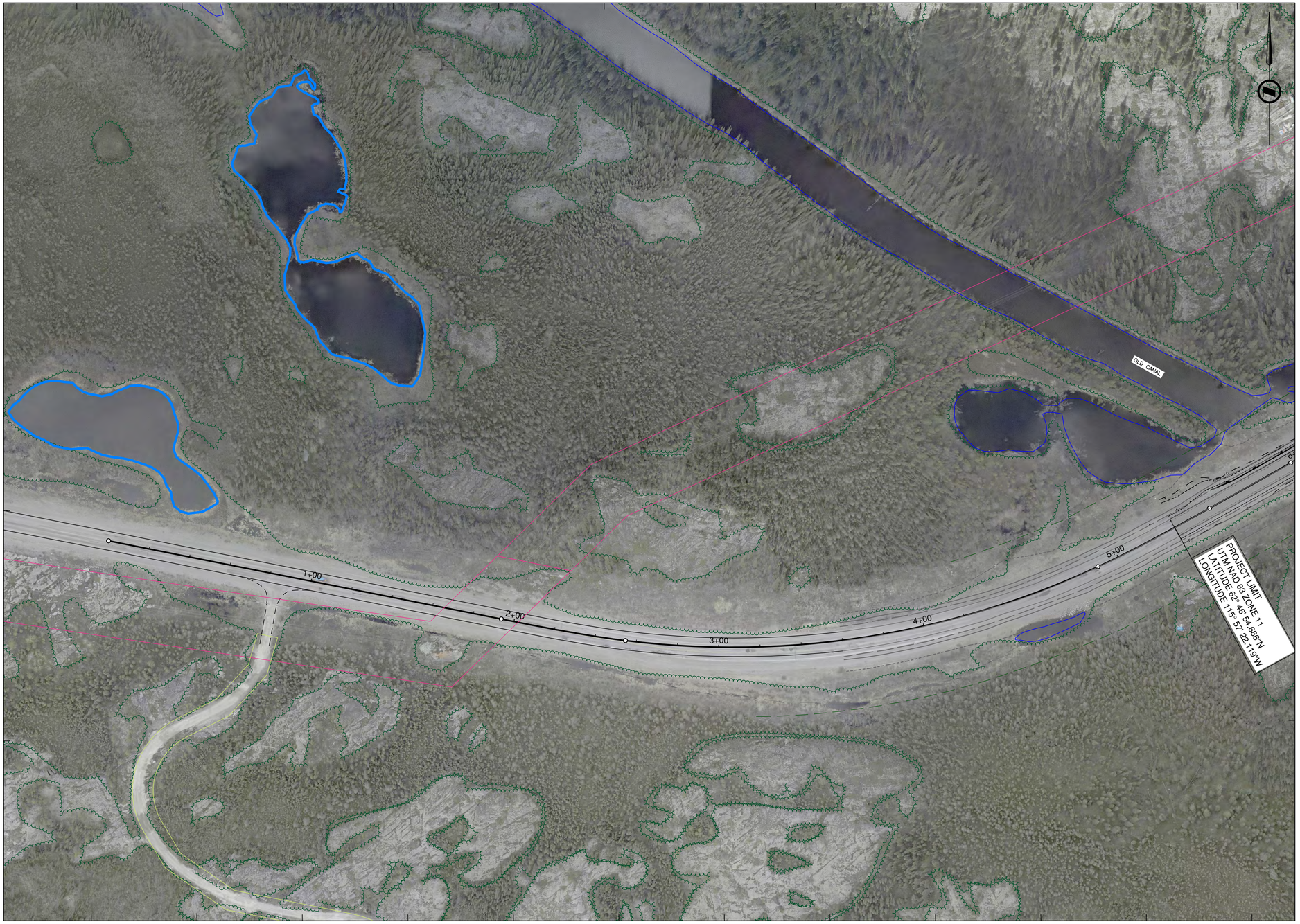
5015 49th Street
Yellowknife, NT X1A 2L9
Phone: 867-767-9086
Email: benjamin_bey@gov.nt.ca
Email: info@frankchannelbridge.com

PROJECT No. SC-INF01-7198

DRAWING No. TKGP-ENV-MAP-0301 | B

115° 58' 8" W | 115° 58' 5" W | 115° 58' 1" W | 115° 57' 58" W | 115° 57' 54" W | 115° 57' 50" W | 115° 57' 47" W | 115° 57' 43" W | 115° 57' 40" W | 115° 57' 36" W | 115° 57' 32" W | 115° 57' 29" W

62° 47' 2" N
62° 46' 59" N
62° 46' 55" N
62° 46' 52" N



PLAN
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PRELIMINARY
NOT FOR CONSTRUCTION

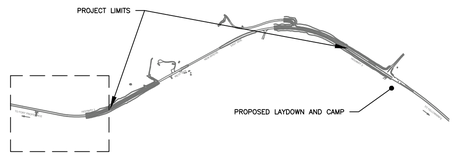
LEGEND

- WETLAND
- PERMANENT WATERCOURSE
- WOODED AREA
- CLEARING AREA (WOODED AREA)
- WATER BODY
- FISH HABITAT
- WATER QUALITY MONITORING STATIONS
- WATER INTAKES*
- TEMPORARY EASEMENT (PRELIMINARY)
- PROPOSED RIGHT OF WAY LIMIT (PRELIMINARY)
- EXISTING RIGHT OF WAY LIMIT
- POWER LINE EASEMENT

NOTES
*WATER INTAKES FOR ICE BRIDGES, CLEANING & DUST CONTROL (SEE THE APPLICATION FORM FOR DETAIL PER YEAR)

REFERENCES
- PRE-DEVELOPMENT NATURAL ENVIRONMENT OVERVIEW, NOV 15, 2021
- GNWT ATLAS

KEY PLAN



NAD83(2010), UTM ZONE 11(N)

Government of Northwest Territories

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TŁĮCHǪ-KIEWIT PARTNERSHIP

Rev	Date	Description	Init
B	2025-04-04	ISSUED FOR PERMITS	H. R.-M.
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REVISIONS

GOVERNMENT OF NORTHWEST TERRITORIES

HIGHWAY NO. 3, Km 243.8

DEHK'È FRANK CHANNEL BRIDGE (03B004-1)

PERMIT APPLICATION – LOCAL MAP

MAP 2-2 / 1 OF 5

DESIGNED	H. ROY-MARTEL	DATE	2025-04-04
CHECKED	A. FOSSEY	DATE	2025-04-04
DRAWN	S.BRUNETTE	DATE	2025-04-04
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Government of Northwest Territories

TRANSPORTATION DIVISION INFRASTRUCTURE
GOVERNMENT OF THE NORTHWEST TERRITORIES
5015 49th STREET
YELLOWKNIFE, NT X1A 2L9
PHONE: 867-767-9086
EMAIL: benjamin_bey@gov.nt.ca
EMAIL: info@frankchannelbridge.com

PROJECT No.
SC-INF01-7198

DRAWING No.
TKGP-ENV-MAP-0302 | B

CANCEL PRINTS BEARING PREVIOUS LETTER

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PLOTTED : Wednesday, April 2, 2025

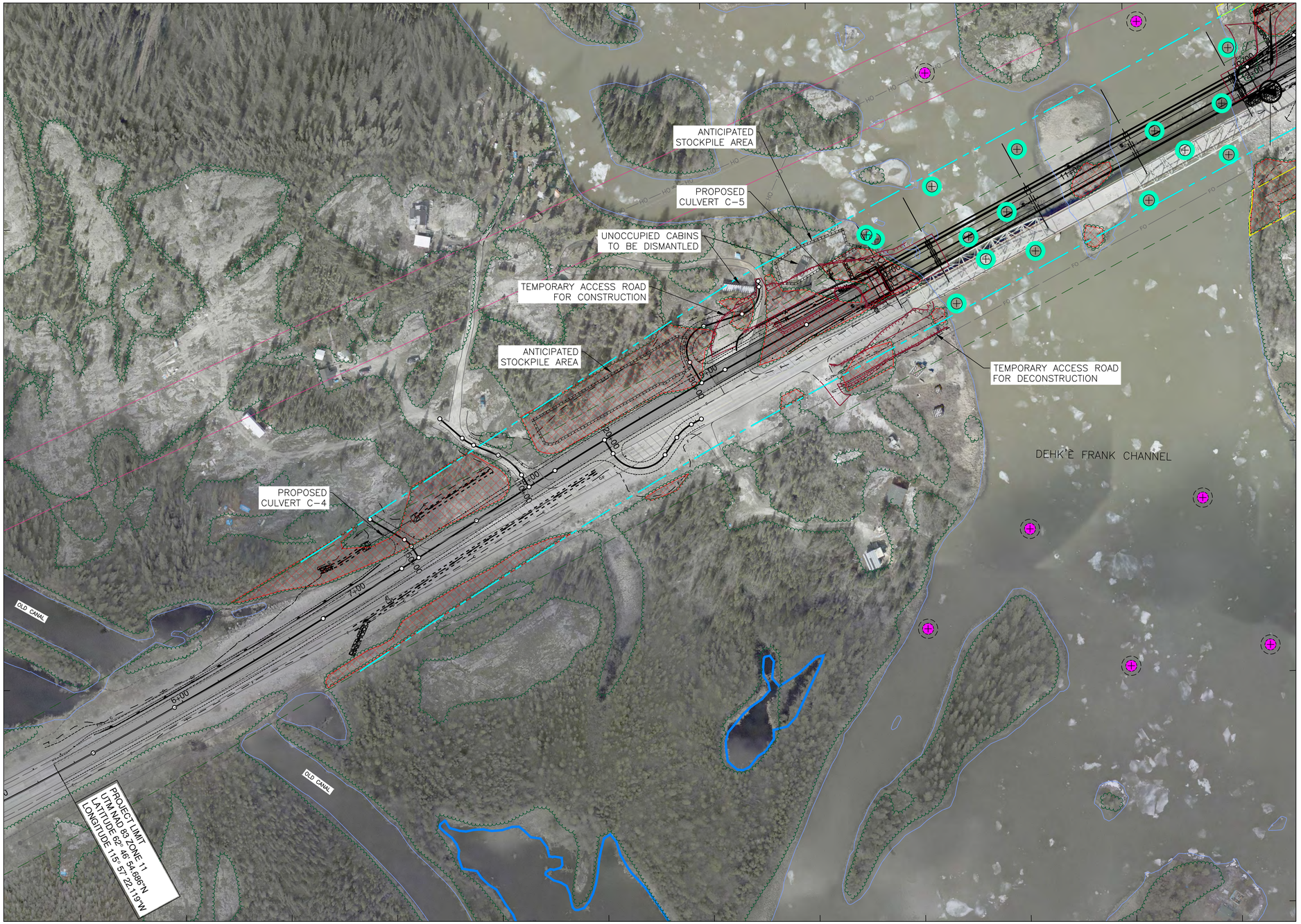
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62° 46' 59" N

62° 46' 55" N

62° 46' 52" N



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PLAN
SCALE: 1:1000

PRELIMINARY
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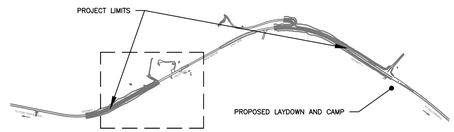
LEGEND

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GOVERNMENT OF NORTHWEST TERRITORIES

HIGHWAY NO. 3, Km 243.8

DEHK'È FRANK CHANNEL BRIDGE (03B004–1)

PERMIT APPLICATION – LOCAL MAP

MAP 2–2 / 2 OF 5

DESIGNED	H. ROY–MARTEL	DATE	2025–04–04
CHECKED	A. FOSSEY	DATE	2025–04–04
DRAWN	S.BRUNETTE	DATE	2025–04–04
SCALE	1:1000	0 10 1:1000 50m	

Government of Northwest Territories

TRANSPORTATION DIVISION INFRASTRUCTURE
GOVERNMENT OF THE NORTHWEST TERRITORIES
5015 49th STREET
YELLOWKNIFE, NT X1A 2L9
PHONE: 867–767–9086
EMAIL: benjamin_bey@gov.nt.ca
EMAIL: info@frankchannelbridge.com

PROJECT No.
SC–INF01–7198

DRAWING No.
TKGP–ENV–MAP–0303 | B

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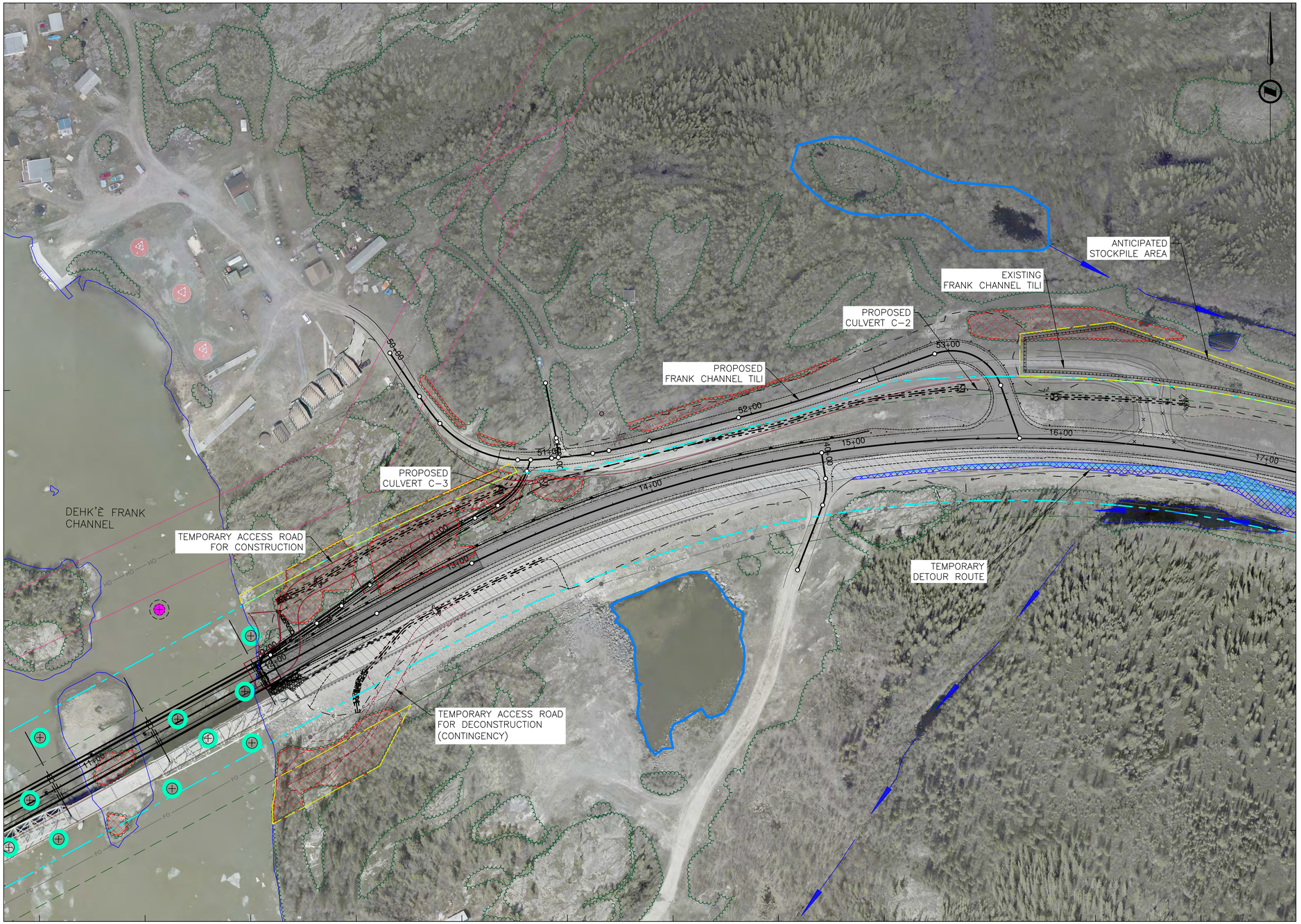
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PLAN
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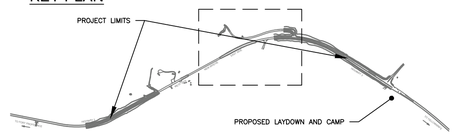
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MAP 2-2 / 3 OF 5

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SCALE 1:1000 (0 10 1:1000 50m)

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GOVERNMENT OF THE NORTHWEST TERRITORIES
5015 49th STREET
YELLOWKNIFE, NT X1A 2L9
PHONE: 867-767-9086
EMAIL: benjamin_bey@gov.nt.ca
EMAIL: info@frankchannelbridge.com

PROJECT No. SC-INF01-7198

DRAWING No. TKGP-ENV-MAP-0304 | B

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PLOTTED : Thursday, April 3, 2025

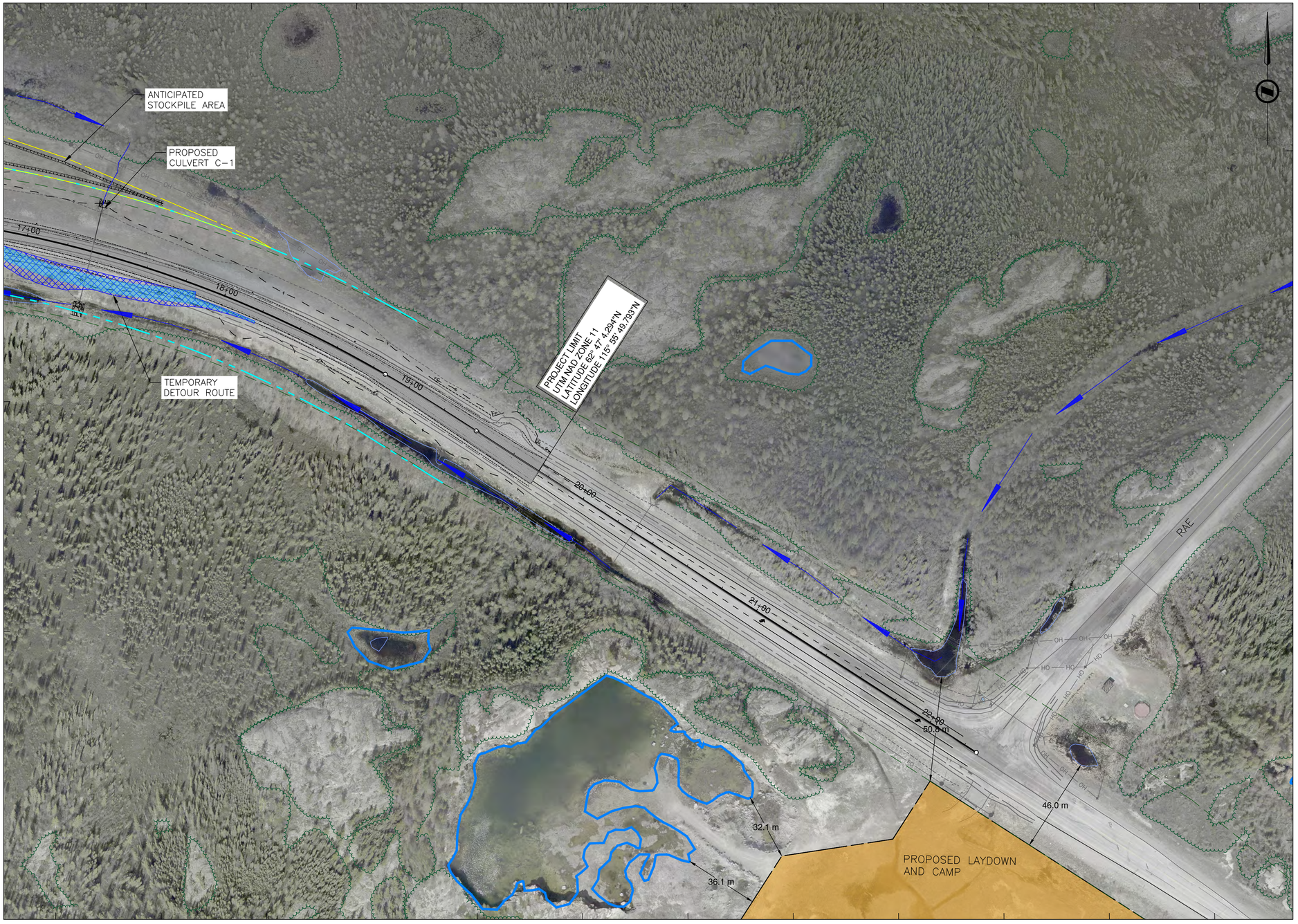
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62° 47' 10" N

62° 47' 6" N

62° 47' 2" N

62° 46' 59" N



115° 56' 6" W | 115° 56' 2" W | 115° 55' 59" W | 115° 55' 55" W | 115° 55' 52" W | 115° 55' 48" W | 115° 55' 44" W | 115° 55' 41" W | 115° 55' 37" W | 115° 55' 34" W | 115° 55' 30" W | 115° 55' 26" W

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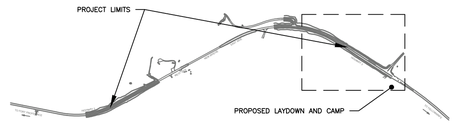
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YELLOWKNIFE, NT X1A 2L9
PHONE: 867-767-9086
EMAIL: benjamin_bey@gov.nt.ca
EMAIL: info@frankchannelbridge.com

PROJECT No.
SC-INF01-7198

DRAWING No.
TKGP-ENV-MAP-0305 | B

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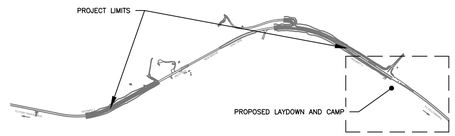
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PERMIT APPLICATION – LOCAL MAP

MAP 2-2 / 5 OF 5

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PHONE: 867-767-9086
EMAIL: benjamin_bey@gov.nt.ca
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PROJECT No. SC-INF01-7198

DRAWING No. TKGP-ENV-MAP-0306 | B

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PLOTTED : Thursday, April 3, 2025

2.3. Current Land Ownership and proposed Right-of-Way

The axis of the new bridge and the new road approaches can largely be accommodated within the existing HWY-3 Right-of-Way (RoW). The same applies to many of the temporary areas required for the construction work. However, for the completion of work, an additional 15 m wide surface is required for the proposed new RoW, on the north side of the existing RoW. In addition, temporary easements will be required to access specific areas during the construction phase (see all sheets related to Map 2-2).

The existing RoW, with a width of 60 m, is of course publicly owned and is identified as: Public Highway, Road Yellowknife HWY-3. The additional area required for the new RoW on the north side falls within an overlay to the existing RoW that is categorized as follows in terms of land tenure in the territory of CGB: (Active Administrative) 106-SK-015. This is the same land tenure category covered by the temporary easement areas, the multi-purpose trail and the Frank Channel Tili reconfiguration. The proposed new project RoW is preliminary and is still under discussion between GNWT-INF and CGB authorities. Similarly, a portion of the existing RoW on the south side that would no longer be required for the road axis could possibly be retroceded. This will also be discussed between the two governments. Table 2-1 summarizes the area (hectares [ha]) changes to the existing RoWs and the proposed new RoW.

Table 2-1 Proposed Right-of-Way Areas

Surface component	Hectares (ha)	Square meters (m^2)
Existing RoW between start and finish of work – land portion (with Frank Channel Tili).	7.73	77,338
Additional area of the proposed new RoW between start and finish of work – land portion (with Frank Channel Tili).	1.55	15,530
Area of existing RoW that can be retroceded on completion of work.	1.20	11,998

A total of 2.55 ha (25,520 m^2) must be added for temporary easements for the Project; 20,275 m^2 specifically for the camp-laydown area (see Map 2-2, sheet 5 of 5).

In addition, two unoccupied cabins will now be located within the new RoW (see Map 2-2, sheet 2 of 5). These cabins will be affected by temporary worksite developments (access road for the construction of the new bridge) and will therefore have to be relocated – deconstructed. This will be done based on feedback received in consultation between GNWT-INF and CGB.

2.4. Conformity with Land Use Plan

Section 1.3.3 of the Tłı̨chǫ Land Use Plan (2013), this plan specifies that the Project activities are not applicable within the boundaries of a community government. Thus, for the present project, there is no table of conformity to produce regarding the Tłı̨chǫ Land Use Plan.

3. Authorizations and Approvals

3.1. Eligibility

The GNWT-INF's eligibility for a land use permit is as described in Section 18 part (b) of the Mackenzie Valley Land Use Regulations (MVLUR). GNWT-INF is currently in discussions with the CGB and the relevant territorial authorities regarding the new RoW required for the additional surface. CGB is the owner of the two abandoned cabins affected by this new RoW. The area proposed for the camp laydown is under the management of CGB Right of Way. Discussions are currently underway with CGB to formalize the land rental.

3.2. Applications Needed According to Legislation and Regulations

The GNWT-INF is submitting this PSD to support preliminary screening of the Project by the WLWB as required by the Mackenzie Valley Resource Management Act (MVRMA). Anticipated authorizations and approvals required for the Project to proceed are shown in Table 3-1, with the status of each application.

Table 3-1 Approvals/Authorizations Applicable to the Project

Legislation/Regulation	Authority	Activity	Type / Action
Mackenzie Valley Resource Management Act & Mackenzie Valley Land Use Regulations	WLWB	Earthworks, fuel storage, use of equipment-machinery, RoW vegetation clearing, drilling, use of explosives	Type A Land Use Permit
Northwest Territories Waters Act & Northwest Territories Waters Regulations	WLWB	Water use, construction of structure across a waterbody 5 m wide or more, watercourse training (channel or bank alteration, culverts)	Type B Water Licence
Fisheries Act (Fish and Fish Habitat Protection Program)	Fisheries and Oceans Canada (DFO)	Works in and around water	Request for review (RfR) submitted on December 18, 2024 Correspondence received April 16, 2025, from DFO indicating that authorization is required Application for authorization is planned in summer 2025
Canadian Navigable Waters Act & Major Works Order	Transport Canada (TC)	Installation of a bridge over navigable waterway and implementation of causeways for the construction periods: major works	Application for an approval of works under the under the Navigation Protection Program (NPP) is planned for the end of May 2025
Archaeological Sites Act & Archaeological Sites Regulations	GNWT-Education, Culture and Employment (GNWT-ECE), Prince of Wales Northern Heritage Centre (PWNHC)	Survey, excavation, alteration, disturbance or study of archaeological sites, if required	Archaeological Overview Assessment (AOA) completed in December 2021 Archaeological Impact Assessment (AIA) planned for summer 2025: Application for Archaeology Permit of Class 2 submitted March 11, 2025

4. Detailed Description of the Project

This project description refers to the design and construction of a new bridge and deconstruction of the existing bridge. In addition to the maps presented in section 2 of this document, Appendix A contains the engineering design drawings relevant to the Project (60% advancement). The design is based on several requirements set by GNWT-INF as part of the development of the Project, themselves based on several Canadian and, in some cases, American criteria, guides, publications, manuals and protocols. These are listed in Section 12.2).

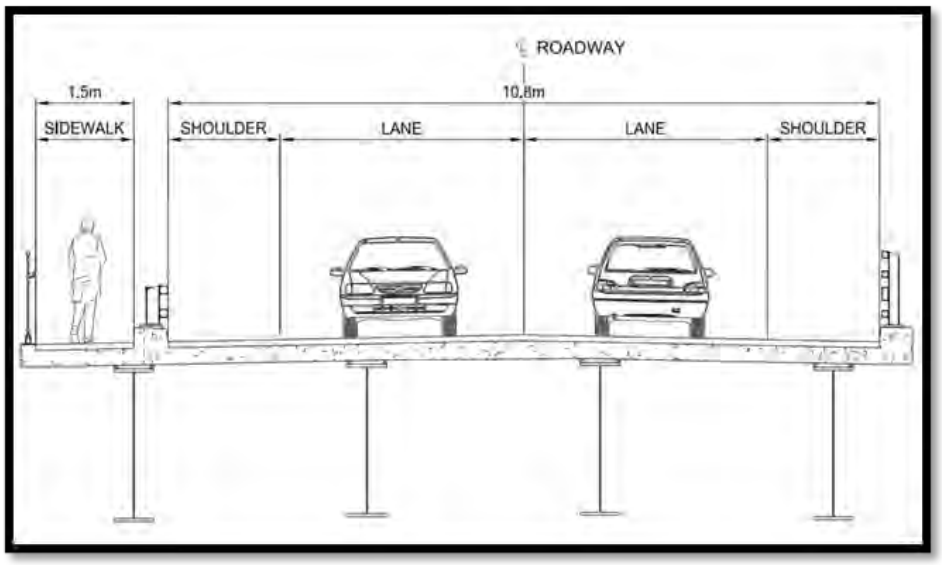
4.1. Permanent Structures

4.1.1. New Bridge

The design approach for the new bridge is to minimize the footprint of the piers in the aquatic environment and to have a posted speed that is specific to a road corridor of 70 km/h, while minimizing widening of the road corridor, and favoring points of connection to the existing roadway that are closest to the existing bridge. To achieve this, the new bridge will be constructed 5.5 m to the north of the existing bridge (approximately 15 m between the two bridges center lines). At this location, the new bridge and its approaches can be located largely within the existing RoW (see Map 2-2). This location also promotes better integration with the area's land use, since the cabins closest to the axis of the existing bridge are no longer occupied on the north side and will be removed to accommodate the construction of the new bridge.

The new bridge will be 193 m long (Abutment to abutment centerline) and 10.8 m wide (carriageway only) with two lanes for the traffic (3.7 m in each direction, with 1.7 m shoulders on both sides, and 1.5 m for a pedestrian sidewalk on the north side of the deck) The sidewalk is to provide a safe, dedicated bridge crossing for a multi-user pathway (MUP) for pedestrians. Figure 4-1 illustrates this cross-section of the bridge width. The bridge will be an open deck with no height restrictions. The Dehk'è Frank Channel bridge consists of a 167m three-span continuous straight steel I girders bridge and a simply supported jump span of 26 m with NU girders with precast deck panels.

Figure 4-1 Cross-Section of the New Bridge



The bridge abutments and piers consist of cast in place concrete pier caps supported by drilled shafts with permanent steel casing foundations socketed into competent bedrock. All cast-in-place work will occur on or above causeways or land, minimizing the risk of concrete spillage into Frank Channel. In total 10 drilled shafts will be installed. Here are the main characteristics of the foundations for the bridge pile:

- 10 drilled shafts, permanently cased.
- Permanent casing lengths 2.4 m to 8.3 m long.
- Rock socket 3.0 m to 5.8 m long.

The bridge foundations are illustrated on the relevant structure drawings found in Appendix A.1. Seven (7) of the piles will be installed below the ordinary high-water mark (OHWM) (see structure drawings TKGP-STR-DWG-0004 and TKGP-STR-DWG-0006). It's important to note that the total encroachment of the seven (7) piles under OHMW is marginal, limited to 18 m^2. The two middle piers (piers 2 and 3) will be located on the outside shelves of the rock outcrop island in a shallow area of the channel, and the west pier (pier 1) and the two abutments will be located on shallow areas on or near the banks. The east abutment will encroach only very slightly into the aquatic environment, while the west abutment will be completely out of the water and in the riparian zone (see structure drawings TKGP-STR-DWG-0012 and TKGP-STR-DWG-0013. Retaining walls (Mechanically Stabilized Earth abutments [MSEs]) and appropriate riprap will be installed to solidify and protect the abutments. The surface areas and backfill volumes for the abutments retaining walls are the following:

- West retaining walls abutment – area of 288 m^2 and 539 m^3 of backfill is needed (20 mm and 50 mm).
- East retaining walls abutment – area of 144 m^2 and 1,325 m^3 of backfill is needed (20 mm and 50 mm).

The following are the main material quantities for the structure of the bridge:

- Structural Steel - 497 tons (t).
- Precast NU Girders - 74 m^3.
- Precast Slabs - 686 m^3.
- Concrete (pier caps, abutments) - 412 m^3.
- Bearings - 26 units.
- Expansion Joints - 2 units.
- Steel Railings - 527 m.

Water access under the bridge for fishing or recreational boats will still be possible. The bridge clearances vary underneath from 4 m to 5 m, and possible navigation corridors from 50 m to 55 m wide (see drawings TKGP-STR-DWG-0004 in Appendix A.1).

4.1.2. Roadway Approaches

Several roadway improvements are also necessary to support the construction of the new bridge. The primary improvement includes realigning HWY-3 to the north, to allow safe connection to the new bridge with a posted speed of 70 km/h. This will require roadwork over a length of just over 460 m on the west side of Frank Channel, up to the Old Canal area. This length new roadway approach is greater on the east side of Frank Channel, at around 775 m, with the limit of work being located just before the intersection with the road leading to Rae. Added to this is the 285 m reconstruction of Frank Channel Tili, all to ensure a functional and safe intersection with HWY-3 (the future intersection is moved westwards approximately 70 m). Then there's the extension of the MUP for the bridge and also planned on land on either side of Frank Channel, with a length of around 100 m on the east side to connect with the new alignment of HWY-3, and a length of 150 m on the west side to connect with Frank Channel Tili.

The longitudinal profile of the new HWY-3 alignment does not result in major elevation changes compared with the original ground, except at the points closest to the new bridge and at the Frank Channel Tili intersection. It should be noted that on the east side, close to the bridge, the new road segment will be quite a bit lower than the existing road (around 2 m to3 m lower). The new HWY-3 segments will have a 9.0 m wide paved surface, with two 3.7 m lanes in each direction and 2.5 m shoulders (0.8 m paved and 1.7 m gravelled). Frank Channel Tili will have a finished chipseal surface with variable widths from 7.0 to 9.0 m, with wider shoulders at its intersection. The MUP will be 2.0 m wide on land, compared with 1.5 m on the bridge (finished in stone dust outside of the bridge).

The relevant roadway drawings are in Appendix A.2 of the present document:

- Plan and profile: TKGP-RDW-DWG-0201 to 0206, 0211, 0212, and 0221.
- Typical sections: TKGP-RDW-DWG-0301 to 0304.

The following is a summary of the segment-specific cut and fill quantities just presented for work on the approaches and Frank Channel Tili:

- HWY-3 West Approach (with the MUP): 1,355 m^3 cut and 12,263 m^3 fill.
- HWY-3 East Approach (with the MUP): 12,439 m^3 cut and 23,278 m^3 fill.
- Frank Channel Tili: 176 m^3 cut and 5,160 m^3 fill.

Of these fill quantities, nearly 6,500 m^3 will be reused from the cuttings, and the any excavated organic soils will also be retained for reuse in the restoration at the end of the work, reducing the quantities of cuttings that must be disposed of off-site or offered to other users in the region. Embankment base and fill will be completed by the supply of approximately 2,000 m^3 of class 50 mm rock and 32,000 m^3 of class 300 mm rock. The work will be completed afterwards with 20 mm class granular layers and paving with a mixture of hot mix asphalt (bridge approaches) or chip seal (main highway and New Tili Road).

All suppliers of materials entering the site will be required to provide proof that they are free from contamination and can be used in accordance with the criteria for road works. Materials to be reused on site or disposed of offsite will be subject to prior environmental characterization as outlined in the Spill Prevention and Contingency Plan (SPCP) attached as Appendix B.1

4.1.3. Stormwater Management

A full report on permanent stormwater management is available in Appendix C.1 and an Erosion and Sediment Control Plan during the work is also available in Appendix B.2

The permanent drainage system details, the ditch characteristics in additional roadway drawings in Appendix A.2 (TKGP-RDW-DWG-0701 to 0703 and TKGP-RDW-DWG-0711 and 0712). These systems have been designed to minimize disturbance to existing hydrology within project limits.

There will be 928 m of new ditches in total. Several control measures are also planned, including energy dissipators, heavy rock riprap, apron riprap, rock check-dams, slope armouring, embankment protection. Five new culverts are also required as part of the project and are also shown on the above-mentioned drawings with the relevant details. The following are the characteristics of the culverts:

- Culvert C-1: East side - Under the Hwy-3 – ø 1,350 mm – 48 m long.
- Culvert C-2: East side - Under Frank Channel Tili intersection – ø 800 mm – 42 m long.
- Culvert C-3: East side - Under the MUP – ø 450 mm – 18 m long.
- Culvert C-4: West side - Under the private entrance for access road #5 – ø450 mm – 24 m long.
- Culvert C-5: West side - Under the temporary west access road for construction – ø400 mm – 9 m long.

To install the drainage systems with culverts, the site must import 1,520 tons of 20 mm granular fill and 530 tons of riprap (this latter quantity also includes the riprap required for abutments).

4.2. Temporary works, structures, installations and facilities

4.2.1. Access roads

Three temporary access roads are to be built as part of the project, initially to provide access to the temporary causeways along the shoreline for construction of the new bridge and deconstruction of the existing bridge. The causeways will later be used to build ice bridges to allow work to continue at different stages of the project.

Two temporary accesses are initially planned on either side of Frank Channel for the construction phase of the new bridge. These accesses will be built up on the mainland and along the shoreline, up to near the OHWM, and will have a typical width of 9 m to 12 m, a maximum slope of 10% and a granular base 300 mm thick. To respect these slopes for safety purposes and to facilitate truck and machinery movements towards the channel, some drilling and blasting work is planned to remove outcropping rock, but in a localized manner and with explosive charges very limited due to the presence of the existing bridge. An estimated 1,730 m^3 of rock will be excavated by this method, most of which (80% of the volume) will be on the east side of the channel. The Map 4-1 identifies areas where blasting is required, but the weight of explosives planned to be used in a 30-day period for the project is not yet known. This will be determined later as part of the project development.

The temporary access road on the east side will be built from Frank Channel Tili and will terminate near the abutment of the new bridge on the same side. It will be just over 165 m long. The temporary road on the west side will start at a private entrance serving a few cabins around 100 m from HWY-3 to the west abutment area. It is at this location that two unoccupied cabins located in the RoW will be affected by the work. As previously mentioned, a decision on dismantling or relocation of these cabins will be made during consultation with CGB. These two roads will occupy a surface area of just under 3,200 m^2 during construction. Some areas will have to be cleared of vegetation, and all this clearing will take place at the start of the project in fall 2025 with various equipment that have not been determined yet (forestry mulcher, crawler tractor, other). The total area of clearing is presented in the Closure and Reclamation Plan (CRP) in Appendix B.6.

For deconstruction of the existing bridge, a temporary access is planned to the southwest of the existing bridge, on the west side of the channel. This access will be approximately 60 m long, around 9-10 m wide and cover an area of around 600 m^2. It will be built from a private road entrance giving access to a cabin located a little further south, still on the west side of the channel. This access will end at a causeway to be built in the water to accommodate an ice bridge, so that the existing bridge can be deconstructed. For now, it should be noted that the ice bridge, which will allow the deconstruction of the existing bridge to the east side of the channel, will not require the installation of a causeway on this side, nor a temporary access road.

115° 57' 25" W | 115° 57' 22" W | 115° 57' 18" W | 115° 57' 14" W | 115° 57' 11" W | 115° 57' 7" W | 115° 57' 4" W | 115° 57' 0" W | 115° 56' 56" W | 115° 56' 53" W | 115° 56' 49" W | 115° 56' 46" W

62° 47' 2" N

62° 46' 59" N

62° 46' 55" N

52+00

51+00

14+00

13+00

11+00

10+00

HO

FO

TEMPORARY ACCESS ROAD FOR CONSTRUCTION

CAUSEWAYS FOR CONSTRUCTION

TEMPORARY ACCESS ROAD FOR DECONSTRUCTION (CONTINGENCY)

POTENTIAL ROCK BLASTING AREA

TEMPORARY ACCESS ROAD FOR CONSTRUCTION

CAUSEWAYS FOR DECONSTRUCTION

POTENTIAL ROCK BLASTING AREAS

TEMPORARY ACCESS ROAD FOR DECONSTRUCTION

HWL (1:2 YR HISTORIC CONDITIONS) EL 156.680

DEHK'È FRANK CHANNEL

62° 47' 2" N

62° 46' 59" N

62° 46' 55" N

62° 46' 52" N

115° 57' 25" W | 115° 57' 22" W | 115° 57' 18" W | 115° 57' 14" W | 115° 57' 11" W | 115° 57' 7" W | 115° 57' 4" W | 115° 57' 0" W | 115° 56' 56" W | 115° 56' 53" W | 115° 56' 49" W | 115° 56' 46" W

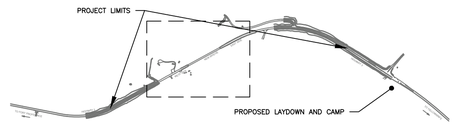
PLAN
SCALE: 1:1000

PRELIMINARY
NOT FOR CONSTRUCTION

LEGEND:

- POTENTIAL ROCK BLASTING AREAS
- TEMPORARY BRIDGE OFFICES
- PERIMETER OF CAUSEWAYS

KEY PLAN



NAD83(2010), UTM ZONE 11(N)

Government of Northwest Territories

Consultant Logo

TŁĮCHǪ-KIEWIT PARTNERSHIP

Rev	Date	Description	Init
B	2025-04-04	ISSUED FOR PERMITS	H. R.-M.
A	2025-03-14	ISSUED FOR DISCUSSION	H. R.-M.

REVISIONS

GOVERNMENT OF NORTHWEST TERRITORIES

HIGHWAY NO. 3, Km 243.8

DEHK'È FRANK CHANNEL BRIDGE (03B004-1)

PERMIT APPLICATION – CAUSEWAYS & BLASTING AREAS

MAP 4-1

DESIGNED	H. ROY-MARTEL	DATE	2025-04-04
CHECKED	A. FOSSEY	DATE	2025-04-04
DRAWN	S.BRUNETTE	DATE	2025-04-04
SCALE	1:1000	0 10 1:1000 50m	

Government of Northwest Territories

TRANSPORTATION DIVISION INFRASTRUCTURE
GOVERNMENT OF THE NORTHWEST TERRITORIES
5015 49th STREET
YELLOWKNIFE, NT X1A 2L9
PHONE: 867-767-9086
EMAIL: benjamin_bey@gov.nt.ca
EMAIL: info@frankchannelbridge.com

PROJECT No.
SC-INF01-7198

DRAWING No.
TKGP-ENV-MAP-0307 | B

CANCEL PRINTS BEARING PREVIOUS LETTER

FILE: C:\USERS\FRED.AUBIN.JAVOE\DC\ACCDOCS\VIEWIT\35161-FRANK CHANNEL BRIDGE_PH2\PROJECT FILES\40 DESIGN ENG\08 ENV\CAD\SHEETS\TKGP-ENV-MAP-0307.DWG
PLOTTED : Friday, April 4, 2025

All the temporary accesses are either within the existing road RoW or within the planned new RoW. This can be seen on the preliminary drawing for the proposed RoW and can be viewed both on the Map 2-2 (Sheets 2 and 3 of 5) and Map 4-1. It should be noted that a fourth temporary access is indicated on these maps and is outside either of the RoWs. This access, to the southeast of the existing bridge, is shown here only as an indication. It may be required for deconstruction of the existing bridge, but this is not part of the deconstruction scenario now (this will depend on the working methods, which are still under study). On restoration drawings contained in the CRP (Appendix B.6), this area is shown only as an option for revegetation after the work. This is also shown on the environmental drawings in Appendix A.3 (drawing TKGP-ENV-DWG-0202).

4.2.2. Causeways

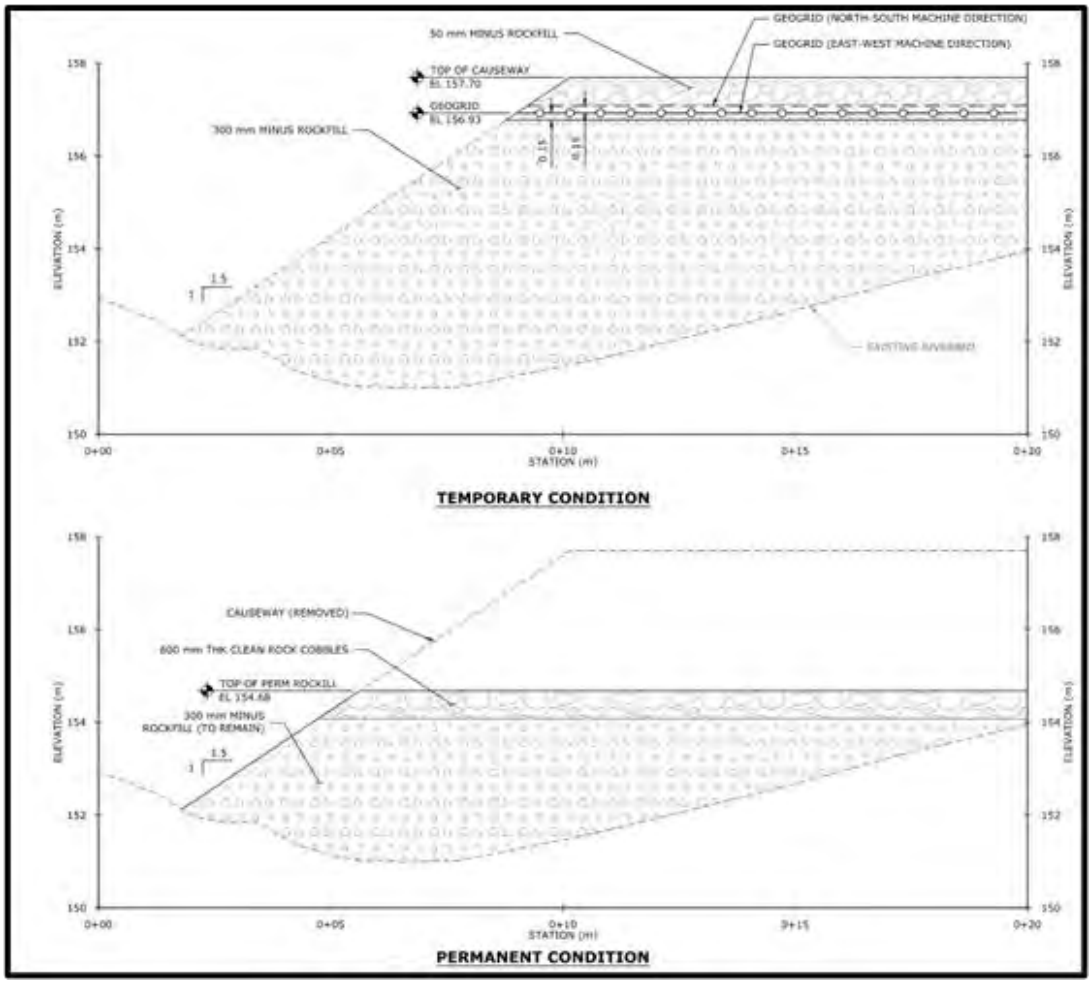
For the construction of the new bridge, four causeways need to be built in the initial phases of the work, so that work on the bridge foundations and structure can be carried out. These causeways are shown with all details on the drawing TKGP-ENV-DWG-0101 found in Appendix A.3 (environmental drawings). Two causeways will be built from the banks on either side of the channel (east and west sides), and the other two will be built on either side of the island in the center of the channel.

The causeways were designed to minimize encroachment into the aquatic environment as much as possible. The design is also based on the latest construction means and methods and on a geotechnical stability analysis to ensure the safety of workers and operations with the equipment required for bridge construction (including a drill rig and crane). The top of these causeways will be approximately 1 m above the OHWM (157.70 vs 156.68 m). From this level, the causeways will vary in height from about 4 m to 9 m from the water to the existing riverbed (drawing TKGP-ENV-DWG-0101, Appendix A.3).

The causeways will be built during the winter, and the required material will be pushed and placed by a tracked dozer and excavator from the shore (work from the island's shore can only be completed once the ice bridges have been put in place). The material used will be 300 mm and 50 mm class rock, with geogrids in the surface layers to reinforce the structural capacity of the fill. The lower half of the backfill used for the temporary causeways will, however, be left permanently in place at the end of the work, as it is impossible to remove this material with conventional machinery given the slopes recommended to limit encroachment into fish habitat. The top of the material left in place will consist of a layer of larger-caliber stones, which can be reshaped when the top half of the fill is removed to help restore fish habitat. The Figure 4-2 shows the relevant details of these causeways in a typical longitudinal cross-section.

It is very important to note that scenarios were initially studied to remove all the material from the causeways after work, but these had too significant an impact on fish habitat. These scenarios led to much greater restrictions on water flow in the channel, with more notable changes in velocity. The reason for this is that the slopes of the causeways were much less pronounced, thereby increasing the area of encroachment into the water environment. These causeways will be in place for more than one year.

Figure 4-2 Typical cross-section for the causeways



The following table gives the main quantities related to the causeways for the construction phase.

Table 4-1 Main quantities for the causeways during construction of the new bridge

		From the west bank of the Frank Channel	From the west bank of the island	From the east bank of the island	From the east bank of the Frank Channel	Total
Working platform area (m^2)	Temporary	913	1,095	1,183	65	**3,256**
Footprint on the ground (m^2)	Temporary	1,446	1,703	1,735	394	**5,278**
Footprint below OHWM (m^2)	Temporary	1,302	1,491	1,425	368	**4,586**
Temporary fill volume (m^3)	Temporary	2,105	3,480	3,330	670	**9,585**
Permanent fill volume (m^3)	Permanent	690	1,050	1,005	450	**3,195**
Fish habitat restoration platform (m^2)	Permanent	190	700	294	73	**1,257**

Three additional causeways will also be required for deconstruction of the existing bridge. These will be smaller in scale than those required for construction and will be built up with the material removed from the causeways required for construction. When the upper half of the construction causeways is removed, the material will be pushed right up to the axis of the existing bridge, so that the causeways required for deconstruction can be created. The first causeway for deconstruction will be on the west side of the channel, the second on the west side of the island and the third on the east side of the island. At this stage, it is not anticipated that a causeway will be required on the east side of the Channel Bank, due to the slope of the existing terrain, which is more suited to the nature of the work to be carried out. The causeways for deconstruction are detailed in drawing TKGP-ENV-DWG-0201 found in Appendix A.3.

Even though the deconstruction work on the existing bridge will be carried out in winter, causeways are still required for the deconstruction because the ice bridges will not be able to accept the loads of the bridge's structural elements when they fall from their existing foundations and piers, The upper platform of these causeways will be located some 30 cm above the OHWM (157.00 m vs. 156.68 m). Their depth below the OHWM will not exceed 3 m. The following table gives the main quantities related to the causeways for the deconstruction of the existing bridge.

Table 4-2 Main quantities for the temporary causeways during the deconstruction of the existing bridge

	From the west bank of the Frank Channel	From the west bank of the island	From the east bank of the island	Total
Working platform area (m^2)	145	247	125	**517**
Footprint on the ground (m^2)	335	390	201	**926**
Footprint below OHWM (m^2)	265	285	180	**730**
Temporary fill volume (m^3)	566	446	207	**1,219**

4.2.3. Ice Bridges and Flexifloat Modular Barges

Once the causeways have been built on either side of the riverbanks, ice bridges will be installed, during the winter work seasons, to link up with the island at the center of the channel, both for the construction phase of the new bridge and for the deconstruction phase of the existing bridge. In the axis of the new bridge to build, there will be two ice bridges on each side of the island during the first winter season of the work, two more the following winter in the same axis and finally two more, still on each side of the island, for the deconstruction phase of the existing bridge in the last winter season of the work. For safety reasons, depending on the equipment and work involved, the ice bridges for the construction phase will need to be approximately 1.6 m thick, and those for the deconstruction phase 2.6 m thick. As a rough guide, a thickness of 1.6 m for construction is roughly equivalent to the difference in elevation between the OHWM (156.68 m) and the 100-year flood (158.75 m).

The length of the ice bridges will vary from fifty to sixty meters, depending on their location and whether the work involves construction or deconstruction. The ice bridge will be wide enough to allow the circulation of machinery and equipment. The width of the bridge used for deconstruction could be a wider (just over 25 m) by being under the existing bridge but also serving to remove the bridge components up to the temporary south-west access road. The width of the other ice bridges has not yet been determined, but it will be considerably smaller.

The quantities of water required to install the ice bridges during construction are estimated at around 8,000 m^3 (4,000 m^3 each year for the first two winter seasons of work) while those for deconstruction are estimated at approximately 15,000 m^3 for the last winter season of work. Ice bridge installation will take 1 to 2 months at each of these seasons.

For the new bridge's two summer construction seasons, modular Flexifloat barges will be installed to move vehicles and machinery between the island and the banks on either side of the channel (larger cranes will not travel on these barges). The following figure illustrates this type of barge, which makes a temporary bridge where the width of the installation corresponds to that of a typical vehicle moving in one direction.

Figure 4-3 Example of Flexifloat Temporary Bridge



4.2.4. Additional Information for The Construction Activities

Once the foundation work and abutments of the new bridge have been completed during the first winter of construction (2025-2026), substructure work on this bridge and the abutments retaining walls can be completed in the following spring and summer (2026), the erection of the girders can be carried out in the winter of 2026-2027, and work on the deck and paving of the bridge can be completed in the spring and summer of the following year (2027).

Civil works will begin in autumn 2025, with the completion of the new configuration of a section of Frank Channel Tili. Summer 2026 will see the completion of the east and west approaches to the bridge, as well as work on the eastern section of HWY-3. Summer 2027 will see the completion of work on the eastern and western approaches, as well as the completion of work on the western segment of HWY-3.

During all bridge work and roadworks, traffic will be maintained in both directions in the existing HWY-3. Special traffic management configurations will be developed with appropriate control and signage measures, and will take place within the existing highway RoW, except in the Frank Channel Tili area, where a temporary RoW will be required. A slight road detour will also be required to rebuild culvert C1 in summer 2026 but still within the existing RoW (this is the easternmost culvert near the intersection with the RAE road, Map 2-2, sheet 4 of 5).

Much of the traffic for the supply of materials, goods and services during construction will be from Yellowknife, but there will also be traffic from Alberta via the HWY-3 corridor. Concrete and asphalt, for example, will come from Yellowknife. Aggregate, granular and backfill materials will mainly come from a quarry owned by GNWT and located about 5 km east of the project site (Map 2-1). In addition to concrete mixers, off-site materials will be transported by two main types of truck: 30 megaton (MT) street legal end dumps and 30 MT street legal side dumps. Trucking peaks are estimated at 12 vehicles per day on HWY-3 during foundation and structural work (expected to occur during the months of January to July in 2026 and January to September in 2027), and at 12 vehicles per day during road and civil work (expected to occur during the months of June to October in 2026 and June to October in 2027). The civil work will start in Fall 2025, but the effort will be of a smaller scale than in the summer of 2026.

On the work site itself, the recommended trucks are 20 MT street legal short haul 12-wheelers. For all equipment and machinery on site during the major construction phases, please refer to Table 2 of the *Spill Prevention and Contingency Plan* in Appendix B.1.

4.2.5. Additional Information for The Deconstruction-Demolition activities

For these activities, the work will essentially be concentrated in 2028, i.e. after the new bridge is in operation and traffic has been transferred to the new road configuration. During winter 2028, the deconstruction of 2-66’ (2 - 20,12 m) span bridge will be completed following an engineered plan with environmental controls. Preliminary demolition plans include bridge deck removal by machine demolition to reduce structure weight. Following concrete deck removal, the steel structure will be progressively removed by shearing select chords at the abutment locations. As shearing of the chords proceeds, the old bridge will rest on the causeways and ice bridge to permit access for the machine demolition. Figure 4-4 illustrates an example of a bridge removal for the Watino Bridge Project completed by Kiewit.

Figure 4-4 Example of removal activities on Watino Bridge Project



Steel materials will be sized and transported for scrap. The concrete substructure piers will be dismantled to accessible limits and remove waterway navigation hazards. It has not yet been decided where the materials will be disposed. Agreements to this effect will be communicated to the WLWB once they have been concluded.

The quantities to be removed and disposed of at authorized sites or for reuse are as follows:

- Steel – 585 MT.
- 250 MT per truss.
- Composite spans: 85 MT.
- Concrete – 591 m^3
- Abutments and Piers: 268 m^3
    - Bridge deck: 323 m^3.

In terms of possible reuse and disposal, however, it should be noted that it is plausible that lead may be present in the paint or undercoating covering the bridge. It is planned to have a tarp under the bridge during the deconstruction on causeways and on the ice bridges to capture residual or flakes of lead paint are contained for proper disposal. This is provided for in the Waste Management Plan in Appendix B.3. The plan also outlines requirements for preliminary sampling prior to deconstruction of the bridge. The sampling program has not yet been precisely defined according to the parameters to be analyzed. This will be specified during the work prior to deconstruction of the bridge in the final year of the planned project.

After the removal of the existing bridge is completed, in late spring/early summer 2028, grading crews will proceed with the removal of the existing pavement. The access to the old bridge will be blocked off and the banks and accesses will be restored.

For this scope, the civil works for the demolition of the road sections mainly consist of the following items:

- Removal of existing asphalt on HWY-3 and Frank Channel Tili: 10,960 m^2.
- Removal of guardrails: 518 m.
- Culvert removals: 79 m.

The paving will be removed by milling the asphalt with a cold planer. The recycled asphalt product from this process will be reused for access road maintenance. Guardrails will be removed with excavators, and it is planned to recycle them. The same applies to culverts. Most of the culverts, however, will be removed during the construction of the new drainage system in the summer seasons of 2026 and 2027. But the final work on the ditches and slopes will also take place in 2028, as for the main deconstruction – demolition work. No place or use is confirmed for the recycling of the guardrails and culverts. This information will be clarified prior to the deconstruction-demolition work, which does not take place until the final year of the project in 2028. If necessary, environmental characterization work will be carried out prior to the future reuse of these structures.

During the deconstruction of the existing bridge and roadway, the trucking peaks are estimated at 12 vehicles per day on HWY-3 and are expected to occur during the months of January to June in 2028.

4.2.6. Proposed Construction Camp, Laydown and Electrical Facilities

A temporary construction camp will be set up as part of the works, construction will begin as soon as the site is mobilized in fall 2025. It will be dismantled as part of site restoration in 2028. The camp is designed to accommodate 60 to 90 workers, with dorms and all the necessary facilities. Drinking water will be supplied from an external source in Yellowknife. Domestic wastewater will be collected and disposed of in authorized off-site areas. Agreements for the supply of potable water and the disposal of domestic wastewater have not been confirmed. As soon as contracts are in place, a copy will be forwarded to WLWB.

The camp will be supplied with electricity via a temporary connection to the roadside grid. The camp will comprise several ancillary facilities and installations:

- Storage area (laydown).
- Fuel Farm (15,000 L capacity for a fuel tank and 15,000 L capacity for a gasoline tank).
- 18 person office.
- Vehicle washing station.
- Client trailer.
- Maintenance shop.
- Parking.
- Lighting.
- Security cameras.
- Fencing all around.
- Backup generator for the camp, the cafeteria the office.

The proposed location for the camp and the whole laydown area is shown on Map 2-2 (sheet 5 of 5). The total surface of all these proposed facilities at the boundary of the fenced-in area is approximately 20,275 m^2. The rights to set up the camp on this site are under discussion with CGB, and no temporary easement has yet been established. The area for the camp and laydown site is outside the existing RoW of HWY-3.

The vehicle washing station will operate based on manual clean-up with water-pressure & laborer. The washing surface will be waterproofed with a containment area, and mud will be collected with a Hydro-Vac truck and disposed of offsite. There will be also a dry wheel wash station in the same area as the one on the image below.

Figure 4-5 Example of dry wheel washing station

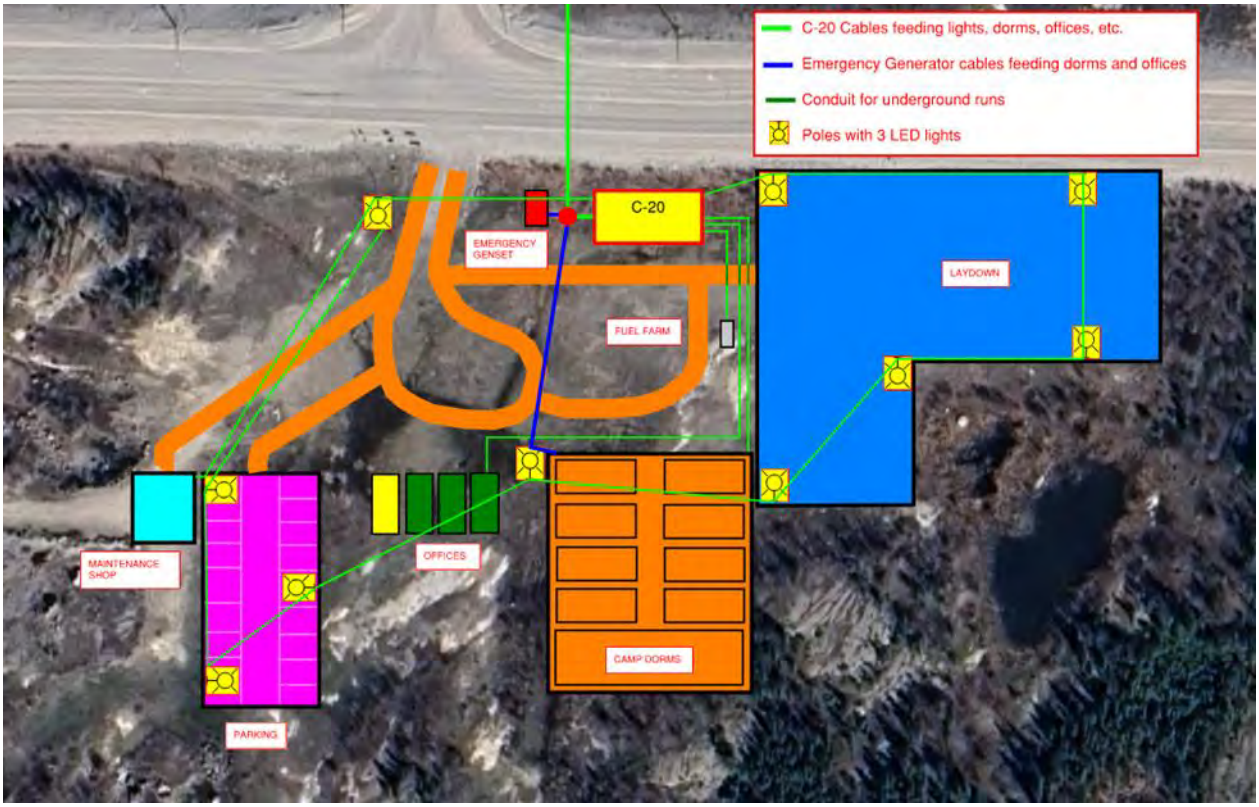


There will also be a concrete washout. The basin will be dug into the ground with berms and lined with geotextile material, or polyethylene sheets anchored in the berms to be completely watertight. The water settles in the basin and the sediment freezes to the bottom. The overlying water (wastewater) is then pumped into tubs or siphoned off directly by Hydro-Vac, and disposed of at an authorized site that is still to be confirmed. The bottom, which will solidified, will be broken up with a hydraulic hammer on an excavator, and the tailings are also transported offsite for disposal at acceptable facilities.

Also, two other satellite facilities are proposed to be complementary with the camp site – laydown area, and they will be on either side of the channel, between the existing and future bridges. Each of these facilities will include offices, lunchrooms and equipment. They will also be connected to the nearby power grid and equipped with 2 backup light plans. These facilities can be located within the existing HWY-3 RoW (see Map 4-1).

It is very important to remember that full details of the camp and laydown area in terms of geo-spatial data cannot be provided at this time, as the agreement with CGB has not yet been finalized. This is a proposed site, a provisional location, and all components within it may yet change location. For this reason, a visual illustration is provided here, but it is intended more as an aid to understanding than as a formal GIS representation. As soon as the final design of the site is completed, TKGP makes a formal commitment to transmit a map to WLWB for this purpose.

Figure 4-6 Example of a preliminary schematic the camp and laydown area for the Project



4.2.7. Wastes and Waste Management

Waste types and waste management approaches and methods are described in the Waste Management Plan in Appendix B.3

4.2.8. Closure and Reclamation: Restoration Activities

Reinstatement of the fish habitat with the material removed from main causeways is planned for the end of winter 2027 and 2028. As for the same work on the causeway along the channel's eastern shore, this will be done in conjunction with the other restoration tasks in 2028. This is anticipated to be completed over 6 to 7-months between May and November 2028. The restoration work and associated plan are detailed in the Closure & Reclamation Plan in Appendix B.6

It should be noted that the removal or relocation of the 2 cabins to the northwest of the bridge, which conflicts with the temporary work, has not yet been decided. This is a matter for discussion between GNWT-INF and the CGB.

4.2.9. Monitoring

Specific environmental monitoring programs will be put in place as part of the project, as well as general works monitoring, which will be enshrined in an overall environmental management plan (EMP) for the project. Monitoring measures put in place will then depend on the various conditions laid down in the environmental authorizations for the project. However, specific monitoring programs and mitigation measures are already proposed in the management plans included in Appendix B. Control measures for stormwater management during the Project care located in the Erosion and Sediment Control Plan (Appendix B.2). A monitoring plan for various wildlife species can be found in Appendix B.4, and water quality monitoring measures can be found in Appendix B.5. In addition to these, other mitigation measures that will be applied during the work can be found in section 9 of this document. The monitoring will cover the construction phase, deconstruction activities, operation of the temporary camp and all site restoration work.

4.3. Water Use and Land Use

4.3.1. Summary of Water Uses

In accordance with section 9 of the Water Licence application form, Table 4-3 and Table 4-4 list key elements of the Project in relation to the planned water uses.

Table 4-3 Proposed quantity of water use

Purpose of Water Use	Name and Type of Water Source	Location	Geographic coordinates (See Map 2-2 for the locations)		Proposed Water Use Volume/Rate, including units (see note)
			Latitude	Longitude	
Access for machinery – ice bridge construction (winter 2025-2026)	Frank Channel – River	Community of Frank Channel	62°47'2.805"N 62°47'3.613"N 62°47'4.173"N	115°56'53.978"W 115°56'52.010"W 115°56'49.088"W	Peak of 143 m^3/d (m^3 per day) during 4 to 6 weeks
Access for machinery – ice bridge construction (winter 2026-2027)	Frank Channel – River	Community of Frank Channel	62°47'2.805"N 62°47'3.613"N 62°47'4.173"N	115°56'53.978"W 115°56'52.010"W 115°56'49.088"W	Peak of 143 m^3/d during 4 to 6 weeks
Access and working platform for machinery – ice bridge construction (winter 2027-2028)	Frank Channel – River	Community of Frank Channel	62°47'1.779"N 62°47'2.465"N 62°47'2.581"N 62°47'3.341"N 62°47'4.116"N 62°47'4.035"N	115°56'51.231"W 115°56'50.213"W 115°56'48.513"W 115°56'44.615"W 115°56'43.360"W 115°56'41.868"W	Peak of 429 m^3/d during 5 to 8 weeks
Drilled shaft construction – during caisson clean-up for inspection (winter 2025-2026)	Frank Channel – River	Community of Frank Channel	62°47'2.811"N 62°47'3.197"N 62°47'4.425"N 62°47'4.840"N	115°56'50.792"W 115°56'49.473"W 115°56'44.385"W 115°56'42.084"W	Peak of 60 m^3 in one day. Will happen four (4) times during the entire project duration
Camp facility - water used for kitchen & camp (2025-2028)	External supplier - potable water	From Yellowknife	62°47'2.875"N 62°47'5.706"N	115°56'54.271"W 115°56'41.841"W	Will vary during the project duration. Peak of 40 m^3/d per day
Dust control (2025-2028)	Frank Channel – River	Community of Frank Channel	62°47'2.875"N 62°47'5.706"N	115°56'54.271"W 115°56'41.841"W	Will vary during the work period. Peak of 90 m^3/d

Note: Water withdrawals for the construction of ice bridges are not included in the calculation of triggers for type A or B water licence according to the Reference Bulletin - Water Use (Land and Water Boards of the Mackenzie Valley, July 2024)

Table 4-4 Comparison of proposed water use to available capacity

Water Source	Capacity of Water Source, including units	Other Users of the Water Source	Comparison of Total Proposed Water Use to Available Capacity
Peak for winter 2025-2026 in the Dehk'è Frank Channel (4 weeks)	388 m^3/s 938,649,600 m^3 for 4 weeks	Mainly the neighborhood communities of Frank Channel, Edzo and Rae (Behchokǫ̀)	**0.00087%** of the available capacity
Peak for winter 2026-2027 in the Dehk'è Frank Channel (4 weeks)	388 m^3/s 938,649,600 m^3 for 4 weeks	Mainly the neighborhood communities of Frank Channel, Edzo and Rae (Behchokǫ̀)	**0.00087%** of the available capacity
Peak for winter 2027-2028 in the Dehk'è Frank Channel (5 weeks)	388 m^3/s 1,173,312,600 m^3 for 5 weeks	Mainly the neighborhood communities of Frank Channel, Edzo and Rae (Behchokǫ̀)	**0.00155%** of the available capacity

Note: calculations are based on 6a scenario 1:2 Year Recurrence (Historic Conditions) from the hydraulic study – See technical memo for this study in the Appendix C.2 of this application

4.3.2. Summary of Land Use and In-Water Work / Water Crossing

In accordance with section 8 of the Land Use Permit application form, Table 4-5 and Table 4-6 present the main relevant elements of the Project in relation to the number of hectares to be used in the main items of the Project.

Table 4-5 Surfaces areas for land-based work (permanent – temporary)

Item	Hectares (ha)	Square meters (m^2)	Main works planned
Camp – Laydown area (fall 2025 – fall 2028)	2.03	20,275	Mobilization, operation of the camp-area – closure of the camp
In the existing RoW	5.28	52,787 (68% of the RoW for land portion)	Temporary accesses (in full for the south-west access, partially for the others), abutments, reconfiguration of the east and west approaches, maintenance of traffic, signage drainage, part of the MUP, deconstruction-demolition work, reconfiguration of private accesses, restoration work
In the new proposed RoW	1.03	10,285 (66% of the RoW for land portion)	Temporary accesses, drainage, part of the MUP, signage, Frank Channel Tili reconfiguration – intersection, reconfiguration of private accesses, restoration work
Temporary additional easements	2.55	25,520	Additional surfaces in reserve for work, temporary southeast access if required for deconstruction of existing bridge, temporary stockpiling of materials required for work.
Total	10.89	108,867	

Table 4-6 Surfaces affected by work in, on or over water

Item	Hectares (ha)	Square meters (m^2)
Causeways for construction of the new bridge (including 7 piles below the OHWM for a total of 18 m^2)	0.46	4,586
Causeways for deconstruction of the existing bridge	0.09	926
Ice bridge for construction winter 2025-2026 (approx.)	0.348	3,478
Ice bridge for construction winter 2026-2027 (approx.)	0.737	7,371
Ice bridge for deconstruction 2027-2028 (approx.)	2.045	20,445
New bridge construction (piers, substructure, deck, paving)	0.26	2,592
Existing bridge deconstruction	0.34	1,345

4.4. Operations Activities

The new Frank Channel Bridge and approaches once constructed will become part of the operations and maintenance of the HWY-3.

5. Project Schedule

During the seasons and/or periods when there will be work, typical working hours will normally be as follows:

- 7 days per week, 11-hour days.

The overall work schedule can be summarized as follows:

Table 5-1 Timeline for the Project Realization

Activity	Year	Start-Up Month	Duration (Months)	Work near (less 30 m) or in Frank Channel
Mobilization to site	2025	September	1	No
Clearing & Access to West and East abutments	2025	October	1	Yes (only on the banks)
Drill & Shoot Outcrop rock for the East and West temporary accesses	2025	October - November	1	Yes
Build East and West causeway(s)	2025-2026	Between November -February	0,5	Yes
Build Ice Bridge	2026	January	2	Yes
Transport Materials to Island & Build Island causeway	2026	Between January - February	1	Yes
Flexifloat Installation North side of Causeways for Construction	2026	April	7	
Build Foundation from Island	2026	February	2	Yes
Complete Bridge Sub-Structure	2026	June	3	Yes
Build Ice Bridge for Island Girder & Work on Bridge Structure	2026	September	5	Yes
Concrete Precast Panels Installation from Island	2027	January	3	Yes
Complete Precast Panels and Superstructure	2027	April	3	No
Remove the top of the Island causeway & Build a temporary deconstruction causeway under the existing bridge	2027	Between March – April	1	Yes
Flexifloat Installation North Side of Causeways for Construction	2027	June	2	Yes
Complete Bridge Deck & Paving	2027	May	5	Yes, above water only, outside the OHWM
Roadway Traffic Switch on New Bridge	2027	December	1	No
Build Ice Platform: Existing Structure Deconstruction Work	2028	January	4	Yes
Remove the temporary deconstruction causeway	2028	March	1	Yes
Existing Roadway Demolition & all Site Restoration	2028	April	6	Yes (only few weeks for bank restoration and fish habitat reinstatement)
Project completion	2028	November	1	No

6. Community Engagement

In 2016, GNWT-INF considered options to update the existing bridge; however, it was rejected because it is necessary to maintain continuous traffic during the work, and rehabilitation would have required in a restricted work zone on the bridge resulting in major safety and functionality concerns. In addition, a rehabilitation scenario could not provide the same service life as the construction of a new bridge (40 years vs. 75 years). In 2018, steps towards replacing the existing Dehk'è Frank Channel bridge were initiated with a functional planning study to select the best alignment for the new bridge (Stantec Consulting, 2019a). During this study, clear advantages were realized in proceeding with a new bridge to address the deficiencies observed over the years, as noted in section 2.1 of this document. Finally, a rehabilitation scenario could not provide the same service life as the construction of a new bridge (40 years vs. 75 years).

6.1. Summary of Community Meetings in 2018

The 2018 functional planning study included engagement with community aimed at finding the best and most feasible alignment for a new bridge and identifying significant elements to be considered in the design. A meeting was held with representatives of (Community Government of Behchokǫ̀ (CGB) and Tłı̨cho Government (TG), and the general public, with 47 registered participants. A summary of these engagement meetings can be found in Appendix D.1 (*Engagement Plan,* Engagement Record on Appendix B of this plan), along with the presentation made at the public meeting.

Four main options were presented at these meetings (see Appendix C of the *Engagement Plan* in Appendix D.1), some with different possible implementation options:

- Option A, which would pass considerably further north than the existing bridge, i.e. in the area of the islands located in the channel, which are a little further north than the one crossed by the chosen option.
- Option B (with two variants), which corresponds roughly to the alignment selected for the present project.
- An option C that would pass considerably further south of the existing bridge.
- Option D, which would pass much further south, closer to the mouth of the channel with Great Slave Lake.

With the costs and impacts to be considered, it became clear with these engagement meetings that option D was certainly not the most preferable, and that option B was possibly the most preferable, at least in terms of minimizing impacts on the environment and land use. Several other concerns were also raised by participants in connection with the design of the future project, such as:

- Potential spinoffs for the local population and companies in terms of employment opportunities and service contracts during construction.
- Project costs and funding.
- Minimization of possible impacts in terms of changes in public services offered to the community.
- Historical importance of the channel in the community and navigation concerns.
- Minimization of impacts on cabins and camps in the area north and south of the existing bridge.
- Minimization of impacts on the landscape with a new bridge and improvement of the bridge's profile compared to the current situation.
- Consideration of fishing activities in the channel during construction activities.
- Safety considerations for the design of the new bridge, including sidewalks and measures to control wildlife movements.
- Consideration of noise during construction.
- Importance of specific discussions with the Frank Channel neighborhood community.
- Use of the already disturbed area in front of the Rae Tili intersection as a construction laydown.

6.2. Summary of Public Involvement since 2021

Project design began in 2021 with the development of 30% engineering by TKGP. An Engagement Record has been maintained, and an Engagement Plan has been developed and was designed to meet the requirements set out in the MVLWB's *Engagement Guidelines for Applicants and Holders of Water Licences and Land Use Permits in the* Mackenzie Valley (see Appendix D.1). A variety of methods are available for gathering comments and engaging with interested and affected parties. These methods are set out in Engagement Plan for the Project and include community meetings, one-on-one meetings, letters and direct emails. GNWT-INF and TKGP will be using the input from all engagement methods to finalize project designs and inform on the construction process. GNWT-INF will continue to assess how people, communities, and the environment may be impacted by replacing the Dehk'è Frank Channel Bridge.

Several written exchanges took place in 2021 and 2022 to clarify elements relating to the development of the 30% design. And the process of engagement intensified at the end of 2024 with the start of engineering development to bring the design to 60% completion and to have more detailed information related to construction activities.

In February 2025, TKGP, on behalf of GNWT-INF, held two in-person information sessions in Behchokǫ̀ to share design renderings and discuss project impacts. The events included an open house, formal presentation and a question-and-answer portion to respond to community questions and concerns. Live translation was provided for both sessions. The Project team provided participants with printable feedback forms, a QR code for an online engagement form and a project-specific email. A total of 92 participants attended the in-person engagement activities in Behchokǫ̀. Two separate afternoon/evenings were selected during the week to accommodate diverse schedules.

The in-person information sessions were advertised publicly by radio, social media, posters in communities, and on the project webpage. Indigenous people and organizations, and other potentially affected parties, received invitations to attend the engagement sessions by email approximately two weeks in advance.

Also, since fall of 2024, GNWT-INF and TKGP have held meetings with the Tłı̨chǫ Government (TG), the Community Government of Behchokǫ̀ (CGB) and residents of Frank Channel to further discuss the Project. Feedback will be integrated, where appropriate, in the final bridge design and construction plans.

6.2.1. Engagement Sessions of February 2025

The details of all these engagement sessions and activities can be found in the What We Heard Report in Appendix D.2. The main points raised and observed during these meetings and consultations can be summarized as follows:

a) <u>Alignment, design and traffic flows</u>

- Participants stated that the design of the existing bridge is not ideal for safety concerns.
- Participants generally supported the alignment for the new Dehk'è Frank Channel Bridge.
- Participants recommended engaging with the residents of Frank Channel to understand their specific concerns about the new alignment.
- There was general agreement that the new alignment would be suitable to allow for construction of the new bridge while maintaining use of the current bridge until Project completion.
- For the alignment, participants requested the preservation of the cabin identified as the "Old Man's Cabin." just south of the existing bridge on the west side of the channel.
- There are abandoned family cabins within the Project footprint/area of the Project.
- Participants generally supported the design of the new Dehk'è Frank Channel Bridge, which includes two-lanes, one for each direction of traffic, as well as a separated sidewalk for pedestrians.
- Participants asked about lighting on the new bridge and if there are plans to install an anti-climbing fence.
- Participants raised questions about traffic impacts during construction of the new Dehk'è Frank Channel Bridge: importance of maintaining access across the channel throughout construction, as the bridge is the only all-season access from the west to Yellowknife.
- Participants had concerns about navigational traffic during construction of the new bridge and deconstruction of the existing bridge as local community members actively fish in the channel.

b) <u>Public concerns and interests</u>

- Protecting wildlife, fish, and their habitat is a priority for participants.
- Culturally and in terms of the natural environment, fish and fish habitat protection are important for the design and during the construction phase and the deconstruction phase of the Project and Participants shared knowledge and advice on fish and fish habits in the Dehk'è Frank Channel (migration route, fishing nets during summer and winter).
- Participants recommended the Project team engage with community members to understand locations of nets and current fishing activities.
- Participants had questions surrounding the protection of the water during construction and the mitigations that would be in place.
- Participants expressed the potential benefits and opportunities the new bridge could bring, including employment and training opportunities, subcontracting opportunities, and safer access between communities, and recommend that there be economic opportunities provided to local workforces and companies (they requested additional information be shared at the next engagement sessions on how local community members may participate on the Project).

- Participants noted the importance of referring to the Project by its full name, Dehk'è Frank Channel Bridge, as Dehk'è is the Tłı̨chǫ word for the channel.
- Participants noted the historical importance of the Dehk'è Frank Channel to the community, and they requested that a Traditional Knowledge (TK) Study be completed, and the knowledge be incorporated in the final design and construction planning (TK study is on going).
- Several participants noted the importance of the legacy of the current bridge: after the new bridge is built, they recommended a portion of the old bridge be displayed as a tourist attraction and legacy piece.

6.2.2. Meetings with the residents of the Frank Channel Community

And in March 2025, specific meetings were held with residents of the Frank Channel community. The issues and concerns raised by these residents were very similar to those discussed at the public engagement sessions in February 2025.

The points discussed with Frank Channel community in March 2025 can be summarized as follows:

- Questioning the location of the proposed camp with suggestions for alternative sites.
- Assessment of the potential for retaining the existing bridge after the new one is built, for historical and tourism purposes.
- Favorable perceptions of the proposed improvements in terms of safety and functionality.
- Minimization of disruption to navigation and fishing activities.
- Concerns about fish migration periods.
- Concerns about water quality.
- Consideration of wildlife in the area for activities.
- Improved landscape with new bridge.
- Concerns about working hours and noise levels during construction.
- Consideration of historic character of the area and associated cultural aspects.
- No information on specific sensitivities for the island.
- Opportunities in terms of jobs, training and community spinoffs.

6.2.3. Engagement Sessions of April 2025

The details of all these engagement sessions and activities can be found in the Engagement Plan and What We Heard Report in Appendix D (D.1 and D.2). The main points raised and observed during these meetings and consultations can be summarized as follows:

- Participants expressed general concerns regarding the protection and involvement in Indigenous communities throughout the project.
- Participants asked whether extensive blasting will be required during the construction process.
- Participants raised concern about the possibility of animals crossing the bridge and the potential impact on safety.
- Participants had questions about the total cost of bridge, since it's a simple design.
- Participants asked about the possibility of improving the road extending to the access going to the cabins southeast of the new bridge.
- Participants asked about the maximum clearance between the water level and the bridge, noting that the current water level is unusually low.
- Participants were concerned about the unpredictable weather, due to climate change, and the timeline for the construction of the bridge. They also raised the point that intense cold snaps can be risky for equipment.
- Participants inquired about the planned methodology for bridge deconstruction and removal.
- Participants asked how construction equipment and temporary structures would be deployed on the existing bridge, given its limited load capacity.
- Participants asked what components of the existing structure would remain submerged or buried below the waterline following deconstruction.
- Participants inquired about the possibility of installing higher and longer railing along the walkway facing the water, citing concerns about safety, particularly given previous incidents where individuals have jumped from the existing bridge.
- Participants referenced a case involving another bridge over a different river, noting that fish once migrated through that river, but the bridge now obstructs their passage.
- Participants raised concerns about the potential impacts of blasting activities on the structural integrity of the existing, corroded bridge, as well as on fishing activities occurring beneath it.
- Participants inquired whether hiring for the project will prioritize local workers from Rae and Edzo, and where they can access relevant information about job opportunities and the qualifications required for candidates. They emphasized the importance of considering Tlicho people residing in Yellowknife for hiring opportunities, ensuring they are not excluded from the recruitment process.
- Participants asked whether an Environmental Assessment was conducted for the project.

7. Description of the Biophysical Environment

Valued components (VCs) have been used to characterize the existing biophysical and human environment in the study areas used in the screening. The VCs are parts of the environment that may be seen as important to regulators, Indigenous Governments and Organizations, or other affected parties. The sections that follow describe the existing conditions of VC within the study areas. The VCs selected include:

- Climate
- Air Quality
- Noise
- Water Quality and Quantity
- Fish and Fish Habitat
- Terrain, Soil and Permafrost
- Vegetation
- Wildlife
- Communities

7.1. Study Areas

The existing biophysical environment is described using the project-specific description. For this reason, some of the elements described here relate to a regional study area, such as the one delineated on Map 2-1, while other biophysical components are described in greater detail for the work areas and road corridors shown on Map 2-2 (i.e. the general local study area).

7.2. Climate

The 30-year Canadian Climate Normal data from 1981-2010 were assessed from the Yellowknife Airport weather station. Yellowknife has a daily average temperature of -4.3 ˚C, with daily maximum temperatures reaching 21.3 ˚C in July, and a daily minimum of -29.5 ˚C in January. 190.1 days per year experience temperatures > 0 ˚C and 175.2 days are < 0 ˚C. Temperatures below -20 ˚C occur as early as October and be sustained until April, however, temperatures above 0 ˚C are possible throughout the year, but most frequently from March to October (Wood, 2019).

Yellowknife has an annual average precipitation of 288.6 mm, with an average snowfall of 157.6 cm and an annual rainfall average of 170.7 mm. Precipitation annual totals have experienced an increase throughout northern Canada (+25% for the Arctic Tundra in the period from 1948 to 2005). In this region, the greatest increases have occurred during the fall, winter, and spring. The most extreme rainfall recorded was in August 1973 (82.8 mm). Extreme snowfall is often recorded in the months of January to March, with the most extreme daily snowfall having occurred in February 1982 (23.7 cm) (Wood, 2019).

Yellowknife has an annual wind speed average of 12.8 km/h with winds being most frequently easterly. The maximum hourly speed recorded was 72 km/h in September 1957, and the maximum gust speed was 113 km/h in November 1956. September, October, January and February are the only months with recorded days experiencing winds above or equal to 63 km/h (Wood, 2019).

7.3. Air Quality

Air quality in the Northwest Territories (NWT) is generally very good. Existing criteria air contaminants (CAC) emissions for the NWT originate from a variety of sources such as industrial facilities, transportation and natural events such as forest fires. The CAC emissions are reported annually by industries for all of Canada as part of the National Pollutant Release Inventory (NPRI).

The NWT operates a continuous ambient air quality monitoring stations at Snare Rapids and Yellowknife (approximately 78 km and 88 km outside of the project area, respectively) as part of the National Air Pollution Surveillance (NAPS) Program.

Based on data from NAPS (ECCC, 2025), the measured CAC concentrations for carbon monoxide (CO), ground level ozone (O_3), at the Yellowknife station were well below the applicable Northwest Territories Ambient Air Quality Standards (NWT AAQS). Fine Particulate matter ($PM_{2.5}$) and coarse particulate matter (PM_{10}) experienced peak concentrations throughout the summer months (July to September). Elevated levels of $PM_{2.5}$ and PM_{10} were likely the result of regional wildfires.

Data from the Snare Rapids monitoring station presented CAC concentrations for O_3 that were below the NWT AAQS; no other data was available for this station.

7.4. Noise

As the Project is in a sparsely populated area, ambient sound levels are anticipated to be limited vehicle traffic and characteristics of natural environment such as wind, rainfall, running water and wildlife.

7.5. Water Quantity and Quality

Frank Channel is an approximately 5 km stream connecting Marian Lake to Great Slave Lake (GSL). At the bridge site, the channel is about 175 m wide, with an island occupying roughly 16% of this width (Northwest Hydraulic Consultants Ltd. (2025). Great Slave Lake receives approximately 75% of its inflow from the Slave River (Sanderson, et al., (2012,) the largest transboundary river in the NWT and a key component of the Mackenzie River Basin. From the existing Frank Channel crossing, water flows approximately 1 km southeast into the north arm of Great Slave Lake (Stantec Consulting Ltd. (Stantec, 2019b).

The project area's habitat features fast-flowing, turbid waters, instream vegetation, and fine substrate. Specifically, the streambed substrate was primarily composed of fines (70%), with subdominant organic material (20%) and cobble (10%). High embeddedness (80%) was observed. Stream banks were 10 m high, stable, and sloped (40˚) (Stantec, 2019b). Water quantity is further described in the Stantec Fish Habitat Assessment (Appendix C.5) and the Hydraulic Report (Appendix C.2).

Water quality generally meets the Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines for the Protection of Freshwater Aquatic Life (FAL), as evidenced in the Tłı̨chǫ Aquatic Ecosystem Monitoring Program (TAEMP) study conducted in 2018. The TAEMP 2018 study sought to monitor changes in fish, water, and sediment quality to ensure their safety for consumption by the Tłı̨chǫ people (TAEMP, 2018). Standard physical and chemical parameters, including temperature, pH, conductivity, clarity, turbidity, total suspended solids (TSS), total dissolved solids (TDS), alkalinity, dissolved oxygen, major nutrients, ions, and trace metals, were used as indicators. These parameters are comparable to Aboriginal Affairs and Northern Development Canada (AANDC; now Crown-Indigenous Relations and Northern Affairs Canada) Water Resources' datasets for the Frank Channel on Great Slave Lake, the nearest water quality monitoring station.

Water samples showed pH ranging from 8.38 to 8.47, within the CCME FAL guidelines (6.5-9.0) (CCME 2014). TDS ranged from 166 mg/L to 184 mg/L, and TSS were below the detection limit of 3 mg/L at all locations. Metal concentrations were below method detection limits (MDL). A comparison of the 2018 data with the 2014 data revealed no appreciable changes in mercury levels in fish tissues, as well as in sediment and water.

According to the project Water Quality Monitoring Plan (WQMP, Appendix B.5), field monitoring will occur in accordance with the CCME water quality guidelines, during in-water construction and construction below the high-water mark when flows are present (WQMP, 2025). All data will be kept on a secure site for the duration of the project and will be communicated according to procedures to be developed as part of subsequent WQMP and Engagement Plan processes.

7.6. Fish and Fish Habitat

Applicable data regarding fish and fish habitat from previous studies have been reviewed. The Fish Habitat Assessment for the project (Stantec, 2019b) describes the Frank Channel at the existing crossing as 180 m wide, predominantly a run habitat (100%) with minimal cover (5%) from overhanging vegetation and large woody debris. A small riffle (4 m by 10 m) is located approximately 50 m upstream, outside the project footprint. The channel bed is primarily composed of fine sediments (70%), followed by organic material (20%) and cobble (10%), with the cobble being highly embedded (around 80%). Geotechnical investigations corroborate this substrate composition, identifying channel bottom sediments (0.8-1.3 m thick) over granite bedrock at the proposed pier locations. Sediment samples were fine, washing away during collection. Water depths during drilling ranged from 1.0 to 2.5 m beneath ice 0.7 to 1.0 m thick (Stantec, 2019b, Associated Engineering (B.C.) Ltd. 2024b).

The stream banks are 10 m high, stable, and sloped (40º), consisting mainly of bedrock with some gravel. Vegetation cover on the banks is about 60%, with signs of previous disturbance. The west bank features a mixed coniferous and deciduous forest, while the east bank is primarily covered in young shrubs. The island supporting the existing bridge is mainly vegetated with grass and some trees. Emergent grasses and sedges are present along both shorelines near the bridge, becoming dominant downstream and around developed areas upstream. The water in Frank Channel is turbid with suspended sediments, likely originating from the shallow, turbid Marian and Russel Lakes (Stantec, 2019b, Associated Engineering (B.C.) Ltd. 2024b).

The project area's proximity, along with the absence of fish passage barriers, makes Frank Channel a significant migratory route influencing species' presence. Post-spawning walleye migrates from Mosquito Creek to Marion Lake via the Frank Channel, and lake whitefish also migrate between the north arm of Great Slave Lake and Marion Lake through Frank Channel after freeze-up (Stantec, 2019b).

The habitat at the Frank Channel crossing is potentially suitable for northern pike at all life stages. However, limited flow refugia in the channel might restrict habitat for juveniles or smaller-bodied fish. While some gravel exists at the crossing, high embeddedness (estimated at 80%) could limit spawning for gravel-dependent species like sculpin and burbot (Stantec, 2019b).

The proposed replacement of the existing crossing structure has the potential to impact fish and fish habitat. To minimize impacts during all project stages, mitigation measures will include but are not limited to winter construction during low flow periods, following best practices outlined by Fisheries and Oceans Canada (DFO) and applicable permits. Although this timeframe coincides with the fall spawning restricted activity period, suitable habitat for fall spawning fish is not present within the Project affected area. Additional mitigation strategies may be required based on the final bridge design (Stantec, 2019b).

Based on the characteristics of Frank Channel and a desktop review of fish presence, the Project area serves as a migration route for resident fish species with no barriers to passage and offers suitable overwintering habitat in the deeper portions of the channel. The channel provides moderate rearing habitat due to limited cover and refuge for small fish. Spawning activity has not been documented in Frank Channel, and the substrate composition and typical high sediment loads further reduce its spawning potential. Emergent vegetation upstream and downstream of the bridge may offer suitable spawning habitat for northern pike or other vegetation-spawning species; however, instream aquatic vegetation used by northern pike for cover is generally lacking (Associated Engineering (B.C.) Ltd. 2024b).

Table 7-1 below provides a summary of key information for several fish species. It includes the common name of each Species, its corresponding Scientific Name, an indication of its Presence within the project area (i.e., either known to be in the area, or having a potential to be in the area), whether it is classified as a Sport Fish, its NWT General Status Rank (i.e., secure, sensitive, "May be at Risk" or "At Risk") as determined by the NWT General Status Ranking Program, and its SARA Status according to the Canadian Species at Risk Act.

Table 7-1 Known and Potential Fish Species Present in Frank Channel

Species	Scientific Name	Prescence	Sport Fish	NWT General Status Rank	SARA Status
Arctic lamprey	*Lampetra camtschatica*	Potential	No	Undetermined	**None**
Lake chub	*Couesius plumbeus*	Potential	No	Secure	**None**
Emerald shiner	*Notropis atherinoides*	Potential	No	Secure	**None**
Spottail shiner	*Notropis hudsonius*	Potential	No	Secure	**None**
Flathead chub	*Platygobio gracilis*	Potential	No	Secure	**None**
Longnose dace	*Rhinichthys cataractae*	Potential	No	Secure	**None**
Longnose sucker	*Catostomus catostomus*	Potential	Yes	Secure	**None**
White sucker	*Catostomus commersonii*	Potential	Yes	Secure	**None**
Northern pike	*Esox Lucius*	Potential	Yes	Secure	**None**
Cisco	*Coregonus artedi*	Potential	Yes	Secure	**None**
Lake whitefish	*Coregonus clupeaformis*	Known	Yes	Secure	**None**
Broad whitefish	*Coregonus nasus*	Potential	Yes	Secure	**None**
Least cisco	*Coregonus sardinella*	Potential	Yes	Secure	**None**
Chum salmon	*Oncorhynchus keta*	Potential	Yes	Undetermined	**None**
Rainbow trout (stocked in GSL)	*Oncorhynchus mykiss*	Potential	Yes	Alien	**None**
Kokanee (in GSL)	*Oncorhynchus nerka*	Potential	Yes	Vagrant	**None**
Round whitefish	*Prosopium cylindraceum*	Potential	Yes	Secure	**None**
Arctic Char (stocked in GSL)	*Salvelinus apinus*	Potential	Yes	Secure	**None**

Species	Scientific Name	Prescence	Sport Fish	NWT General Status Rank	SARA Status
Lake trout	*Salvelinus namaycush*	Potential	Yes	Secure	**None**
Inconnu	*Stenodus leucichthys*	Potential	Yes	Sensitive	**None**
Arctic grayling	*Thymallus arcticus*	Potential	Yes	Secure	**None**
Trout perch	*Percpsis omiscomaycus*	Potential	Yes	Secure	**None**
Burbot	*Lota lota*	Potential	Yes	Secure	**None**
Ninespne stickleback	*Pungitius pungitius*	Potential	Yes	Secure	**None**
Slimy sculpin	*Cottus cognatus*	Potential	Yes	Secure	**None**
Spoonhead sculpin	*Cottus ricei*	Potential	Yes	Undetermined	**None**
Yellow perch	*Perca flavescens*	Potential	Yes	Undetermined	**None**
Walleye	*Sander vitreus*	Known	Yes	Secure	**None**

7.7. Terrain, Soils and Permafrost

Available geotechnical reports, maps, and applicable publications were reviewed and summarized in a Geotechnical Report assembled to the TKGP/project (Weaver, 2024, complete report is in Appendix C.3). This report indicates that the project area is characterized by undulating granitic bedrock, overlain by undifferentiated glaciolacustrine sediments, consisting of sand to silty clay. These soils are associated with the ancestral GSL and may be underlain by deep water sediments of glacial Lake McConnel, which would be associated with more cohesive deposits. These glaciolacustrine sediments are noted to potentially contain ground ice/ permafrost (TKGP, 2024).

The Geotechnical Report indicates that the project area is located within a region of extensive, discontinuous, and degrading warm permafrost. Permafrost thaw can cause various issues for linear infrastructure, including differential settlements, longitudinal cracking, shoulder rotation, culvert distortion, slope instability, and ditch ponding. Given the existing warm permafrost, continued thawing is expected even without construction activities, potentially making remediation ineffective. Therefore, if permafrost is present, it is suggested to leave it undisturbed. Related embankment deformations, such as dips from consolidation settlement, would then fall under routine maintenance (approximately every 3 years), as the overall permafrost condition extends beyond the project limits and cannot be fully addressed within them. It is recommended that supplementary investigation be conducted to confirm subsurface conditions, groundwater, and the thermal regime to validate these permafrost assumptions (TKGP, 2024).

As a complement to the existing geotechnical data, a bathymetric survey was carried out in 2018 to detail the existing terrain conditions for the future bridge. The report on this survey can be found in Appendix C.8 of this document.

7.8. Vegetation

7.8.1. Methods

The TKGP Dehk'é Frank Channel Bridge Replacement Pre-Development Natural Environment Overview report, developed by Natural Resource Solutions Inc. (NRSI), details the methodology applied to identifying vegetation communities (complete report is in Appendix C.4). The objective was to conduct preliminary assessments and mapping of the existing terrestrial, wetland, and aquatic habitats surrounding the project. Vegetation communities were delineated via aerial photography and confirmed in subsequent field surveys in September 2021. Following the field surveys, each uniquely identified polygon was assigned an Ecological Land Classifications (ELC), according to the Level IV Great Slave Lowland High Boreal (HB) Ecoregion nested within the Level III Taiga Shield HB Ecoregion. Wetland Classification was completed according to the Level III Taiga Shield HB Ecoregion or classified as Shallow Open Water (SHOP-W) (NRSI. 2021).

7.8.2. Results

Much of the study area consists of bog forest west of the bridge and bog woodland east of the bridge, with the remaining study area altered by human activity and infrastructure. Apart from two sedge fens and a sedge dominated marsh, the wetlands surveyed within the study area were classified as shallow open water (SHOP-W) (NRSI, 2021). In total 10 distinct ELCs, were identified within the study area. These ELCs are further defined in Table 7-2 below, extracted from the NRSI Pre-Development Natural Environment Overview. A search of the Northwest Territories Species Monitoring Infobase queried to the Taiga Shield Ecoregions indicated there were no plant or lichen data available for the project area (Ecosystem Classification Group, 2008).

Table 7-2 Ecological Land Classifications Identified within the Study Area

ELC Type	ELC Type Title	Characteristics
Dry		
ANTH	Anthropogenic Disturbance	Graminoid dominated open area with no canopy and minimal mid-canopy shrubs such as willows (*Salix spp*.) and dwarf bitch (*Betula glandulosa).*
ROLI-W	Rock Lichen Woodland	Open wooded area with caprock outcrops covered in various lichens and reindeer lichens or shallow soils. The canopy and mid-canopy are sparsely dominated by stunted black spruce (*Picea mariana*) and jack pine (*Pinus contorta*), and the groundcover is dominated by various species of lichen and reindeer lichen such as *Cladina rangiferina* and *Cladina mitis*.
HELI-W	Heath Lichen Woodland	Open wooded area dominated by heaths or caprock outcrops covered in various lichens and reindeer lichens. The canopy typically consists of mature lack spruce, jack pine, and paper birch (*Betula papyrifera*). The mid-story and groundcover are dominated by heaths such as alpine bearberry (*Arctostaphylos alpina*), bog labrador tea (*Ledum groenlandicum*), alpine azalea (*Kalmia procumbens*), and lingon berry (*Vaccinium vitis-idaea*).
Moist		
SHHE-F	Shrub-herb Forest (mesic)	Closed canopy forest dominated by white spruce (*Picea glauca*) and trembling aspen (*Populus tremuloides*), with a mid-story dominated by shrubs such as willows, lowbush cranberry (*Viburnum edule*), red currant (*Ribes triste*), and red raspberry (*Rubus idaeus*).
SHTH	Shrub Thicket (riparian)	Vegetation community is riparian, where there is typically no canopy, and the mid-story and groundcover are dominated by shrubs such as dwarf birch, green alder (*Alnus alnobetula*), and willows (i.e. *Salix planifolia* and *Salix bebbiana*).

Wet		
ELC Type	**ELC Type Title**	**Characteristics**
BOG-F	Bog Forest	Closed canopy forest with a thick peat layer. The canopy consists of mature black spruce, paper birch, and tamarack (*Larix laricina*). The sparse mid-canopy consists of green alder, willow and immature black spruce, while the groundcover is dominated by sphagnum moss.
BOG-W	Bog Woodland (peat plateau)	Flat, open, wooded area with a thick peat layer. The canopy consists of mature black spruce, paper birch, and tamarack (*Larix laricina*). The mid-canopy consists of green alder, willow and immature black spruce, while the dense groundcover is dominated by sphagnum moss, bog labrador tea and bog rosemary (*Andromeda polifolia*).
Wetland		
FEN-G	Sedge Fen (graminoid dominated)	Floating peatland dominated by graminoids such as sedge, and grass. Sphagnum moss is abundant and shrubs such as bog rosemary and bog labrador tea are common.
MARSH-S	Marsh (sedge dominated)	Transitional region of emergent vegetation dominated by graminoids such as sedge and grass surrounding open water. Sphagnum moss is abundant and lingonberry, bog rosemary and bog labrador tea are common where flooding is less frequent.
SHOP-W	Shallow Open Water	Natural or man-made wetland present for all or most of the year. Submerged or floating aquatic plants are dominant in water up to 2 m deep and less than 25% of the surface water area is occupied by emergent or woody vegetation.

7.9. Wildlife

NRSI completed terrestrial and wetland field surveys on September 23 and September 27, 2021. A review of existing data sources was completed to gather information related to wildlife and wildlife habitat with an emphasis on species at risk (SAR). SAR are species listed as special concern, threatened, or endangered under the *Species at Risk (NWT) Act* or under Schedule 1 of the federal SARA, or the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

Per the NRSI Pre-Development Natural Environment Overview, the study area encompasses wetlands, woodlands, and watercourses associated with Frank Channel. These areas fall within the Level IV Great Slave Lowland High Boreal (HB) Ecoregion, which is a subdivision of the Level III Taiga Shield High Boreal Ecoregion. The Great Slave Lowland HB ecoregion is characterized by coniferous and mixed forests growing on sufficiently thick mineral or organic substrate between rock outcrops. Drier areas commonly feature jack pine (*Pinus banksiana*) and trembling aspen (*Populus tremuloides*), while moist areas within the Level III ecoregion are dominated by spruce (*Picea spp*.), tamarack (Larix laricina), and birch (*Betula spp*.). Shore fens, floating fens, and peat plateaus are common features of the Great Slave Lake region and the Level IV ecoregion (NRSI, 2021).

The Pre-Development Natural Environment Overview of NRSI (Appendix C.4) report summarized the results of the field surveys, wildlife observations, details regarding Species at Risk (SAR) and potentially suitable habitat surrounding the proposed project area. Table 7-3 below lists the threatened wildlife species of conservation concern identified by NRSI in its 2021 study as potential species in the study area. Updates have been made with more recent data to provide an up-to-date picture of the status of each species. The table is supplemented by brief descriptions of most of the species that are likely to be present in the work area.

7.9.1. Mammals

Several mammal species that have cultural importance to the Tłı̨chǫ Nation and have the potential to occur in the project area include little brown myotis (M*yotis lucifugus*), barren-ground caribou (R*angifer tarandus groenlandicus*), boreal caribou (R*angifer tarandus caribou*), grizzly bear (U*rsus arctos*), wolverine (*Gulo gulo*), and wood bison (B*ison athabascae*).

7.9.2. Birds

The project area falls within Nesting Zone C8, where migratory bird nesting season is from early-May to mid-August (ECCC 2018). As such, only incidental observations of a few local species were recorded. In total, four species of bird were observed in the study area. The species observed were Bald Eagle (*Haliaeetus leucocephalus*), Canada Jay (*Perisoreus canadensis),* American Robin (*Turdus migratorius*), and Unknown Gulls (*family Laridae*). No bird species observed in the study area are federally or provincially listed as species at risk. Several bird species that have cultural importance to The Tłı̨chǫ Nation, and may have the potential to occur in the project area including bank swallow (*riparia*), barn swallow (*Hirundo rustica*), common nighthawk (*Chordeiles minor),* evening grosbeak (*Coccothraurdsstes vespertinus*), harris's sparrow (*Zonotrichia querula*), horned grebe (P*odiceps auratus*), lesser yellowlegs (*tringa flavipes*), olive-sided flycatcher (*Contopus cooperi),* red-necked phalarope (*Phalaropus lobataus),* rusty blackbird (E*uphagus carolinus*), short-eared owl (A*sio flammeus*), yellow rail (*Coturnicops noveboracensis*) (Table 7-3).

Table 7-3 Wildlife Species at Risk and Conservation Concern with Potential to Occur in the RSA

Common Name	Scientific Name	COSEWIC	SARA	GNWT	SARC Assessment	Habitat Preference	Potentially Suitable Habitats within Study Area	Potentially Suitable Habitats within Preliminary Project Area	Likelihood of Occupancy in Preliminary Project Area	Observed by NRSI
Mammals										
Little Brown Myotis	*Myotis lucifugus*	Endangered	Endangered	Special Concern	Special Concern	Summer roosts: anthropogenic structures, tree cavities, under the bark of trees, rock crevices and caves. Winter hibernacula: caves or mines	ANTH BOG-F ROLI-W BOG-W	ANTH BOG-F ROLI-W BOG-W	Very Likely	No
Barren-ground Caribou	*Rangifer tarandus groenlandicus*	Threatened	Under Consideration	Threatened	Threatened	Give birth in open tundra and high, rocky areas. Summer: areas with high quality grasses, sedges, shrubs and mushrooms. Winter: where lichen is abundant, and snow is shallow. Avoid human settlements	NA	NA	Unlikely	No
Boreal Caribou	*Rangifer tarandus caribou*	Threatened	Threatened	Threatened	Threatened	Require large areas of intact habitats. Mature coniferous forests with abundant lichens, ridges, swamps, burned areas and meadows. Avoid human settlements	NA	NA	Unlikely	No
Grizzly Bear	*Ursus arctos*	Special Concern	Special Concern	No Status	Special Concern	Very diverse habitats (seral to climax vegetation, wet to dry habitat and a variety of altitudes) in the mountains, also found at lower densities on the tundra except in the northern Arctic Islands.	Not Assessed	Not Assessed	Not Assessed	No
Wolverine	*Gulo gulo*	Special Concern	Special Concern	No Status	Not at Risk	Variety of habitats with adequate food supplies year-round. Avoid human settlements.	NA	NA	Unlikely	No
Wood Bison	*Bison athabascae*	Special Concern	Threatened	Threatened	Threatened	Willow savannas with grasses and sedges	NA	NA	Confirmed	Yes

Common Name	Scientific Name	COSEWIC	SARA	GNWT	SARC Assessment	Habitat Preference	Potentially Suitable Habitats within Study Area	Potentially Suitable Habitats within Preliminary Project Area	Likelihood of Occupancy in Preliminary Project Area	Observed by NRSI
Birds										
Bank Swallow	*Riparia*	Threatened	Threatened	Not Applicable	Not Applicable	Breed near open habitats along rivers, streams, lakes, and gravel pits vertical sand-silt banks. Nest in riverbanks, lake and ocean bluffs, sand/gravel mounds, aggregate quarries and road cuts.	NA	NA	Unlikely	No
Barn Swallow	*Hirundo rustica*	Special Concern	Threatened	Not Applicable	Not Applicable	Breed near open habitats, including meadows near wetlands. Nest in manmade features (buildings, garages, barns, bridges, and road culverts). About 1% nest in natural features (caves, and crevices in cliff faces)	ANTH	ANTH	Probable	No
Common Nighthawk	*Chordeiles minor*	Special Concern	Threatened	Not Applicable	Not Applicable	Nests in a variety of habitats: sand dunes, beaches, open forests, forest clearings, rocky outcrops, peat bogs, marshes, lakeshores, riverbanks, road, quarries.	ANTH BOG-W HELI-W ROLI-W MARSH-S FEN-G	ANTH BOG-W HELI-W ROLI-W MARSH-S FEN-G	Probable	No
Evening Grosbeak	*Coccothraudsstes vespertinus*	Special Concern	Special Concern	Not Applicable	Not Applicable	Breed in open, mature confier-dominated forests. Nomadic according to food availability (seeds or spruce budworm).	BOG-F BOG-W HELI-W	BOG-F BOG-W HELI-W	Unlikely	No

Common Name	Scientific Name	COSEWIC	SARA	GNWT	SARC Assessment	Habitat Preference	Potentially Suitable Habitats within Study Area	Potentially Suitable Habitats within Preliminary Project Area	Likelihood of Occupancy in Preliminary Project Area	Observed by NRSI
Birds										
Harris's Sparrow	*Zonotrichia querula*	Special Concern	Under Consideration	Not Applicable	Not Applicable	Breeds in open tundra mixed with patches of coniferous trees and shrubs. Nests on the ground, in dense shrubby vegetation (dwarf birch, alder, and willow).	BOG-W	BOG-W	Unlikely	No
Horned Grebe	*Podiceps auratus*	Special Concern	Special Concern	Not Applicable	Not Applicable	Small natural or man-made ponds, marshes, and wetlands.	SHOP-W	SHOP-W	Probable	No
Lesser Yellowlegs	*Tringa flavipes*	Threatened	Under Consideration	Not Applicable	Not Applicable	Breed in semi-open woodlands and wet meadows interspersed with marshes, bogs, and ponds. Also nest in altered habitats (gas line rights-of-way and mine clearings).	SHOP-W	SHOP-W	Very Likely	No
Olive-sided Flycatcher	*Contopus cooperi*	Special Concern	Special Concern	Not Applicable	Not Applicable	Nest near rivers and streams on the edge of mature conifer forests or areas with young trees (wildfires or clear-cuts) with scattered tall trees and snags.	HELI-W BOG-F	HELI-W BOG-F	Probable	No
Red-necked Phalarope	*Phalaropus lobataus*	Special Concern	Special Concern	Not Applicable	Not Applicable	Breeds in sub-Arctic tundra, or tundra-forest transition habitats. Nest in grass-sedge vegetation near lakes, bogs, and marshes, ponds, rivers or streams.	MARSH-S SHOP-W BOG-F HELI-W	SHOP-W BOG-F HELI-W	Probable	No

Common Name	Scientific Name	COSEWIC	SARA	GNWT	SARC Assessment	Habitat Preference	Potentially Suitable Habitats within Study Area	Potentially Suitable Habitats within Preliminary Project Area	Likelihood of Occupancy in Preliminary Project Area	Observed by NRSI
Birds										
Rusty Blackbird	*Euphagus carolinus*	Special Concern	Special Concern	No Status	Not Assessed	Breed near water in boreal forest, and in treed wetlands (bogs, fens, and swamps). Nest in small spruce trees.	BOG-F	BOG-F	Very Likely	No
Short-eared Owl	*Asio flammeus*	Threatened	Special Concern	No Status	Not Assessed	Nest on the groud in open areas (grasslands, tundra, bogs, and marshes). Nomadic according to food availability (rodent).	BOG-W FEN-G	BOG-W FEN-G	Unlikely	No
Yellow Rail	*Coturnicops noveboracensis*	Special Concern	Special Concern	Not Applicable	Not Applicable	Nest in shallow marshes dominated by short sedges and grasses, wet meadows, and shrubby wetlands where ground is saturated with water throughout the summer with little or no standing water (0 to 12 cm).	MARSH-S	NA	Unlikely	No
Insects										
Gypsy Cuckoo Bumble Bee	*Bombus bohemicus*	Endangered	Endangered	No Status	Data Deficient	Typically nest underground in abandoned rodent burrows. Females overwinter in soil, mulch, and rotting logs.	UK	UK	UK	No
Suckley's Cuckoo Bumble Bee	*Bombus suckleyi*	Threatened	Under Consideration	No Status	Not Assessed	Typically nest underground in abandoned rodent burrows. Females overwinter in soil, mulch, and rotting logs. Frequently visit aster, thistle, and golden rod.	UK	UK	UK	No

Common Name	Scientific Name	COSEWIC	SARA	GNWT	SARC Assessment	Habitat Preference	Potentially Suitable Habitats within Study Area	Potentially Suitable Habitats within Preliminary Project Area	Likelihood of Occupancy in Preliminary Project Area	Observed by NRSI
Insects										
Transverse Lady Beetle	*Coccinella transversoguttata*	Special Concern	Special Concern	No Status	Not Assessed	Found in a wide range of habitats and on a variety of plants.	UK	UK	UK	No
Yellow-banded Bumble Bee	*Bombus terricola*	Special Concern	Special Concern	No Status	Not at Risk	Use a wide range of habitats, as long as flowers and nest sites are available. Typically nest underground in abandoned rodent burrows and rotten logs. Queens overwinter in loose soils and rotting trees.	UK	UK	UK	No

*NA = Not Available, UK = Unknown

The Little Brown Myotis

The Little Brown Myotis is federally listed as “Endangered” under Schedule 1 of SARA and is listed as “Special Concern” under the NWT *Act* (Table 7-3). Threats to the Little Brown Myotis include a fungal disease known as White-nose Syndrome (WNS). This has not been reported in the NWT (NWT website). Other threats to the species include disturbance to, or loss of, overwintering hibernacula, maternal roosting sites, or foraging habitat by anthropogenic activities.

Barren-ground Caribou

The Barren-ground Caribou, a species of immense cultural, spiritual, and economic significance to the people of the Northwest Territories, are designated as "Threatened" under the NWT Act and are "Under Consideration" for listing under Schedule 1 of SARA. Their populations face several threats, including climate change impacts, habitat loss, increased vulnerability to hunting and predation due to increased access, forest fires, predators, and unsustainable harvest levels.

Boreal Caribou

The conservation status of Boreal Caribou is designated as “Threatened” under both Schedule 1 of the federal SARA and the NWT Act. These populations are primarily threatened by habitat disturbance, increased access for predators and hunters, and the impacts of climate change on the forest ecosystems they inhabit. Furthermore, boreal caribou hold significant cultural importance for First Nation groups, highlighting the broader implications of their decline.

Grizzly Bear

Grizzly Bears are federally listed as "Special Concern" under Schedule 1 of SARA and are also assessed as "Special Concern" under the NWT Act. However, they have “No Status” under the territorial Species at Risk (NWT) Act (Table 7-2). While minimal threats exist, potential factors include development, human-grizzly bear interactions, and habitat loss due to climate change. The NWT is home to an estimated 4,000-5,000 grizzly bears, with the highest densities found in the Mackenzie and Richardson Mountains. Grizzly bears in the NWT, and across their Canadian range, are vulnerable to population declines due to their late reproductive maturity (six to eight years), small litters (one to three cubs), and long intervals between litters (three to five years).

Wolverine

Wolverines are federally listed as a "Special Concern" under Schedule 1 of SARA and are assessed as having "No Status" under the NWT Act. Threats to wolverines in the NWT include development and other human activities that can disturb them and fragment habitat, even at a distance from their core range. Disturbance of maternal den sites can lead to the abandonment of kits. Furthermore, human-caused mortalities from conflicts and harvesting could become problematic if not effectively managed.

Wood Bison

Wood Bison are federally listed as "Threatened" under Schedule 1 of SARA and under the NWT Act. Threats to their populations include introduced bovine brucellosis and tuberculosis, limited genetic diversity in disease-free groups, natural anthrax outbreaks, vehicle collisions, hazards associated with spring floods and thin ice, and human-bison conflicts.

Bank Swallow

Bank Swallows are listed as "Threatened" under Schedule 1 of SARA but are considered "Not Applicable" under the NWT Act. Bank Swallows breed near open habitats along rivers, streams, lakes, and gravel pits, where they forage for flying insects. Bank Swallows utilize both natural and artificial sites with vertical sand-silt banks, such as riverbanks, bluffs, sand/gravel mounds, quarries, and road cuts, excavating burrows averaging 63 cm in depth, typically horizontally into the bank. Threats to Bank Swallows include material extraction during nesting seasons, declines in insect populations, habitat loss, and extreme weather events.

Barn Swallow

Barn Swallows are listed as "Threatened" under Schedule 1 of SARA but are considered "Not Applicable" under the NWT Act. These swallows nest in a variety of locations, including man-made structures like buildings, garages, barns, bridges, and road culverts, as well as natural habitats such as caves and cliff crevices. They breed near open habitats, such as meadows near wetlands, where they forage for flying insects and gather mud for nest construction. Threats to Barn Swallows include significant declines or changes in insect populations, severe weather events, destruction of nests on human-built structures, and habitat loss and degradation from human activities.

Common Nighthawk

Common Nighthawks are federally listed as "Special Concern" under Schedule 1 of SARA but are considered "Not Applicable" under the NWT Act.. These birds nest in a variety of habitats, including sand dunes, beaches, open forests, forest clearings (such as recently logged or burned areas), rocky outcrops, peat bogs, marshes, lakeshores, river banks, gravel areas (roads, quarries, and flat gravel-covered roofs), and airports. Threats to Common Nighthawks include collisions with vehicles and aircraft, declines in insect populations, severe weather events, and habitat loss.

Evening Grosbeak

Evening Grosbeak are federally listed as "Special Concern" under Schedule 1 of SARA but are considered "Not Applicable" under the NWT Act. Evening Grosbeaks are nomadic and driven by their food supply. Threats include loss or degradation of trees and forests and decreased food supply.

Harris's Sparrow

Harris's Sparrows are federally listed as "Special Concern" under Schedule 1 of SARA but are considered "Not Applicable" under the NWT Act. Threats include habitat degradation, declining food sources, and increased numbers of predators.

Horned Grebe

Horned grebe is a waterbird species that is federally listed as "Special Concern" under Schedule 1 of SARA but are considered "Not Applicable" under the NWT Act. Threats include habitat loss, extreme weather events, decreased food supplies, disease, and collisions with power lines and wind turbines.

Lesser Yellow Legs

Lesser yellowlegs is a shorebird species that is listed as "Under Consideration" under SARA, and "Threatened" under COSEWIC. Lesser yellowlegs breed in muskeg and open forests in the boreal ecozone. They nest in dense vegetation near open water. Threats include breeding habitat degradation, climate change, and direct disturbance to nest sites.

Olive-sided flycatcher

The Olive-sided Flycatcher is listed as a "Special Concern" under SARA and is considered "Not Applicable" under the NWT Act. This species typically inhabits wetlands, mature conifer forests, and areas with young trees, such as those resulting from forest fires or clear-cuts. Threats to the Olive-sided Flycatcher include habitat loss and degradation from human activities, significant declines or changes in insect populations, and human activities that lead to increased predator numbers and reduced food sources.

Red-necked Phalarope

The Red-necked Phalarope is listed as a "Special Concern" under SARA and is considered "Not Applicable" under the NWT Act. This species breeds in low and sub-arctic tundra, as well as tundra-forest transition habitats. Their nests are typically located in grass-sedge vegetation near freshwater wetlands, lakes, ponds, rivers, or streams. Threats to Red-necked Phalaropes include breeding habitat degradation from climate change and industrial development, and direct disturbance at nest sites from human activities such as resource exploration and development.

Rusty Blackbird

The Rusty Blackbird is listed as a "Special Concern" under SARA but has "No Status" under the NWT Act. They inhabit boreal forests and wetland areas during breeding season and migration, often nesting in loose colonies near open water in treed wetlands (bogs, fens, and swamps). Potential threats in the Northwest Territories include activities that alter their forest and wetland habitats, such as forest clearing and changes in surface water levels or flow patterns, as well as wetland drying due to climate change. Other potential threats are mercury deposition in wetlands from the atmosphere and melting permafrost, and human activities that reduce food sources and increase predator populations.

Short-eared Owl

The Short-eared Owl is federally listed as a "Special Concern" under SARA and has "No Status" under the NWT Act. During summer, these owls nest on the ground in grasslands, tundra, bogs, marshes, and other open (non-forested) areas, favoring habitats with abundant small mammals, as their populations fluctuate with prey availability. Potential threats include habitat loss and degradation from human activities, primarily in their southern range, and climate change, which is predicted to alter their tundra habitat, reducing prey availability and increasing predation risk.

Yellow Rail

The Yellow Rail is a waterbird species federally listed as "Special Concern" under SARA but considered "Not Applicable" under the NWT Act. These birds nest in marshes dominated by sedges and grasses, wet meadows, and shrubby wetlands. Their nesting areas have little to no standing water (typically 0 to 12 cm) and the ground remains saturated throughout the summer. Potential threats in the Northwest Territories include habitat loss and degradation from human activities, human activities that reduce food sources and increase predator populations, and breeding habitat degradation due to climate change.

Gypsy Cuckoo Bumble Bee

Gypsy Cuckoo Bumble Bees are listed as "Endangered" under SARA but have "No Status" under the NWT Act. These bees require host bumble bee nests, typically located underground in abandoned rodent burrows. Potential threats in the Northwest Territories include declines in host species populations, such as McKay's Bumble Bee and Yellow-banded Bumble Bee; the introduction of exotic bumble bee species for pollination, which can spread diseases to native bees; and the use of pesticides and herbicides. Additionally, high densities of imported honeybees can outcompete native bumble bees for pollen.

Suckley's Cuckoo Bumble Bee

Suckley's Cuckoo Bumble Bees are currently "Under Consideration" for listing under SARA and have "No Status" under the NWT Act. These bees require host bumble bee nests, typically located underground in abandoned rodent burrows. Potential threats in the Northwest Territories include declines in host species populations, the introduction of exotic bumble bee species for pollination (which can spread diseases to native bees), and the use of pesticides and herbicides. Additionally, high densities of imported honeybees can outcompete native bumble bees for pollen.

Transverse Lady Beetle

Transverse Lady Beetles are listed as a “Special Concern” under SARA and have “No Status” under the NWT Act. They utilize a wide range of habitats pending available prey. Potential threats include negative interactions with non-native species such as Seven-spotted Lady Beetle, and use of pesticides.

Yellow-banded Bumble Bee

Yellow-banded Bumble Bees are listed as “Special Concern” under SARA and have “No Status” under the NWT Act. These bees utilize a wide range of habitats, if flowers and suitable nest sites are available. Colonies typically nest underground in pre-existing cavities such as abandoned rodent burrows and rotten logs. Potential threats to this species include the use of pesticides and herbicides, as well as the introduction of exotic bumble bee species for pollination, which can spread diseases to native bee populations. Additionally, high densities of imported honeybees can outcompete native bumble bees for pollen resources.

8. Description of the Human Environment

This human environment screening report adopts a conservative approach from the outset when evaluating traditional land use within the preliminary project area. It assumes that traditionally used species present are potentially associated with traditional practices like camping, hunting, gathering, and trapping.

Assessments are based on the relationships between the biophysical components described in Section 7 - particularly those relating to wildlife, vegetation, fish and fish habitat - and their implications for traditional land-use activities. Additionally, assessments of air quality and surface water quality offer valuable insights into broader environmental changes, which may further influence traditional land use practices.

Available traditional land use information has been integrated into the analysis to provide context for existing environmental conditions, to identify potential areas of concern, and to support relevant environmental observations. Furthermore, the Tłı̨chǫ Government is currently conducting a Traditional Knowledge Study for this Project, scheduled for completion in June 2025, which is expected to enhance and further inform the assessment of traditional land use activities and associated environmental considerations.

8.1. Project Description and Study Areas

The existing human environment is described using the aforementioned project-specific description. As with the biophysical components, some of the descriptions refer to more local elements, while for other subjects, they refer more to inter-community or regional aspects, notably by showing the existing links between the CGB communities and the links that exist with Yellowknife. Thus, the study areas for these human components are still either regional in scope (Map 2-1) or local (Map 2-2).

8.2. Community Descriptions

The Tłı̨chǫ Nation comprises four distinct communities on its lands: Behchokǫ̀, Whatì, Gamètì Wekweètì, which are described below. Each of these communities is an independent public government with powers and responsibilities like the municipal government of other NWT communities, and they are referred to as community governments (Tłı̨chǫ Government, 2025a). Of these four communities, only Behchokǫ̀, where is the Project, is shown on Map 2-1 with its municipal boundaries. The other three communities are located further north than the northern boundary of this map, more than 100 km from Behchokǫ̀.

Behchokǫ̀, located near the North Arm of Great Slave Lake, is one of the largest First Nations communities in the Northwest Territories (Community Government of Behchokǫ̀, CGB, n.d.). Formerly known as Rae-Edzo, its name was officially changed to Behchokǫ̀ in 2005 under the Tłı̨chǫ Agreement, signifying "Big Knife" in the Tłı̨chǫ language, and it includes the neighborhoods of Rae, Edzo, and Frank Channel (Tłı̨chǫ Government, 2025b). These three neighborhood communities are approximately 10-120 km northwest of Yellowknife on the Yellowknife Highway (HWY-3). These three communities are identified on Map 2-1 and are only a few kilometers apart. To serve these communities, the CGB offers services in terms of community planning, public works and community improvements, public utilities such as water quality, water delivery and sewage services as well as emergency response planning and fire protection, recreation and other services such as bylaw enforcement. CGB administers all lands within Behchokǫ̀ and regulates land use and development through its Community Plan, Zoning By-law, leasing, and Development Permit processes (Tłı̨chǫ Government, 2025b).

Whatì, located on the shores of Lac La Martre, another major lake in the Northwest Territories, is located around 130 km northwest of Behchokǫ̀. In recent years, this community has been served by a new 4-season road, the Tlich all-season road (TASR), which starts at km 196 of HWY-3. Whatì is known for its excellent year-round fishing, particularly for large Lake Trout and Northern Pike. It is also situated along North American bird migration routes, making its marshes a vital stopover for migratory birds. Community members actively engage in traditional practices such as fishing, trapping, arts, crafts, and hunting.

Gamètì, previously Rae Lakes, adopted its current name in 2005 following the Tłı̨chǫ Agreement. It is situated between Great Slave and Great Bear Lakes, within a traditional Tłı̨chǫ and Sahtu Dene hunting area. Initially a temporary camp, Gamètì developed into a settled community in the 1970s with the construction of an airstrip, school, store, and permanent log housing. Gamèti can be reached by a winter road from Whatì (approx. 100 km) or Behchokǫ̀ (approx. 200 km). A major mine is under development along the winter road to Gameti, Nico Mine (cobalt, gold, bismuth, copper), which is 50 km from the 4-season road to Whatì.

Wekweètì, situated on a rolling, rocky landscape overlooking the Snare River, was renamed from Snare Lake in 2005 under the Tłı̨chǫ Agreement. It is the closest community to the region's primary power source, the Snare River hydro dams and powerhouses, including the Dogrib Power Corporation facility, a Tłı̨chǫ Investment Corporation business. Wekweètì can be reached by winter road from Whatì or Behchokǫ̀. Following this route, Wekweètì is about 230 km from Behchokǫ̀.

Finally, as mentioned in the project description, the community of Behchokǫ̀ is about 110 km from Yellowknife, the capital of NWT. This is where the most extensive services are located in the Territories, as well as the most important public institutions and government service points.

8.3. Economy, Employment and Business

The Tłı̨chǫ Region, with a population of approximately 3,025 (NWT Bureau of Statistics, 2024), is served by a variety of businesses across its four communities: Behchokǫ̀ (1,998), Whatì (613), Gamètì (286) and Wekweètì (128). These businesses provide essential services and contribute to the local economy. Today, many residents of the Tłı̨chǫ Region are employed in Tłı̨chǫ companies, in local government and business, or work on rotation for different mines in the north part of the NWT.

Behchokǫ̀ offers a diverse range of services, including tourism (True North Safaris, Behchokǫ̀ Motel, Winterhawk Bed & Breakfast), transportation (Northern Exposure, Behchokǫ̀ Towing Services, Tli Cho Air), retail (Tlicho Online Store, F.C. Services Ltd., Northern Store), healthcare (Somba K'e Dental Clinic), media (First North Productions), and dining (Trappers Hideaway Restaurant).

Whatì offers dining (Choo-Choo's Kitchen & Bake Shop) and accommodation (Whatì Motel), with further services provided by Lac La Martre Development Corporation. Whatì is home to the Mezi Community School, fishing lodges, and other amenities.

Gamètì provides essential services such as retail (Rae Lakes General Store Ltd), accommodation (GAhti Bed & Breakfast, Gamètì Motel), transportation (Northern Exposure, Tli Cho Air), and fuel (Gamètì Gas Station).

Wekweètì features transportation (Northern Exposure, Tli Cho Air), retail (Hozila Naedik'e General Store), and accommodation (Wekweètì Hotel). Notably, Dechi Laoti First Nation Holding (DLFN Holdings) and 5352 NWT Limited, wholly owned by the Tłı̨chǫ Investment Corporation, provide critical services like fuel delivery, gas station, general store, taxi, postal services, and rental properties.

In addition, 2018 NWT Bureau of Labour Statistics (BLS) data reveals that in the Tłı̨chǫ Region, a significant portion of the population participates in traditional activities: 22.9% in arts and crafts, 39.4% in hunting or fishing, 14.9% in trapping, and 34.1% in berry gathering. The collective Indigenous traditional use information strongly suggests extensive contemporary, historic, and precontact use of the project area, highlighting its high archaeological potential.

Finally, the Yellowknife Region is about seven times more populous than the Tlicho Region (NWT Bureau of Statistics, 2024). In 2024, the population of Yellowknife was 22,297. Yellowknife alone accounts for about half the population of the entire NWT, which is 44,731.

8.4. Land and Resource Use

8.4.1. Existing Traditional Land and Resource Use

In 2021 an Archaeological Overview Assessment (AOA) was completed for the project (see the complete report in Appendix C.6), incorporating a review of available Traditional Use Information. The AOA identified the Frank Channel as a critical natural travel corridor linking Great Slave Lake and Marian Lake.

8.4.2. Availability of traditional And Other Land and Resource Uses

Studies referenced in the AOA, specifically those from the North Slave Métis Alliance and the Old Fort Rae area, emphasize the importance of trails, including the Ɩdaà Trail and those through the Marian Lake area, and the area's significance for fishing. Records also document the utilization of various non-game resources, such as berries, birch syrup, and moss. These findings, combined with the presence of the Frank Channel community, indicate a high likelihood of contemporary Indigenous traditional use sites, including plant collecting locations.

8.4.3. Access to Traditional and Other Land Resource Uses

Per to AOA, the presence of two historical fur trade posts, Fort Rae and Old Fort Rae, within 15 km of the project area, suggested a strong correlation between these travel corridors and traditional Tłı̨chǫ practices, including camping, hunting, gathering, and trapping (Lifeways of Canada Limited. 2021). The 1991-1993 heritage resource survey of the Ɩdaà Trail, conducted in collaboration with Tłı̨chǫ residents and elders from Behchokǫ̀ and Gamètì, reinforces this conclusion (Andrews 1991, Andrews 1993). The Ɩdaà Trail, a vital route connecting Great Slave Lake and Great Bear Lake, was used extensively by the Tłı̨chǫ people, particularly in post-contact times for accessing trading posts via dog-team and canoe.

8.4.4. Cultural and Spiritual Sites for Traditional Land and Resources Uses

A report titled, Continual change and gradual warming: A summary of the North Slave Métis Alliance's recorded cultural knowledge on climate and environmental change, provides a comprehensive summary of the North Slave Métis Alliance's (NSMA) cultural knowledge regarding climate and environmental change within their traditional territory north of Great Slave Lake, Northwest Territories. The report synthesized data extracted from interviews with NSMA members and primary and secondary literature to detail Métis cultural knowledge of climatic and environmental conditions, variability, and the impacts of climate change on factors such as seasonality, precipitation, water levels, ice quality, and wildlife. As previously mentioned, the Tłı̨chǫ Government is currently undertaking a Traditional Knowledge Study, which is expected to be completed in June 2025.

8.5. Heritage and Archaeological Resources

8.5.1. Baseline Site Data

As a part of the AOA (Appendix C.6), an Access Request for the NWT Archaeological Sites Database was completed and submitted to the Prince of Wales Northern Heritage Centre (PWNHC) Archaeology Program. The PWNHC reported that there are 36 recorded archaeological sites within 35 km of the Project area, most of these were on Marian Lake or on the North Arm of Great Slave Lake. See Table 8-1 for additional details. Twenty of the previously recorded sites contain Precontact materials, fourteen contain Historic Period Indigenous materials, three contain Historic Period materials, and three contain Contemporary materials. Per the AOA, there were four previously recorded archaeological sites within 500 m of the Project area and within a 100 m buffer zone additional to this Project area (KePI-1, KePI-3, KePI-4, and KePI-5 described below, see the AOA in Appendix C.6 for the Project Area considered in the study).

8.5.1.1. KePI-1, The Frank Channel Site (Deh K'è, K'òòta Nįįlįį)

The Frank Channel Site (KePI-1) is recognized as a key archaeological location, demonstrating evidence of Precontact, Protohistoric, and Historic occupation over a vast timeframe, and directly connected to the proposed project. Prior site reviews have indicated that large sections of the site have suffered extensive damage. This site has a high likelihood of encountering extant, intact portions within the Project area.

8.5.1.2. KePI-3 (Deh K'è Įłè)

Observations from a 1993 site visit included numerous cans, barrels, scrap metal, and a quartz flake, believed to be of Precontact origin. While the observed site is not anticipated to be affected by the project, it suggests that similar materials may be present within the Project area. KePI-3 is located approximately 430 m south of the 100-m buffer zone and 555 m from the Project Area.

8.5.1.3. KePI-4 (Įt'ǫ Ndi Nàke)

Tipis, a plywood shack, and fragmented faunal remains were identified in a 1993 site visit about 385 m south of the 100 m buffer zone and 285 from the preliminary Project area. While the observed site is not anticipated to be affected by the project, it suggests that similar materials may be present within the Project area.

8.5.1.4. KePI-5 (Deh K'è Nàke)

Scatter of black chert and siltstone debitage, and calcined bone associated with a contemporary cabin were identified in a 1993 field visit, approximately 60m south of the 100 m buffer zone and 160 m from the preliminary Project area. While the observed site is not anticipated to be affected by the project, it suggests that similar materials may be present within the Project area.

8.5.2. Previous Assessments

As mentioned above, the project area has been previously evaluated through the desktop AOA conducted in 2021 (Appendix C.6). The AOA was carried out in the pre-project area known in 2021, with a 100 m buffer in accordance with territorial standards and guidelines. It is this area that is still known to be archaeologically valid and is referred to as the Project area for the AOA purpose. Mackenzie Valley Land Use Regulations prohibit land use operations within 30 m of known archeological sites without adequate authorization. The Prince of Wales North Heritage Centre Archaeology Program requires an AOA to consider archaeological sources within 500 meters of Projects. For the purposes of the AOA, archaeological data was compiled for areas within 35 kilometers of the project area to assist in the determination of archaeological potential. This compilation is shown in Table 8-1 below.

Methodology utilized for the AOA included consideration of a variety of factors, including hydrology, landform identification and features, proximity to previously recorded archaeological sites, modern vegetation patterns, ecological land classification based on the NRSI 2021 report, surficial geology, traditional use information, previous land disturbance, and knowledge of settlement patterns and archaeological site location probability. Though sometimes difficult to access, a search for publicly available traditional use information associated with the Project area was completed.

The AOA has identified several areas of high archaeological potential in the project area. These areas are shown in Figure 8 of the AOA in Appendix C.6. Considering this potential, an Archaeological Impact Assessment (AIA) is planned for 2025 before construction work begins on the project.

Table 8-1 below presents a summary of Archaeological Sites recorded near the Project area. It details each site by its unique Borden Number and associated Name, along with its Classification and Type. Where available, information on the likely Cultural Affiliation or Dating of the site is provided. The table also includes the Year Visited for recorded surveys, the relevant Permit number (if applicable), the Researcher(s) involved in the site documentation, and the approximate Distance from the Project Area. This information is intended to provide a concise overview of the archaeological context in the vicinity of the Project Area.

Table 8-1 Archaeological Sites Recorded near the Project Area of the AOA

Borden Number	Name	Classification	Type	Cultural Affiliation or Dating	Year Visited	Permit	Researcher	Distance from Project Area
KdPl-1	Rae Point Old Fort Rae Fort Rae (Old)	Indigenous Historic; Historic	Grave; fort; HBC; trading post; burial	Athapaskan Dogrib Euro-Canadian	1966	1966-261; NWT 93-759; NWT 2000- 902; NWT 2008-008	Noble, W. C.; Andrews, Tom; Stevenson, M.; Hayden, Shannon	15.7 km
KePl-1	Frank Channel	Precontact	Campsite	Timber Point, Frank Channel, Taltheilei, 670 +/- 70 B.P.	1966	1966-261	Noble, W. C.	160 m
KePl-2	It'Q Ndi Il ├¿ (Green Leaf Island One)	Precontact; Indigenous	Campsite	Athapaskan Dogrib	1993	1993-759	Andrews, Tom	725 m
KePl-3	Deh K'e Il ├¿ (River Place One)	Precontact; Indigenous	Campsite	Athapaskan Dogrib	1993	1993-759	Andrews, Tom	555 m
KePl-4	It'Q Ndi N ├ák ├¿ (Green Leaf Island Two)	Precontact; Indigenous	Campsite (fishing)	Athapaskan Dogrib	1993	1993-759	Andrews, Tom	285 m
KePl-5	Deh K' ├¿ N ├áke (River Place Two)	Precontact; Contemporary	Campsite	Athapaskan Dogrib	1993	1993-759	Andrews, Tom	160 m
KePl-6	Deh K' ├¿ Cemetery (River Place Cemetery)	Indigenous Historic	Grave; burial (cemetery)	Athapaskan Dogrib	1993	1993-759	Andrews, Tom	635 m
KePl-7	Deh K' ├¿ Tai (River Place Three)	Precontact	Campsite	Athapaskan	1993	1993-759	Andrews, Tom	1.4 km
KePl-8		Precontact	Isolated find		2017	2017-020	Foster, Jean-Paul	3.6 km
KePl-9			Campsite		2017	2017-020	Foster, Jean-Paul	6.4 km

Borden Number	Name	Classification	Type	Cultural Affiliation or Dating	Year Visited	Permit	Researcher	Distance from Project Area
KePm-1	Mosquito Creek	Precontact		Acasta Lake; 5000 B.C.	1967	1967-275	Noble, W. C.	13.5 km
KePm-2	Grader	Precontact	Isolated find		1992	1992-726	Andrews, Tom	10.4 km
KePm-3	Fort Rae	Precontact			1967	1967-275	Noble, W. C.	7.1 km
KePm-4		Precontact	Campsite	Athapaskan Dogrib	1993	1993-759	Andrews, Tom	3.9 km
KePm-5		Indigenous Historic	Campsite	Athapaskan Dogrib	1993	1993-759	Andrews, Tom	3.6 km
KePm-6		Historic	Trail	Mid-20th century	2019	2019-010	Smethurst, Naomi	7.9 km
KfPm-1		Precontact	Grave; campsite; workshop (lithic)	Dogrib Athapaskan	1992	1992-730	Andrews, Tom	23.5 km
KfPm-2		Indigenous Historic	Campsite	Dogrib Athapaskan	1992	1992-730	Andrews, Tom	24.1 km
KfPm-3	Sezhq Ehd ├á	Indigenous Historic	Grave; burial	Dogrib Athapaskan	1992	1992-730	Andrews, Tom	16.6 km
KfPm-4		Indigenous Historic	Campsite	Athapaskan Dogrib	1993	1993-759	Andrews, Tom	11.7 km
KfPm-5	Whagw ├¿ K' ├¿ (Moss on Sand Place)	Indigenous Historic	Campsite	Athapaskan Dogrib	1993	1993-759	Andrews, Tom	10.1 km
KfPm-6	"Pay the Rock"	Indigenous Historic	Sacred	Athapaskan Dogrib	1993	1993-759	Andrews, Tom	25.9 km
KfPm-7	Bedford Point	Precontact; Indigenous	Campsite	Athapaskan Dogrib	1993	1993-759	Andrews, Tom	24.6 km
KfPn-1	Kwembeh Cemetery Stone (Knife Cemetery)	Indigenous Historic	Burial (Cemetery)	Athapaskan Dogrib	1993	1993-759	Andrews, Tom	31.1 km
KfPn-2		Indigenous Historic	Trading post	Euro-Canadian	1993	1993-759	Andrews, Tom	33.0 km

9. Screening of Potential Effects

9.1. Methods

The preliminary screening of potential adverse effects on the environment is undertaken in five steps:

1. Identify potential adverse and positive interactions between the Project and VCs of the biophysical and human environment as described in sections 7 and 8.
2. Identify how a Project-VC interaction could change (affect) the VC.
3. Identify mitigations that will be applied to reduce or eliminate adverse effects.
4. Characterize the potential residual adverse effect on the VC.
5. Describe how the VC could be affected by other projects acting in combination with the Project and how climate changes could affect the Project.

9.1.1. Project Interactions with the Environment

Potential interactions between the Project and VCs of the biophysical and human environment are identified in Table 9-1. The replacement of the existing Frank Channel Bridge with a new open-deck structure, designed to meet current load standards and eliminate height restrictions with a 75-year design life, will support ongoing and future mineral resource development in the Slave Geological Province and improve road travel and traffic flow in the southern NWT. This upgraded infrastructure offers the benefit of more efficient and cost-effective transportation due to its increased capacity for larger equipment (Wood, 2019). Furthermore, travel safety on this section of HWY-3 will be enhanced, and exchanges within the Behchokǫ̀ community territory will be improved. Table 9-1 identifies both potential environmental impacts and several interactions (positive, adverse, climate), as well as potential positive outcomes from various Project activities. Adverse interactions are not anticipated if proposed mitigation measures (i.e., outlined in management plans [Appendix B] and discussed in Section 9.1.2) are implemented and followed.

Table 9-1 Project Activity Interaction Matrix

Activity	Anticipated Timing	Climate[1]	Air Quality	Noise & Vibration	Water Quality and Quantity	Fish & Fish Habitat	Terrain, Soils, Groundwater and Permafrost	Vegetation	Wildlife	Communities, Economy, Employment & Business	Traditional & Other Land Use	Heritage Resources
Mobilization to site	September – October 2025	-	✓	✓	✓	✓	✓	✓	✓	P	✓	✓
Clearing & Access to West and East Abutments	October – November 2025	-	✓	✓	✓	✓	✓	✓	✓	P	✓	✓
Drill & shoot Outcrop rock for the East and West Temporary accesses	October – November 2025	-	✓	✓	✓	✓	✓	✓	✓	P	✓	✓
Build East and West causeway(s)	November 2025 – February 2026	-	✓	✓	✓	✓	✓	✓	✓	P	✓	✓
Build Ice Bridge	January – March 2026	-	✓	✓	✓	✓	✓	✓	✓	P	✓	✓
Transport Materials to Island & Build Island causeway	January – February 2026	-	✓	✓	✓	✓	✓	✓	✓	P	✓	✓
Flexifloat Installation North side of Causeways for Construction	April – November 2026	-	✓	✓	✓	✓	✓	✓	✓	P	✓	✓
Build Foundation from Island	February – April 2026	-	✓	✓	✓	✓	✓	✓	✓	P	✓	✓

Activity	Anticipated Timing	Climate[1]	Air Quality	Noise & Vibration	Water Quality and Quantity	Fish & Fish Habitat	Terrain, Soils, Groundwater and Permafrost	Vegetation	Wildlife	Communities, Economy, Employment & Business	Traditional & Other Land Use	Heritage Resources
Complete Bridge Sub-Structure	June – September 2026	-	✓	✓	✓	✓	✓	✓	✓	P	✓	✓
Build Ice Bridge for Island Girder & Work on Bridge Structure	September 2026 – February 2027	-	✓	✓	✓	✓	✓	✓	✓	P	✓	✓
Concrete Precast Panels Installation from Island	January – March 2027	-	✓	✓	✓	✓	✓	✓	✓	P	✓	✓
Complete Precast Panels and Superstructure	April – July 2027	-	✓	✓	✓	✓	✓	✓	✓	P	✓	✓
Remove the top of the Island causeway & build a temporary deconstruction causeway under the existing bridge	March – April 2027	-	✓	✓	✓	✓	✓	✓	✓	P	✓	✓
Flexifloat Installation North Side of Causeways for Construction	June – August 2027	-	✓	✓	✓	✓	✓	-	✓	P	✓	✓
Complete Bridge Deck & Paving	May 2027 – November 2027	-	✓	✓	✓	✓	✓	-	✓	P	✓	✓

Activity	Anticipated Timing	Climate[1]	Air Quality	Noise & Vibration	Water Quality and Quantity	Fish & Fish Habitat	Terrain, Soils, Groundwater and Permafrost	Vegetation	Wildlife	Communities, Economy, Employment & Business	Traditional & Other Land Use	Heritage Resources
Roadway Traffic Switch on New Bridge	December 2027 – January 2028	-	✓	✓	✓	✓	✓	✓	✓	P	✓	✓
Build Ice Platform: Existing Structure Deconstruction Work	January – April 2028	-	✓	✓	✓	✓	✓	-	✓	P	✓	✓
Remove the temporary deconstruction causeway	March-April 2028	-	✓	✓	✓	✓	✓	✓	✓	P	✓	✓
Existing Roadway Demolition	April – October 2028	-	✓	✓	✓	✓	✓	✓	✓	P	✓	✓
All Site Restoration	April – October 2028	-	P	P	P	P	P	P	P	P	P	P
Project Completion	November – December 2028	P	P	P	P	P	P	P	P	P	P	P

Notes:

1 Climate is identified as a VC that may affect the Project
✓ denotes potential adverse interaction
- denotes no interaction
P denotes potential positive interaction

9.1.2. Potential Effects and Mitigations

The potential effects and mitigation measures for each adverse Project-environment interaction listed in Table 9-1 are summarized for each VC in section 10 of the Water Licence Application form and section 17 of the form related to the Land Use Permit application. The mitigation measures draw upon regulatory requirements, published guidance, standard best practices relevant to the area, traditional knowledge (TK) known and documented to date (a TK a study is ongoing and should be completed in June 2025) or input from engagement (see Appendix D for the Engagement Plan and Records), and professional experience, all deemed effective for the identified Project activity. The selection process for the mitigations is further discussed in the following management plans.

- Spill Prevention and Contingency Plan (SCP) – Appendix B.1
- Erosion and Sedimentation Control Plan (ESCP) – Appendix B.2
- Waste Management Plan (WMP) – Appendix B.3
- Wildlife Management and Monitoring Plan (WMMP) – Appendix B.4
- Water Quality Monitoring Plan – (WQMP) – Appendix B.5
- Conceptual Closure and Reclamation Plan (CRP) – Appendix B.6

9.1.3. Characterization of Residual Effects for Screening

Residual effects on the VC are those that might occur to the VC after the mitigations are applied. Residual effects are characterized by their duration, frequency, timing, extent and reversibility and magnitude of the potential effect to the VC. The definitions used to characterize residual effects for this screening level of assessment are shown in Table 9-2.

Table 9-2 Characterization of Residual Effects used in Screening

Criteria	Potential Outcomes			
Duration	**Short-Term:** Effect lasts for the duration of a construction season (less than 1 year)	**Medium-Term:** The effect occurs during the subsequent years of construction if it lasts more than one year and lasts up to one year after completion of the construction work.	**Long-Term:** Effect lasts for more than 1 year after construction activity ceases	
Frequency	**Once:** Effect occurs once	**Intermittent:** Effect occurs intermittently	**Continuous:** Effect occurs continuously	
Seasonal Timing	**Season-Specific:** Effect is restricted to a particular season or seasons	**Non-Season-Specific:** Effect could occur year-round		
Geographic Extent	**Project Area:** Within project footprint			
Reversibility[1]	**Reversible or Irreversible**			
Magnitude of effect to VC	**Negligible** No discernable change to VC	**Low**[2]	**Moderate**[3]	**High**[4]

Notes:

1 Reversibility: The likelihood that the VC will recover from an environmental effect.

2 Low: The Project may result in a decline in the VC in the PA compared to existing conditions during the life of the Project, but VC levels should recover to baseline after Project closure.

3 Moderate: The Project will likely result in a decline in the VC lower than baseline, but stable levels in the study area after Project closure and into the foreseeable future.

4 High: The Project could threaten the sustainability of the VC in the PA after Project closure, and into the foreseeable future; or could exceed an established threshold. This type of effect might be considered significant.

9.2. Potential Effects on Air Quality, Noise and Vibration

Table 9-1 identifies Project interactions with the environment that may affect air quality and noise. Potential effects and the mitigation measures proposed to reduce or eliminate impacts on air quality and noise are presented in detail in section 10 of the Water Licence application form and section 17 of the Land Use application form.

9.2.1. Change in Air Quality

Project construction activities have the potential to release criteria air contaminants (i.e., gaseous emissions and particulate matter/dust), potentially affecting local air quality. Mitigation measures and impacts are detailed in section 10 of the Water Licence application form and section 17 of the Land Use Permit application form.

9.2.2. Potential Effects on Noise and Vibration

Noise is anticipated from various activities related to the Project, including bridge deconstruction, existing roadway demolition, and all activities required for the construction of the new bridge and for road realignments. Section 10 of the Water Licence application form and section 17 of the Land Use Permit application form detail the mitigation measures for potential noise/vibration impact.

9.2.3. Summary of Potential Residual Effects on Air Quality and Noise

Table 9-3 summarizes the potential residual effects on air quality and noise using the criteria described in Table 9-2.

Table 9-3 Summary of Potential Residual Effects on Air Quality and Noise

Potential Residual Effect	Residual Effects Characterization					
	Duration	Frequency	Timing	Geographic Extent	Reversibility	Magnitude
Change in air quality	ST	C	SS	LSA	R	L
Change in noise	ST	C	SS	LSA	R	L

Duration:
ST: Short-term
MT: Medium-term
LT: Long-term

Frequency:
S: Once
IR: Intermittent
C: Continuous

Timing:
SS: Seasonal/ NS: Non-Season specific

Geographic Extent:
PA: Project Area

Reversibility:
R: Reversible
I: Irreversible

Magnitude:
N: Negligible
L: Low
M: Medium
H: High

9.3. Potential Effects on Water Quality and Quantity

Table 9-1 identifies Project interactions with the environment that may affect surface water. Potential effects and proposed mitigation measures related to surface water, are detailed in section 10 of the Water Licence application form and section 17 of the Land Use Permit application form.

9.3.1. Change in Water Quality

To safeguard water quality during construction (including land clearing and work near or in water), robust mitigation measures will be implemented, including an ESCP and a SPCP. Erosion controls will be proactively implemented and regularly inspected. Water quality monitoring will occur during in-water or near-water work, as needed, with WQMP. Environmental Monitors will ensure compliance with regulations throughout construction.

9.3.2. Change in Water Quantity

Water may be withdrawn to construct ice bridges, for cleaning equipment, machinery and vehicles, and for use as dust suppression. These withdrawals will be carefully managed to minimize impacts on potential water users and fish/fish habitat. All activities will adhere to the Department of Fisheries and Oceans (DFO) Protocol for Water Withdrawal from Ice Covered Waterbodies in the NWT and Nunavut (DFO, 2005) and the DFO Code of practice: Ice bridges and snow fills (DFO, 2023). Any quantities of water withdrawn will be marginal in relation to Dehk'è Frank Channel's hydraulic capacity. This has been clearly demonstrated in section 4.3 of this document (Table 4.4) where it states that the water withdrawals planned for the Project will have a negligible impact on flows in the Dehk'è Frank Channel. In addition, the few culverts to be installed as part of the roadworks will not alter the quantities of water flowing into Frank Channel.

9.3.3. Summary of Potential Residual Effects on Water Quality and Quantity

Table 9-4 summarizes the potential residual effects on water quality and water quantity using the criteria described in Table 9-2.

Table 9-4 Summary of Potential Residual Effects on Water Quality and Quantity

Potential Residual Effect	Residual Effects Characterization					
	Duration	Frequency	Timing	Geographic Extent	Reversibility	Magnitude
Change in water quality	MT	IR	SS	PA	R	**N-L**
Change in water quantity	**MT**	**IR**	**SS**	**PA**	**R**	**N**

***Duration**:*
ST: Short-term
MT: Medium-term
LT: Long-term

***Frequency**:*
S: Once
IR: Intermittent
C: Continuous

***Timing**:*
SS: Seasonal
NS: Non-season specific

***Geographic Extent**:*
PA: Project Area

***Reversibility**:*
R: Reversible
I: Irreversible

***Magnitude**:*
N: Negligible
L: Low
M: Medium
H: High

9.4. Potential Effects on Fish and Fish Habitat

This section identifies and discusses the potential effects on fish and fish habitat, mitigations that are proposed to eliminate or reduce those effects, and the residual effects that are predicted to remain after mitigations are applied. Based on Project interactions with the environment identified in Table 9-1, the Project could impact the Fish and Fish Habitat VC. Potential effects, and mitigations proposed to reduce or eliminate the effects of the Project on fish and fish habitat are identified in section 10 of the Water Licence application form and section 17 of the Land Use Permit application form.

9.4.1. Change in Fish Habitat

Proposed construction activities may result in the loss or alteration of fish habitat including fish habitat. To mitigate these impacts, all work will adhere to the DFO Measures to Avoid Causing Harm to Fish and Fish Habitat Including Aquatic Species at Risk (DFO, 2025b) as applicable. Mitigation approaches are captured in section 10 of the Water Licence application form and section 17 of the Land Use Permit application form.

9.4.1.1. Loss or Alteration of Fish Habitat Below the Ordinary High-Water Mark (OHWM)

The Project will result in a temporary loss of habitat for three years while rock causeways are installed in the Frank Channel. A portion of the causeways will permanently remain in the Frank Channel along the banks and the rocky outcrop island as it is stated in the Section 4.2.2 of the present document. Additionally, a minor loss of habitat will occur from installing three new bridge piers below the OWHM; however, the above substrate components of the existing three bridge piers will be removed and restored. All encroachment areas under the Ordinary High-Water Mark (OHWM) are presented in Sections 4.1.1, 4.2.2 and 4.3.2 of this document.

The Project is situated within Zone 1 of the Northwest Territories Restricted Activity Timing Windows (DFO 2013), which designates a Restricted Activity Period (RAP) from April 1 to July 15 for spring/summer spawners and from August 15 to June 30 for fall spawners, including lake trout. Ideally, the acceptable work window, accommodating both spawning periods, would be between July 1 and August 14. Nevertheless, due to scheduling constraints imposed by Government of Canada funding deadlines and the Project's construction sequence, which necessitates the use of ice bridges, the placement of rock below the Ordinary OHWM for access ramp and rock causeway construction will occur during the fall and winter restricted period. While this will result in disturbance, alteration, or temporary loss of habitat, its significance is lessened by the marginal spawning habitat that the Project Area (PA) provides. Specifically, the Frank Channel is a turbid watercourse that lacks the clean, coarse substrate preferred by many resident fish species.

To further minimize impacts on fish and fish habitat, several measures are detailed in section 10 of the Water Licence application form and of section 17 of the Land Use Permit application form. Additionally, the material used for the causeways will be strategically left in place at the end of the work to reintroduce good quality habitat.

9.4.1.2. Loss or Alteration of Fish Riparian Habitat

Riparian vegetation removal/damage at the crossing locations (for the construction of the new bridge and for the deconstruction of the existing bridges) may lead to a loss of riparian fish habitat and an increase of erosion and sedimentation, may affect fish and fish habitat. Other watercourses affected by the work are not considered fish habitat, but their riparian zones may still represent wildlife habitat. Loss or alteration of these riparian habitats may also have an impact on the environment as part of the Project.

To minimize erosion and protect fish habitat, riparian areas will be preserved wherever feasible, with vegetation removal restricted to the right-of way (RoW) width (the existing one and the new one). All removed vegetation and debris will be removed from the site to prevent entry into the watercourse, and stream bank grading at approaches will be avoided. Impacts on riparian vegetation at temporary crossings and accesses will be minimized considering that much of the work in these areas will be carried out in winter. Trees and shrubs removed will be cut above ground level when feasible in the context of the work to be done, to preserve root structure and stability. Finally, disturbed streambank areas will be stabilized and will be revegetated upon Project completion to minimize erosion (GNWT-DOT, 2013). Revegetation details are provided in the CRP in Appendix B.6. Please note that the entire island at the center of the channel, which will serve as a work area during construction and deconstruction, will be completely restored and revegetated at the end of the work.

9.4.1.3. Barriers to Fish Passage

While maintaining water flow and fish passage is a priority during construction, potential barriers may arise from various activities. The Project design has already taken these possibilities into account to minimize the impacts associated with them. The causeways will be installed primarily on a shallow shelf on either side of the existing rock outcrop and on the banks. The causeways are not expected to impact fish passage because most of the deep channels will remain open and not impacted for fish to travel through. The sequencing of construction will also be conducted such that sections of the channel will remain undisturbed by equipment, material placement, and noise. Finally, the new bridge has been designed to minimize disturbance below the high-water mark and to preserve fish passage.

9.4.2. Change in Fish Health

9.4.2.1. Blasting Disturbances of Riparian and Fish Habitat

The project requires the construction of temporary accesses and permanent ditches, which will necessitate the blasting of outcropping rock in specific areas. Some of these areas may lie within the 30 m riparian zone of the Dehk'è Frank Canal, and blasting activities could result in overpressures and vibrations that could impact fish populations in the aquatic environment. Best industry practice is to follow DFO's recommendations for such activities. These recommendations will be followed in the context of this Project. In terms of mitigation measures, further details are also provided in section 10 of the Water Licence application form and in section 17 of the Land Use Permit application form.

9.4.2.2. Water Withdrawal

As mentioned above in relation to water quantity, the impacts associated with water abstraction will be marginal given the flows present in the Frank Channel. In addition, DFO codes of practice and guidelines will be followed for all water withdrawals.

9.4.2.3. Increased Sedimentation

Project activities, such as riparian vegetation clearing, bridge disassembly, and new crossing construction, pose a risk of increased sedimentation, which can negatively impact fish health. Sediment in watercourses can damage gills, impair feeding success by reducing water clarity, and smother fish eggs, leading to mortality. To mitigate this, the ESCP (Appendix B.2) will be implemented. Sediment and erosion control measures will be regularly inspected to ensure their effectiveness. Additionally, rocks and materials placed below the OHWM must be clean and free of fine particles. Geotextiles will also be used to control the causeway materials. Finally, water quality will be monitored to ensure that any impact on fish species present during the works is minimized (WQMP, Appendix B.5).

9.4.2.4. Accidental Spills

The use of equipment near watercourses carries the risk of accidental spills of fuel, oil, and grease, which can degrade water quality and harm fish health. Similarly, spills from waste materials during crossing construction pose a threat. To mitigate these risks, and to address potential impacts from camp operations or along the alignment, construction of water and erosion control structures will be implemented where necessary to protect fish habitat. A comprehensive SPCP and WMP will be enacted to minimize the likelihood of spills and manage potential effects. These plans include protocols for the storage and transport of fuel, waste, and other harmful substances, as well as detailed spill response procedures. Specific mitigation measures are outlined in section 10 of the Water Licence application form and section 17 of the Land Use Permit application form, and within the SPCP and WMP documents (Appendix B.1 and B.3).

9.4.3. Summary of Potential Residual Effects on Fish and Fish Habitat

Table 9-5 summarizes the potential residual effects on fish and fish habitat using the criteria described in Table 9-2.

Table 9-5 Summary of Potential Residual Effects on Fish and Fish Habitat

Potential Residual Effect	Residual Effects Characterization					
	Duration	Frequency	Timing	Geographic Extent	Reversibility	Magnitude
Change in fish habitat	LT	C	NS	PA	I	L-M
Change in fish health	MT	I	SS	PA	R	N-L

KEY (see Table 9-2 for definitions)
Duration:
ST: Short-term
MT: Medium-term
LT: Long-term

Frequency:
S: Once
IR: Intermittent
C: Continuous

Timing:
SS: Seasonal
NS: Non-season specific

Geographic Extent:
PA: Project Area

Reversibility:
R: Reversible
I: Irreversible

Magnitude:
N: Negligible
L: Low
M: Medium
H: High

9.5. Potential Effects on Wildlife, Including Species at Risk

The Project has potential to interact with wildlife (mammals, birds, species at risk) during construction and operation (Table 9-1). Potential effects, pathways and mitigations proposed to avoid or reduce potential Project effects on wildlife and wildlife habitat are listed in section 10 of the Water Licence application form and section 17 of the Land Use Permit application form.

9.5.1. Change in Habitat

During construction, activities have potential to directly or indirectly impact wildlife habitat. There can be temporary and permanent loss of wildlife habitats. Also, the displacement of wildlife from habitat either by direct removal or from the effects of construction activities (e.g., noise, dust, etc.) may happen. But the Project minimizes this kind of disturbance by utilizing existing roads and accesses, and planning construction sites in already disturbed areas.

Construction activities consider sensitive periods, such as avoiding migratory bird nesting seasons and bats sensitive periods during vegetation clearing. If these periods cannot be fully considered in certain sectors, a biologist will be called in to make the findings in the field and provide the appropriate measures to follow. Also, as shown in Appendix B.4 of the WMMP, specific measures are also planned to protect SAR that could be found in the work areas, or to regulate activities if other wildlife species frequent these areas.

Other measures will also have the effect of minimizing impacts on wildlife and wildlife habitats in the PA. Measures aimed at minimizing erosion will have a positive effect in this respect, as will certain measures concerning clearing and deforestation, and revegetation with native species at the end of the work. Dust suppression, noise and vibration reduction and speed limits on the site will also have a positive impact in minimizing the risk of impact on wildlife and its habitats. Suppressing dust, reducing noise and vibrations, and limiting speed on the site will also have a positive impact by minimizing the risk of impact on wildlife and wildlife habitat.

9.5.2. Change in Movement

Construction activities have the potential to create temporary physical and sensory barriers that hinder wildlife movement. To address this, Project staff will receive awareness training. All construction will adhere to wildlife setbacks and timing restrictions from the WMMP. Food and wildlife attractants will be stored securely, and all construction materials will be removed from post-construction. The speed limit will also minimize the risk of accidents with wildlife during work.

Blasting will only proceed if no large mammals are within the PA, preceded by a pre-blast survey by the monitoring team. During operation and maintenance, the Project could continue to affect wildlife movement, particularly for species with traditional routes or those sensitive to roads and traffic. However, there is no change to be anticipated in this respect compared with the current situation, as the new bridge is in the same sector and the realignment of the road approaches is essentially in the same corridor. No additional barriers are added

Mitigation measures to minimize impacts on wildlife movement during construction are essentially the same as those provided for change in habitat. Detailed mitigation measures are in the WMMP in Appendix B.4, section 10 of the Water Licence application form, and section 17 of the Land Use Permit application form.

9.5.3. Change in Mortality Risk

Construction activities present a potential risk of increased wildlife mortality. To mitigate this, several measures will be implemented. Personnel will undergo wildlife awareness training, including protocols for yielding to wildlife on roads and work sites. Large mammal sightings will be communicated to minimize collision risks. If large mammals pose a safety hazard, operations will be paused, and gentle encouragement may be used to relocate them, with detailed incident reports filed. Bear-banger deterrents will be limited to immediate safety concerns (scare tactics can be used to try to keep these species as far away from the work site as possible). Vehicle speed limits will be enforced. Blasting will proceed only after thorough surveys confirm no large mammals are within the PA. Project staff will receive training on bear and general wildlife awareness. Harassment, feeding, hunting, and fishing of wildlife are prohibited. Camps and laydown areas will be designed to prevent wildlife interactions, with secure waste storage and appropriate lighting. Measures of the WMMP will be implemented to prevent wildlife attraction to food waste. Contaminant exposure will be minimized through deterrents, and territorial or federal authorities will be contacted immediately in the event of wildlife exposure.

9.5.4. Summary of Potential Residual Effects on Wildlife

Table 9-6 summarizes the potential residual effects on wildlife using the criteria described in Table 9-2.

Table 9-6 Summary of Potential Residual Effects on Wildlife

Potential Residual Effect	Residual Effects Characterization					
	Duration	Frequency	Timing	Geographic Extent	Reversibility	Magnitude
Change in Habitat	MT	C	NS	PA	R	L
Change in Movement	MT	C	NS	PA	R	L
Change in Mortality Risk	ST	IR	NS	PA	R	L

KEY (see Table 9-2 for definitions)
Duration:
ST: Short-term
MT: Medium-term
LT: Long-term

Frequency:
S: Once
IR: Intermittent
C: Continuous
Timing:
SS: Seasonal
NS: Non-season specific

Geographic Extent:
PA: Project Area
Reversibility:
R: Reversible
I: Irreversible

Magnitude:
N: Negligible
L: Low
M: Medium
H: High

9.6. Potential Effects on Terrain, Soils, Groundwater and Permafrost

This section identifies and discusses the potential effects on terrain, soils, groundwater and permafrost, mitigations that are proposed to eliminate or reduce those effects, and the expected residual effects that are expected to remain after mitigations are applied.

Based on Project interactions with the environment identified in Table 9-1, the Project may affect terrain, soils, groundwater, and permafrost. Potential effects and mitigations proposed to reduce or eliminate the effects on terrain, groundwater, and permafrost are identified in section 10 of the Water Licence application form and section 17 of the Land Use Permit application form.

9.6.1. Change to Terrain, Soils, and Permafrost

Ground-disturbing activities associated with the Project, including clearing, road construction, camp establishment, and material excavation, may potentially alter the terrain, diminish the aesthetic quality of the land and water, and impact soil, groundwater, and permafrost. These alterations may manifest as erosion, changes in drainage, infiltration, and overall hydrology, slope instability, shifts in soil conditions, and modifications to permafrost.

9.6.1.1. Effects and measures regarding the permafrost

To minimize these potential construction impacts regarding the possible presence of a permafrost zone, the Project will implement recommendations from the Geotechnical Design Report (TKGP, 2024). According to this report, the easternmost section of the Project, from the intersection of Frank Channel Tili to the end-of-construction limit, is likely to be located in a potential permafrost zone due to presence of thick high plasticity and thaw sensitive clay subgrade (up to 5.5 m thick) and due to the presence of permafrost in the vicinity. However, this cannot be confirmed as further geotechnical investigations would be required. In these circumstances, the following risk mitigation measures have been proposed in the design as the permafrost regime is to be maintained according to the Geotechnical Design Criteria for the project (Geotechnical Design Report, TKGP, 2024):

- To accommodate the new design speed, the proposed embankment will be placed over the existing embankment, thereby increasing fill height
- The proposed slopes for additional fill are predominately 4H:1V, with some locations at 3H:1V to avoid sliver fills extending into existing ditches
- The proposed subgrade preparation to accommodate the increased fill height is expected to take place within the existing embankment fill area (i.e. no ground disturbance outside of the existing embankment footprint is expect).

9.6.1.2. Other effects and measures

Clearing and topsoil removal will occur during frozen ground conditions when it's possible for the most sensitive areas, and equipment will utilize designated winter roads, with work on saturated soils either avoided or mitigated. Machine clearing will be employed to minimize terrain disturbance in permafrost-prone areas, and surface disturbance will be strictly limited to the PA. Furthermore, the Contractor will clearly demarcate all work boundaries to prevent off-site damage and will prioritize the use of existing disturbed areas for laydown and the workers' camp. Heavy equipment access to the central island will be restricted to periods when the ground is frozen, with work pads established during that time and equipment remaining stationary during warmer seasons. Non-bedrock compacted areas outside the Project footprint will be restored as detailed in the CRP (Appendix B.6), and adherence to the SPCP (Appendix B.2) is mandatory.

Although the landscape will experience temporary visual alterations due to equipment and new structures within the existing road corridor, these impacts are not considered significant. In fact, the Project is anticipated to ultimately enhance views for road users by removing a prominent structure at the Frank Channel crossing, resulting in clearer sightlines with a lower profile and no overhead obstruction. Specific mitigation measures for visual impacts during construction will be developed in consultation with the local community.

9.6.2. Change to Groundwater

Impacts to groundwater are anticipated to be marginal due to the absence of planned Project wells and very limited excavation work. The nearest groundwater is likely to flow towards the Frank Channel, posing no risk to nearby wells. Also, at the bridge approach embankments, the 100-year flood groundwater level (158.35m above sea level) is situated below the base of the planned embankments. The main thing regarding groundwater is that the shallowest groundwater in the eastern Project area may interact with a ditch within a potential permafrost zone at the construction boundary's edge. But this is addressed in the mitigation measures presented above regarding permafrost.

The other thing is that groundwater could still be affected during construction by the associated risks of contamination in terms of water quality. Spills of petroleum hydrocarbons, concrete waste and wastewater, and chemical toilet contents from various activities pose a potential risk to groundwater quality, depending on the specifics of any spill. To this end, the SPCP and WMP will be strictly adhered to and implemented to further mitigate potential impacts on water quality. Specific measures have also been incorporated into the project design to reduce risks arising from equipment washing activities, washing water in contact with concrete, and domestic wastewater management. These measures are detailed in section 10 of the Water Licence application form and section 17 of the Land Use Permit application form.

Finally, vegetation clearing, and soil compaction may lead to alterations in surface water infiltration rates and locations. To mitigate this, all access routes, work zones, and clearing boundaries will be clearly delineated to prevent damage beyond the Project footprint. Existing disturbed areas will be prioritized for laydown areas, equipment access, and the workers' camp. Heavy equipment access to the central island will be restricted to frozen ground conditions during winter, with work pads established during this period and equipment remaining stationary thereafter to avoid disturbance during warmer months. Also, any non-bedrock compacted areas outside the Project footprint will be restored as outlined in the CRP (Appendix B.6.).

9.6.3. Soil Contamination

Contamination of soil from spills of deleterious substances may occur during the Project: petroleum hydrocarbons during fuel transfer, equipment malfunction during construction, fuel storage, equipment maintenance, leaks from stationary equipment. Also, temporary on-site storage of waste (domestic garbage, waste petroleum products, hazardous waste) during construction could result in contamination of soil from improper storage or handling of wastes. The contractor will follow the SPCP provided in Appendix B.1. The plan includes mitigation measures for fuel storage and refueling, equipment storage and designated maintenance areas, daily equipment checklists, spill response procedures, and reporting requirements. The plan also indicates that preliminary soil characterization will be carried out prior to the work to ensure that the soil is properly managed for possible reuse during the work or for any off-site disposal. Spills that meet the reportable thresholds in Schedule B of the Spill Prevention and Contingency Planning and Reporting Regulations (R-068-93) will be reported to the Government of Northwest Territories (GNWT) Spill Registry. The contractor will follow their spill reporting and clean-up protocol for any spills as outlined in the SPCP. Finally, to limit the risks of contamination associated with waste and hazardous materials, the WMP in Appendix B.3 must be applied.

9.6.4. Summary of Potential Residual Effects on Terrain, Soils, Groundwater, Permafrost

Table 9-7 summarizes the potential residual effects on terrain and permafrost using the criteria described in Table 9-2.

Table 9-7 Summary of Potential Residual Effects on the Terrain, Soils, Groundwater, Permafrost

Potential Residual Effect	Residual Effects Characterization					
	Duration	Frequency	Timing	Geographic Extent	Reversibility	Magnitude
Change to terrain, soils, groundwater, and permafrost conditions	MT	IR	SS	PA	I	L

KEY (see Table 9-2 for definitions)

Duration:
ST: Short-term
MT: Medium-term
LT: Long-term

Frequency:
S: Once
IR: Intermittent
C: Continuous

Timing:
SS: Seasonal
NS: Non-season specific

Geographic Extent:
PA: Project Area

Reversibility:
R: Reversible
I: Irreversible

Magnitude:
N: Negligible
L: Low
M: Medium
H: High

9.7. Potential Effects on Vegetation

Based on Project interactions with the environment identified in Table 9-1, the Project may affect vegetation. Potential effects and mitigation measures proposed to reduce or eliminate the effects on vegetation are identified in section 10 of the Water Licence application form and section 17 of the Land Use Permit application form.

9.7.1. Change in Vegetation Community and Species Diversity

Construction activities may lead to direct vegetation loss, potential harm to at-risk plants (though none are expected), changes in species composition, the possible introduction of non-native species, effects on plant health from dust, an increased risk of fire, and vegetation compaction.

More specifically, construction activities will result in the direct loss of approximately 6,390 m² of wooded areas (with a possible additional 1,400 m² for a temporary access road) and 5,915 m² of other vegetation (grass, shrubs, herbaceous plants), totaling about 12,305 m² of vegetation removal. To minimize this impact, clearing will be restricted to the necessary areas, with clearly marked boundaries, and existing disturbed areas will be used for laydown and camp areas. The new bridge design minimizes disturbance by largely staying within the existing right-of-way, unlike other alternatives.

Restoration efforts, detailed in the CRP (Appendix B.6), will revegetate a total of 26,700 m², exceeding the existing vegetated area by over 14,300 m². While vegetation removal and construction could potentially harm at-risk plants, a desktop review found no potential for federally listed species (Hairy braya, Mackenzie hairgrass, Nahanni aster) will occur in the PA, and the NWT Species and Habitat Viewer (GNWT 2025) showed no mapped occurrences.

The Project overlaps with mesic shrub-herb and bog forest communities, as well as previously disturbed and anthropogenic areas. To mitigate changes in species composition, disturbance will be limited, and disturbed areas that are not part of the new infrastructure will be restored with native species. The introduction of non-native species will be mitigated by ensuring equipment arrives clean and by monitoring and manually removing invasive species like sweet clover, disposing of them properly. Locally sourced, weed-free native seeds and shrubs will be used for revegetation where possible.

Dust from construction activities may affect plant health, which will be controlled through methods like watering roads and reducing speed limits. The risk of fire from machinery, sparks, hot work (welding), and explosives will be mitigated by ensuring clear equipment exhausts, fire extinguishers on all machinery, implementing hot work procedures (removing flammables, having water nearby, monitoring for sparks), and following safety protocols for explosives.

Compaction of vegetation will be avoided by clearly marking work boundaries, restricting equipment access and material placement outside these areas, and using existing disturbed areas for laydown and processing, with no temporary stockpiling on vegetation, especially riparian areas. Construction in previously undisturbed areas may lead to the removal of some forested and lowland areas, potentially reducing species diversity. To minimize this, clearing will be limited to essential areas, prioritizing previously disturbed and unvegetated sites. Natural revegetation will be the primary method, with a revegetation plan using approved native species and local sourcing where needed.

The risk of introducing non-native species via equipment will be mitigated by ensuring all equipment arrives clean, and winter construction will further reduce this risk. With these measures, changes in vegetation species diversity are expected to be primarily during construction within the PA.

9.7.2. Increased Risk of Fire

Fire risks are present in the Project. To minimize these risks, the measures listed in section 10 of the Water Licence application form and section 17 of the Land Use Permit application form will be implemented as part of the work.

9.7.3. Summary of Potential Residual Effects on Vegetation

Table 9-8 summarizes the potential residual effects on vegetation using the criteria described in Table 9-2.

Table 9-8 Summary of Potential Residual Effects on Vegetation

Potential Residual Effect	Residual Effects Characterization					
	Duration	Frequency	Timing	Geographic Extent	Reversibility	Magnitude
Change in vegetation community diversity	MT	S-C	SS	PA	R	**L**
Change in vegetation species diversity	LT	C	NS	PA	R	L

***Duration**:*
ST: Short-term
MT: Medium-term
LT: Long-term

***Frequency**:*
S: Once
IR: Intermittent
C: Continuous
***Timing**:*
SS: Seasonal
NS: Non-season specific

***Geographic Extent**:*
PA: Project Area
***Reversibility**:*
R: Reversible
I: Irreversible

***Magnitude**:*
N: Negligible
L: Low
M: Medium
H: High

9.8. Potential Effects on Traditional and Other Land and Resource Uses

9.8.1. Screening of Potential Residual Effects on Traditional and Other Land and Resource Uses

The Project has potential to interact with the Traditional and Other Land and Resource Uses VC as identified in Table 9-1. Potential effects, pathway, and mitigations proposed to reduce or eliminate the effects on traditional and other land and resource uses are identified in section 10 of the Water Licence application form and section 17 of the Land Use Permit application form.

9.8.2. Change in Availability of Resources for Traditional and Other Land and Resources Uses

The Project has the potential to affect the availability of resources that are part of traditional and other land and resources use activities during construction and operations. During construction, removal of vegetation has potential to result in direct loss and/or alteration of wildlife habitat, fish habitat and vegetation and can reduce the availability and abundance of harvestable species and plants.

Construction activities may result in the loss or modification of wildlife habitat and vegetation. Dust generated from earthwork and material transport could negatively influence wildlife and fish habitat and/or water quality. Furthermore, noise and traffic associated with construction and access roads may deter wildlife and harvesters, potentially diminishing the availability and perceived value of resources important for traditional harvesting and consumption.

The NRSI Pre-Development Natural Environment Overview (NRSI, 2021) identified potential residual effects including direct habitat loss/alteration and indirect habitat loss due to sensory disturbance, which can decrease habitat effectiveness. These effects may reduce the availability of traditionally harvested wildlife through habitat changes and increase mortality risk from traffic and wildlife encounters. Vegetation clearing and ground disturbance during construction are the primary drivers of direct habitat change. Indirect habitat impacts from construction-related sensory disturbances (i.e., heavy equipment, pile driving, increased traffic) may lead to wildlife avoidance and reduced ecological function in surrounding areas.

Perhaps the most tangible impact associated with the availability of the resource and harvesting areas is the one related to the presence of fishing nets in the work area. Fishing nets are present both upstream and downstream of the existing bridge, in winter and summer. These nets are located on either side of the island in the middle of the channel. Their position may vary from season to season, but according to the information gathered during the February 2025 engagement sessions, their presence could conflict with certain planned works. But the availability of resources or these fishing activities during and after construction should not be affected in a continuous and irreversible way, as the migration route for fish will still be present and there are no significant changes anticipated in hydraulic conditions according to the study to this effect available in Appendix C.2.

Section 10 of the Water Licence application form and section 17 of the Land Use Permit application form detail the potential effects and proposed mitigations to minimize or eliminate impacts on traditional and other land and resource uses.

Following the implementation of mitigation measures for air quality, noise, wildlife, fish, water, and vegetation, changes in resource availability will be most noticeable during construction. The majority of disturbances will be reversible, including those relating to the availability of fishery resources and fishing areas, while vegetation removal will cause irreversible, medium-term changes. Overall, the effects on traditional and other land and resource use are anticipated to be of low magnitude.

9.8.3. Change in Access of Traditional and Other Land and Resources Uses

During construction, the Project may temporarily affect access to land and resources used for traditional and other purposes. However, upon completion, it has the potential to improve access to important areas for land and resource use. The Project's proximity to Frank Channel, the Įdaà Trail, Marian Lake, and Great Slave Lake, as highlighted in the AOA, suggests a high likelihood of impacting nearby significant resources. While traditional land users will generally have unimpeded access through the PA, temporary restrictions may be necessary for public safety. Regarding this safety concern, it was revealed during the engagement sessions of February 2025 that there is a rocky point on the west side of the channel, north of the existing bridge, which is used as a fishing spot from the shore outside the winter season. However, it is not directly affected by the construction work but is accessible from the same temporary access that will be used to the northwest to install the causeway on the west bank. The conflict of use for this fishing access can be managed with appropriate information and signage measures during construction. And the impact is likely to be much less during the winter months, when most of the work will take place from this access point (construction and deconstruction of the causeways).

For the other traditional resource uses, no major changes in access to resources for traditional uses are anticipated, as the Project primarily takes place within the existing Right-of-Way (RoW) and a contiguous new RoW. Vehicle travel during construction will be limited to existing infrastructure. Temporary safety-related access restrictions to traditionally used lands and resources within the PA may occur but will be lifted after construction. Overall, adverse effects on access are expected to be short-term and reversible, while potential positive effects, such as increased security access, are long-term. With the implementation of mitigation measures, the residual effects on traditional land and resource uses resulting from changes in access are expected to range from negligible to positive.

9.8.4. Changes to Cultural and Spiritual Sites for Traditional and Other Land and Resources Uses

The Project has the potential to impact cultural and spiritual sites during both construction and operation. The AOA identifies the general PA as having high archaeological potential due to its proximity to significant cultural and historical features, including Frank Channel, the Ɂdaà Trail, Marian Lake, and Great Slave Lake. Traditional use and knowledge studies from the North Slave Métis Alliance and the Old Fort Rae area further emphasize the importance of trails in this region, particularly the Ɂdaà Trail and routes through the Marian Lake area (AOA, 2021). The AOA also indicates historical use for fur trading and fishing. Despite this documented historical presence, engagement efforts to date have not identified any specific sites within the current or proposed RoW with a special concern, with two very specific exceptions.

First, there is the historic character of the Frank Channel area, which, according to observations gathered during the engagement sessions, deserves commemoration. This is documented in the next section of this document.

Secondly, there is the presence of cabins in the PA. Some of these cabins are located close to the Project RoW, but three are within this RoW. Two of these cabins, those on the northwest side of the existing bridge, are affected by the Project work. They are unoccupied and belong to CGB. It is therefore planned to dismantle them as part of the Project, in line with a wish expressed during the engagement sessions to the effect that if these cabins were to be included in the Project, preference should be given to those that are unoccupied. The third cabin is located on the south-west side of the existing bridge, within the existing RoW. During the engagement sessions, it became clear that this cabin, known as Old Man's Cabin, should be preserved, as it represents a cultural and historical value in the Frank Channel area. Planning for the deconstruction of the existing bridge therefore took this highly valued component into account, and the cabin can remain in place.

Although the impact on the cabins will be irreversible, it will be a low-magnitude one, since the cabins affected are not occupied or privately owned, and those that are of high value to the community will be able to remain in place.

9.8.5. Summary of Potential Residual Effects on Traditional and Other Land and Resource Uses

Table 9-9 summaries the potential of residual effects on traditional and other land uses using the criteria in Table 9-2.

Table 9-9 Summary of Potential Residual Effects on Traditional and Other Land Uses

Potential Residual Effect	Residual Effects Characterization					
	Duration	Frequency	Timing	Geographic Extent	Reversibility	Magnitude
Change in availability	MT-LT	IR/C	NS	LSA	R/I	L
Change in access	ST/LT	IR/C	NS	LSA	R/I	N
Change in cultural and spiritual sites	LT	S	NS	PA	I	L

KEY (see Table 9-2 for definitions)
Duration:
ST: Short-term
MT: Medium-term
LT: Long-term

Frequency:
S: Once
IR: Intermittent
C: Continuous

Timing:
SS: Seasonal
NS: Non-season specific

Geographic Extent:
PA: Project Area

Reversibility:
R: Reversible
I: Irreversible

Magnitude:
N: Negligible
L: Low
M: Medium
H: High

9.9. Potential Effects on Heritage and Archaeological Resources

9.9.1. Screening of Potential Residual Effects on Heritage and Archaeological Resources

Based on the Project interactions identified in Table 9-1, the Project may affect Heritage Resources, including Archaeological Resources. Potential effects, pathways and mitigation measures to reduce or eliminate effects on these resources are identified in section 10 of the Water Licence application form and section 17 of the Land Use Permit application form.

9.9.2. Changes to Archaeological and Historical Sites, Contents, and Contexts

Archaeological sites are potentially vulnerable to ground disturbance during various construction operations. The Project's location near Frank Channel, the Ɂdaà Trail, Marian Lake, and Great Slave Lake, as noted in the AOA, indicates a high likelihood of impacting archaeological resources. A Senior Archaeologist has determined elevated potential archaeological zones in the PA (in the AOA). The site-specific recommendations for Project with the 2025 AIA report will be followed after acceptance by PWNHC and GWT Culture and Heritage Division (GWNT-ECE). To manage potential discoveries, the Project will implement its own Archeological Site Chance Find Protocol and train staff accordingly. This Protocol will be developed after the AIA will be completed in 2025 in order to integrate all the recommendations contained in this report. This document will be drawn up in the spirit of what was done in 2019 for the TASR, which was then submitted to WLWB.

While heritage values are considered individually for each site as outlined in permit reports, a consistent standard for acceptable loss across the VC is lacking. Mitigation needs and Project approvals are determined by territorial heritage regulators, primarily based on the scientific value and integrity of individual sites assessed through AIAs. Community concerns can also influence the final outcome for individual sites within this VC. Although the Project could impact archaeological resources, these site-specific impacts are subject to territorial regulation. The GWNT-ECE independently evaluates the scientific value of archaeological sites and dictates necessary mitigation measures, ensuring Project-related effects are addressed according to territorial standards.

It should also be noted that the TK Study currently underway could provide further insights into the impact of potential historical components. These components are not yet known, but it is certain that this study will be transmitted to the WLWB as soon as it is completed and the main recommendations formulated. For the time being, the engagement sessions have shown that the community has a historical attachment to the Dehk'è Frank Channel site and that this should be commemorated with the new bridge. GNWT is therefore taking steps to ensure that this will be achieved once the work is completed.

9.9.3. Summary or Potential Residual Effects on Archaeological and Historical Sites

Table 9-10 summarizes the potential of residual effects on archaeological and historic sites using the criteria in Table 9-2.

Table 9-10 Summary of Potential Residual Effects on Archaeological and Historic Sites

Potential Residual Effect	Residual Effects Characterization					
	Duration	Frequency	Timing	Geographic Extent	Reversibility	Magnitude
Change to site contents and contexts	MT-LT	IR/C	NS	PA	R/I	L

KEY (see Table 9-2 for definitions)
Duration:
ST: Short-term
MT: Medium-term
LT: Long-term
Frequency:
S: Once
IR: Intermittent
C: Continuous
Timing:
SS: Seasonal
NS: Non-season specific
Geographic Extent:
PA: Project Area
Reversibility:
R: Reversible
I: Irreversible
Magnitude:
N: Negligible
L: Low
M: Medium
H: High

9.10. Potential Effects on Communities

The Project has potential to affect Yellowknife and the Tłı̨chǫ Nation through the deposition of wastewater, waste and other materials at their facilities. The Tłı̨chǫ Nation is comprised of four distinct communities on its lands: Behchokǫ̀, Whatì, Gamètì, and Wekweètì. The community of Behchokǫ̀ is about 110 km from Yellowknife, the capital of NWT. Based on current Project planning, it appears that Behchokǫ̀ facilities will be used minimally, at most on an ad hoc basis (no use is planned in other communities). The bulk of trade and transportation will be handled out of Yellowknife.

Agreements have not yet been reached with all the sites that will receive surplus materials and soils, waste and wastewater from the Project. At this stage of the Project's development, it is not foreseen that all disposal activities will encounter capacity problems at the different sites targeted at the moment. With this in mind, this is why the Behchokǫ̀ lagoon has not been selected as the main wastewater disposal site, as it probably does not have the capacity required for the Project.

Apart from these aspects, in terms of the communities, it is important to consider the positive local and regional spin-offs that could result from the Project: indigenous and local and labor that may be hired for the Project, provision of services, indigenous and local subcontractors, suppliers-vendors from Yellowknife or other NWT locations, and increased spending in the region and community during the construction period. The contractor will have to implement its own programs to maximize benefits for the community, indigenous population and the region.

9.11. Potential Cumulative Effects

Cumulative effects that may arise from the Project are limited, since activities will be carried out in stages and in very defined sequences, as shown in the schedule in Section 5. For example, the clearing and deforestation activities scheduled for the first autumn will not cumulate with the blasting activities that will take place afterwards, and with the construction in-water work that will only begin in the following winter. Noise and dust nuisances may occur at the same time as disturbances resulting from in-water or civil works, but these impacts will essentially be limited to temporary disturbances for wildlife, and with the planned mitigation measures disturbances should be relatively reduced.

As a result, cumulative effects within the Project itself are not anticipated to be significant, and the situation is much the same with cumulative effects occurring outside the Project site. There is no other major roadworks scheduled to take place on HWY-3 at the same time. Any planned resource or energy Projects, such as mining developments, will not cause any interaction with work planned for the Project, which will maintain a continuous, functional link with Yellowknife, and will take place on the same road corridor as at present. Therefore, nothing is anticipated to cumulate effects with other Projects.

9.12. Potential Effects of Climate on the Project

The Project's 2021 Climate Assessment Gap Analysis identifies increasing temperatures as a potential driver of climate-related impacts in the PA. These risks include flooding from increased precipitation, accelerated permafrost thaw, a higher likelihood of infrastructure damage due to ice damming, and fire-driven land changes leading to ground failure. Climate change has been taken into account in the design, based on the recommendations made in the Hydrotechnical Analysis (Associated Engineering (B.C.), 2024, Appendix C.7). To address these potential risks, the Project design incorporates best practices for permafrost protection, and the Project itself is intended to mitigate climate change effects on infrastructure. Furthermore, the PA will undergo regular monitoring for visual signs of erosion, and the implementation of an ESCP.

10. Summary of Effects Screening

Overall, the Project is anticipated to have negligible to low residual environmental effects, due to the implementation and following the mitigation measures outlined in this document and in associated management plans (Appendix B). While cumulative effects during construction are generally expected to be negligible to low, activities potentially leading to the loss or alteration of fish habitat could specifically result in effects ranging from low to medium. Table 10-1 summarizes TKGP's rating for potential adverse effects summarized in Section 9.1.

To minimize these specific impacts, vegetation clearing will be limited, and existing disturbances will be prioritized. Clean materials and geotextiles will be used below the OHWM, accompanied by water quality monitoring. Shoreline vegetation will be preserved where feasible, and disturbed banks will be revegetated. Construction waste will be managed properly. In-stream work will be confined to the design footprint, with fish protection measures implemented during causeway construction, and with rigorous monitoring during construction to preserve water quality and minimize impacts on fish and fish habitat. Natural banks will be minimally disturbed, and water flow and fish passage will be maintained through careful causeway placement and construction sequencing. No further mitigation measures for cumulative effects are considered necessary.

Table 10-1 Summary of Magnitude of Potential Adverse Residual Effects of the Project

Potential Effect	Magnitude (per Tables 9-3 through 9-10)
Change in air quality	L
Change in noise	L
Change in water quality	N-L
Change in water quantity	N
Change in fish habitat	L-M
Change in fish health	N-L
Change in wildlife habitat	L
Change in wildlife movement	L
Change in wildlife mortality risk	L
Change is terrain, groundwater, and permafrost conditions	L
Change in vegetation community diversity	L
Change in vegetation species diversity	L
Change in availability of resources for traditional land and resource uses	L
Change is access to resources for traditional land and resource uses	L
Change in cultural and spiritual sites	L
Change to archaeological and historical sites	L

11. Closure

This report has been prepared by the Tłı̨chǫ-Kiewit General Partnership (TKGP) to support the Type A land use permit and Type B water licence applications submitted to the Wek'eezhii Land and Water Board (WLWB) on behalf of the Government of the Northwest Territories Department of Infrastructure (GNWT-INF) for the Dehk'è Frank Channel Bridge Replacement Project. This report may not be relied upon by any other person or entity, other than for its intended purposes, without the express written consent of TKGP and GNWT-INF.

This report was undertaken exclusively for the purpose and limited to the scope expressed herein. This report cannot be used or applied under any circumstances to another location or situation or for any other purpose without further evaluation of the data and related limitations. Any use of this report by a third party, or any reliance on decisions made based upon it, are the responsibility of such third parties. TKGP accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken based on this report.

TKGP makes no representation or warranty with respect to this report, other than the work was undertaken by trained professionals and technical staff in accordance with generally accepted engineering and scientific practices current at the time the work was performed. Any information or facts provided by others and referred to or used in the preparation of this report were assumed by TKGP to be accurate. Conclusions presented in this report should not be construed as legal advice.

The information provided in this report was compiled from existing documents, data collected during field studies carried out in 2021, studies made for the 60% advancement design and data provided by the Proponent. This report represents the best professional judgment of TKGP personnel available at the time of its preparation. TKGP reserves the right to modify the contents of this report, in whole or in part, to reflect any new information that becomes available for the completion of the 90% advancement design.

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